

UNIVERSITY OF PRESOV
FACULTY OF MANAGEMENT AND BUSINESS



ECONOMICS, MANAGEMENT & BUSINESS 2023

CONTEMPORARY ISSUES, INSIGHTS AND NEW CHALLENGES

Róbert Štefko - Richard Fedorko - Eva Benková (Eds.)



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Preface

The movement in all areas of human life is accelerating globally at present. As capital and goods move more freely than ever before, the flow of labour force is rapidly increasing. On the one hand, the global economy is growing, on the other hand, trade disputes are deepening, and turbulence is arising in developing markets. There is a high rate of migration of people. Refugees are becoming job seekers, and migration brings many political as well as economic problems. Thus, at present, the management of organisations faces many challenges and opportunities, but also threats. There is a strong reason to explore all aspects and trends in economics, management, and business in relation to these and other important factors.

The presented proceedings of papers cover a wide range of current issues, insights, and new challenges in economics, management, and business.

The results of research in the mentioned main areas are presented. Attention is also paid to research in broader contexts and areas that enrich, complement, and expand knowledge.

We consider research and the transfer of one's research results into the practice of organisations as one of the significant dimensions and justifications for the current and future existence of faculties and universities. It is one of the essential driving elements of the development of universities and their faculties as well as organisations in practice. It is also the source of innovations and one of the conditions for the dynamic development of organisations as well as for societies and whole integration blocs.

Modern management develops new effective models. However, it also draws from the fountain of knowledge.

It is knowledge gained by research that appears to be a key factor in overcoming the consequences of every crisis as well as in overcoming important existing problems of enterprises and in performing theoretical, mainly current macroeconomic tasks, especially at the stage of subsequent development.

Finally, the success of a company in a strenuous effort to gain a leading position in the market is one of the main tools used to measure the quality of management. Marketing and financial health of companies, along with high competitiveness in the area of human resources and technology, satisfaction of markets by quality, and desired production based on high technology – all this is the added value provided by transferring research results into practice.

The main ambition is to contribute to the theory and experience based on current economic trends, modern management, and theoretical and practical approaches to business.

Prof. Ing. Dr. Róbert Štefko, Ph.D.

Dean

Chairman of International Scientific Committee

1. Economics

Long-Term Unemployment as a Risk Factor for the Sustainability of Business Development in Slovakia and the European Union

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Abstract

Research background: Long-term unemployment is a socio-economic phenomenon occurring in the economy of every EU member country. It affects different sectors of the national economy, different population groups, and selected regions of Europe and Slovakia. Regional differences in the occurrence and rate of long-term unemployment in the European Union and within Slovakia are significant and almost unchanged in the short term.

Purpose of the article: Solving the problem of long-term unemployment is a matter of the right approach of individuals, companies, governments, and European institutions. It represents one of the risky macroeconomic factors for the development of enterprises because it limits the supply of qualified labor in the labor market. The article examines the state and development of long-term unemployment in Slovakia and the EU and presents possibilities for solving this macroeconomic problem.

Methods: The article aims to examine, compare, and evaluate the state and change of long-term unemployment in Slovakia and Europe over the past years. Identify the most critical regions, analyze the causes and consequences of this phenomenon, and formulate measures to eliminate or reduce the rate of long-term unemployment. Selected indicators of descriptive statistics, average annual growth rate, and cluster analysis were used in the research and analysis.

Findings & Value added: Long-term unemployment is a phenomenon that depends on several factors. Factors can be economic, political, social, demographic, and others. The interplay of individual factors thus creates an environment where the demand for work meets the offer. It results in reduced purchasing power, which leads to reduced profits for businesses, lower budgets, and the workforce. It creates a cycle that goes on and on. An active approach to solving the unemployment issue means, involve not only public authorities but also businesses and the private sector in the support process.

Keywords: long-term unemployment, business, European Union, Slovakia

JEL classification: J60, J64

1. Introduction

Unemployment is a phenomenon current in every modern advanced economy and is constantly addressed at the political, professional, and social levels of community life. It is always a current topic of various studies, comparisons, plans, or discussions because work and regular income from it is one of the most substantial values of an individual. It affects the financial situation of households, the offer of job opportunities by companies, and shows the state problem areas in the national economy. The unemployment rate in Slovakia has been significantly different in individual regions of the country for a long time. A parallel statement also applies to the European area. The employment rate affects the population's standard of living and is closely related to the quality of life in a specific region. In almost all districts of Slovakia, the registered unemployment rate has gradually decreased over the last ten years. The exception was the pandemic era. There are regions in Slovakia and the European Union where unemployment fell over the decade faster than in others, and vice versa, where it fell minimally. The article explores the state and development of long-term unemployment in the regions of Slovakia and the European Union and presents partial chances for solving this problem.

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2. Theoretical background

The unemployment rate depends on several different factors. It affects directly or indirectly all entities operating in the national economy. Individuals come to the labor market with a job offer but often have insufficient or incomplete qualifications, high demands for monetary compensation, poor work habits, or weak motivation to keep their job for the long term. The state and public administration bodies create the basic framework for working conditions in the country, burden employers and employees with taxes and levies, and contribute to the quality of the business environment, which can subsequently attract or, on the contrary, discourage investors (job creators). Employers create a demand for work, need properly qualified people ready to work, an undemanding bureaucratic apparatus for communication and fulfilling tax and levy obligations, and a healthy and fair business environment.

From an economic point of view, unemployment is an imbalance between the supply of work and the demand for it. Although unemployment has negative economic and social consequences, this phenomenon is a permanent part of the economy and is considered natural. It becomes a problem when it becomes long-term. Unemployment lasting more than 12 months can negatively affect the economic and social sphere, as well as the health and psychological state of the individual. (Krebs, 2010)

Vaska (2014) adds additional stages in the case of long-term unemployment:

- Unemployment from 24 to 36 months, the so-called very long-term unemployment. Within the European Union, Slovakia has long been one of the countries where this type of unemployment occurs.

- Unemployment for more than 36 months, the so-called extremely long-term unemployment. It includes unemployable individuals, which would not work for various reasons even with a job offer.

Unemployment is a consequence of job loss, which means an immediate change in several areas of life. A person's finances reduce, the standard of living decreases, and the dependence on financial assistance from the state will increase. (Schraggeová, 2011, Hamráčková, 2013)

Paukovič (2002) includes among the root causes of unemployment:

- regional differences in unemployment,
- low labor force mobility,
- low-paid work that becomes uninteresting and demotivating,
- high tax and levy burden, which causes a difference between the employer's costs for his employee and the employee's net income,
- poorly controlled gray economy.

Žilová (2003) mentions other causes of unemployment in her works:

- lack of jobs,
- inflexibility of the labor force,
- poorly developed information network on the labor market,
- fatalism of the long-term unemployed a
- employers' prejudices against the long-term unemployed.

According to Čaplánová and Martincová (2014), unemployment is one of the indicators of the so-called magic square that represents macroeconomic balance. Every type of economy must balance this phenomenon, which is unsolvable without state interventions. Unemployment can be characterized not only as an economic and social problem but also as a serious political problem that results in the loss of goods and services that could have been produced by the unemployed if they had worked. This loss is easy to calculate with average labor productivity.

European commission (2023) reports that almost half of the unemployed people are still long-term unemployed, that is, unemployed for more than 12 months. Long-term unemployment has implications for society, with dire social consequences for the persons concerned and a negative impact on growth and public finances. Long-term unemployment is one of the causes of persistent poverty. Therefore, addressing long-term unemployment is a key employment challenge of the Commission's jobs and growth strategy.

Economists are discussing a new theory, why employers are not interested in the long-term unemployed. They consider the so-called "skills gap" theory. This theory points out that long-term unemployed do not have the specific skills which one's employers look for. That is probably because their skills have deteriorated after being unemployed for a year or longer. In terms of demographic background and education, the long-term and short-term unemployed are very similar. They are represented in all age categories, education levels, geographic regions, and income levels. (Louie, 2014, Jurečka, 2013).

Bejaković and Mrnjavac (2018) warn that long-term unemployment can have indirect negative consequences. It concerns principally the family of the unemployed. The loss of a job could have a significant impact on the other family members. Family income decreases due to the lack of regular

earnings, which can also affect the quality of goods and services that the family can purchase. Long-term unemployment also affects the relationship between partners. Some try to solve this problem together, which may bring them closer together, but some cases lead to damage to the marriage (partnership) and subsequent separation.

3. Methods

The Slovak Central Office of Labour, Social Affairs and Family calculates the *registered unemployment rate (RU)* based on the records of job seekers, consequently from the available number of applicants and the total number of applicants.

$$RU = \frac{\text{available job seekers}}{\text{economically active population}} \times 100 (\%)$$

Since 1993, the Statistical Office of the Slovak Republic (2023) also obtains information on unemployment (*UR - unemployment rate*) through regular quarterly labor force surveys. A certain number of apartments are included in the sample every quarter. The size depends on the number of inhabitants in each district. All persons over 15 years from selected households are subject to the labor force survey.

$$UR = \frac{\text{unemployed individuals}}{\text{economically active population}} \times 100 (\%)$$

Eurostat uses both mentioned data sources monthly to create an internationally comparable unemployment rate. We obtained the input data for the analysis of long-term unemployment from databases or reports of all three mentioned institutions. For relevant comparison, we chose the rates in relative units. To calculate the average trend indicator, we used the *Average Annual Growth Rate (AAGR)*. It is determined by taking the numerical mean of specified or calculated year-on-year growth rates. The formula is following:

$$AAGR = \frac{[(\text{Growth Rate})y + (\text{Growth Rate})y + 1 + \dots + (\text{Growth Rate})y + n]}{N(1)}$$

Where:

Growth Rate (y) – Growth rate in year 1

Growth Rate (y + 1) – Growth rate in the next year

Growth Rate (y + n) – Growth rate in the year “n”

N – Total number of periods

Since practical data mining problems high-dimensional data are clustered, the resulting clusters are high-dimensional geometrical objects which are difficult to analyze and interpret. A low-dimensional graphical representation of the clusters could be much more informative than such a single value of the cluster validity one can cluster by eye and qualitatively validate conclusions drawn from clustering algorithms. (Abonyi and Balázs, 2007)

We have used two clustering methods, the hierarchical Ward's method, and the non-hierarchical K-means method. A significant part of these degrees of similarity is based on the calculation of the distance of objects. The Euclidean distance we used is defined by the formula:

$$d_{ij} = \sqrt{\sum_{k=1}^K (x_{ik} - x_{jk})^2}$$

Where x_{ik} is the value of k variable for *i-th* object and x_{jk} is the value of k variable for *j-th* object. For calculated distance is then determined the rule of linking statistical units into clusters.

4. Results and Discussion

For the analysis, we used a methodology corresponding to the standard methodology developed by the International Labor Organization (ILO). The available data are from the European Statistical Office

(Eurostat). According to ILO guidelines, Eurostat defines an unemployed person as a person aged 15-74 (for Spain and Italy 16-74) without work during the reference week, who is ready to start work within the next 2 weeks, and who was actively looking for a job during the last 4 weeks. Long-term unemployment, which exceeds a period of 12 months, is monitored by Eurostat in the same age interval.

As expected, the rate of registered long-term unemployment in individual member countries varies to a large extent. On the other hand, the development of the indicator for the monitored period 2013-2022 in the European Union is very similar. Trend graphs, and AAGR values in Table 1, prove an average annual decrease in long-term unemployment among citizens in all economies. This finding can be considered positive, but it also points to still-present differences within the individual regions of the Union.

Table 1. Long-term unemployment of 15 to 74 years old citizens in the EU (percentage of population in the labour force)

Country/Time	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Trend	AAGR
Belgium	3,5	3,9	4,0	3,7	3,1	2,6	2,1	2,1	2,6	2,3		0,9544
Bulgaria	7,9	7,4	6,1	5,0	3,9	3,6	2,9	2,7	2,6	2,3		0,8719
Czechia	3,0	2,7	2,4	1,7	1,0	0,7	0,6	0,6	0,8	0,6		0,8363
Denmark	1,8	1,7	1,6	1,2	1,2	1,0	0,8	0,9	1,0	0,5		0,8673
Germany	2,3	2,2	2,0	1,7	1,5	1,4	1,2	1,1	1,2	1,0		0,9116
Estonia	3,8	3,3	2,4	2,2	2,0	1,3	0,9	1,2	1,6	1,3		0,8876
Ireland	7,9	6,6	5,3	4,2	3,0	2,1	1,6	1,4	1,8	1,3		0,8183
Greece	16,7	17,5	16,4	15,4	14,3	12,5	11,3	10,5	9,2	7,7		0,9176
Spain	13,0	12,9	11,4	9,5	7,7	6,4	5,3	5,0	6,2	5,0		0,8993
France	2,9	3,1	3,1	3,1	2,9	2,5	2,3	1,9	2,3	2,0		0,9596
Croatia	11,0	10,1	10,2	6,6	4,6	3,4	2,4	2,1	2,8	2,4		0,8444
Italy	7,4	8,2	7,4	7,1	6,9	6,5	5,9	5,1	5,4	4,6		0,9485
Cyprus	6,1	7,7	6,8	5,8	4,5	2,7	2,1	2,1	2,6	2,3		0,8973
Latvia	6,3	5,1	4,9	4,4	3,6	3,4	2,7	2,4	2,3	2,0		0,8803
Lithuania	5,1	4,8	3,9	3,0	2,7	2,0	1,9	2,5	2,6	2,3		0,9153
Luxembourg	1,8	1,6	1,9	2,2	2,1	1,4	1,3	1,7	1,8	1,3		0,9645
Hungary	4,8	3,6	3,0	2,3	1,6	1,4	1,1	1,1	1,3	1,2		0,8572
Malta	3,5	2,9	2,7	2,4	2,0	1,8	0,9	1,1	0,9	1,0		0,8701
Netherlands	2,3	2,7	2,7	2,3	1,7	1,2	0,9	0,7	0,8	0,7		0,8762
Austria	1,6	1,9	2,0	2,4	2,3	1,7	1,4	1,7	2,0	1,2		0,9685
Poland	4,5	3,9	3,0	2,2	1,5	1,0	0,7	0,6	0,9	0,9		0,8363
Portugal	9,7	8,7	7,5	6,4	4,6	3,2	2,8	2,3	2,9	2,7		0,8675
Romania	3,9	3,4	3,6	3,4	2,4	2,2	2,0	1,8	2,0	2,2		0,9384
Slovenia	5,2	5,3	4,7	4,3	3,1	2,2	1,9	1,9	1,9	1,7		0,8832
Slovakia	11,6	10,7	8,8	6,8	5,9	4,7	3,9	3,7	3,9	4,1		0,8909
Finland	2,1	2,4	2,9	2,9	2,6	2,0	1,5	1,5	1,8	1,5		0,9633
Sweden	2,3	2,3	2,3	2,0	2,0	1,7	1,5	1,8	2,0	1,9		0,9790
EU-27 (MIN)	1,6	1,6	1,6	1,2	1,0	0,7	0,6	0,6	0,8	0,5	x	0,8183
EU-27 (MAX)	16,7	17,5	16,4	15,4	14,3	12,5	11,3	10,5	9,2	7,7	x	0,9790
EU-27 (Average)	5,6	5,4	4,9	4,2	3,5	2,8	2,4	2,3	2,5	2,1	x	0,9002

Source: authors according to Eurostat (2023)

Ireland (AAGR=0.8183) recorded the most significant decrease in long-term unemployed over the past decade among the member states, which means an average annual decline of approximately 18 percent. Ireland followed the Czech Republic (average decrease of 16%), Poland, and Hungary. Within the V4 countries, the fall of the indicator was the slowest in Slovakia. Greece has the highest long-term unemployment rate in the Union for a long time, while Denmark, the Netherlands, and the Czech Republic have the lowest. Within the EU-27, the observed rate fell by an average of approximately 10 percent over the past ten years.

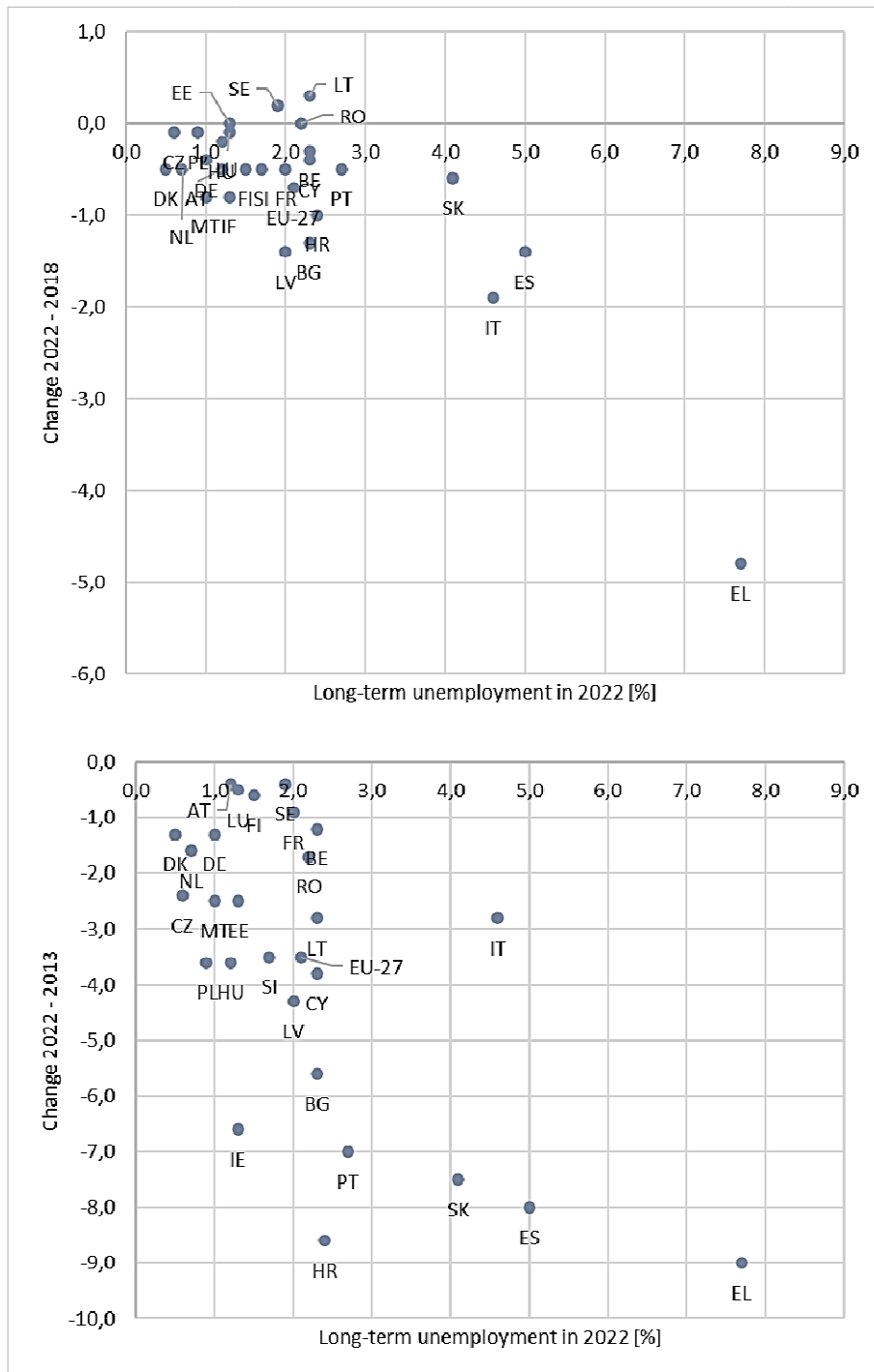


Figure 1. Change in Long-term unemployment over the last decade/over the last five years in the EU
 Source: authors according to Eurostat (2023)

In the two graphs in Figure 1., the EU member countries are in the coordinate system according to the recorded rate of long-term unemployment in 2022 (axis "x") and changes in the indicator compared to the reference year 2013 or 2018. We have chosen the interval of 10 and 5 years deliberately because it best represents the differences in the position of the countries in the graphs. The worst location in terms of the rate of long-term unemployment in 2022, but the best position in terms of the decrease of the indicator for both time intervals held Greece. Compared to 2013, the level fell by 9 percentage points, followed by Croatia (-8.6 percentage points) and Spain (-8 p.p.). Compared to 2013, long-term unemployment fell in all member states. Compared to 2018, the results in the countries' locations were significantly different. The decline was much milder, in Lithuania and Sweden there was an increase of 3, respectively 2 tenths of a percentage point.

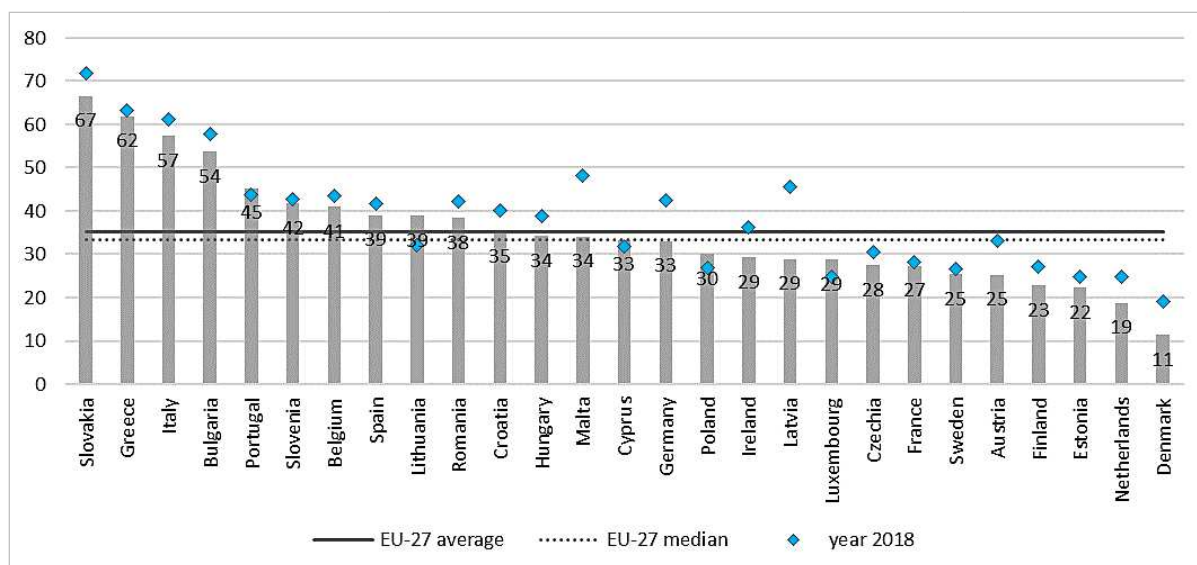


Figure 2. Long-term unemployment in 2022 in percentage of total unemployment
Source: authors according to Eurostat (2023)

We also examined the state and development of the share of long-term unemployment in total unemployment in member countries. At the top of the list was Slovakia by almost 67%. The positive news is the share decreased in most countries compared to 2018. The EU average was 35,2% in 2022, the median value was 33,3%. (Figure 2.)

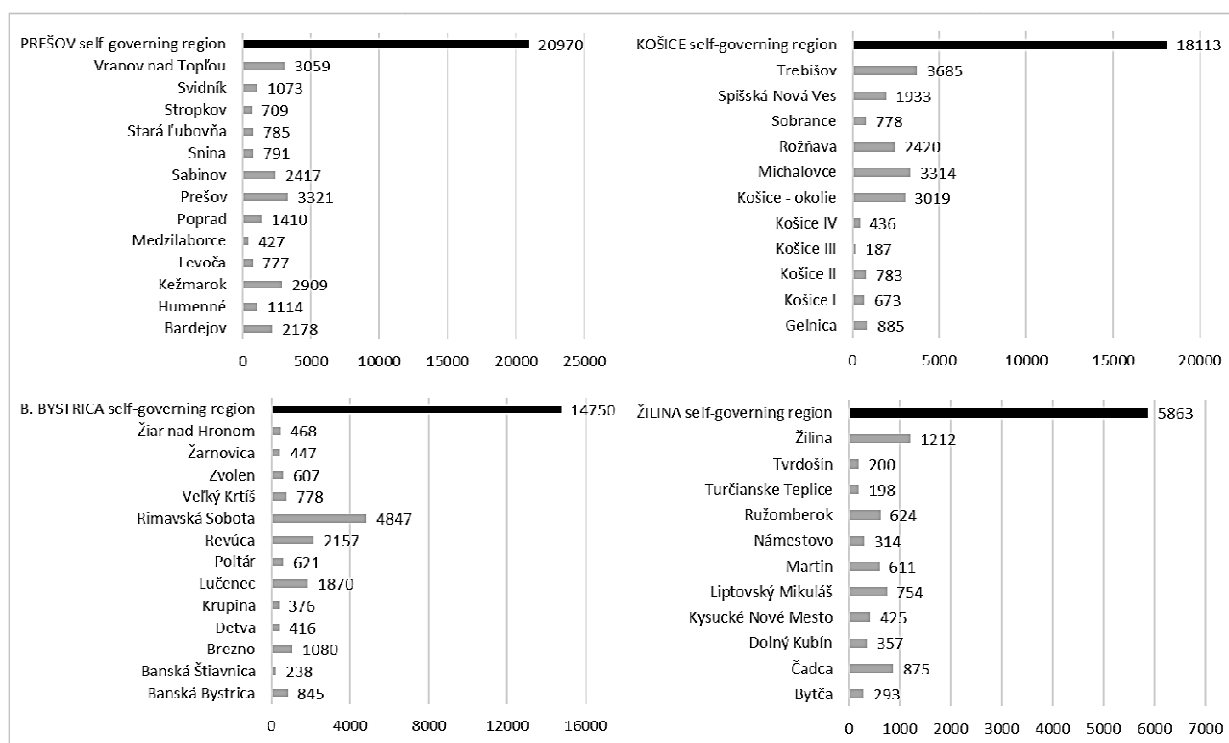


Figure 3. Regions and districts of Slovakia most burdened by long-term unemployment (number of persons as of December 31, 2022)
Source: authors according to Central Office of Labour, Social Affairs and Family (2023)

Among the eight regions of Slovakia, Prešov, Košice, and Banská Bystrica self-governing regions have traditionally recorded the highest number of long-term unemployed (unemployment duration of more than 12 months). If we do the math, at the end of 2022, these three regions represented approximately 73.5% of the long-term unemployed among all registered long-term unemployed job seekers within

Slovakia. (Figure 3.) Regional differences within Slovakia persist for a long time, not only in the case of long-term unemployment. However, the problem of regional inequalities does not concern only Slovakia, it is also a problem of other EU member states. Ultimately, regional differences persist even in the regions of the Union as a whole. At the end of 2022, Myjava district recorded the fewest long-term unemployed persons among all Slovak districts (115 persons). (Figure 4.)

A high level of employment in Slovakia persists for a long time, especially in the West. Therefore, many potential domestic and foreign companies (investors) concentrate their business precisely in this area of Slovakia. They find here enough qualified labor force and higher quality infrastructure. On the other sides, businesses (mainly small and medium-sized) in other parts of the country disappear more often than they are founded. Companies and sub-contractors for the automotive sector are an exception. Governments consider them still beneficial and promising.

Businesses naturally affect long-term unemployment in Slovakia, and long-term unemployment affects the existence and survival of enterprises. Loss of work habits, insufficient level of qualifications, and other problems associated with long-term unemployment cause problems for companies in staffing positions. The problem can often be so severe that employers decide to close their business or move it elsewhere.

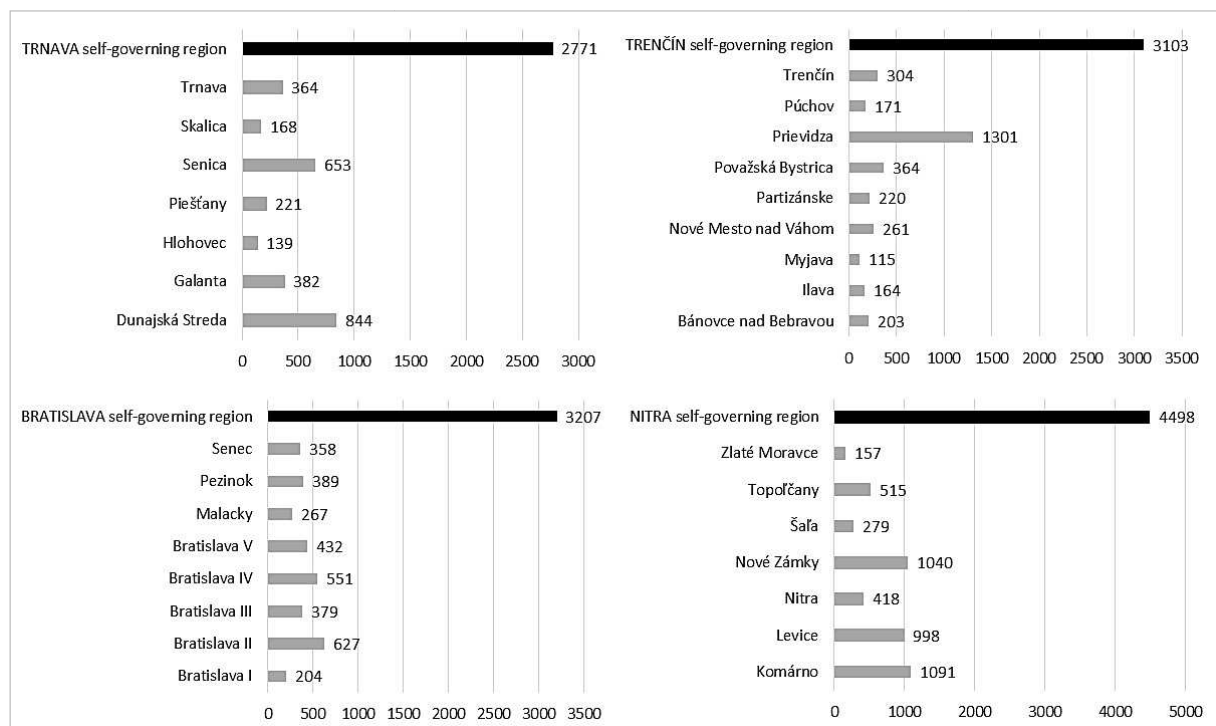


Figure 4. Regions and districts of Slovakia less burdened by long-term unemployment (number of persons as of December 31, 2022)

Source: authors according to Central Office of Labour, Social Affairs and Family (2023)

Cluster analysis aims to reveal mutual similarities between 27 Member States based on further analysis of previous research data. Preceding quantitative and graphical analyzes indicate differences in the development of three selected indicators. Therefore, we decided to use that statistical tool to analyze multidimensional data.

Three imputed variables for the Member States were Long-term unemployment as percentage of population in the labour force in 2022, Long-term unemployment as percentage of unemployment in the same year, and the AAGR. The objective of cluster analysis was to achieve such groups of states, which would be characterized by certain homogeneity in case of selected indicators.

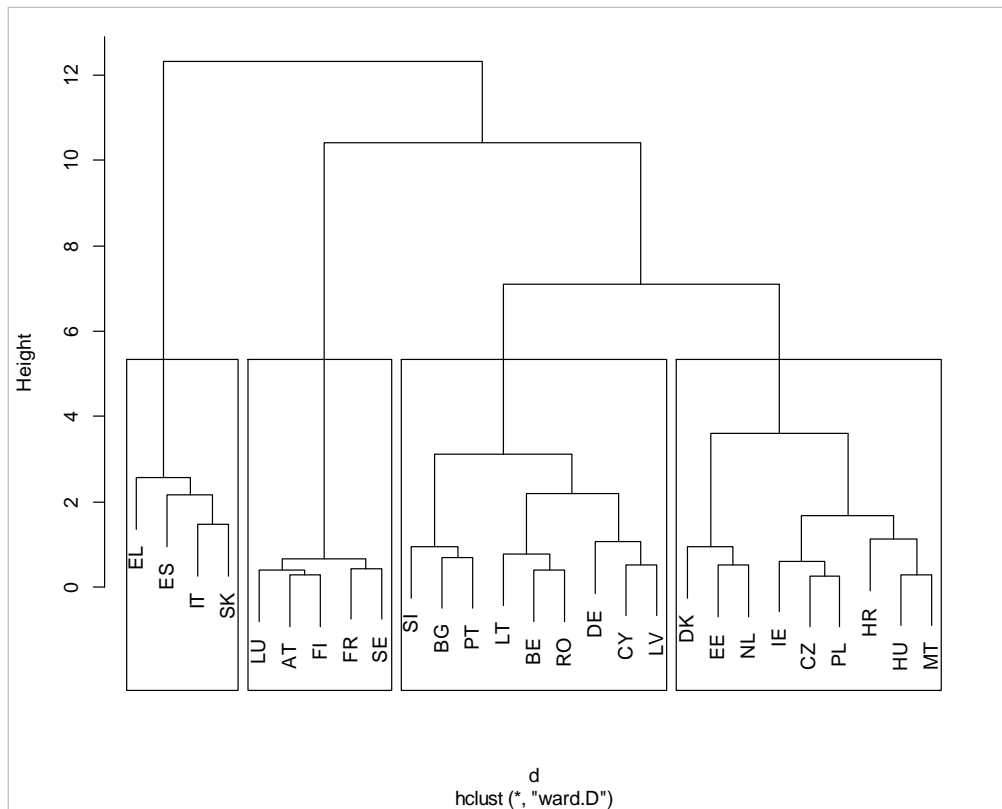


Figure 5. Tree diagram of member countries using Ward's clustering method
Source: authors (2023)

Hierarchical clustering methods are sequentially joining clusters, which decrease them continuously into one. The result of clustering is a tree diagram. Ward's method involves an agglomerative clustering algorithm, which looks for groups of leaves and forms branches, and limbs. In the daigram, we can identify two smaller groups of countries and two larger groups with similar characteristics. (Figure 5.) A negative finding is the placement of Slovakia among the countries with the worst results in long-term unemployment.

Conclusion

Unemployment is a phenomenon that has many known but also unpredictable causes and consequences. It depends on several factors, economic (the price of work, supply, and demand for work, the phase of the economic cycle), political (current legislation, levy burden, crisis measures), social (willingness to work, fair redistribution of pensions, perception of the value of work, society's reaction to political decisions, and others), demographic (age and educational structure of the population) and others. The intersection of these and other factors creates an environment where the demand for work meets the offer. Long-term unemployment is the result of all these factors. It is a problem that plagues several countries of the European Union, not excluding Slovakia. However, in recent years, there has been a positive development of this unemployment rate indicator within the entire community. The decrease in long-term unemployment is a good signal. Only the near future will show how individual countries can deal with this ever-present negative phenomenon. The pandemic has subsided, but many businesses employing thousands of people are struggling with the consequences of the conflict in Ukraine. Many of their operating costs have increased, and they are forced to reconsider the number of employees. The rate of registered unemployment will probably increase, but it is already extremely important that the plans and strategies adopted by governments in the current situation regard their consequences, which will also manifest themselves in the long term. It is necessary to prevent the bankruptcy of small and medium-sized enterprises, which employ an enormous population. It is essential to take measures (in Slovakia, for example, free qualification or retraining courses for the public) to re-insert the long-term unemployed into working life and thus offer new and existing companies a high-quality and qualified workforce in sufficient quantity.

The problem of persistent regional differences between individual regions in Slovakia and Europe calls for a long-term and strategic solution. The leaders of the Union, leading representatives of the

member states, and all residents of individual regions are aware of this. Balancing regional inequalities is one of the most significant prerequisites for the progress of the entire community, it requires a lot of effort, but especially transparency, efficiency, and control over the funds that flow to support less developed regions. Analogously, what applies to Europe also applies to Slovakia and its policy of supporting jobs and employment. Finally, the current economic and social situation, still affected by the coronavirus pandemic and the war in Ukraine, shows that work is one of the essential values of individuals and the entire society.

Despite the improving situation of the unemployment rate of long-term unemployed jobseekers in individual self-governing regions and districts, we must state that relatively regional differences persist. Despite the efforts of those responsible for measures to support selected regions, new ones are still emerging (increase in the number of registered unemployed due to layoffs during the pandemic; lack of professionally educated workers for selected sectors of the economy), but also ongoing problems (deficiencies in literacy or education of selected population groups; still insufficiently developed infrastructure, which prevents the creation of new jobs; but also the lack of a workforce with the required professional competence) which constantly make it difficult to more significantly fulfill the goals in the area of reducing unemployment in Slovakia.

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Position of Slovak Republic in Global Value Chains

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Abstract

Research background: It is sometimes said that the global economy can be viewed either through the economic growth and structural changes in individual countries, or through global value chains (GVC). Slovak Republic is a small economy in the center of Europe that is widely open in collaboration with other countries. Intensive involvement in international trade and global value chains is an effective way of improving Slovakia's position in the global market. However, participation in only low-value-added activities disables Slovakia from developing and future prosperity, and at the same time intensifies the country's vulnerability and dependency on its European neighbors.

Purpose of the article: Introduce up-to-date data about the emplacement of Slovak Republic in the global economy and GVC. Identify possible opportunities for Slovakia to improve its position in the global economy through the lens of modern mega trends in global supply chain management.

Methods: In the article, taking into account its nature, we mainly use descriptive and analytical methods. To illustrate the position of the Slovak Republic in the global market, we will use the value of export performance.

Findings & Value added: We will analyze and prove, that the traditional rule of expanding domestic value added to increase economic growth seems obsolete and ineffective in up-to-date GVC trends. In the article, we will consider different options for improving Slovakia's position in the global market on the assumption of the strengths and weaknesses of Slovak economy.

Keywords: globalization, global value chains, international trade, Slovak Republic, small and medium enterprises, value added

JEL classification: F41, F60

1. Introduction

Global value chains (GVC) are often considered the lead story of trade in the modern world, with an estimated 80 percent of global trade taking place through them (Agarwal et al., 2022). By GVC we understand in general fragmentation of production in many phases or processes that take place in numerous locations in different countries (Kersan-Škabić, 2019, p. 1204). The positive effects of GVC participation on income growth are likely to extend to everyone in society—if the welfare state works. GVC integration in certain regions of a country can give people the incentive to migrate within their country, which can be a powerful mechanism for reducing poverty. Higher incomes will also generate more demand for a greater number and diversity of goods and services, imported and domestic. This demand will lead to the diversification of the economy, which will increase opportunities for a broader and more diverse set of agents. GVC are also likely to make a larger variety of goods more affordable (World Bank report, 2019, p. 82). Multinational companies have contributed to the rise of global production, which made it more and more difficult to distinguish the country of origin of any product. This led finally to the development of the concept of „trade in value added“ to indicate the domestic and foreign value added in gross export (Kersan-Škabić, 2019, p. 1204).

The most well-known measure of a country's position in GVC is the participation index, which is calculated by summarising the domestic value added in foreign export (forward participation) and foreign value added in domestic export (backward participation). The higher the value on a scale of 0 to 100, the higher the country's participation in GVC. The EU member states rate differently in the GVC

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participation index. The highest participation is in Luxembourg and Slovakia and the lowest is in Croatia. Determinants like reduction of tariffs and other trade barriers, the level of economic freedom, macroeconomic stability, a favorable business environment (level of wages, tax burden), technological development, and enlargement of the EU all influence participation within the GVC (Kersan-Škabić, 2019, p. 1204). However, as for Slovak Republic, intensive involvement in international trade and global value chains is an effective way to support the improvement of Slovakia's position in the rankings of (not just) European Union countries from an economic and social point of view. The Slovak economy is relatively open, dependent on international trade, and from the point of view of involvement in the GVC, unfortunately, the added value of Slovak production is relatively small. The country is concentrating on low-value-added activities (e.g. production and assembly), especially in the automotive sector. As we can see in Figure 1, a graph of the value added in GVC (named also the Smile curve because of its shape) shows us, that the value added depends significantly on the activity that the country provides and exports. For instance, the country that provides customer support for the global company gains a much higher level of domestic value added than the country which produces direct products.

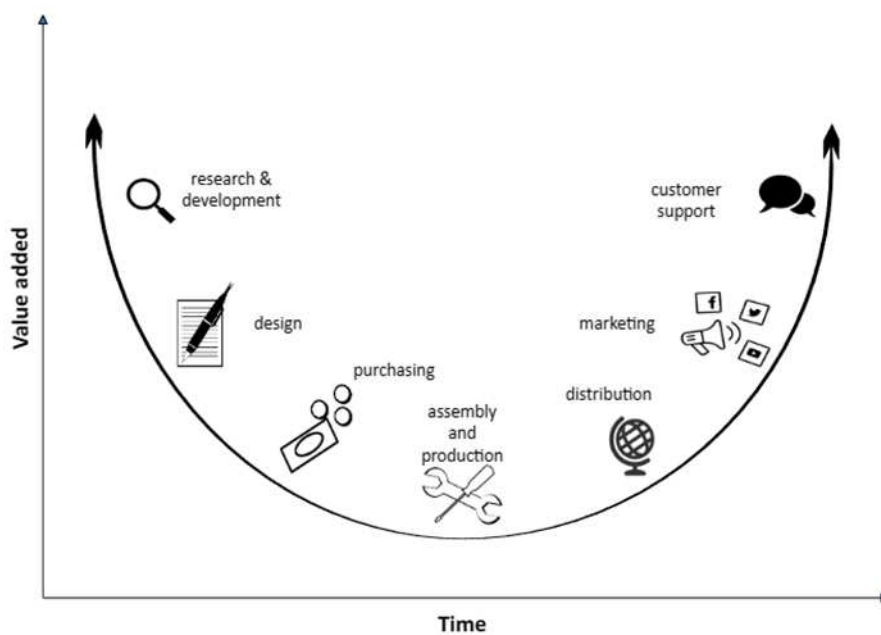


Figure 1. Value added in the GVC
Source: own processing (2023)

However, if a country is willing to raise the level of its domestic value added, there are two paths. On the one side, the country can minimize the quantity of imported intermediate inputs. Hence, it would strengthen its value added by adding its own domestically produced inputs. On the other side, there is a way to develop particular sector(s) of the economy, so that the country is competitive in sharing a „higher value“ level of GVC. We will introduce the possible paths in more detail and their (dis)advantages in the part Results.

In the study we researched and came to the conclusion, that a complex set of measures is needed, both to boost the export and improve the qualitative side of them. In our work, we suggest improving the position of Slovak Republic in the global economy by supporting small and medium enterprises in their desire to take part in GVC.

2. Methods

In the article, we mainly use analytical and descriptive methods. Apart from all, in the work we provided literary research on the issue of the involvement of the Slovak Republic in global value chains. The article relies on various domestic and foreign professional literary sources.

In our conclusions and ideas, we rely on statistical data from evaluation reports of the Slovak economy from the Organization for Economic Cooperation and Development (OECD), studies of The

World Bank as well as up-to-date articles from representatives of universities and scientific research institutions.

To illustrate the position of the Slovak Republic on the world market, we used the value of export performance. The export performance serves as an indicator of what volume of goods and services was exported during the monitored period, with the result that the export value is expressed in proportion to the nominal value of GDP in percentage. It is measured by the share of exports of products and services at the overall level of GDP. The export performance indicator can change over time, but only if there are simultaneous changes in supply and demand in foreign and domestic markets. The higher the country's export performance, the higher its competitiveness, which indicates that there is a high demand for the goods of the given economy on the foreign market. This applies especially to small economies, which, due to an insufficient sales market, cannot realize their production on the domestic market and export the majority of their production to foreign markets. (Hrinko, 2020, p.61)

3. Results

Speaking of minimizing the quantity of imported intermediate inputs, we would turn to one of the latest studies of The World Bank, where this way of improving a country's position on global trade is denied. If the economy tries to increase the domestic value added in exports by artificially supporting the inputs/intermediates by using tariffs and non-tariff measures, it will increase the cost of production and make the product less competitive in the international market, resulting in reduced demand for the product as well as workers in the exporting sector and will also affect the productivity and quality of the domestic firms as well, adversely affecting the welfare in the society.

Participation and integration into the GVC help the economies to improve their trade competitiveness, achieve higher GDP per capita growth and for example also improve female labor force participation despite falling domestic value added (DVA) in gross exports. Global technological advancement as well as falling trading costs have resulted in the fragmentation of production across borders. This reduction in trade costs helps the firms to exploit the comparative advantage of each country in the specific stage of production and hence, there is a reduction in DVA in gross exports. (World Bank Document, 2019, p.156)

As it was mentioned before, the importance of international trade for Slovakia is most evident across manufacturing sectors, where 81% of produced domestic value added is supported by foreign demand. Motor vehicle manufacturing is the most integrated Slovak economy activity in GVC, accounting for approximately 31% of value added in exports in 2018, of which 10% is domestic value added. (TiVa, p.1)

Despite the slowdown of the integration of Slovakia into GVC during the economic crisis of 2008-2009, there is an increase in foreign value added between 2016 and 2018 (see Figure 2). (TiVa, p.1) As for domestic value added, the country's DVA is relatively small with a significant part of international inputs. Below we provided a graph from Trade in Value Added, OECD database.

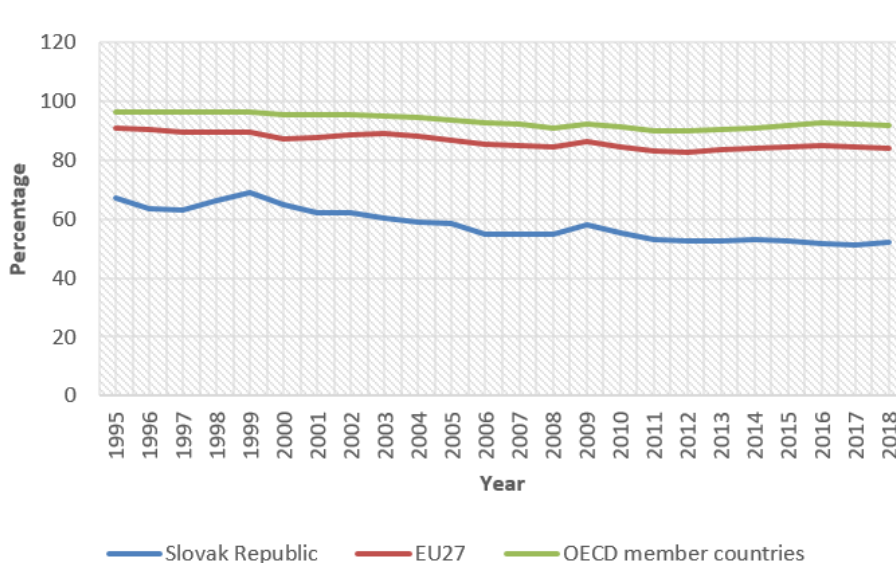


Figure 2. Domestic value-added content of gross exports, as a percent of gross exports, 1995 to 2018
Source: own processing based on TiVA (2021)

As we can see, between 1995 and 2018 all countries showed decreasing percentage of domestic value added. It could be caused by the development of trade and collaboration between countries, offshoring, and increasing the exports of the countries. However, Slovak Republic still faces a lower percentage of domestic value added in comparison to both EU and OECD countries. Hence, there is no doubt that for Slovakia appropriate policies to increase the qualitative side of exports are needed.

Firms in competitive economies source goods and services internationally if they are superior in quality and/or lower cost. If a country artificially induces firms to source locally, it will reduce their competitiveness and lead to less total value added and productivity. From a policy point of view then, developing countries should encourage technological advance but remain indifferent to whether inputs are sourced locally or internationally. That is a choice best left to the firm. There are policies that countries can use to encourage technological innovation, such as support for STEM (science, technology, engineering, and mathematics) education, subsidies to R&D, intellectual property rights (IPR) protection, and openness to foreign trade and investment. (World Bank Document, 2019, p.158)

As was mentioned above, neither relying only on low value-added activities nor trying to artificially raise domestic value-added will be effective for Slovakia to improve its position in GVC. Regarding the studies and examples from above, we have come up with advice for Slovakia for improving its position via the rising support of small and medium enterprises to take part in GVC.

SMEs are estimated to account for between 80-99 percent of firms in any given country as well as between 60-70 percent of global employment (WTO, 2016, p.3-5). They also have a higher rate of sales growth than large firms. This implies a substantial share of any nation's economy is supported by SMEs. (World Bank Document, 2019, p.132)

As for Slovakia, the business sector has long been characterized by a high representation of micro-enterprises (0 to 9 employees). Of the total number of active business entities in 2021, micro-enterprises aggregated up to 97.3%. Small (2.1%) and medium-sized (0,4%) companies have significantly lower representation. (Report on the state of small and medium-sized businesses in Slovakia in 2021 p.69) For a clear understanding of Slovakia's business sector structure see the table below.

Table 1. Number of active business entities in Slovakia by size category, 2021

Size of a firm (number of employees)	Absolute number	Percentage, %	Difference 2021- 2022
Micro (0-9)	618 115	97,3	37 175
Small (10-49)	13 469	2,1	-22
Middle (50-249)	2 725	0,4	-15
Large (249 and more)	655	0,1	13
SMEs together	634 309	99,9	37 138
Firms together	634 964	100	37 151

Source: Statistical Office of Slovak Republic (2023)

In countries such as France, Germany, Slovakia, and Sweden, SMEs account for only 30 to 40 percent of gross exports, well below their contribution to value creation and employment. Not only is SME participation in direct exports low compared to their economic weight, only a fraction of SMEs export at all. This is a distinct difference between large and small firms, given that the majority of large businesses are also international exporters. (World Bank Document, 2019, p.123)

Regardless of the nebulous way SMEs are defined, they are not well represented in international trade and GVC worldwide. (WTO, 2016, p.3-5) Given the positive effects GVC has been shown to bring, it is worth considering how to include more small firms in global production networks. For example, participation in GVC is associated with increased productivity, the export of more sophisticated (and frequently higher value) products, and a more diversified national export basket. Additionally, GVC has been demonstrated to be a pathway for economic development for countries (Kowalski et al., 2015, p.11).

SMEs can join global value chains by exporting intermediate goods or services directly (direct forward participation) or by supplying inputs to a local firm or multinational company – indirect exports (indirect forward participation). These forms of integration into GVC are not necessarily exclusive. Some SMEs export both directly and indirectly, highlighting the potential complementarity of these foreign market entry modes. SMEs can also participate in GVC by importing products as inputs into their own production

processes (direct backward participation) or sourcing products from local firms that use imported inputs. Forward linkages represent the seller’s perspective, or supply side, while backward linkages represent the buyer’s perspective, or sourcing side, of GVC. (World Bank Document, 2019, p.122)

According to Kordalska and Olszyk’s research, the identification of clear patterns of specialization for companies is crucial for national policy-making, because companies participating in GVCs produce a smaller range of products, which means that they focus on their core competencies. Their analysis confirms the unfavorable positions of some central and eastern European countries, such as Slovakia, in GVCs, which still do not focus on R&D activities. Kordalska and Olszyk’s results reveal that there are no links between GVC activities and R&D tasks in central and eastern European countries. On the other hand, these results are in contrast to the known positive effects of GVC activities on innovation and productivity in the production process among advanced economies. (Kordalska, Olszyk, 2021, p.10)

As Tomáš Jeck mentioned in his research for the Slovak Academy of Science, the ability of the economy to adapt to current or upcoming technological developments and changes is, among other things, determined by the level of innovation. In the term of innovation, we include for example the following factors: quality of research and development (R&D), education of the workforce, and funding intensity. When we talk about the factors of innovative development, Slovakia is below the EU average in many of them. The biggest shortfalls are the expenses of the corporate sector on R&D, only 27% of the EU average in 2016, and product or process innovations of small and medium-sized enterprises, which represented only 21% of the EU average in 2016. (Jeck, 2017, p.9)

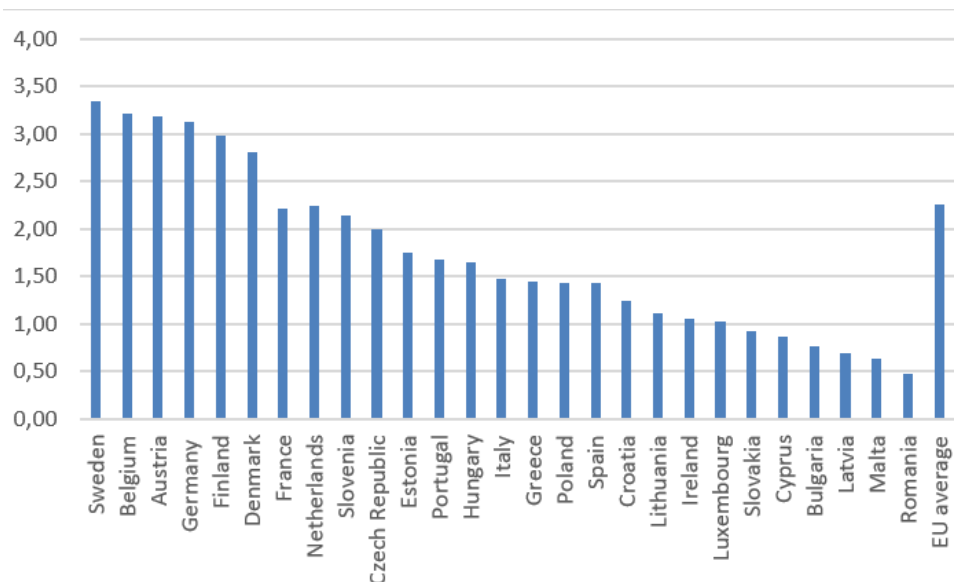


Figure 3. Percentage of GDP invested in R&D in EU27, 2021.
Source: own processing based on Eurostat (2021)

If we look at Figure 3, we can see that Slovakia is one of the last in the area of spending on research and development (R&D) with a value of only 0.93% for the year 2021 converted to annual GDP. This was not the case only in 2021, but also in previous years, when the given value ranged from 0.64% in 2000 to 0.83% in 2019, while the EU average grew at a constant rate from 1.81% in 2000 to 2.3% in 2020. (Jeck, 2017, p.9)

One of the ways for a country to increase its R&D investments and boost new ideas and knowledge is to raise the level of GVC participation. Piermartini and Rubinova’s paper ‘*How much do global value chains boost innovation?*’ investigated how global value chains affect the diffusion of knowledge across borders. In particular, the authors looked at the impact of foreign R&D expenditure on the production of new ideas, including the number of applications for patents. The results suggest that GVC linkages can be a driver of knowledge spillovers for both developed and emerging economies. It was found that, on average, GVCs boosted innovation by 5% in the short run and this effect increases by 3.5 times in the long run. For Slovakia, being part of GVC has risen the number of patent applications by 5%. (Piermartini, Rubinova, 2021, p.18)

The research from Piermartini and Rubinova also showed that the strength of these positive externalities increases with both forward and backward linkages. Finally, absorptive capacity plays an important role and only countries with enough human capital devoted to research and development can benefit from ideas created abroad. Another channel through which GVCs may help increase the productivity of a local firm is, for example, by providing technology or know-how to produce a good of a higher standard. (Piermartini, Rubinova, 2021, p.24) Such findings can be taken as motivation for Slovak Republic to become even more interested in participating in GVC and increasing the levels of export. As was shown in the research, it can give both local firms and employees know-how, knowledge, or simply inspiration for new ideas.

It is no doubt that further research is needed, but according to Kersan-Škabić, countries with higher investment in R&D and rich with knowledge-based capital can be expected to achieve significantly more value added in industries with high knowledge intensity than those with low knowledge intensity and consequently high GVC participation. (Kersan-Škabić, p.6) Hence, we consider it essential for Slovakia to strengthen its support of SMEs also in investing in research and development activities.

3.1 Offshoring VS Reshoring

In addition to the advice discovered in the previous chapter, it is important to address the fact of the up-to-date trend of reshoring. Supply Chain 4.0 technologies may enable firms to reduce the number of stages in supply chains by reshoring routine labor-intensive activities in developing countries back to developed countries. These technologies make undertaking some production stages in high-wage countries more profitable by reducing the amount of labor required, thus weakening the incentive for firms to locate in low-wage countries and reducing the importance of low labor costs in determining comparative advantage, providing instead an advantage to integrating multiple stages of production at a single automated location. (Agarwal et al., 2022, p.10)

Slovakia is a relatively new member of the European Union. For decades the country enticed foreign direct investments from developed European countries (especially in the automotive industry) as a country with a cheap and low-qualified labor force. However, as Matej Dedinský mentioned in his article *The Financial Times* praised Slovakia: The end of cheap labor, nowadays it is said that this principle does not work anymore. Due to the entrance of new countries into the EU and the development of Slovak Republic, the country is not treated as one with cheap labor. Hence, we consider Slovakia should not rely on low value-added activities but concentrate on strengthening its potential in adding value to global trade. (Dedinský, 2019)

4. Discussion

Slovak Republic is a small economy in the center of Europe, that is widely open in collaboration with other countries. Openness and the small size of the economy make the country vulnerable and dependent on international trade. According to Naščáková and Baricová, "the degree of openness of the Slovak economy is still growing, and in 2019 the ratio of foreign trade turnover to gross domestic product in Slovakia was equal to 185%". (Naščáková-Baricová, 2020, p.18)

Heavy involvement in international trade and global value chains has been an effective way for promoting Slovakia's economic and social catch-up. Large foreign direct investment inflows have helped develop a competitive export-led manufacturing industry, with a strong specialization in the automotive and electronics sectors, fostering robust growth and productivity performance with good fiscal and external balance results. (Giorno, 2019, p.3)

Slovakia's participation in GVC is particularly prevalent in the manufacturing sector, especially in the transport and electronic equipment industries. It is also characterized by a high proportion of foreign inputs in exports, whereas the use of Slovak inputs in other countries' exports is low, as is also the case in other small economies. This indicates that Slovakia's role in GVC is more about assembling imported inputs than supplying parts and components to other GVC participants.

Claude Giorno in his study for OECD (Giorno, 2019) also writes about the share of foreign-added value in Slovak exports, stating that the extensive use of imported intermediate inputs in Slovakia's exports means that the share of domestic value added to its exports is low by international standards. (Figure 4)

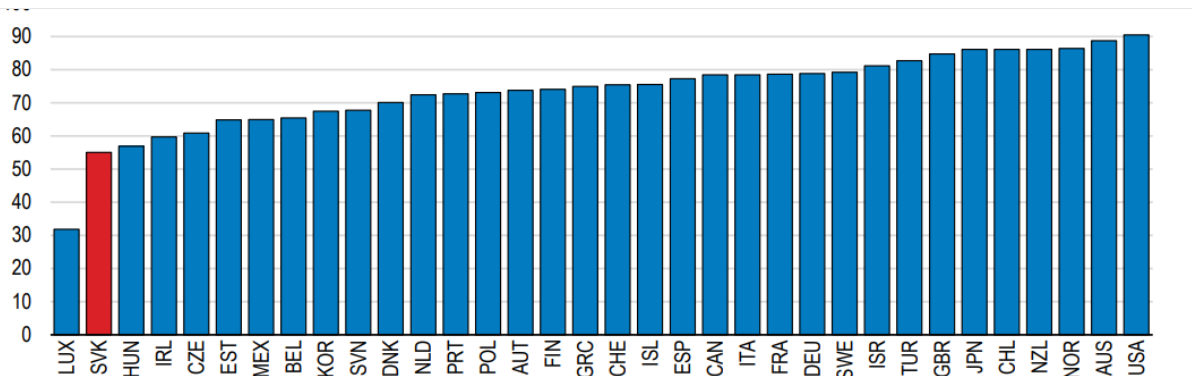


Figure 4. Domestic value added of OECD countries in GVC, %, 2015
Source: Giorno (2019)

However, as it was mentioned in the results of the article, the idea to artificially rise domestic value added is not assumed as effective, but rising the value of exports is. So, for Slovakia, it is essential to sustain its high values of export and support pro-export policies. In the next part, we will look at the position of the Slovak Republic on the world market, observing the openness of the economy and the value of export performance.

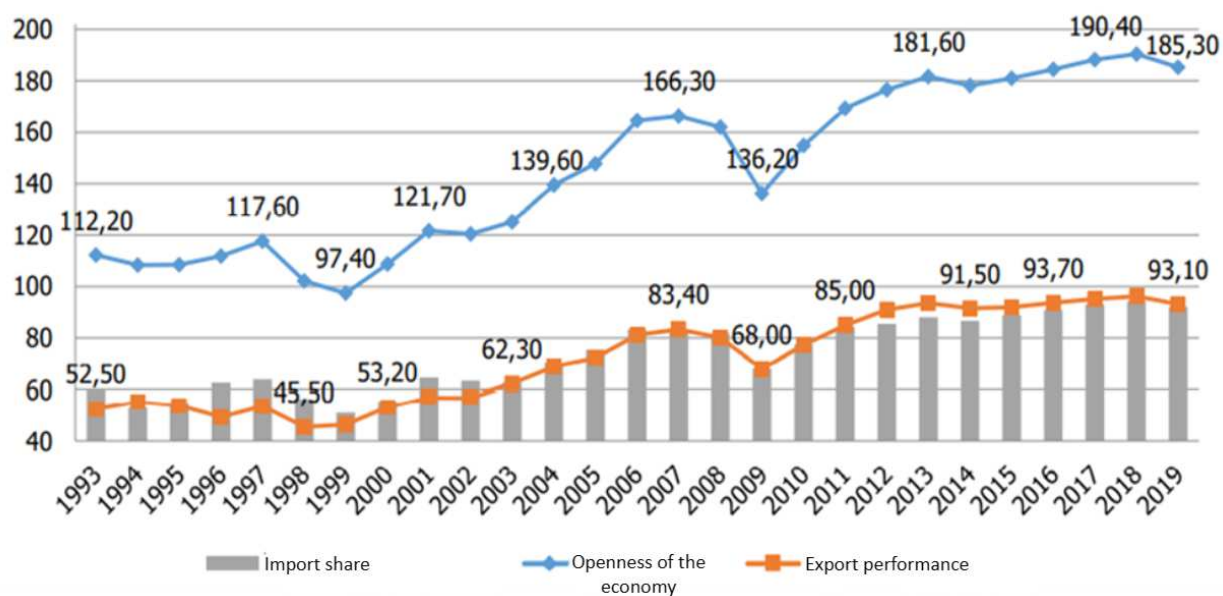


Figure 5. Openness, export, and import of Slovakia as a share of GDP, %
Source: Hrisko (2020)

As we can see in Figure 5, it is obvious that in the 1990s the Slovak economy was not as export-oriented as it is today, while imports made up a significant part of GDP. In 2019, the degree of openness of the Slovak economy reached the level of 185.3% of the nominal value of GDP, while the share of export performance in 2019 was 93.1%. The Slovak Republic's above-standard export performance is not ensured by its own forces. More than half of Slovakia's export of goods consists of foreign-added value that was imported to the country (Hrisko, 2020, p.67).

As for the latest data, the Slovak economy recorded a drop in export performance of 7.25% between 2019 and 2020 and recorded the highest decline among the V4 countries. In 2020, the value of Slovakia's export performance reached 85.71%. According to Viera Ružeková et al., the significant orientation of Slovak exports to the EU markets becomes a major weakness of Slovakia at the time of the economic recession of the European Union, which is additionally compounded by the relatively low quality of exports, with an excessive orientation towards the export of the production of the automotive and electrotechnical industry, goods with low added value and weak diversification, which was also reflected in the decline in export performance of the Slovak Republic (Ružeková et al., 2020, p.16).

In the study „Fragile Reality of Slovak Export“ Viera Ružeková writes, that the biggest problem of Slovak export is: non-sophisticated production, losing competitive ability and advantages in the international context, as well as excessive orientation towards EU markets. Hence, the Slovak economy should concentrate not only on quantitative aspects of the exports, but mainly on the qualitative area of exports, represented by the export of sophisticated production, top technologies, and the increasing share of services in exports, as the main determinants of international competitiveness. (Ružeková et al., 2020, p.27)

Conclusion

It is sometimes said that the global economy can be viewed either through the length of growth and structural change in individual countries, developed and developing, or through GVC. According to the World Bank, Global value chains are the complex network structure of flows of goods, services, capital, and technology across national borders. (World Bank Report, 2019, p.v)

Although Slovakia's integration into world trade has produced remarkable results in recent decades, reforms are needed to improve the quality of this integration and prepare the country for future changes in the international environment. Over the years, Slovakia's integration into world trade has largely remained based on activities located in the lower part of the value chain curve (such activities include, for example, the assembly of imported intermediate products), which give the country little domestic added value.

However, we figured out that the traditional way of rising the value of domestic value added now seemed to be ineffective. So, it is necessary to improve Slovakia's position in GVC by complex and sophisticated policies, so that the country can boost its exports not only in quantitative but also in qualitative ways. As an example of such policy, the article offers supporting small and medium enterprises in their desire to take part in GVC. We chose this particular measurement due to the data that showed us relatively low participation of SMEs in the GVC worldwide. In Slovakia, the business sector has long been characterized by a high representation of micro-enterprises (0 to 9 employees). Of the total number of active business entities in 2021, micro-enterprises aggregated up to 97.3%.

Regarding the data that showed that different kinds of participation of SMEs in GVC can improve the quality of export in the country, we concluded that the policy would be effective for Slovak Republic.

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The Comparison of Volume of Realized Cross-Border Mergers and Acquisitions in the European Agri-Food Sector and Banking Sector

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Abstract

Research background: The agri-food, banking, and technology sectors have dominated intense M&A activity for several years. The agri-food sector, which is an important component of the primary sector, plays a fundamental role as agriculture helps sustain life by providing the food we need to survive, and it also makes an important contribution to the national and global economy. The banking sector in the EU plays a crucial role in promoting economic growth, ensuring financial stability, creating jobs, facilitating cross-border integration and fostering financial innovation. Providing essential services enables individuals, businesses and governments to manage their finances effectively and promote economic prosperity in the region.

Purpose of the article: The main objective of this paper is to compare the volume of realized mergers and acquisitions in the agri-food and banking sectors.

Methods: The dataset containing records of completed cross-border mergers and acquisitions in Europe is based on data from the Zephyr and Orbis databases. Since only the transactions above 1 million euros were selected for the resulting database, this analysis focuses on 12 countries in Europe, with the analyzed trend covering 18 periods (from 2004 to 2021). To test each hypothesis, the Wilcoxon matched pairs signed-rank test and the sign test, which compares differences between established sectors, were used.

Findings & Value added: From the above analysis, it can be concluded that there are statistically significant differences in the volume of realized cross-border mergers and acquisitions (M&A) between the agri-food sector and the banking sector in 2005, 2006, 2007 and 2015. No differences were found in the other observed years. Based on the descriptive statistics, we can claim that the banking sector had a significantly higher volume of mergers and acquisitions in the mentioned years.

Keywords: mergers and acquisitions, agri-food sector, banking sector, comparison, consolidation, Europe

JEL classification: F23, G34, Q17

1. Introduction

The agri-food, banking and technology sectors have dominated intense M&A activity for several years. In the case of the banking sector, which could not withstand the downturn triggered by the 2007-2008 financial crisis, banks were acquired by competitors. The consolidation of the banking sector has continued in 2019–2021, although the impact of the COVID -19 pandemic has caused the number of mergers and acquisitions in the banking sector to drop significantly. The global economy is currently in a phase of increased corporate consolidation, which has led to the emergence of truly large companies that dominate key sectors. The agri-food sector is no exception to this general trend of market domination by mega-corporations. The expression of corporate consolidation has been particularly striking along the entire food supply chain, with the size and scope of mergers and acquisitions in the sector comparable to some of the largest corporate mergers in the global economy during this period (Clapp, 2019).

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The agri-food sector, which is an important component of the primary sector, plays a fundamentally important role. Agriculture is important because it helps sustain life by providing the food we need to survive. It also makes an important contribution to the national and global economy. According to the World Bank's 2022 report, this sector accounts for 4% of global gross domestic product (GDP), and in some of the least developed countries, it can account for more than 25% of GDP. This sector provides a large number of jobs worldwide. According to employment indicators from the Food and Agriculture Organization of the United Nations, agriculture is the second largest source of employment, accounting for 26.7% of total employment (Peng et al., 2023). The EU is the leader in agricultural production, but investment trends vary among member states. The EU is the largest agricultural producer in the world, with a total agricultural output of EUR 181.7 billion in 2018. The generally low profit margins of the sector are the main incentive for EU farmers to invest in fixed assets, increase cost efficiency and modernise production. This is also the main reason why farmers need additional working capital, as they require funding to cover current costs. Large farms invest more than small farms and rely more on external financing (EIB, 2020).

The structural change in the agricultural and food industry is characterised by consolidation processes. On the one hand, this leads to fewer large companies dominating individual stages of global value chains. On the other hand, the same companies control more and more stages of entire commodity value chains, from production to trade to processing. This means that fewer and fewer companies are exerting significant influence over the entire food system. Consolidation in the agri-food sector is taking place in both the horizontal and vertical dimensions. Horizontal concentration means that individual stages of global value chains are increasingly concentrated in the hands of a few large companies. Vertical integration, on the other hand, means that multinational companies gradually expand their activities and influence across different stages of the value chain. Horizontal concentration occurs at all stages of global value chains, e.g., in intermediate inputs, production, trade, processing, and retailing. Mergers and acquisitions are the means of choice for agri-food companies seeking to consolidate their power and influence over an increasingly large part of global value chains. Other models of collaboration among powerful companies include joint ventures, strategic alliances, and contractual agreements (PublicEye, 2023).

According to Clapp (2019), there are several drivers of corporate consolidation, some of which are industry-specific, which helps illustrate the complexity and nuances of the impact. Similarly, debates about the impacts associated with concentration are also specific to the agri-food sector. The agricultural input industry is of particular importance at this time due to recent merger activity in the sector and its importance in defining the prevailing model of agricultural production in the food system. As such, it has important significance for both economic and environmental outcomes.

Examining M&A determinants for the agri-food industry is important for three reasons. First, mergers and acquisitions in the agri-food industry tend to be among the most extensive and account for a large share of total merger and acquisition activity. Second, the agri-food industry differs from other industries by many characteristics, so the factors that explain the success or failure of mergers and acquisitions in other industries are not necessarily transferable to the agri-food industry. For example, the agri-food industry has a comparatively large number of smaller companies. The third and final reason is that mergers and acquisitions follow a wave-like pattern, meaning that there is increased merger activity during certain periods. (Muehlfeld et al., 2011; Herger et al., 2008; Oomen, 2017).

According to Oomen (2017), four concepts can influence the performance of M&As in the agri-food sector (Figure 1). The first concept is a set of influences called "other influences." The motives behind an M&A or the actors involved in an M&A may explain certain decisions or events. Therefore, it is important to consider this concept in the case studies. The second concept is the internal factors of M&A performance. The presence or absence of these determinants can have strong effects on M&A performance and should be analysed to explain the success or failure of an M&A. In light of his study, the relationship between internal factors and M&A performance is more important than the other relationships, given the available data. Therefore, the arrow in figure 1 is thicker. The third concept is the environment of the agri-food sector. Since the determinants have to be present in the agrifood sector, the characteristics of the agri-food sector are important here. For example, the importance of cooperatives might have strong implications for the performance of an M&A. Fourth, external influences might affect the performance of an M&A. For example, an M&A can be unsuccessful because of unfavorable legislation or poor economic conditions.

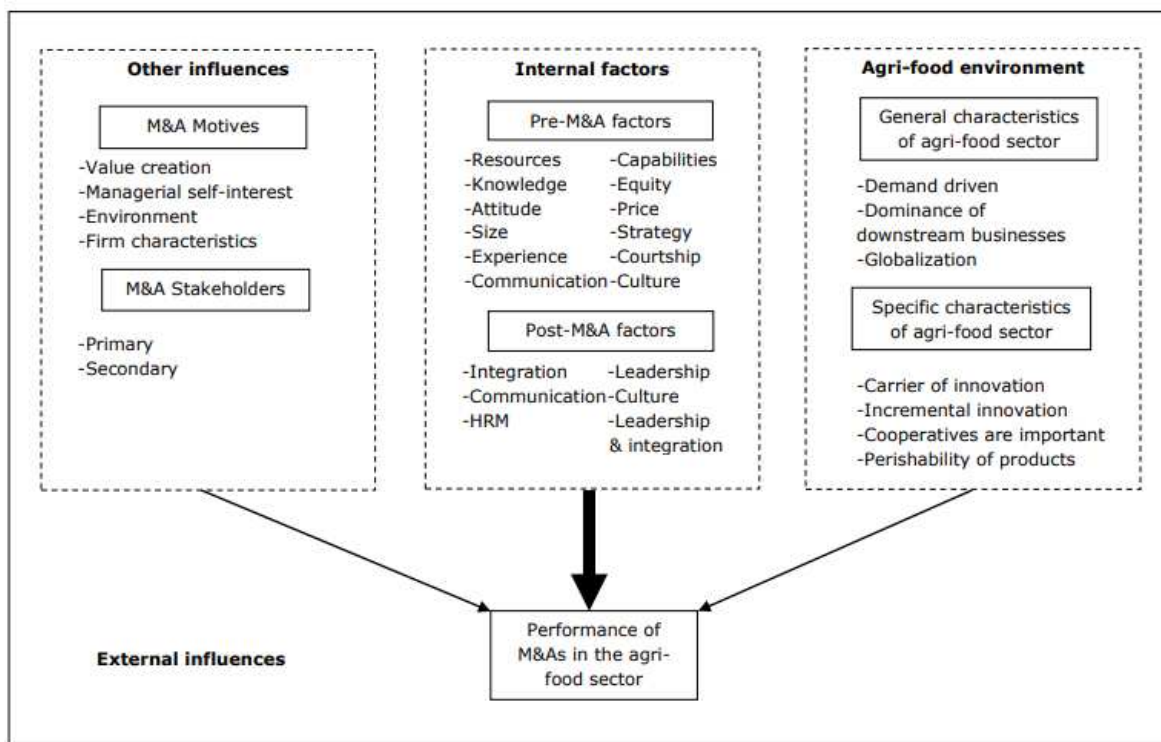


Figure 1. Concepts of impact on performance of M&A in agri-food sector
Source: Oomen (2017)

COVID-19 has had vastly differing impacts on different firms. This pandemic has motivated an improved understanding of marketing channels and selling conditions for agricultural producers to better prepare the food supply chain for future shocks and disruptions. Consumer preferences have quickly fluctuated, and grocery stores have had to adapt ready-to-eat food spaces and add precautionary equipment. Between the heightened need for food at home and the increased operational expenses, there has been an increase in costs for every segment of the supply chain (Volpe, 2020; Volpe et al., 2022). The distribution of food has changed: online and physical supermarkets, as well as take-away delivery, have grown, while the catering industry, restaurants, and on-the-go shops and their suppliers have suffered tremendously. In addition to COVID-19, consumers and their changing demands have a major impact on M&A transactions in the food sector. Consumers want transparency; they want to know where their food comes from and how it is produced. They want healthy foods with less sugar and fat. They want more convenience. Sustainability is a huge trend; consumers want food produced with less impact on the environment, less waste and more attention to animal welfare. These are the trends that investors are also looking at in deciding on transactions (Grain & Mutsaers, 2020). M&A deals in this sector are particularly sophisticated and challenging and require real industry specialists with thorough knowledge.

The banking sector in the EU plays a crucial role in promoting economic growth, ensuring financial stability, creating employment opportunities, facilitating cross-border integration, and driving financial innovation. Its provision of essential services enables individuals, businesses, and governments to effectively manage their finances and foster economic well-being within the region.

Following the global financial crisis of 2007-2009 and the subsequent European sovereign debt crisis of 2009-2012, the European banking markets underwent significant structural changes. European banks, particularly those on the periphery of the euro area, experienced substantial outflows of deposits and incurred significant losses. The financial distress, the reversal of financial integration, and the persistently low interest rate environment posed significant challenges for European banks. In fact, the number of banks in the European Union decreased by 40% between 2008 and 2020 (European Banking Federation, 2022). Consequently, there has been an increase in market concentration and a decrease in competition (De Jonghe et al., 2016; Maudos & Vives, 2019). Prior to the global financial crisis, banking concentration in major European economies was relatively moderate (Uhde & Heimeshoff, 2009), and competition was intense (Goddard et al., 2013). This was attributed to a high volume of cross-border bank mergers and acquisitions and the implementation of various reforms such as the

single banking license and the introduction of the Euro (Weill, 2013). Overall, Europe was considered to be "over banked" (Pagano et al., 2014). While a considerable body of literature has examined the implications of this environment for European banks' lending decisions (Heider et al., 2019) and their profitability, among other topics, little is known about its effects on mergers and acquisitions activity among European banks (more Kontonikas et al., 2023; Kravčáková Vozárová et al., 2022).

Brexit referendum, which resulted in the United Kingdom's decision to leave the European Union, has had significant implications for the relationship between the UK and the EU, including within the banking sector. According to Petit and Beck (2023), Brexit poses unique challenges for financial sector policymakers in the EU as the most important financial center in Europe (London) is now outside its regulatory framework. The Trade and Cooperation Agreement agreed in December 2020 between the United Kingdom and the European Union includes a very thin financial sector chapter, with eight out of 783 articles directly covering this sector. A Memorandum of Understanding to establish EU-UK structured regulatory cooperation on financial services has not been signed, and any regulatory cooperation has been paused due to the conflict over the Northern Ireland Protocol, part of the UK Withdrawal Agreement. The divergence of UK regulation from EU regulation is almost a given outcome following Brexit. The UK's rationale behind the will to actively diverge from the EU pertains to broader political choices and regulatory approaches and objectives: flexibility, common law principles-based, competitiveness, growth, and innovation. In addition to such active divergence, there can also be passive divergence, with the UK not keeping up with EU legislative changes or not following new EU regulation in the financial services sector.

2. Methods

The main objective of this paper is to compare the volume of realized mergers and acquisitions in the agri-food and banking sectors. The M&A indicator, according to which we evaluate the differences between two sectors (1- agri-food sector, 2 – banking sector), presents the volume of realized cross-border mergers and acquisitions in these sectors in the countries of Europe (in million €).

Subsequently, we established a research hypothesis for this paper:

H1: „There are statistically significant differences in the volume of realized cross-border mergers and acquisitions (M&A) between the agri-food and banking sectors in Europe.“

The dataset containing records of completed cross-border mergers and acquisitions in Europe is based on data from the Zephyr and Orbis databases. Since only the transactions above 1 million euros were selected for the resulting database, this analysis focuses on 12 countries in Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, United Kingdom), with the analyzed trend covering 18 periods (from 2004 to 2021).

To verify individual hypotheses was used Wilcoxon Matched Pairs Signed-rank Test and Sign test to compare the differences between established sectors. Unlike the t test for paired data, the Wilcoxon signed-ranks test does not require normal distributions. Instead, it tests the hypothesis that the scores for two variables were drawn from the same distribution. The test formula is as follows (Košíková et al. 2017):

$$Z = \frac{\min(S_p, S_n) - (n(n + 1)/4)}{\sqrt{n(n + 1)(2n + 1)/24 - \sum_{j=1}^l (t_j^3 - t_j)/48}}$$

where:

N = number of cases with non-zero differences

l = number of ties

t_j = number of elements in the j-th tie, j = 1, ..., l.

Table 1 presents descriptive statistics for the volume of realized cross-border mergers and acquisitions in the agri-food sector (AFS) and banking sector (BS) in the selected period 2004–2021, where std. dev. represents the standard deviation, Q1 lower quartile, Q3 upper quartile, and MeanY means the total average value of the volume of M&A for all monitored years.

Table 1. Descriptive statistics for the volume of M&A

	Mean		Median		Q1		Q2		Std. Dev.	
	BS	AFS	BS	AFS	BS	AFS	BS	AFS	BS	AFS
MeanY	269410	151846	252236	125352	150016	51621	370253	242173	173723	113420
2004	299690	127179	108282	58241	39325	12862	612418	272167	357645	158394
2005	129576	28951	68435	15054	27957	6168	215030	29330	136426	41081
2006	265816	141899	192238	32402	19608	15877	488692	65048	268589	360874
2007	318432	72812	129431	27677	78484	18406	426594	78312	379940	97757
2008	391050	202730	233392	69400	75713	19058	398094	170500	595979	335750
2009	239748	299255	88257	87397	50269	22855	328258	488088	308633	432486
2010	224990	60259	89050	41107	33690	27900	266735	80533	359777	53930
2011	338633	108924	67325	84889	28176	3000	264760	119608	594078	147455
2012	170118	86700	59337	33788	33195	9400	136728	38829	267577	135203
2013	323683	56389	147178	40281	43518	19050	680941	89969	379320	48120
2014	195299	52268	121200	60642	38000	33148	300414	67732	232956	19775
2015	410821	108140	175000	47741	144930	8755	860896	158815	368699	152823
2016	212141	281812	121406	85000	68009	56049	178264	254470	301211	432755
2017	304774	508488	299478	155756	154983	89528	521021	199536	174968	1127682
2018	226947	600782	182552	154259	123425	16700	290916	1500000	173019	813304
2019	375779	746067	194248	55063	103383	46910	615674	150000	399153	1977725
2020	564573	927752	346235	326325	164136	124057	628772	1258346	631427	1348537
2021	502773	574792	197407	127132	134570	53826	633423	483000	806498	927432

Source: own processing (2023)

3. Results

Table 2 presents the results of the Wilcoxon matched pairs signed-rank test and the Sign test. Moreover, it shows in which year the evaluations (the volume of M&A in individual sectors) differ.

Table 2. The Wilcoxon matched pairs test and the Sign test

Variables	Sign test		Wilcoxon matchet pairs test	
	Z	p-value	Z	p-value
AverageBS & AverageAFS	2.0207	0.0433	2.2749	0.0229
2004	1.8091	0.0704	1.6893	0.0912
2005	2.0207	0.0433	2.3534	0.0186
2006	2.0207	0.0433	2.1181	0.0342
2007	2.2136	0.0269	2.2934	0.0218
2008	1.2060	0.2278	1.4226	0.1549
2009	0.0000	1.0000	0.1690	0.8658
2010	1.3333	0.1824	1.4809	0.1386
2011	0.0000	1.0000	1.0070	0.3139
2012	0.3536	0.7237	0.8402	0.4008
2013	1.3333	0.1824	1.7178	0.0858
2014	0.6667	0.5050	1.4809	0.1386
2015	1.7889	0.0736	2.0226	0.0431
2016	1.5119	0.1306	1.1832	0.2367
2017	1.3333	0.1824	1.4809	0.1386
2018	-0.4082	0.6831	0.7338	0.4631
2019	1.3333	0.1824	1.4809	0.1386

2020	-0.3536	0.7237	0.2801	0.7794
2021	0.0000	1.0000	0.4045	0.6858

Note: Marked tests are significant at $p < .05000$

Source: own processing (2023)

The results of the Wilcoxon matched pairs test and the Sign test show that there are statistically significant differences in the volume of realized cross-border mergers and acquisitions between the agri-food sector and the banking sector in 2005, 2006, 2007, and 2015. Differences were not confirmed in the other monitored years. Based on the descriptive statistics in Table 1, we can claim that significantly higher volumes of M&A were in the banking sector in the mentioned years.

The countries with the largest volume of cross-border mergers and acquisitions in the banking sector for the period 2004–2021 include France, Italy, Spain, Germany, the Netherlands, and the United Kingdom. The largest number of cross-border mergers and acquisitions in the banking sector for the period 2004 – 2021 were in Italy, France, Spain, Germany, the United Kingdom, and Netherlands. During the monitored years, the given volume or number of cross-border mergers and acquisitions in the banking sector changed. Therefore, for a better idea, we present in Table 3 the average ranking of countries in individual years according to volume and number of cross-border mergers and acquisitions in the banking sector for the period 2004–2021.

Table 3. Ranking of countries according to the volume or number of cross-border M&As in the banking sector

Country	Average Rank of volume M&A	Rank of volume M&A	Average Rank of number M&A	Rank of number M&A
Austria	9.0	9	10.9	11
Belgium	8.2	7	8.6	8
Cyprus	13.8	15	12.8	15
Denmark	8.5	8	7.4	7
Finland	12.1	13	11.1	12
France	3.3	1	3.3	2
Germany	4.6	4	6.3	4
Greece	10.2	10	10.4	9
Ireland	14.5	16	14.8	16
Italy	3.8	2	2.3	1
Luxembourg	10.8	11	10.9	10
Malta	16.5	18	16.4	18
Netherlands	6.2	5	7.4	6
Poland	16.8	19	16.7	19
Portugal	11.2	12	11.3	13
Spain	4.2	3	4.3	3
Sweden	12.9	14	11.9	14
Turkey	15.7	17	16.0	17
United Kingdom	7.9	6	7.2	5

Source: own processing (2023)

The countries with the largest volume of cross-border mergers and acquisitions in the agri-food sector for the period 2004–2021 include France, the United Kingdom, Netherlands, and Italy. The largest count of cross-border mergers and acquisitions in the agri-food sector for the period 2004–2021 was in France, Spain, the United Kingdom, Italy, and Netherlands. During the monitored years, the given volume or number of cross-border mergers and acquisitions in the monitored sector changes. Therefore, for a better idea, we present in Table 4 the average ranking of countries in individual years according to volume and count of cross-border mergers and acquisitions in this sector for the monitored period.

Table 4. Rank of countries according to the volume or number of cross-border M&As in the agri-food sector

Country	Average Rank of volume M&A	Rank of volume M&A	Average Rank of number M&A	Rank of number M&A
Austria	8.3	9	9.0	11
Belgium	7.6	7	8.5	9
Denmark	7.7	8	8.1	7.5
Finland	9.7	12	9.6	12
France	3.0	1	2.9	1
Germany	6.3	6	7.0	6
Greece	8.9	11	8.1	7.5
Italy	5.0	4	4.4	4
Netherlands	4.2	3	4.9	5
Portugal	8.6	10	8.8	10
Spain	5.3	5	3.3	2
United Kingdom	3.4	2	3.4	3

Source: own processing (2023)

4. Discussion

The production of agricultural and agri-food products and their trade are of particular importance for the European Union. Given its share of global exports and imports, the Union can rightly claim, alongside the United States, the position of the most important importer and exporter of agricultural products. Within the European processing industry, the agri-food sector is one of the most important. It is essential that European agriculture and the agri-food industry, which closely depends on it, maintain and increase their competitiveness and their market shares in their internal as well as external markets while respecting the commitments that the EU has made in its international trade relations. However, European agriculture is currently facing a much more competitive environment, mainly due to the globalization of markets (European Commission, 2013).

The global food system is increasingly dominated by a shrinking number of ever larger firms that command enormous influence over their respective markets. All along agri-food supply chains, from inputs such as seeds, chemicals, and farm equipment, to commodity trading, to food processing and retail, just a handful of very large firms tower over the scene.

What, precisely, this trend toward consolidation means for the agri-food system as a whole is not always clear. There are divergent perspectives with respect to what growing consolidation means for both economic and environmental sustainability in the food system. On one hand, a diverse set of critics have raised a number of concerns about heightened concentration in the sector. Food justice advocates and many farmer groups, for example, argue that growing corporate control over the food system, in particular the industrial agriculture model these firms promote, has contributed to heightened economic vulnerability for farmers and consumers, and has undermined the environmental sustainability of food systems. Many economists have also been concerned about growing concentration in the sector, in particular because having fewer dominant firms can threaten competition, which in turn can undermine efficiency, innovation, and social welfare. On the other hand, the firms that are key players in the sector portray their consolidation as beneficial for the food system, as they claim it promotes innovations that bring social and environmental benefits (Clapp, 2019).

Pazarkis et al. (2022) argue, that the global agri-food industry is undergoing deep reorganizations, with a plethora of mergers, acquisitions, and agreements unifying the sector. Past mergers in the field have been largely driven by technological innovation and integration, along with enhanced copyright protection. Further technological innovation and integration remain important for today's mergers, but they are not the only driving forces. Today's mergers are also largely shaped by increased financialization in the agri-food sector, which has prioritized investor claims for profits in ways that encourage corporate integration. These waves of mergers and acquisitions have revolutionized and restructured this sector several times in recent decades, and continue to bring about change and adjustment even today. The overall continuous integration of food businesses and agricultural enterprises in recent decades has not gone unnoticed. Research covering the consolidation process may not focus strictly on mergers and acquisitions in terms of the consolidation phenomenon,

but the overall structural changes that have taken place in the sub-sectors involving the food and food industries have been highlighted. There is no doubt that mergers and acquisitions have served as a means of facilitating this change. One of the main reasons for the merger is to reduce costs because a combined company can operate more efficiently than two separate companies. However, the merger of two companies could potentially lead to a reduction in competition and, an increase in the prices charged to the consumer, or a reduction in the prices paid to the producer in the event of a monopoly position.

Peng et al. (2023) investigated the influence of several agricultural factors in determining the likelihood of cross-border mergers and acquisitions in the global agriculture and food sector. They found that better agricultural resources, productivity, and the environment of the receiving (target) country are associated with a lower (higher) probability of cross-border mergers and acquisitions. Overall, they highlighted the important role these agricultural factors play in determining cross-border mergers and acquisitions, particularly in the agricultural and food sectors.

Cross-border integration is a critical aspect facilitated by the EU banking sector. Banks provide financial services across member states, enhancing cross-border trade and investment. The harmonization of regulations and the establishment of a single market have simplified cross-border banking activities, making financial services and transactions more accessible for businesses and individuals. This integration supports economic integration and bolsters competitiveness within the European Union. Cross-border M&As enable market expansion, yield synergies and efficiency gains, facilitate risk diversification, enhance financial stability, foster competition, and promote harmonization and integration. These factors collectively support economic growth, stability, and competitiveness within the EU.

According to Kontonikas et al. (2023), post-2008, banking market concentration has significantly increased in Western European countries. At the same time, interest rates reached historically low levels, with potential negative implications for bank profits from lending activities. Furthermore, the higher market concentration in the post-2008 period coincides with lower competition. These structural changes are associated with higher announcement of abnormal returns and profitability improvements for the bidding banks. The main source of this improved performance is the merger-related increases in the net interest margins, resulting in market power exploitation. Their findings highlight the importance of market structure for bank M&As performance and can contribute to the ongoing policy debate concerning the implications of competition for financial stability. The link between market structure and stability is complex, and the literature provides ambiguous and often contradictory findings (Martinez-Miera & Repullo, 2010). This strand of the literature relies on different assumptions, and, thus, higher market power can either enhance or hamper financial stability through its effects on overall bank risk. These results support the view that high concentration (low competition) improves the performance of bidding banks through market power exploitation. At the same time, it remains to be seen whether future bank M&As will be positively received by investors in the current environment of higher interest rates.

Conclusion

Mergers and acquisitions of companies have become a common part of the market economy. Increasing competition forces companies to look for opportunities that will help them, for example, improve their position and increase their market share.

According to Denčić-Mihajlov (2020), mergers and acquisitions, as transactions characterized by the consolidation of companies or assets through different types of financial transactions, are an increasingly important factor in modern economic activity. Considering the international orientation of the companies today, and the continuous process of integration in global markets, a further growth trend of M&A activity is expected in the upcoming time. The future will certainly bring new challenges for the implementation in M&A strategies, such as changing regulatory requirements, the change of needs and consumer habits, new risks that companies face in implementing the chosen strategy of growth and development.

The study compared the volume of realized M&As in the agri-food sector and the banking sector. From the above analysis, it can be concluded that there are statistically significant differences in the volume of realized cross-border mergers and acquisitions (M&A) between the agri-food sector and the banking sector in 2005, 2006, 2007, and 2015. Differences were not confirmed in the other monitored years. Based on the descriptive statistics, we can claim that significantly higher volumes of M&A were in the banking sector in the mentioned years.

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The Analysis of the Youth Unemployment in the Slovak Republic

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Abstract

Research background: The concept of unemployment represents an unfavorable situation both for an individual and for the entire society. The unemployment rate shows a real picture of the country's economic health. It is a very sensitive issue in today's global society. It affects both the older and the younger generation, and the inability to get a job is very frustrating for young people, and it leads to negative consequences on their psychological state and social life.

Purpose of the article: Proposed paper offers analysis of the present state of the youth unemployment in the Slovak Republic.

Methods: Unemployment analysis is performed on the basis of statistical data and indicators obtained from the Statistical office of Slovak Republic. Through statistical tests, the informative value of the results of the performed correlation analyses was identified, and thus the degree of their statistical significance was determined.

Findings & Value added: Based on the results of the performed analysis, we conclude that unemployed young people in Slovakia present a significant part of the total number of unemployed and therefore significantly influence the unemployment rate in Slovakia. Youth unemployment rate in Slovakia has decreased significantly from 2010 to 2020 (except for the year 2020).

Keywords: labour market, unemployment, youth people, Slovak republic

JEL classification: J21, J64

1. Introduction

The youth employment situation deserves immediate attention. Not only because it threatens the principle of equality and solidarity between generations, an important aspect of social justice, but any prolongation or deepening of the crisis will also increase the political and social unrest as more and more young people lose faith in the current economic change. Although unemployment harms the economic and social well-being of all those affected, the harm is more clear when it occurs at the fragile beginning of a person's working life. Therefore, it is urgent to take all possible national and international measures that will avoid the second and potentially more dangerous phase of the global crisis and to maintain faith in the current economic and social changes and their ability to ensure decent work and social justice for all (International Labour Organization 2012).

Youth unemployment is relevant to study, not only because of the increasing salience of the social problem, especially in certain countries, but also because it reveals welfare-regime country differences that the existing literature has overlooked (Cinalli, Giugni, Graziano 2013).

The youth unemployment problem is not new (. The interest in the literature begins debate in the 1980s when the representatives of the 'baby-boom' generation joined the jobs market. For Europe, unemployment was always on the interesting and important issue because EU historically registered higher values than US or Japan (Yiannaki, 2010) both for general rate of unemployment and youth unemployment rate.

Youth unemployment is a serious global problem. Youth has a special meaning for all countries of the world. Youth can be considered as an engine for achieving development goals because they are more energetic, talented, creative, open, productive and dynamic and shape future workers, entrepreneurs, consumers and producers. All these youth potentials are valuable resources for economies. To achieve

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development goals, youth must be integrated into the workforce and economies. Higher youth unemployment is not only a local or developing country problem, it is a real global challenge. Therefore, it must be fought globally. (Ayhan 2016).

1.1 Unemployment as a society-wide problem

Unemployment is a ubiquitous problem that is a complex of cultural, economic interpersonal, physical, and psychological dimensions. Whereas the pernicious negative outcomes of unemployment are empirically established in the literature, there is a need to better understand the psychological experiences of unemployment so as to inform interventions that ameliorate its impact (Kossen, McIlveen 2018).

Unemployment is accepted as an important macroeconomic problems in all countries. Due to the unemployment rate being an important variable, it is a priority target in economic policies. In this direction, the issue of how to increase the employment rate and reduce the unemployment rate is included in countries' short-, medium-, and long-term economic policies of countries (Doganer 2022).

To be employed is an important condition for a person's dignified existence, it brings not only material benefit, but also gives him a sense of self-realization and social value. Employment determines the beginning and the end of people's economic activity. Employment shows generally valid values not only to those who are employed. It is the influence of identification, advice and personal example. Forcibly removing job from a person's personal life has proven negative consequences - social, economic and, of course, psychological. Without occupation, the meaning of life disappears, social contacts are limited and the integrity of the personality gradually breaks down. (Výrost, Slaměník, Solárova 2019)

Thus, employment is not only used to collect goods or to perform services, but it creates a field in which it is possible to conduct conversations, meet other people and create friendships. Group work creates a social environment in which a person is evaluated and compared with others (Buchtová, Šmajš, Boleloucký 2013).

The EU labour markets show a number of long-term imbalances and asymmetries, which are reflected in a persisting high unemployment rate. A group that is particularly affected by the high unemployment rate are young people (Potužáková, Mildeová 2015).

1.2 Youth unemployment

Persons who belong to the group of disadvantaged job seekers include, among others, especially School graduates (citizens under the age of 25 who have completed full-time vocational training less than two years ago and have not obtained their first regularly paid job - that is, a job that would last more than six consecutive months). (ÚPSVaR 2018)

Psychologists studied more than 7,000 young people born between 1980 and 1984. Their analysis revealed that emotional distress in early life (feeling anxious or depressed as a teenager) was a very strong factor in unemployment in adulthood. Teenagers living in extreme poverty were 32% more likely to be unemployed as adults. It's not exactly clear why early psychological distress is linked to lower employment later in life, but researchers say that turmoil during the school years can disrupt people's educational attainment, which in turn hurts future job opportunities. One important result of this research is that anxiety and depression, even at an early age, can take a huge professional and economic toll over a person's life (Psychological science organisation 2016).

Based on the published papers, the most studied determinants of youth unemployment are increased levels of regional economic advances, state demographics, relocation, household conditions, regional openness and export/import. Economic freedom, labour market reforms, economic growth, high proportion of part-time employment, active labour market policies, minimum wage norms, extent of bargaining scope and alignment are prominent determinants that reduce unemployment at large and improve labour market performance of youth in particular (Ralph, Arora 2022).

The problem of youth unemployment is a global issue. It is important to deeper examine the issues of youth unemployment. High unemployment means a waste of limited resources and decelerates the long run growth potential of an economy in the result of lower incomes, lower aggregate demand and GDP growth rates. (Gontkovičová, Mihalčová, Pružinský 2015)

There are micro and macroeconomic reasons for youth unemployment. Macroeconomic reasons consist of the level of production and the general rate of unemployment in the economy. Determinants of youth unemployment are sustainable growth, falling unemployment, crisis, labor costs, population growth, school-to-work transition and educational mismatch. The consequences of youth unemployment are explained in the literature as economic, social and psychological. The economic results of youth

unemployment are a decline in overall output, increasing poverty, loss of human capital, and social consequences include social unrest, crime, illegal trade, immigration, brain drain, drug and human trafficking. The psychological consequences of youth unemployment are: mental disorders, depression, suicide attempts, feelings of despair, inactivity, uselessness and exclusion from society. (Ryan 2001)

The majority of European countries spends significant resources each year on active labor market programs (ALMP) with the aim of improving the integration prospects of struggling youths. Among the most common programs used are training courses, job search assistance and monitoring, subsidized employment, and public work programs. For policy makers, it is of utmost importance to know which of these programs work and which are able to achieve the intended goals – may it be the integration into the first labor market or further education (Caliendo, Schmidl 2016).

The European Union considers long-term unemployment among youth an impediment to their full integration into society. The Commission of the European Union has, therefore, supported research into the mechanisms by which youth unemployment leads to "social exclusion" (Kieselbach 2003).

The European Union is working to reduce youth-unemployment rate in line with the main EU target of achieving a 75 % employment rate for the working-age population (. Main framework is the Europe 2020, a strategy for smart, sustainable and inclusive growth, especially Youth on the Move - it is comprehensive package of policy initiatives on education and employment for young people in Europe. Furthermore, the European Commission adopted a series measures to tackle youth unemployment. Key initiatives include: Youth Employment Package (2012), Youth Employment Initiative (2013) and also communication Working together for Europe's young people - A call to action on youth unemployment (2013).

2. Methods

The data that were used for the analysis of youth unemployment in Slovakia were obtained from statistical databases of the Statistical Office of the Slovak Republic for the period from 01.01.2010 – 31.12.2020 and from statistical databases of the European Union. These databases store statistical data and indicators in the field of economic and socio-economic development of the Slovak Republic and EU member states.

The statistical analysis consisted of performing correlation analyses, which determined the relationship of individual variables, based on established hypotheses. The relationship between the investigated variables is identified by the value of the correlation coefficient, which is denoted by the letter "r". Then the results of individual correlation analyzes have been verified with a test of statistical significance of the correlation coefficient. Verification of established hypotheses was performed on the basis of T-test and P-value. Through statistical tests, the informative value of the results of the performed correlation analyses was identified, and thus the degree of their statistical significance was determined.

3. Results

In the first half of the decade, the unemployment rate floated above 10%. The highest unemployment rate in Slovakia was in 2012 and it achieved 14.44% (see Figure 1). Since 2016, the unemployment rate has decreased, and the lowest unemployment rate in Slovakia was recorded in 2019. In 2020, the unemployment rate in Slovakia increased again to 7.57%, and this increase was caused by Covid 19 pandemic.

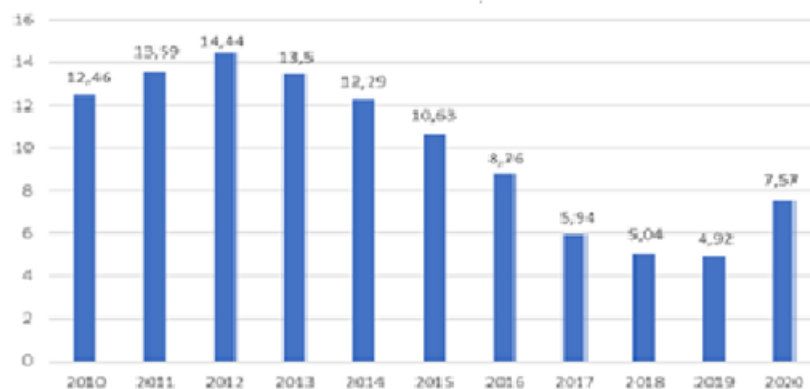


Figure 1. Unemployment rate in the Slovak republic in the years 2010-2020
Source: Own processing according the SOSR (2023)

The number of unemployed young people under the age of 29 in single regions of Slovakia in the years 2010-2020 is shown in the following Figure 2. It is clear that the number of unemployed young people under the age of 29 was decreasing proportionally to unemployment rate in Slovakia. At the same time, we can see that the highest number of unemployed young people under the age of 29 were recorded in the eastern Slovakia. Central Slovakia and western Slovakia recorded identical numbers of unemployed young people under the age of 29 in the searched period. The Bratislava region registered the lowest number of unemployed young people under the age of 29 as there are many job opportunities in the Bratislava region where young people can also apply after completing their studies.

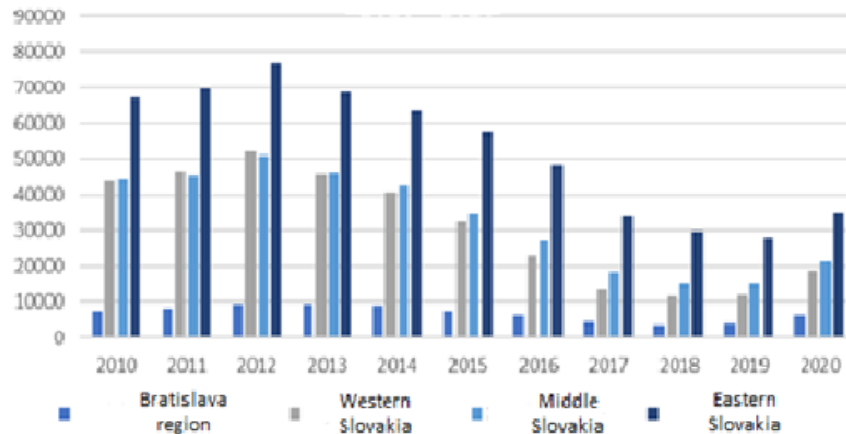


Figure 2. The number of unemployed young people under 29 years of age in single regions of the Slovak Republic in 2010 - 2020
Source: Own processing according the SOSR (2023)

In the following Figure 3, we can see the specific number of unemployed teenagers and graduates, the result is that there were about six times more unemployed graduates than unemployed young job seekers during the searched period.

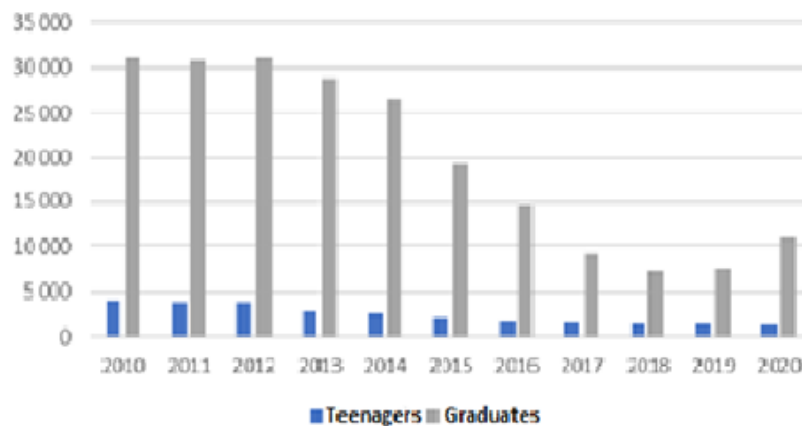


Figure 3. Share of teenagers and graduates in the total number of unemployed youth in Slovakia
Source: Own processing according the SOSR (2023)

Through the available Eurostat databases, we obtained data of the young unemployment rate of individual states of the European Union. To compare, we chose data from the Czech Republic, Poland and Hungary. We compared data in the time interval from 2012 to 2020, as the mentioned database did not contain older data regarding the youth unemployment rate in individual EU member states. In the following Figure 4, we can see the displayed youth unemployment rate of young people aged 15-24 (NEET) in the mentioned states during the searched years. The results of the comparison show that the highest youth unemployment rate during the searched period was in Slovakia. The country with the second highest youth unemployment rate was Poland, followed by Hungary, and finally, the Czech Republic achieved the lowest youth unemployment rate among the compared countries.

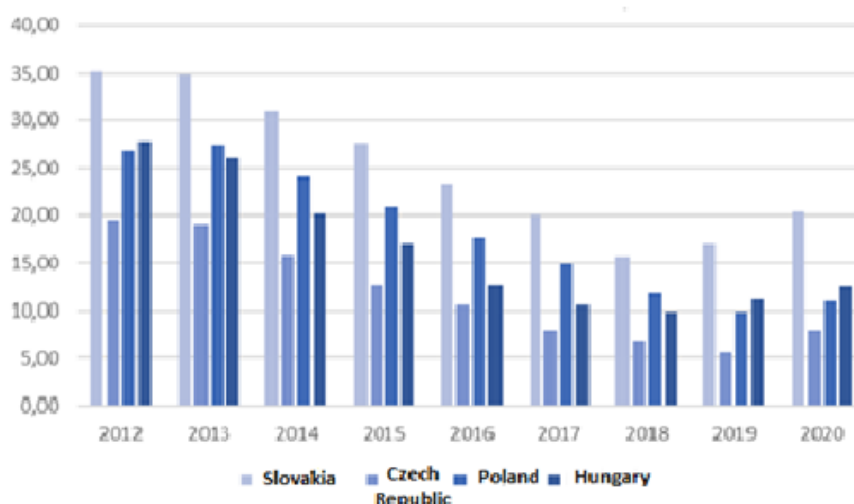


Figure 4. Percentage share of unemployed youth aged 15-24 in total unemployment in selected EU countries
Source: own processing according the Eurostat database (2023)

As part of the statistical analysis of the youth unemployment rate in Slovakia, hypotheses were set and then subsequently verified. The set hypotheses discussed the relationship, or the influence of individual groups of unemployed youth in Slovakia on the unemployment rate in Slovakia. Total research sample of unemployed young people in Slovakia was divided into the following four groups: young people from 15-24 years old, teenagers and graduates. Through the performed correlation analyses, a positive linear correlation dependence in all cases was identified, so we can conclude that all investigated categories of unemployed youth in Slovakia significantly influence unemployment rate in Slovakia (see Table 1).

Table 1. Correlation analyses

Correlation analyses	r-correlation coefficient	P-value
X: Number of unemployed youth aged 15-24 in 2010	0,5214	0,000
Y: Total rate of unemployment in 2010		
X: Number of unemployed youth aged 15-24 in 2020	0,6003	0,000
Y: Total rate of unemployment in 2020		
X: Number of unemployed teenagers in 2010	0,6457	0,000
Y: Total rate of unemployment in 2010		
X: Number of unemployed teenagers in 2020	0,5520	0,000
Y: Total rate of unemployment in 2020		
X: Number of unemployed graduates in 2010	0,1832	0,000
Y: Total rate of unemployment in 2010		
X: Number of unemployed graduates in 2020	0,3045	0,000
Y: Total rate of unemployment in 2020		

Source: own processing (2023)

4. Discussion

Based on the results of the performed analysis, we conclude that unemployed young people in Slovakia present a significant part of the total number of unemployed and therefore significantly influence the unemployment rate in Slovakia. Youth unemployment rate in Slovakia has decreased significantly from 2010 to 2020. During the searched period several important and effective tools has been implemented to improve the situation of youth unemployment of Slovakia, such as:

- dual education of students,
- graduate practice,
- de minimis subsidy schemes (subsidies of up to EUR 200,000.00 over three consecutive years), which were provided and are still provided by the Slovak Labor, Social Affairs and Family Offices to support the employment of young people under 29 years of age,
- subsidies from the State Budget and the European Structural and Investment Funds to support the employment of job seekers and disadvantaged job seekers.

Conclusion

Unemployment in the world and specifically in Slovakia is a serious problem, which is a very sensitive topic for all age groups, but especially for graduates and young people who do not have practical experience in the labor market. It is therefore necessary to appeal to local politicians to solve this problem without delay and look for ways and active solutions to reduce youth unemployment. Youth unemployment rate in Slovakia has decreased significantly from 2010 to 2020 (except for the year 2020). It may be caused by the fact that several important and effective tools has been implemented to improve the situation of youth unemployment of Slovakia, such as: dual education of students, graduate practice, etc. However, comparing data of youth unemployment rate with the situation in the Czech Republic, Poland and Hungary, the results of the comparison show that the highest youth unemployment rate during the searched period was in Slovakia. Slovak Republic can improve the situation by using the tools of European Commission. European Commission adopted a series measures to tackle youth unemployment. Key initiatives include: Youth Employment Package (2012), Youth Employment Initiative (2013) and also communication Working together for Europe's young people - A call to action on youth unemployment (2013).

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Key Attributes Affecting the Value of European M&A Transactions

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Abstract

Research background: The research background encompasses a comprehensive review of relevant literature pertaining to market expansion and growth strategies. Specifically, it investigates the existing knowledge and research gaps regarding the determinants of achieving a set limit condition.

Purpose of the article: Mergers and acquisitions have been one of the vital forms of market expansion and growth strategy widely-utilized by firms in recent years, both within and across national boundaries. The paper focused on the analysis of the probability of achievement of the set limit condition that the value of the merger and acquisition will be capitalized at more than €1 billion.

Methods: The independent variables considered were the GDP of the source and target country, the distance between the capitals of the source and target country, the existence of a common border and language between the source and target countries, the current presence of the countries in the EU, the sector (manufacturing, services) and the year of the cross-border transaction.

Findings & Value added: The results suggest that the significant factors are mainly the GDP of the source country, the distance of the capitals, the existence of a common border, the sector, the year and, last but not least, the EU membership of the source and the target country.

Keywords: cross-border mergers and acquisitions, distance, sector, European Union, regression model

JEL classification: F15, F21, F23

1. Introduction

Mergers and acquisitions (M&As) are among the key and effective strategies for ensuring the competitiveness of companies on international markets, their long-term and sustainable growth in the current global economic environment. They consist in the joining of enterprises with the aim of combining their resources and capacities, unifying processes and procedures, streamlining their business activities, and thereby increasing profitability and their economic strength. In particular, to gain access to new markets with already existing customers, market knowledge and local knowledge that would otherwise be difficult for them to access without obtaining local resources and partners, to gain access to new resources and capacities that would otherwise be unavailable to them, to achieve synergistic effects such as productivity growth, increase the quality of management, reduce costs by concentrating resources and eliminating duplicate activities, reduce labor costs, unify research and development capacities that can be used for the growth and subsequent development of business activities, diversify portfolios and risks, ensure against the influence of fluctuations in domestic markets, etc. (more Chapčáková et al., 2022; Hečková et al., 2016).

In addition, the results of the research on the issue in question show that, from a macroeconomic point of view, cross-border M&As are an important determinant of transfers and the subsequent distribution of production from one country to another, they support technological transfer, the transfer of know-how and other capacities between different countries, which has a positive impact not only on the companies themselves, but also on the entire economies of the countries involved in these transactions (Wang et al., 2022a; Hitt et al., 2016; Hagedoorn et al., 2002). This means their positive contribution to the economic growth and competitiveness of countries as a result of helping to increase productivity, technology transfer and investment, leading to growth in economic activity, job creation, etc. (Pereira-Moliner et al., 2021) In addition to technological and managerial expertise, mergers and acquisitions can

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also bring other benefits. For example, subsequent investments by enterprises in the development of infrastructure, improving the quality of education and training of the workforce in the host country, etc.

However, it is important to emphasize, that cross-border mergers and acquisitions represent highly complex processes, requiring rigorous planning and implementation, sufficient time and financial resources, and taking into account not only opportunities, but also risks, respecting local cultural and social norms and environmental aspects. These are primarily cultural differences and difficulties in integrating different cultures and values, which can lead to problems within the company and a negative impact on its performance in the future. Different financial and legal structures in different countries can lead to problems in the implementation of transactions and their failures. It should also be added that cross-border mergers and acquisitions can have a negative impact on host economies, especially when businesses gain a dominant market position and limit competition. In some cases, these transactions can lead to job losses and endanger local economic growth (more Králičková, 2020; Lapšanský, 2020).

Research on cross-border mergers and acquisitions shows that the success of these transactions depends on a complex of factors, including strategy and planning, communication, integration and management of cultural differences, and the selection of suitable partners. Cross-border mergers and acquisitions can be successful if properly planned, managed and integrated (Štefko et al., 2021; González-Torres et al., 2020; Xing et al., 2017).

Regional agreements, including advancing integration processes in Europe, have a significant positive impact on the value and number of cross-border mergers and acquisitions. The European Union has created a legal framework and policies that influence these processes and aim to support the completion and functioning of the single market, economic integration and the free movement of capital between member states. One of the main instruments is Directive of the European Parliament and the Council no. 2005/56/EC of October 26, 2005 on cross-border mergers or mergers of capital companies. Its legal basis is Articles 49 (freedom of establishment), 56 (freedom to provide services), 63 (free movement of capital) and 114 (approximation of law for the purposes of the creation and functioning of the internal market) of the Treaty on the Functioning of the European Union (OJEU, 2012). This directive established a common framework for cross-border mergers and acquisitions throughout the Union and established rules and procedures for the approval and execution of these transactions. The directive ensures the protection of the interests of shareholders, employees and creditors, and also prevents negative effects on competition. The Union has also created a range of policies and instruments that support the free movement of capital and investment between member states. For example, an integral part of the effort to achieve the integrity of the internal market and special efforts are made in the field of financial services. Integration directives and regulations contribute to market expansion and support competition by reducing the costs associated with financial integration, enable and support more efficient and smooth movement of equity capital, stimulate financial integration, reduce the cost of capital, eliminate exchange rate risk, enable the sharing of common trading platforms and integrate post-trade market infrastructure. These processes contribute to the reduction of macroeconomic uncertainty, the reduction of exchange rate volatility and the stabilization of inflation, which makes cross-border mergers and acquisitions less risky (more Škare and Porada-Rochon, 2022; Wang et al., 2022b).

The aim of the contribution is the analysis of the probability of reaching the specified limit condition, that the value of the cross-border merger and acquisition will acquire a capitalization higher than 1 billion euros, based on a sample of 19 source and 28 target countries within the European area between 1998 and 2021. The GDP of the source and target countries, the distance between the capitals of the source and target countries, and the existence of a common border and language between the source and target countries are considered as independent variables and the target country, the current presence of the countries in the EU, the sector (manufacture, services) and the year of the transaction. This paper is a continuous extension of the research presented in our previous papers Hečková et al. (2016) and Štefko et al. (2022).

2. Methods

The presented data preparation process started with the extraction of 117 561 data on the number and volume of realized cross-border mergers and acquisitions with a minimum value of one transaction in the amount of 1 million euros in 19 source countries (Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Spain, Sweden, Turkey, United Kingdom) and 28 target countries (Austria, Belgium, Bulgaria, Cyprus, Czech republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey,

United Kingdom) of the European area and the values of the other predictors selected by us. We use a comprehensive dataset on global mergers and acquisitions from Bureau van Dijk Zephyr and Orbis database (Bureau van Dijk, 2022), spanning the period from 1998 to 2021. The dataset consists of individual cross border equity deals between the source country of the acquirer and the target country where the target firm is domiciled. The source of other statistical data used is Eurostat (European Commission, 2022). The extreme value of the capitalization volume of 204.73 million euros was excluded from the research set between the United Kingdom as a source country and Germany as a target country implemented in 2000. Subsequently, to homogenize the data, we removed the top and bottom 10% of the data from the database, so the final number of observations represents 7,511 individual values. The MS Excel and STATA 17 programs were used to process the research results.

$M\&A_{ij,s,t}$ represents the total value of cross-border assets acquired through mergers and acquisitions by source country i , in target country j , in sector s , and at time t . As part of the analysis of cross-border mergers and acquisitions ($M\&A_{ij,s,t}$), we will focus on answering the basic research question: What is the probability of achieving a higher value of cross-border mergers and acquisitions than the limit value set by us at the level of $\text{€}1 \cdot 10^9$. If the value of the implemented merger and acquisition exceeds this limit condition of the case, we assign the result 1. Otherwise, we assign the value 0. The value of the gross domestic product of the source (i) and target country (j) can be considered an important predictor that affects the volume of cross-border mergers and acquisitions in sector s and at time t ($GDP_{j,s,t}$, $GDP_{i,s,t}$). The variables of proximity of countries, specificity of their culture and relatedness of language were also included in the model. The proximity of the source and target countries is quantified by the distance of their capitals, denoted as $distance_{ij}$, the sharing of a common border is quantified by the binary variable $border_{ij}$, which takes the value 1 in the positive case and the value 0 in the negative case. The binary variable $language\ relatedness_{ij}$ takes the value 1 in the case of a matching official language and the value 0 otherwise. The other predictors in the considered model are variables that relate to the membership of the source and target countries in the European Union, namely $EU_{i,t}EU_{j,t}$ takes on the value 1 if the source country i as well as the target country j was a member of the European Union at time t , otherwise, it takes on the value 0. In the end, we will also consider the sector in which the cross-border merger and acquisition took place (1 – manufacturing sector, 2 – service sector) as variables that influence the achievement of the limit condition set by us ($M\&A_{ij,s,t} > \text{€}1 \cdot 10^9$) and the year of realization of the acquisition and merger itself (t). If necessary, we will consider the dependent variable $M\&A_{ij,s,t}$ as dichotomous (0,1) to answer the defined research question, we will choose logistic regression analysis within the study.

Logistic regression enables data analysis when the response is binary, or a frequency quantity expressed by values of 0 or 1, or ratios from the $(0,1)$ interval. Ratios represent the proportion of positive results in the case of several repeated measurements at the same value of the independent variable x . The number of measurements should be approximately the same for each ratio. Logistic regression is used in modeling the probability of the investigated response on the value of a continuous variable. The random variable is assumed to have a binomial distribution with parameter π corresponding to the probability of the outcome "1" and varying monotonically with the value of the independent variable. The resulting model is then an estimate of this parameter as a function of x . The use of logistic models is very broad and includes a number of very different disciplines. The probability depending on the variable x is modeled using the logistic model:

$$\pi(x) = \frac{\exp(\alpha + \beta x)}{1 + \exp(\alpha + \beta x)} \quad (1)$$

Or after editing

$$\log \frac{\pi(x)}{1 - \pi(x)} = \alpha + \beta x \quad (2)$$

where $\log \frac{\pi(x)}{1 - \pi(x)}$ is called *logit*, α and β are regression coefficients and the iterative method of

least squares is used to estimate them a , b . This method can be used to obtain the most reliable estimates

of the regression coefficients α and β . The logistic regression model can be expressed by a sigmoidal curve $\pi(x)$, which expresses the estimate of the probability of the observed phenomenon depending on the independent variable x . Independent variables x can also be multidimensional $\mathbf{x} = (x_1, x_2, \dots, x_m)$. The corresponding model then has a form that is analogous with linear regression in the form:

$$\pi(\mathbf{x}) = \frac{\exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_m x_m)}{1 + \exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_m x_m)} \quad (3)$$

3. Results

Table 1 shows that out of a total of 7,511 analyzed transactions of cross-border mergers and acquisitions ($M\&A_{ij,s,t}$) there are a total of 2,013 such cases that met the condition for acquiring the value „1“ and, on the other hand, 5,498 implementations that met the defined limit they did not fulfill the condition. The construction process of the logistic model by maximizing the logit in individual iterations shows that the maximum was reached already in the 1st iteration (8326.3135).

Table 1. Basic characteristics of the dependent variable of the logistic model

Variable	Value	Count	(Event)
$M\&A_{ij,s,t}$	1	2013	
	0	5498	
	Total	7511	

Source: own processing (2023)

In the following table 2, we present estimates of regression coefficients (estimate), i.e. their guidelines, estimates of their standard deviations, calculated levels of significance p . The regression parameter of each character, i.e. independent variable, represents an estimate of the change in the logistic regression function if there is a unit change of the characteristic in question, assuming that the other characteristics are fixed at a constant value.

Table 2. Basic characteristics of the logistic regression model

Term	Coef	SE Coef	95% CI	Z-Value	p-value
<i>Constant</i>	-1.454	0.200	(-1.847; -1.062)	-7.26	0.000*
x_1	0.000000	0.000000	(0.000000; 0.000000)	4.77	0.000*
x_2	0.000000	0.000000	(-0.000000; 0.000000)	0.27	0.791
x_3	0.000141	0.000042	(0.000059; 0.000224)	3.36	0.001*
x_4					
0	0.000000	0.000000	(0.000000; 0.000000)	*	*
1	0.3897	0.0649	(0.2624; 0.5170)	6.00	0.000*
x_5					
0	0.000000	0.000000	(0.000000; 0.000000)	*	*
1	-0.141	0.117	(-0.371; 0.088)	-1.21	0.227
x_6					
0	0.000000	0.000000	(0.000000; 0.000000)	*	*
1	0.232	0.115	(0.006; 0.457)	2.02	0.044*
<i>type</i>					
1	0.000000	0.000000	(0.000000; 0.000000)	*	*
2	-0.1318	0.0568	(-0.2432; -0.0204)	-2.32	0.020*
<i>t</i>					
1998	0.000000	0.000000	(0.000000; 0.000000)	*	*
1999	0.122	0.205	(-0.280; 0.523)	0.59	0.553
2000	0.267	0.190	(-0.107; 0.640)	1.40	0.162
2001	0.103	0.197	(-0.283; 0.489)	0.52	0.600
2002	0.136	0.203	(-0.261; 0.534)	0.67	0.501
2003	-0.273	0.217	(-0.699; 0.153)	-1.26	0.209

2004	-0.403	0.220	(-0.835; 0.028)	-1.83	0.067
2005	-0.328	0.204	(-0.727; 0.071)	-1.61	0.107
2006	0.041	0.193	(-0.338; 0.420)	0.21	0.832
2007	0.125	0.193	(-0.253; 0.503)	0.65	0.517
2008	-0.136	0.202	(-0.532; 0.261)	-0.67	0.503
2009	-0.131	0.230	(-0.583; 0.321)	-0.57	0.570
2010	-0.407	0.242	(-0.881; 0.066)	-1.69	0.092
2011	-0.134	0.240	(-0.604; 0.336)	-0.56	0.577
2012	-0.400	0.243	(-0.875; 0.076)	-1.65	0.100
2013	-0.833	0.215	(-1.255; -0.412)	-3.87	0.000*
2014	-0.594	0.200	(-0.986; -0.201)	-2.97	0.003*
2015	-0.659	0.206	(-1.064; -0.255)	-3.20	0.001*
2016	-0.003	0.203	(-0.401; 0.395)	-0.02	0.987
2017	0.194	0.199	(-0.196; 0.584)	0.97	0.331
2018	0.341	0.205	(-0.061; 0.742)	1.66	0.096
2019	0.227	0.212	(-0.187; 0.642)	1.07	0.283
2020	0.775	0.216	(0.351; 1.199)	3.58	0.000*
2021	0.546	0.213	(0.129; 0.963)	2.56	0.010*

* - significant at the significance level $\alpha=0.05$, Coef – estimate of the regression coefficient, SE Coef – standard error of the estimate of the regression coefficient, Coef 95% CI – 95 % confidence interval of the estimate of the regression coefficient, p – achieved level of significance, x_1 - GDP $_{i,s,b}$, x_2 - GDP $_{j,s,b}$, x_3 - distance $_{ij}$, x_4 - border $_{ij}$, x_5 - language $_{ij}$, x_6 - EU $_{i,t}$ EU $_{j,t}$, t - year

Source: own processing (2023)

In table 2 it can be seen that at the level of significance $\alpha = 5\%$ significantly affects the achievement of the set limit value of cross-border mergers and acquisitions ($M\&A_{ij,s,t} > 1 \cdot 10^9$ €), i.e. reaching a value of 1, the variable GDP of the source country (GDP $_{i,s,b}$ x_1), the distance of capitals between the source and target countries (distance $_{ij}$, x_3), sharing common border between the source and target countries (border $_{ij}$, x_4), membership of the source and target country in the European Union (EU $_{i,t}$ EU $_{j,t}$, x_6), the sector and the year of the transaction itself. We also provide confirmation of these conclusions in Table 3, where we present the basic variance analysis of the considered logistic model.

Table 3. ANOVA of the regression model

Source	DF	Wald Test	
		χ^2	p-value
Regression	30	392.22	0.000*
x_1	1	22.730	0.000*
x_2	1	0.070	0.791
x_3	1	11.270	0.001*
x_4	1	36.010	0.000*
x_5	1	1.460	0.227
x_6	1	4.060	0.044*
type	1	5.380	0.020*
t	23	148.770	0.000*

x_1 - GDP $_{i,s,b}$, x_2 - GDP $_{j,s,b}$, x_3 - distance $_{ij}$, x_4 - border $_{ij}$, x_5 - language $_{ij}$, x_6 - EU $_{i,t}$ EU $_{j,t}$, t - year
Source: own processing (2023)

4. Discussion

If we focus on the analysis of categorical independent variables, we can accept the conclusion that the fulfillment of the defined limit condition ($M\&A_{ij,s,t} > 1 \cdot 10^9$ €) has, based on the value of the odds ratio of 47.65 % those cross-border mergers and acquisitions, where the source and target countries have a common border, i.e. the variable x_4 (border $_{ij}$) takes on the value 1. In the case of another significant predictor, namely x_6 (EU $_{i,t}$ EU $_{j,t}$), the limit condition is reached by those mergers and acquisitions where both the source and target countries were members of the European Union in the same year and the probability of reaching the value of $M\&A_{ij,s,t} > 1 \cdot 10^9$ € in this case is 26.06 % higher than in cases where the source and target countries were not members of the European Union. Another interesting conclusion

is the fact that reaching the limit value is 12.35 % lower in the case of acquisitions and mergers realized in the service sector than in the manufacturing sector. The last significant variable considered namely the year of implementation of the cross-border merger or acquisition points to the fact, if we focus on the last two analyzed years, that there is a 20.47 % lower probability that realized cross-border mergers will meet the limit condition in 2021 compared to 2020. If we consider the influence of independent variables x_1 to x_3 , then we present the resulting possibilities for model cases in Figure 1.

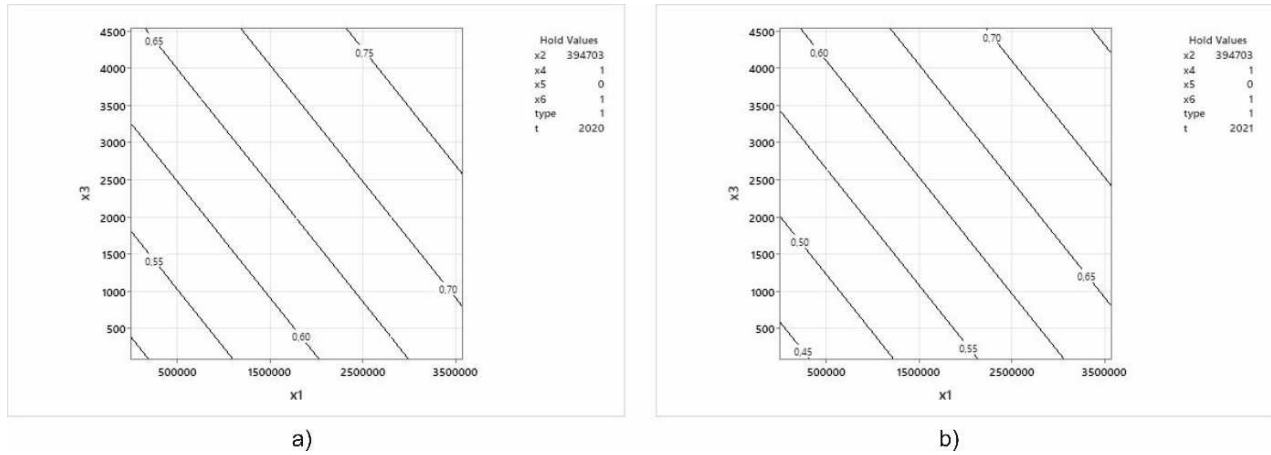


Figure 1. Probability of reaching the set limit condition for 2020 (a) and for 2021 (b)
Source: own processing (2023)

Figure 1 shows that the probability of meeting the limit condition for the value of cross-border mergers and acquisitions increases with the increase in the value of the GDP of the source country and the simultaneous growth of the distance between the capital cities between the source and target countries at a constant value of the GDP of the target country. That the distance of capitals does not play a role is confirmed by the fact that corporations realize their production within global value chains by fragmenting production operations around the world, which is a direct realization of the Concept of International fragmentation in practice (more Bair, 2005). Other constants are the mutual existence of a common border and the simultaneous presence of the source and target countries in the EU and the services sector. At the same time, we see that in 2020, under the same conditions mentioned above, the probability of meeting the limit condition is about 5% higher than in 2021. The results of our analysis for the entire research set in the examined period from 1998 to 2021 clearly confirm that European integration stimulates intra-EU cross-border M&A activity and have enhanced the attractiveness of European companies. From a theoretical point of view, it is a confirmation of a key element of regional integration in Internalization Theory and Neary's (2007) theoretical arguments, in the empirical research of the results of Coeurdacier et al. (2009), Erel et al. (2012) etc.

Conclusion

Based on the analysis of categorical independent variables, we concluded that cross-border mergers and acquisitions, where the source and target countries share a common border, have a significantly higher probability of achieving high transaction values and a set limit condition compared to transactions without a common border. Another important factor is the membership of the source and target countries in the European Union in the same year. Transactions where both countries are members of the EU show a significantly higher probability of achieving high transaction values compared to transactions where at least one of the countries is not a member of the EU. In the service sector, the probability of reaching the limit value of transactions is lower compared to transactions in the manufacturing sector. Our results indicate that the probability of reaching the limit value of transactions increases with the increase in the value of the GDP of the source country and simultaneously with the increase of the distance between the capital cities of the source and target countries, while keeping the value of the GDP of the target country constant. In view of our findings, in further research we will focus on a more detailed examination of the impact of the existence of a common border and membership in the European Union on the resulting values of cross-border transactions, the identification of other specific factors that influence these variables and the examination of the existence of conditional significant factors, including cross-sectoral comparison.

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Change in Energy Intensity and Energy Mix of the EU's Food, Beverages, and Tobacco Industry

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Abstract

Research background: Besides meeting the most basic human needs, the food and beverages and tobacco industry (along with agriculture) must meet the most pressing sustainability challenges.

Purpose of the article: Our study seeks to answer the following research question: Has the EU's Food, Beverages, and Tobacco (FBT) industry started on the road to energy and climate goals between 2008 and 2020 considering changes in the energy intensity index and energy mix?

Methods: Our studies were based on aggregated data from the 27 EU countries on the one hand and data from the eight dominant member states of the FBT industry on the other hand. Dominant Member States were those countries whose cumulative share together represents 80% of the total value added in the FBT sector (EU27). Our study focuses on analyses of the food, beverages and tobacco sector's energy intensity and energy mix.

Findings & Value added: The energy intensity index improved by only 1.1 per cent at the EU level over the period under review. Based on the data of the EU27 and the TOP 8 countries, the results show a positive picture emerged about the energy mix of the FBT industry. The use of high-emitting energy sources is relatively low, which decreased everywhere from 2008 to 2020 without exception.

Keywords: food, beverages and tobacco industries, energy intensity, decarbonisation, energy mix

JEL classification: L66, Q20, Q40, Q55

1. Introduction

The food and beverages industry is one of the most critical sectors of the economy, encompassing the entire process from food production to its sale. Rapid population growth and climate change pose many problems and challenges. The increasing severity of these factors forces the agricultural sector, the food production system, and enterprises to look for an effective solution. Sustainable management of natural resources, water and energy has become essential. (Koçak & Şarkgüneşi, 2017; Bozsik et al., 2022; Gáspár et al., 2023). The EU has focused on climate protection and, simultaneously, the decarbonisation of industry for decades. Achieving the 2015 Paris Agreement, the Green Deal and Fit for 55% targets is a significant challenge for most sectors, incredibly energy-intensive sectors. Although the food and beverages industry is not one of the most energy-intensive sectors, there are about forty energy-intensive processes in food production and processing (Klemes & Perry, 2007). Energy intensity also varies considerably from product to product. Based on studies conducted between 1980 and 2015, Ladha-Sabur et al. (2019) show that "the most energy-intensive food products are powders (i.e. instant coffee and milk powder), fried goods (i.e. French fries and crisps) and bread, all involving thermal processes such freeze-drying or drying in their manufacture; in addition, hygienic and cleaning requirements are the main sources of water consumption and waste in the meat and dairy industries." (Ladha-Sabur et al., 2019)

In addition to meeting the most basic human needs, the food industry must also meet the most pressing sustainability challenges, such as protecting natural water resources, preserving soil quality, reducing carbon emissions, etc. The effects are exacerbated by the growing population requiring more and more "hungry mouths" to be fed worldwide, meaning that the food industry is under severe double pressure: on the one hand, it must increase the production of healthy food, and on the other hand, it must

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reduce negative externalities and impacts on nature. In our study, among the many issues, we focus only on factors related to energy use, energy intensity and decarbonisation.

Reducing greenhouse gas emissions cannot be achieved without a green transition, which requires substantial changes in both production and consumption patterns. (Besley & Persson, 2023) Innovation plays an important role in transforming production processes, not only in the food and beverages industry, but also in related sectors. Moscona & Sastry (2023) examined innovation, climate change, and potential economic impacts in the U.S. agricultural sector.

As in any sector, the food and beverages industry prioritise energy saving, improving energy efficiency and reducing greenhouse gas emissions. To facilitate this, the GREENFOODS branch concept was created, which aims to identify and evaluate energy efficiency measures, integrate renewable energy sources into the food and beverages industry, and also include best practices to help companies in the sector. "The overall objective of the GREENFOODS project is to lead this industry to optimised energy efficiency and the integration of renewable energy sources and following reduction of fossil carbon emissions in order to ensure and foster the worldwide competitiveness, improve the security of energy supply and guarantee the sustainable production in Europe." (Glatzl et al., 2015, p. 397) In addition to energy efficiency, it is important to increase the share of energy from renewable sources in total energy consumption, while at the same time reducing the use of energy from solid fossil fuels. There are many efforts and promising practices to improve the energy efficiency of food processing and to decarbonise the food processing sector, but the transition faces many obstacles. (Clairand et al., 2020) However, appropriate political incentives may increase the acceptance of energy efficiency strategies. Moreover, the industry needs to renew traditional processes and encourage the installation of long-run, profitable intelligent technologies. (Clairand et al., 2020) In our study, we seek to answer the following research question:

RQ: Has the EU's food, beverages and tobacco industry started on the path towards energy and climate goals between 2008 and 2020 in light of changes in the energy intensity index and energy mix?

The structure of the paper is as follows: after the Introduction, Section 2 contains the literature review, Section 3 renders a brief description of the analytical framework and methodology, Section 4 presents our results, which is compared with the main conclusions of the sources of literature in Section 5, and finally, Section 6 summarizes our key findings.

2. Literature review

The global food and beverages industry uses an average of 200 EJ/year, 45% of which is related to processing and distribution (FAO, 2017) Regarding energy use, the food and beverages industry is the fifth most energy-intensive sector in the EU. A vast range of products characterises the food and beverages industry, and its products and production procedures are heterogeneous. Individual products and production processes have different energy intensities. Food production and processing involves about forty energy-intensive processes (Klemes & Perry, 2007). Ladha-Sabur et al. (2019), based on studies conducted between 1980 and 2015, show that the most energy-intensive food products are powders (i.e. instant coffee and milk powder), fried goods (i.e. French fries and crisps) and bread, all involving thermal processes such freeze-drying or drying in their manufacture. In addition, hygienic and cleaning requirements are the primary sources of water consumption and waste in the meat and dairy industries. (Ladha-Sabur et al., 2019) The literature on this topic points out that energy consumption is closely related to food productivity. (Imran & Ozcatalbas, 2021)

According to Wang, 2014, the food industry has focused on improving energy efficiency and recovering waste heat to increase the sustainability of food processing. Replacing traditional energy-intensive food processes with new technologies such as novel thermodynamic cycles and non-thermal and novel heating processes offers further opportunities to reduce energy consumption and production costs and improve the sustainability of food production. (Wang, 2014) One means of achieving the decarbonisation objectives is to increase the use of clean energy sources in the technological process. There is more significant potential for spreading renewable energy sources in the food industry, where biodiesel, biogas and biomass can also be considered for specific processes. Solar energy could also be helpful for thermal processes, such as drying. (Clairand et al., 2020) The benefits of decarbonisation in the food and beverages industry can be seen in four areas: energy and carbon savings, cost savings, environmental protection, and worker satisfaction and health. (Sovacool et al., 2021)

Kanchiralla et al. (2021) analysed the energy and CO₂ intensity of processes in the Swedish food industry via a case study. They found that 70% of the total energy goes to the production and 30% to the support processes. Heat processing (45%) and cooling (18%) are the most energy-intensive production processes. Regarding the support processes, space heating (7%) and hot water (5%) take the most energy in Sweden. The researchers also examined the energy consumption of individual food industry processes by energy carrier. Considering all food processes, 55% of energy consumption came from electricity, 27% from oil, 10% from LPG, 6% from district heating and 1% from biomass and diesel. Bajan et al. (2021) investigate the use of energy and its structures in the food production systems of the V4 countries and the EU-15 countries between 2000-2001 and 2015-2016. Their research revealed that the share of food production systems in total energy consumption has decreased in the V4 countries, while in the EU-15, this value is stabilising at around 4.4%. Among the V4 countries, the share of energy use of the food industry in total consumption was lower than the EU average in the Czech Republic and Slovakia (between 3-4% in 2015-2016), while a higher proportion can be observed in Poland and Hungary. In case of Poland, there was a marked decrease in the period under review, from nearly 11% in the period 2000-2001 to over 7% in 2015-2016. In the case of Hungary, the value ranged from 8.7% in the period 2000–2001 and fell below 8% in 2015-2016, but a lower value of 6.8% was observed in 2010-2011. As far as the energy mix of the food industry in the V4 countries is concerned, the picture is quite diversified. Poland has the highest share of energy from coal among the four countries, even above 30% at the end of the period under review (2015-2016), and the share of petroleum products, although steadily decreasing, also accounts for one-third, while the share of renewables slightly increased from 5% to 8%. The most significant increase in renewables can be observed in the Czech Republic, from 2% to 13%, and in Hungary, from 8% to 14%. In the case of Slovakia, however, the share of renewables in the food energy mix decreased from 16% to 12%. (Bajan et al., 2021)

In the tobacco industry, processing tobacco (e.g. drying, moisturizing and evaporation) requires significant energy use, thermal power (steam) and electricity are the most dominant energy sources. The negative externalities on human health and the environment caused by the tobacco industry make the need to protect the environment and reduce its carbon footprint even more pressing. Wang & Yuan, 2020 conducted a study of the Chinese tobacco industry, finding that energy intensity and energy efficiency improved significantly between 2000 and 2015 and that the government has mandated further reductions in specific energy consumption. Their literature review based on international sources found that the tobacco industry's energy efficiency is relatively high, and its energy savings rate can be a benchmark for other sectors. They highlighted that energy savings and CO₂ reduction opportunities are in scale optimization (such as improving product structures), technology development, and process optimization. In addition, optimizing energy structures at the national level and strengthening the use of clean energy are essential measures in achieving climate targets.

3. Methodology

According to NACE Rev. 2, the Food, beverages, and tobacco industry comprises the following groups: Manufacture of food products (NACE 10), Manufacture of beverages (NACE 11) and Manufacture of tobacco products (NACE 12). In this paper, we use the abbreviation FBT industry to refer to the Food, beverages and tobacco industry. In our study, we examine the energy intensity and energy mix of the EU food, beverages and tobacco industry between 2008 and 2020 to understand whether the sector is on the road toward climate goals. (RQ)

Our studies were based on aggregated data from the EU-27 on the one hand and data from the dominant member states of the FBT industry on the other. Dominant Member States are countries whose cumulative share represents 80 % of the total value added in the FBT sector (EU27). The cumulative shares, as well as the data of the TOP 8 countries based on 2019 data, are shown in Figure 1. Looking at the list of the TOP 8 countries, there were no significant changes in the 13 years studied, only minimal change of order occurred. Our analysis is based on the concentration curve based on 2019 data.

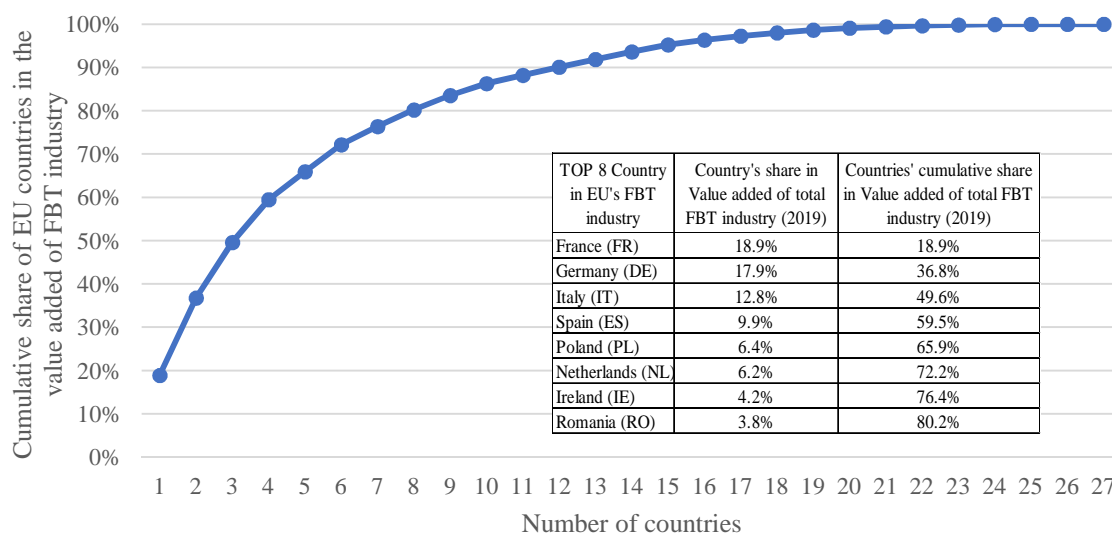


Figure 1. Cumulative share of EU Member States in value added of FBT industry
Source: Own calculation based on data from the Odyssee-Mure database

Figure 1. shows that France, Germany, Italy, and Spain are the most significant players in the EU FBT industry. These four countries account for 60% of the total value added in the FBT industry in the European Union. In addition, four other countries, Poland, the Netherlands, Ireland, and Romania contribute together with a 20% share to the cumulative share of 80%.

Our study focuses on analyses of the food and beverages sector's energy intensity and energy mix. The study relies on two data sources, Eurostat and Odyssee-Mure. The final energy consumption of the FBT industry was collected from the annual energy balance sheets (Eurostat) for the 27 EU Member States in total and by energy carrier, for the period 2008-2020. Value-added data were obtained from the Odyssee-Mure database. Energy intensity was quantified as the ratio of the final energy consumption of the branch (measured in energy units ktoe) to the value-added at constant price (measured in million euro, 2010). This indicator shows how much energy is needed to create €1 million of value added.

The energy mix of the FBT industry was mapped in detail by aggregation of energy sources based on the Energy balance methodology guide. In addition, further aggregations were made, classifying energy carriers based on their CO₂ emission factors (see in Commission Implementing Regulation (EU) 2018/2066, Annex VI, pp. 79-80.). Our classification (Table 1) is consistent with that of Arens et al. (2021).

Table 1. Classification of the energy products based on their CO₂ emission factor

High-emitting energy sources	Medium-emitting energy sources	Low- (and zero-emitting) energy sources
Solid fossil fuels, manufactured gases, peat and peat products, oil shale and oil sands, oil and petroleum products, non-renewable waste (Emission factor is above 70 tCO ₂ /TJ)	Natural gas (Emission factor is 56.1 tCO ₂ /TJ)	Renewable energy sources and biofuels, and nuclear heat (Emission factor is zero or close to zero)

Source: based on Commission Implementing Regulation (Eu) 2018/2066, Annex VI, pp. 79-80 and Arens et al. (2021) self-classification

The amount of the secondary energy sources, such as electricity and heat were allocated to high-, medium- and low-emitting energy sources based on the energy mix of the electricity and heat production of the countries.

4. Results

As mentioned above, this study seeks to answer the following research question: Has the EU's Food, Beverages, and Tobacco (FBT) industry started on the road to energy and climate goals between 2008 and 2020, considering changes in the energy intensity index and energy mix? The results are summarised in Section 4. Our analysis first covered the evolution of energy intensity in the food, beverages and tobacco industry (subsection 4.1). In addition to the energy intensity, the analysis of the energy mix can give information about the FBT industry trends on the path towards achieving energy and climate goals. The findings in connection with the energy mix are in the subsection 4.2.

4.1 Energy intensity of the food, beverages and tobacco industry

Our analysis first covered the evolution of energy intensity. A decrease in this indicator represents an improvement in energy intensity, as less energy is used to create a unit value-added, which means a positive trend. The results are shown in Figure 2. and Table 2.

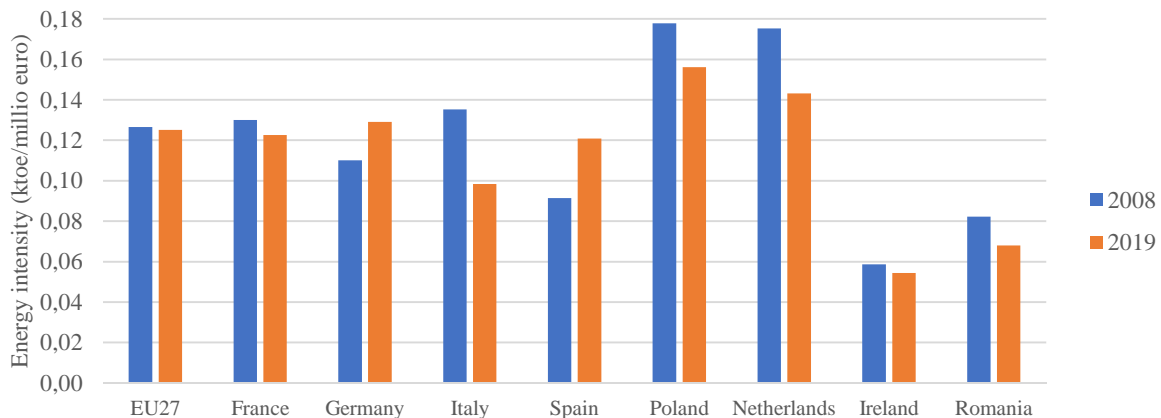


Figure 2. Energy intensity index in the FBT industry, in the EU27 and TOP 8 countries in 2008 and 2019
Source: Own calculation based on Eurostat and Odyssee-Mure database

Based on the EU27 aggregate, the FBT industry's energy intensity index ranged from 0.12 to 0.13 ktoe per million euro over the 13 years under review, with slight fluctuations. In other words, 1 million EUR of value-added required of 0.12-0.13 ktoe energy consumption. From 2008 to 2019, energy intensity index improved by only 1.1 per cent at the EU level; since the value-added of the sector increased by 6.3 per cent, energy consumption increased slightly less, by 5.1 per cent. (Figure 2, Table 2)

Table 2. Change in the energy intensity index and in its main components of the FBT industry between 2008 and 2019

Country	Change in final energy consumption (%)	Change in value added of FBT industry (%)	Change in energy intensity (%)
EU27	5.1	6.3	-1.1
France	13.3	20.3	-5.8
Germany	6.5	-9.2	17.2
Italy	-15.2	16.5	-27.2
Spain	20.0	-9.3	32.3
Poland	21.1	37.8	-12.1
Netherlands	-3.9	17.6	-18.3
Ireland	30.0	40.5	-7.5
Romania	-16.4	1.1	-17.3

Source: Own calculation based on Eurostat and Odyssee-Mure database data

According to the data of the TOP 8 countries, the picture is more diverse. Ireland and Romania have the lowest energy intensity, around half the EU average. In most countries, improvements were observed in the value of the indicator. The most significant change occurred in Italy, where the sector's final energy consumption was reduced by 15.2 per cent, while value added increased by 16.5 per cent. In addition, the Netherlands and Romania reduced energy use in the sector while increasing added value. In the case of Spain and Germany, however, we are witnessing an unfavourable trend. The final energy consumption of the FBT sector increased while the sector's value added decreased. (Figure 2., Table 2.)

4.2 Energy mix

In addition to the evolution of energy intensity, the analysis of the energy mix can give information about the FBT industry trends on the path towards achieving energy and climate goals. (Figure 3)

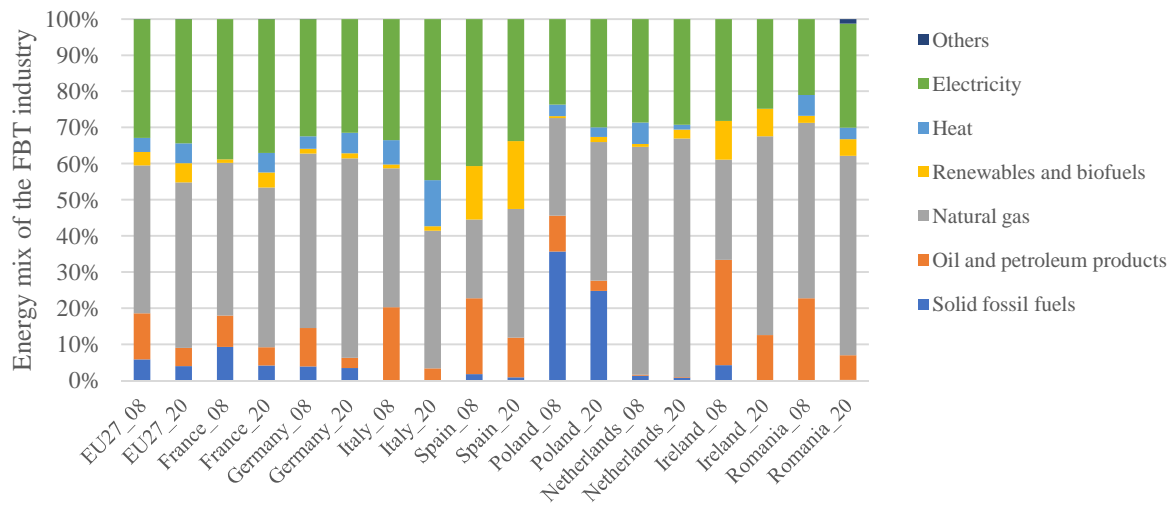


Figure 3. FBT industry's energy mix based on 2008 and 2020 data, in the EU27 and TOP 8 countries
Source: Own calculation based on Eurostat database and energy balance data

Based on the data in Figure 3., natural gas and electricity dominate the energy consumption of the FBT sector. In 2020, natural gas accounted for 46% of total final energy use in the sector and electricity for 34%, according to EU27 aggregates. The Netherlands, Germany, Romania, and Ireland have the highest natural gas ratios. For all countries, there is a shift in the energy mix from 2008 to 2019. We have also examined the energy mix in another breakdown. The energy carriers are divided into three groups based on their CO₂ emission factor. According to this, high-, medium and low-emitting energy carriers were distinguished. The amount of electricity and heat used was divided between the groups based on the energy mix of electricity and heat production in the given country.

We examined whether there had been a shift from high-emission to medium- and low-emission energy sources in the 13 years examined (Figure 4, Table 3)

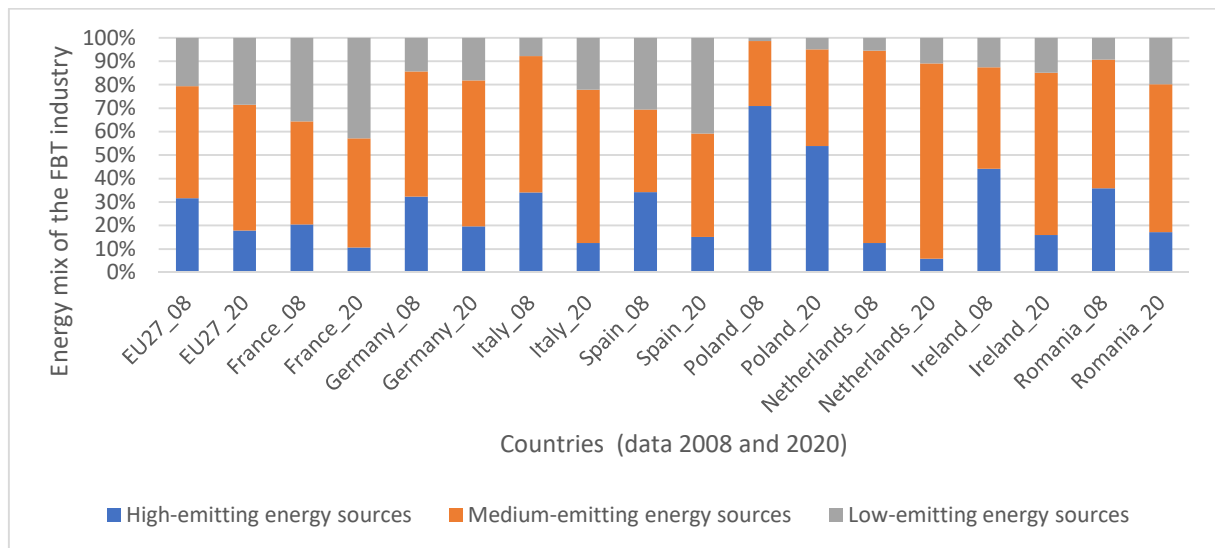


Figure 4. A high-, medium- and low emitting energy sources in the FBT industry's energy mix in the EU27 and TOP 8 countries

Source: Own calculation based on Eurostat database and energy balance data

Based on the data of the EU27 and the TOP 8 countries, a favourable picture emerges regarding the energy mix of the FBT industry (Figure 4.). The use of high-emission energy sources is relatively low (except in Poland), which decreased in each country from 2008 to 2020. Table 3 provides information on the extent and direction of change.

Table 3. Change in the share of high-, medium- and low-emitting energy sources between 2008 and 2019 in the FBT industry's energy mix in the EU27 and TOP 8 countries

Country	Change in share of high-emitting energy sources	Change in share of medium-emitting energy sources	Change in share of low-emitting energy sources
EU27	-13.8%	5.8%	8.0%
France	-9.9%	2.7%	7.1%
Germany	-12.6%	8.8%	3.8%
Italy	-21.6%	7.3%	14.3%
Spain	-19.1%	8.9%	10.2%
Poland	-17.0%	13.4%	3.5%
Netherlands	-6.7%	1.2%	5.5%
Ireland	-28.2%	25.9%	2.3%
Romania	-18.7%	8.2%	10.5%

Source: Own calculation based on Eurostat database and energy balance data

According to Table 3, the TOP 8 countries and the EU27 show a decrease in the share of high-emitting energy carriers in the FBT industry's energy mix, with decreases of around 20 percentage points or more in several countries. This trend is even more favourable in countries where most of the shift has been towards low-emission energy sources. Given that electricity consumption represented a significant proportion (up to 30-40 per cent) of the FBT industry's energy mix, the energy mix of electricity and heat generation were examined in each country. (Our calculations do not consider that countries can also cover their electricity needs from imports, which may distort the results). (Figure 5). The energy mix of electricity and heat production in the countries shows a highly diverse picture.

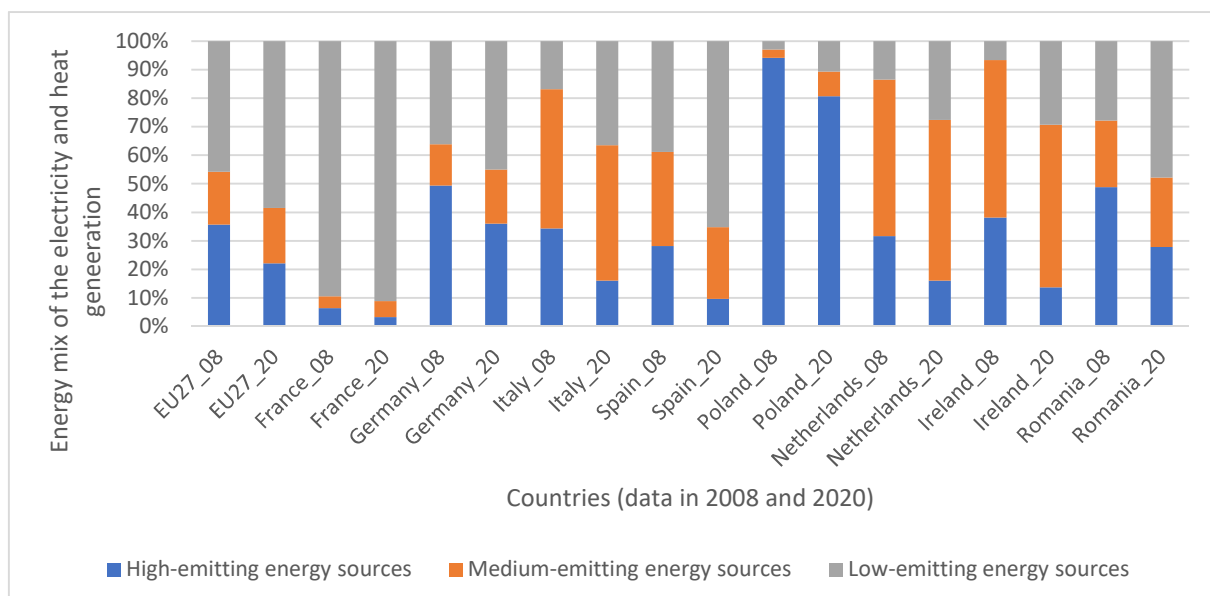


Figure 5. A high-, medium- and low emitting energy sources in the energy mix of electricity and heat generation in the EU27 and the TOP 8 country

Source: Own calculation based on Eurostat database and energy balance data

The energy mix of electricity and heat generation moved favourably from 2008 to 2020 in all countries studied. Poland has the worst energy mix, where even in 2020, the share of high-CO₂-emitting energy carriers was 80 per cent. The best situation can be seen in the energy mix of France, where the share of low-emitting energy sources is over 90%. However, it is important to shade the picture by demonstrate the structure of low-emitting energy sources (LES) (Table 4). For example, a very favourable

LES rate in France is dominated by nuclear energy and a relatively low share of renewable energy sources. While for example, a more modest share of LES in Italy is purely driven by renewable energies.

Table 4. Change in the share of high-, medium- and low-emitting energy sources between 2008 and 2019 in the FBT industry's energy mix in the EU27 and TOP 8 countries

Country	France	Germany	Italy	Spain	Poland	Netherlands	Ireland	Romania
Share of RES in electricity and heat generation of the country (%)	12.3	28.5	36.3	29.3	10.7	22.3	28.9	21.0
Share of RES and Nuclear heat (share of LES) in electricity and heat generation of the country (%)	90.5	44.7	36.3	64.6	10.7	27.0	28.9	47.6

Source: Own calculation based on Eurostat database (energy balance data)

5. Discussion

In Chapter 4, we review whether the findings for the 2008 to 2020 period examined in this study are consistent with the observations in the literature on the situation, decarbonisation opportunities and efforts made by the energy-intensive sectors. In the following, we compare our results with the main findings in the sources of literature.

Our research results align with the results of Bajan et al. (2021), who concluded that the share of food production systems in total energy consumption has decreased in the V4 countries. However, they have already gained a more diversified picture regarding the energy mix. (Bajan et al., 2021). Looking at the energy intensity, we concluded that from 2008 to 2019, the value of the energy intensity index improved by 1.1 per cent at the EU level.

However, the data of the eight countries that play the most significant role in creation of value-added in the FBT industry showed a more diverse picture. In most countries, improvements were observed, but unfavourable trends emerged in Spain and Germany. According to researchers studying the V4 (Bajan et al., 2021), Poland has the highest share of energy from coal among the four countries in terms of the energy mix, which has been confirmed by our research (even in 2020, the share of high-CO₂ emitting energy carriers was 80 per cent in this country). Kanchiralla et al. (2021) analysed the energy and CO₂ intensity of processes in the Swedish food industry via a case study. Among other things, energy carriers examined each food industry process's energy consumption. According to their results, 55% of energy use in the Swedish FBT industry came from electricity (Kanchiralla et al., 2021), well above the EU average (34% in 2020 in the EU-27). According to their research, the share of renewables was also meagre among Swedish companies, which is also in line with our research results, although trends are becoming more and more optimistic: the use of high-emission energy carriers in the EU is relatively low, which decreased from 2008 to 2020 in all countries surveyed, without exception.

According to Sovacool et al. (2021), energy and carbon savings are not the only benefits of decarbonising the food and beverages industry, but cost savings, environmental protection, and worker satisfaction and health can also occur, which will set further research directions for researchers dealing with the topic, including us.

Conclusion

Food industry (together with agriculture) must meet the most basic human needs, it has about forty energy-intensive processes. Over the past two decades, improvements in energy efficiency in the sector have begun, with positive effects in several areas. In this study, we sought to answer how the food and beverages industry's energy intensity index and energy mix changed between 2008 and 2020. Our analysis first covered the evolution of energy intensity. The energy intensity index improved by only 1.1 per cent at the EU level over the period under review. As regards the energy mix, some degree of realignment has been observed in all countries. Based on the data of the EU27 and the TOP 8 countries, a positive picture emerged in connection with the energy mix of the FBT industry. The use of high-emission energy sources is relatively low, which decreased everywhere from 2008 to 2020 without exception. Overall, the EU's Food, beverages and tobacco industry has started on the road towards the energy and climate goals set by the EU.

Our research also had limitations. As Xu & Flapper (2011) point out, the methodology of research on energy use and energy intensity, the specific content of the applied indicators, and the processes covered by the research are primarily unknown in detail, because of which, for example, the values of energy intensity can also be volatile. This makes it difficult to compare the individual research results precisely.

Resources

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Progress in the Digital Competitiveness of EU Economies, Challenges and Risks

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Abstract

Research background: In the context of the current changes brought about by the 6-K wave, the area of developing countries' digital competitiveness is very important. Several indices are used to measure and compare this area. One of them is the Digital Economy and Society Index (DESI). It is a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU Member States, across five main dimensions: Connectivity, Human Capital, Use of Internet, Integration of Digital Technology, Digital Public Services.

Purpose of the article: The main aim of the paper is to investigate the progress in the technological readiness of digitalisation/digitization in terms of DESI in all EU countries and compared to the results, show the position of Slovakia across EU. The analysed period is set to 2017-2022. According to main aim, there was set the research questions: Does the internet coverage of the country affect its position in the DESI index? Who are digital leaders?

Methods: To solve this questions, identify the leaders countries and investigate Slovakia's gap in digital competitiveness, we used the methods of analysis and synthesis, correlation, and other methods of descriptive statistics. For complex calculations, we used the Statistica software.

Findings & Value added: At the conclusions, the leaders of EU countries in the field of digital competitiveness were identified. For Slovakia, there were set challenges and risks according to leaders' countries, which must be considered to improve the current situation in the mentioned area.

Keywords: digital competitiveness, DESI index, European Union

JEL classification: O33, O40

1. Introduction

The enormous impact of the Internet of things and digitization is present across the globe. Unrelenting technological progress and increasing technological pace have become essential features in all countries. The application of ICT has changed the way businesses (Pisár et al., 2022), people, and global innovation work. On the other hand, with the advent of new technologies, several challenges and risks are created that complicate the problems for policy makers. A strong emphasis is placed on governments and their roles, for which it is important to find a balance between the protection of the country's fundamental interests and the ability to ensure national competitiveness. It is nothing new that the digitization process enables countries to maintain global competitiveness, increase GDP, create jobs, or stimulate investments. ICTs therefore play a key role in connecting people, increasing investment and productivity, strengthening competitiveness (Stankovič et al., 2021).

Innovations in the field of digital technologies have become an integral part of business processes and organizations. The primary task of digitization is to facilitate and improve companies' business, increasing efficiency and effectiveness. Newly created business models in the era of digitization produce new business directions and techniques to create a better position on the market. Moving in business without new digital technologies is unthinkable and competing on the market is very difficult to the point of being impossible. It is technological progress that builds the recognition of companies on the market, influences

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innovation, with which competitiveness is closely linked (Vašaničová, & Gira, 2018). The transformation of digitization into all business sectors results in tough battles in the competitive global market. Being digitally competitive is very important for access to knowledge, easy transfer of new knowledge, technology, and capital (Martinčević, 2021).

In the economy, the digital revolution begins on a large scale at the end of the 20th century, when the Internet was put into economic use (Olczyk, & Kuc-Czarnecka, 2022). In the last two decades, the effects of ICT on economic growth have been a very frequent topic among economists (e.g., Stanley, Doucouliagos, & Steel (2018), Bilan et al. (2019), Nasab, & Aghaei (2009)). Many economists, such as Niebel (2018), Bilan et al. (2019) have been inclined in recent years to the opinion that the effect of increasing ICT is not always automatic but depends on implementation in different sectors. Therefore, it is better and more accurate to focus your attention partially on individual sectors and study the impact of ICT on education, health system, human development, profitability of companies, job creation, quality of life, etc. If we focus our attention on the creation of jobs, properly used technological innovations have a positive effect on the creation of new jobs. Therefore, government institutions strive for the best possible technological environment, which leads to the development of companies and the creation of jobs, thereby strengthening economic stability, which has a positive effect on economic development. (Aksentijević, Ježić, & Zaninović, 2021).

Today, the global economy is greatly influenced by the digital economy. Traditional economic aspects such as agriculture, are engaging and implementing more and more digitization in their activities, especially in developed countries (Niebel, 2018). As part of this set trend, governments and international companies are competing for the best possible position in the digital economic spectrum. The European Union aims to become a global leader in the digital economy by developing its unique single digital market strategy (Laitsou, Kargas, & Varoutas, 2020). "Digital economy and digital competitiveness are among the most frequently used terms referring to the perspectives of socio-economic development of contemporary society". In a broader sense, the digital economy describes the development of technological society and discusses the wide use of ICT in all spheres of human activity. Information and communication technologies help people solve common tasks more efficiently. They have an impact not only on individuals, but also on society, because they create new fields of possibilities for companies for the availability of their products and services. The main advantages of ICT in companies include increased efficiency and effectiveness of business processes, creation and transfer of knowledge, development of employee skills or a more accurate understanding of the user experience (Stanković et al., 2021).

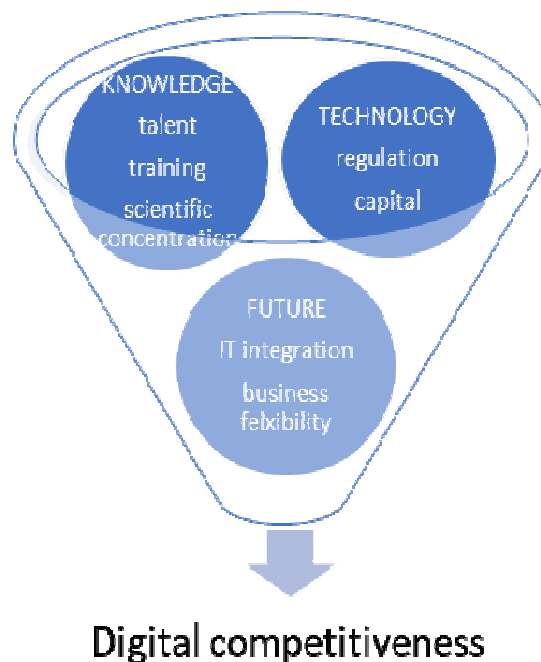


Figure 1. Digital competitiveness

Source: processed according to Martinčević (2021)

Even though the digital economy has received enormous attention in the last 15-20 years, it is a very complex phenomenon. "Measuring techniques and traditional tools of economic development cannot easily capture what is really happening in a digital world whose channels can be lost when a financial transaction occurs". A complication in the assessment of digital development and digital competitiveness of the economy is that they cannot be achieved only by using statistical data. This is what led economists to work together to create various indexes to compare and evaluate national digital economies (Laitsou, Kargas, & Varoutas, 2020). Stankovič et al. (2021) discuss the following best-known methodologies for quantification:

- Digital Economy and Society Index (*DESI*).
- The Network Readiness Index (*NRI*) is used to measure the propensity of countries to use the opportunities offered by ICT. This index also measures the performance of economies in using ICT to support competitiveness, innovation and well.
- The Digital Economy Country Assessment Program (*DECA*), it is a multidimensional model that analyses the readiness to use and the impact of digital transformation on national social and economic progress. It also evaluates the level of development of the digital economy in order to analyse shortcomings and opportunities for future growth.
- ICT Development Index (*IDI*), monitors and compares ICT development across countries over a certain time horizon.
- The e-Government Development Index (*EGDI*), which was developed to examine the development of e-Government in UN member states.

1.1 DESI index

We agree with the authors Bánhidi, Dobos, & Nemeslaki (2020), who discuss the fact, that the European Union has had a universal scoring system since 2014. This is the Digital Economy and Society Index (DESI). This index is intended to measure the readiness and progress of digital transformation (Russo, 2020), (Jenčová, 2021). The practicality of this index is in capturing the trend of the constantly advancing socio-economic digital transformation. The main advantage is the measurability in all EU countries (Bruno et. al., 2023). A comprehensive picture of the digital ecosystem is created and comparisons between Member States are enabled. The period between data collection and its subsequent publication is very long, which often leads to outdated and out-of-date assessments. Regardless of the problems and complications that have arisen, the DESI index is still a robust system that is considered the best in mapping the progress of digitization in Europe.

The use of the DESI index and its interpretation in the context of macroeconomic development is broad (Šofranková et. al., 2022). As Olczyk, & Kuc-Czarnecka, (2022) points out, some studies use DESI to examine the digital development of a given economy and then make recommendations about areas of the digital dimension that should be improved. Other studies use DESI to analyse economic growth, e.g., Stavitsky et al. (2019) confirmed a positive correlation, while Vyshnevskiy et al. (2020) found that the level of digitization of the EU economy as measured by DESI does not have a decisive effect on the growth rate.

The Commission have already adjusted DESI to align it with the four cardinal points set out in the Commission proposal for a Decision 'Path to the Digital Decade' which is being negotiated by the co-legislators. It sets EU level targets to be attained by 2030 to deliver a comprehensive and sustainable digital transformation across all sectors of the economy. The DESI scores and rankings of previous years are re-calculated for all countries to reflect changes in the underlying data and the choice of indicators. Several improvements have been made in the DESI indicators for the DESI 2022 reports. Under Human capital, the digital skills indicators have been modernised to better reflect the required digital competences of people. Under Connectivity, the Fibre to the premises coverage indicator has been added, which allows a more comprehensive analysis of gigabit connectivity. And under Digital public services, there is break in series for most of the indicators thanks to an improved methodology (European Commission, 2023).

Each year, the reports include country profiles helping Member States identify areas for priority action and thematic chapters providing an EU-level analysis in the key digital policy areas. Now, in 2022, DESI includes four dimensions (Table 1) with equal importance. As an example, the DESI score for country C was calculated using the formula (European Commission, 2023):

$$DESI(C) = Human_capital(C) * 0.25 + Connectivity(C) * 0.25 + Integration_of_Digital_Technology(C) * 0.25 + Digital_Public_Services(C) * 0.25$$

Table 1. Structure of DESI 2022

DESI dimension	DESI sub-dimension
1 Human capital	Internet user skills, Advanced skills and development
2 Connectivity	Fixed broadband take-up, Fixed broadband coverage, Mobile broadband, Broadband prices
3 Integration of digital technology	Digital intensity, Digital technologies for business, e-commerce
4 Digital public services	e-Government

Source: own processing according to European Commission (2023)

2. Methods

The main aim of the paper is to investigate the progress in the technological readiness of digitalisation/digitization in terms of DESI in all EU countries and compared to the results, show the position of Slovakia across EU. In the case of Slovakia, we want to identify the current position in the field of digitization and point out the position within the EU countries.

From the many indices monitoring the progress of countries in digitization, we chose the DESI index. This is mainly because our sample consists of EU countries and this index is built precisely to assess progress in EU countries. The analysed period is set to 2017-2022. The sub-goals are:

- To analyse internet coverage in EU,
- To analyse the development of DESI during the period 2017-2022,
- To analyse the sub-dimensions of DESI,
- To identify the progress in DESI sub-dimensions during the time,
- To identify the position of Slovakia in DESI.

According to main aim, there was set the research questions:

RQ1 - Does the internet coverage of the country affect its position in the DESI index?

RQ2 - Who are digital leaders?

Different methods were used to find answers to the research questions, especially according to the nature of the analysed problem. To solve these questions and investigate Slovakia's gap in digital competitiveness, we used the methods of analysis and synthesis, correlation, and other methods of descriptive statistics. For evaluation of the hypothesis, we used the Statistica 13 software.

3. Results and discussion

Firstly, we analysed the broadband internet coverage with more than 100 megabits per second as % of households. The last year due to lack of sources, was 2021. In each country, this internet coverage has increased over the years. In Malta and Luxembourg, this amount was about 100 %. Another country, where the broadband internet coverage in the last analysed year was about 90 % were Belgium, Denmark, Netherlands, Spain, Portugal, and surprisingly Bulgaria. Bulgaria was a surprise, because in other analyses it ranks last among countries. And the second reason for the surprise in the case of Bulgaria is the fact that in 2017 broadband coverage was just over 30%. This country is among the biggest "jumpers", that is, during the years 2017 - 2021, it achieved progress of almost 300%.

The progress in 2017 – 2021 can be seen in Figure 2. The darker the colour, the better the country's broadband internet coverage.

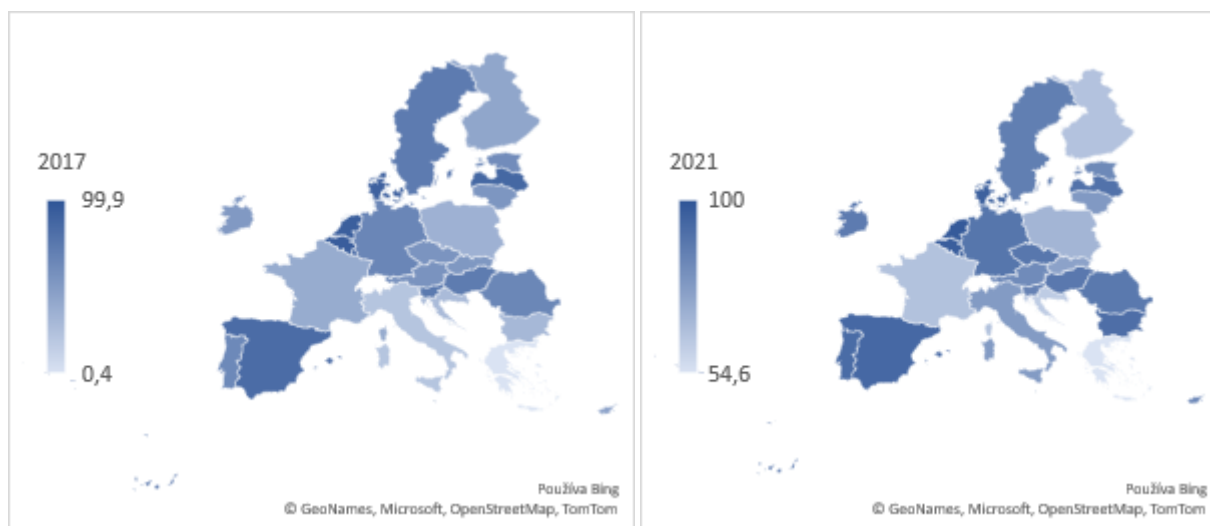


Figure 2. Broadband internet coverage - % of households with more than 100 megabits per second (Mbps)
Source: own processing

Using the data from broadband internet coverage and sub-dimensions of DESI, we try to answer the research question. **RQ1** - Does the internet coverage of the country affect its position in the DESI index? To answer it, we used Correlations. At a significance level of 5%, we correlated with the results shown in Figure 3 and Table 2.

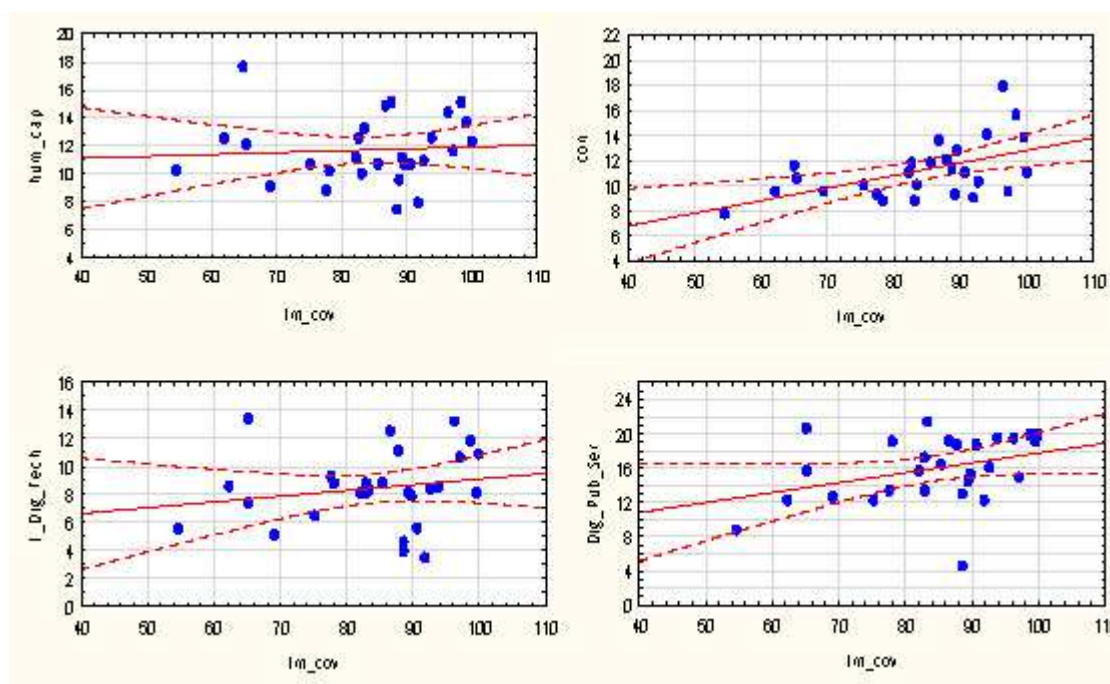


Figure 3. Correlation results
Source: own processing

Table 2. Correlation results

	hum_cap	con	I_Dig_Tech	Dig_Pub_Ser
Int_cov	0.067898	0.527578	0.186945	0.351714

Source: own processing

Notes: *Int_cov* – Broadband internet coverage,
Con – Connectivity,
Dig_Pub_Ser – Digital public services

hum_cap – Human capital,
I_dig_tech – Integration of digital technology,

From the calculated correlations, the highest correlation was between broadband internet coverage and connectivity sub-dimension, in amount of 0.527578. This means, that there is moderately strong direct linear dependence. Low correlation values were detected between broadband internet coverage and other sub-dimensions. There was weak direct linear dependence, while the lowest value and therefore almost no dependence was between broadband internet coverage and human capital (0.067898).

The development of countries' performance in the DESI index during the years has a growing tendency. For each EU country, the values of this index increased from year to year. Some countries have made more progress, some less. Compared to 2017, Denmark, Finland, the Netherlands, Ireland, and Italy adjusted their position most significantly. The smallest progress was in Romania and Latvia. In the case of Slovakia, there is always growth in DESI values throughout the monitored period. The biggest year-on-year growth was achieved in the last two analyzed years. In the Figure 4 we can see the first and last analysed years made by line and other years by columns.

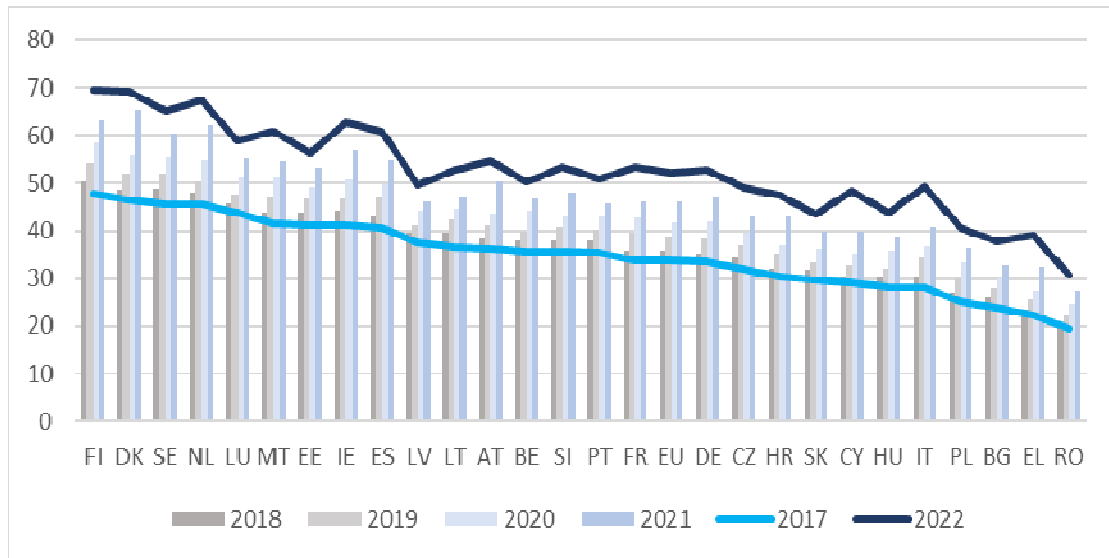


Figure 4. Development of total DESI index
Source: own processing

To answer the research question 2, „Who are digital leaders?“, we calculate the mathematical difference and shows the results in Figure 5. The darker the colour of the country, the more progress the country has made. We also consider the achieved values of the DESI index in the analysed period and based on these facts we subsequently identified digital leaders across the EU. The Finland, Denmark and Netherlands are the digital leaders according to our research.

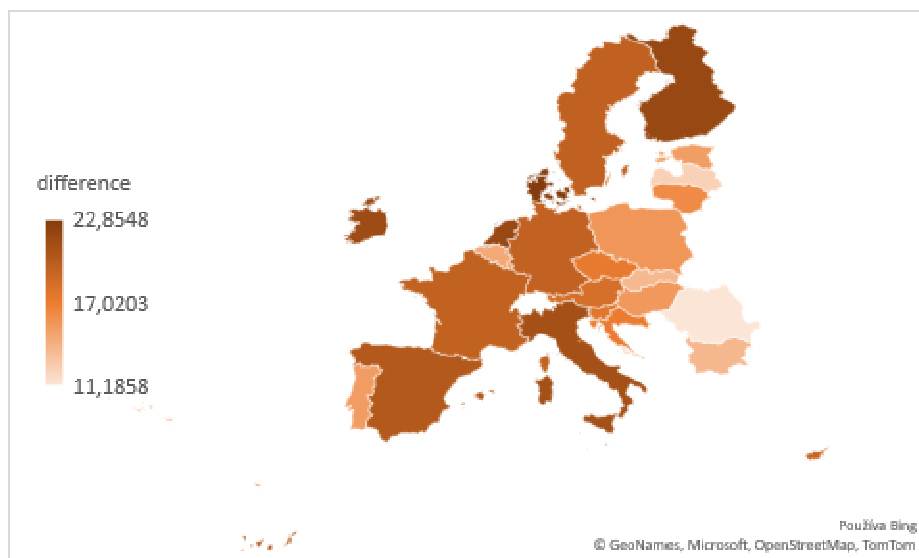


Figure 5. Difference in total DESI across EU
Source: own processing

Since the results in 4 sub-dimensions enter the DESI index, we also analysed those with development during the monitored years. Figure 6 shows the development in sub-dimensions in the first and last year, i.e., in 2017 and 2022. The chart shows a significant progress of countries, even in terms of individual sub-dimensions. The biggest progress was in the Connectivity sub-dimension.

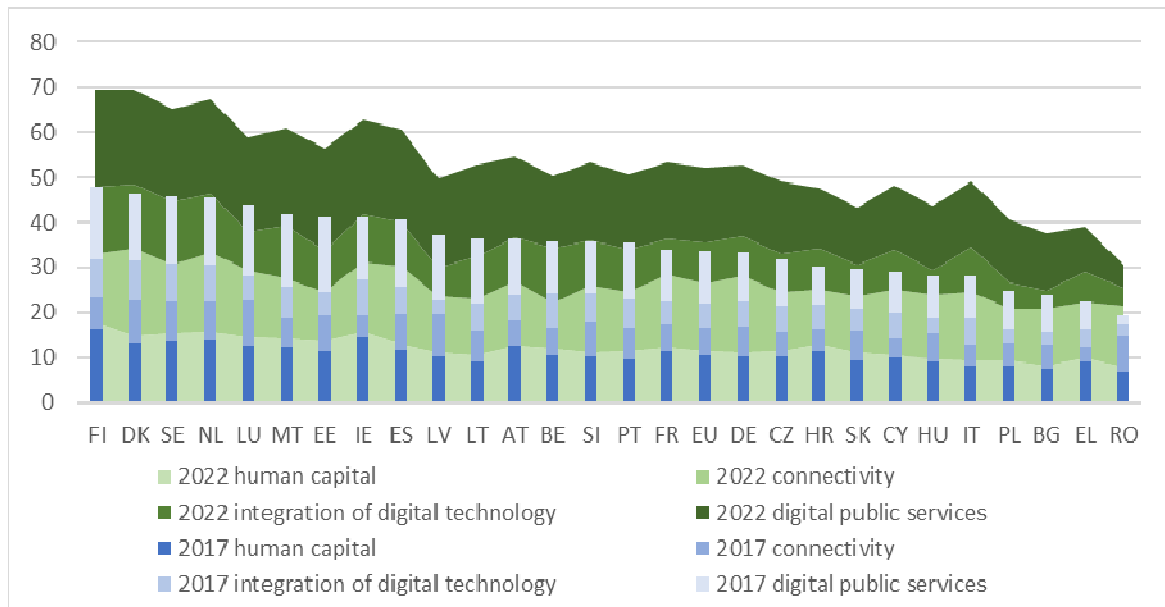


Figure 6. DESI development in sub-dimensions
Source: own processing

For a closer look at how individual sub-dimensions of DESI looked in 2022, Figure 7 serves. We can see how the ratio between individual sub-dimensions changed in individual countries. Croatia had the most balanced distribution between sub-dimensions. The highest values were achieved mostly by all countries in the Digital public services sub-dimension. However, such a situation wasn't in Germany, Italy, Cyprus, Hungary, Greece, and Romania, where there was a more or less significant dominance in the Connectivity sub-dimension.

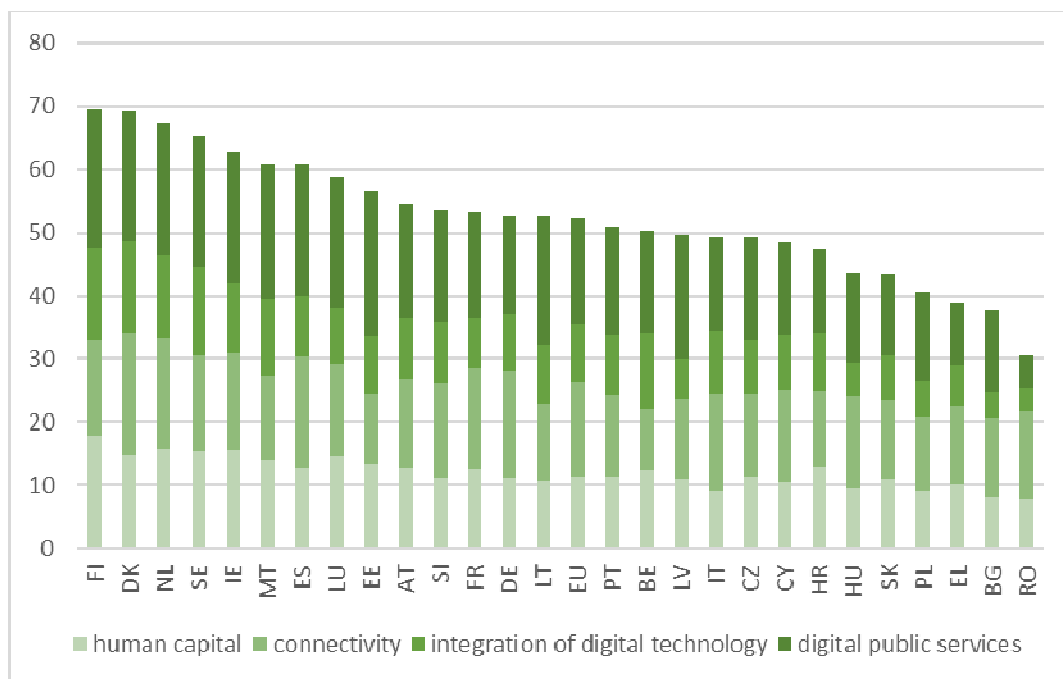


Figure 7. Sub-dimensions of DESI in 2022
Source: own processing

For evaluation of Slovakia's position, it is necessary to compare it. To evaluate the strengths and weaknesses, it is good to compare us with the best. We compare the performance in sub-dimensions in the year 2022. We compare Slovakia's position with the best country, also with the EU average and, finally, with the weakest. This is because at the weakest country we can see how far we are from the lowest values. It is also clear that we are far from the best EU countries, but an achievable goal for Slovakia can also be achieving values higher than the EU average. That would be desirable in our case.

As we can see from the Figure 8, the position of Slovakia compared to selected countries, isn't very well. We are almost at the level of the EU average only in the Human capital sub-dimension. In the other subdimensions, we are more behind the average, even behind the best country overall. Our weakest sub-dimension is Integration of digital technology. So, if we want to keep up with other EU countries, we need to improve in this area.

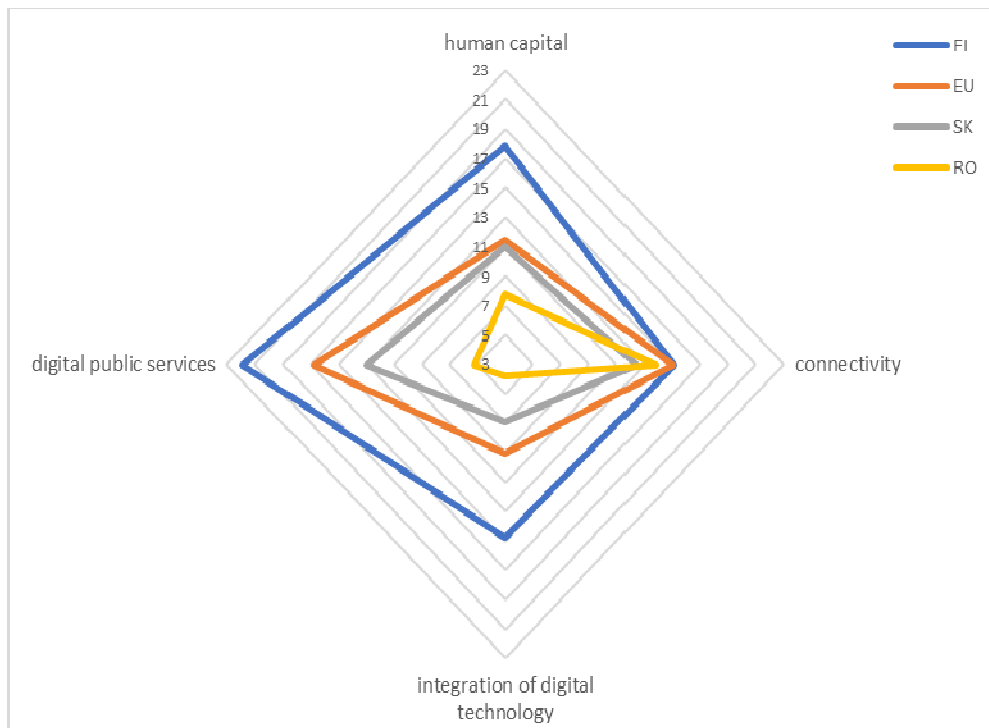


Figure 8. The position of Slovakia across sub-dimensions in 2022

Source: own processing

Conclusion

Almost every sphere is currently somehow connected with technology and digitization. A country that develops and supports this area with its policy is competitive in the context of other countries, not only in the given region, but also globally, as it is a very important area today. And not only in the context of the performance of the country, but also in the context of the development of industry and other sectors of the country, as well as the improvement and simplification of the daily life of its inhabitants.

This paper evaluated the performance of the EU countries within the DESI index. It is one of the many indices that evaluate the digital performance of the country. We identified the leader countries in this area, and, of course, the relationship between broadband internet coverage and sub-dimensions of DESI. These two areas were the subject of our research questions. As for the relationship between broadband internet coverage and sub-dimensions of DESI, moderately strong direct linear dependence was identified only in the case of sub-dimension Connectivity. In the field of digital leaders' countries, after considering several circumstances, we have identified Finland, Denmark, and the Netherlands as leaders. When evaluating the achieved level of the countries in the DESI indexes, we considered progress in the period 2017-2022, and the results achieved not only in the overall ranking, but also in the division into sub-dimensions.

Finally, we also evaluated Slovakia's position in the context of the best country and the EU average. Here we must state that the position of Slovakia compared to selected countries, isn't very well. The weakest place in Slovakia is the sub-dimension Integration of digital technology. This area is focused on the use and utilization of various forms of digital technologies in SMEs. Weak results are in the use of

software packages in enterprises, enterprises analysing data, SMEs selling online and turnover. Until the business sector improves in these areas, we cannot even expect a radical improvement in Slovakia's position within the DESI index.

Like any other research, our investigation has certain limitations. By using other indices, we could in the future better compare the results not only across countries, but also across other approaches and indicators that make up this area. It would also be beneficial for further research, to expand the sample of countries and go into research outside the EU countries as well. Perhaps it would be beneficial if we had a different perspective on the research area.

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Assessment of Profitability and Financing of the New Section of the PPP D4 Highway

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Abstract

Research background: The intention of the EC is the economic sustainability of the projects. The Czech Republic does not track the total amount of road transport losses, therefore we do not even know its proportional part for each project, so we cannot evaluate the economic sustainability of projects in a relevant way.

Purpose of the article: Assessment of the profitability of the PPPD4 project. Addition of unpublished data (IRR, FV, annual installment amount). Calculation of total road transport losses in the Czech Republic.

Methods: Determination of CF value by iterating between baseline CF and NPV. Determining the discount also by iteration. Calculating ROI. Model calculation of PPPD4 revenue with high traffic density of the D4 motorway and toll prices in Spain.

Findings & Value added: Price conversion from NPV to FV, calculation of the annual installment that The Czech Republic will pay for PPPD4. The calculations performed revealed an IRR value of 5.35%. The ROI has become negative, which leads to the conclusion that the PPP project is not profitable as an investment. If PPPD4 were an unsubsidized commercial project, the toll prices would have to be 2.5 times more expensive than the toll prices in Spain for the revenues to equal the costs. The originality of this article lies in the inclusion of a proportional part of the target costs associated with transport in the calculation of the profitability of the PPPD4 project and thereby making the calculation of the efficiency of the investment more precise.

Keywords: transport infrastructure, internal rate of return, profitability, PPP D4, the state budget

JEL classification: O3

1. Introduction

Financing the construction of transport infrastructure is one of the highest non-mandatory expenditures in The Czech Republic. In 2021, the total transport capital expenditure amounted to CZK 82.33 billion, which is "43.9% of all capital expenditure of the state budget 2021" (The Ministry of Transport of The Czech Republic, 2022).

Over the past 10 years, the state budget has had a significant deficit 8 times. The total balance over the past 10 years exceeded one trillion crowns (-1080 billion CZK). This fact will undoubtedly put pressure on state finances. Especially if we take into account the still unsolved phenomena's of the ageing population, the effort to fight climate change, and to achieve, due to the green transition, an economy with zero greenhouse gas emissions. Not to forget the added costs of the Covid-19 pandemic, also the energy crisis, as well as the costs associated with the war in Ukraine and its economic consequences.

It is not the task of the authors to evaluate or define some societal challenges, but it is clear that ambitious plans will require considerable financial resources.

If we accept the thesis that we should treat public things with the care, the question arises whether the construction of the transport infrastructure is in line with this thesis.

The current transport concept of The Czech Republic is defined by the "Public Transport Concept 2020-2025 with a view to 2030". In the document, the Ministry of Transport advocates the so-called Swiss model of co-financing public services in transport (The Ministry of Transport, 2021).

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There is no doubt that investment in transport infrastructure is a project of public benefit. Therefore, the CBA (Cost-Benefit Analysis) method is used to assess the project. However, PPP projects (private and public sector partnerships) make it possible to look at the construction and operation of the transport infrastructure from a different perspective. From the point of view of a private entity, this is a standard investment project, and therefore its assessment should be carried out using standard methods, for example, using the determination of net present value (NPV) or internal rate of return (IRR). From this perspective, 2021 can be considered a turning point, as on 15th February 2021 the Minister of Transport signed a concession agreement with the representatives of VINCI Concessions and Meridiam. According to this contract, together with the construction of the new 32 kilometers of highway between Příbram and Písek, the concessionaire will operate and maintain the perfect condition of another 16 kilometers of the D4 highway and the I/20 road, which will be renewed and retrofitted with, among other things, highway technology and safety equipment (The Ministry of Transport, 2021).

Transport infrastructure is the subject of a number of research projects, but the authors did not find a single professional work that would quantify the total economic loss of transport from the states position, or at least divide the resources invested in transport routes from its own resources (from sales or other income) and from foreign resources (from state and other subsidies).

According to Penyalver D. et al. (2019) *"The efficiency of major transport projects in terms of resources should be always a critical factor in decision-making"*, in his work he also states that in addition to the results from the CBA, other political considerations are involved in the decision-making. In their contribution, the authors Bujna et al. (2012) *"explains the terms of profitability and effectiveness"*. Lielgaidina et al. (2012) developed *"The study focuses on the sustainable approach of using natural resources for the construction and maintenance of roads with respect to the environment, economy and society"*. Horcher et al. (2021) in their paper on the economics of public transport states: *"Efficient resource allocation is critical"*. Why is it important to know the total traffic loss? Verburg (2019) writes in his work: *"The sense of purpose that an attractive ecological and economically viable vision of the future inspires, acts as a powerful motivating force for those who share the vision"*.

According to Wolfson (2015) *"is economic theory as such – as a descriptive and refutable science"*. In accordance with this statement, the authors believe, if the given state does not have a quantified proportion of the total losses from transport, it cannot relevantly assess the economic efficiency of partial transport investment constructions or evaluate the economic direction of transport. Carrying out the overall balance (profit/loss) of the entire transport of a given state and calculating the economic efficiency of investments in transport routes with the inclusion of proportional losses (of the state) from the entire transport appears to be a neglected area. Therefore, the authors decided to at least partially fill this oversight with this paper.

The authors are aware that individual transport structures are unique in their own way. Consequently, they decided to use the highway construction as a model serving the authors' intention to assess whether the project in question is profitable from the state's point of view.

The article, therefore, sets the following goals: (1) Calculate the annual instalments that The Czech Republic will pay to the winning consortium; (2) Evaluate the profitability of the PPP D4 project from the point of view of The Czech Republic.

The objectives stated above imply two research questions that the authors asked themselves: (1) What must the toll price be to pay the annual instalment of the accessibility price? What is the Future Value (FV) in each year of the project if we know the NPV? (2) Can the financing of this transport route be profitable?

The authors' work was based on the following hypotheses:

H1: Driving one km of the new section of the D4 highway, calculated per vehicle, costs more than CZK 6.295 (the highest toll rate in The Czech Republic for using the highway).

H2: Financing the construction and operation of the given section D4 by the PPP project under the given conditions is unprofitable.

2. Methods and data

The Ministry of Transport of The Czech Republic has published only the current value of the PPP D4 project in NPV (hereinafter the project), which amounts to CZK 17.8 billion. The stated value of the project was valid at the time of signing the contract. The concluded contract assumes that after the construction of the new 32 km D4 highway section and the renewal of 16 km of the existing D4 section,

the given section with a total length of 48 km will be operated and maintained by the concessionaire for a period of 24 years and four months.

For an overview and comprehension, we have summarised the individual sub-tasks of the project in Table 1, see Table 1.

Table 1. Subtasks of the project

Summary of subtasks of the project			
Task n.	Partial task	Time calculation	Note
1	Construction 32 km	3 years and 8 months	44 months
2	Management and maintenance 32 km	20 years and 8 months	248 months
3	Retrofitting of a 16 km section	24 years and 4 months	292 months
4	Management and maintenance of a 16 km section	24 years and 4 months	

Source: own processing (2023)

In order for the authors to be able to answer the research questions, to comment in a qualified manner on the hypotheses and fulfil the goals of the article that they have set, it is not enough only to know the current value of the project. Knowledge of the CF value in the individual years of operation of the subject of the contract also appears to be key (or project lifetime).

The initial task will be to determine the value of CF in individual years, during which the value of NPV will be equal to 0. The complexity of the task is increased by the fact that the contract with the concessionaire is not concluded for complete years, but for the previously mentioned period of 24 years and four months (Kubica, 2023).

The starting point for determining the CF value will be the Formula for calculating NPV [Fact sheet] (Investopedia and Cambridge Dictionary). Own processing (Kubica, 2023):

$$NPV = \sum_0^T \frac{CF}{(1+DIS)^T} \quad (1)$$

where: NPV - net present value; CF – cash flow; DIS – discount rate; T – number of years since investment (power/exponent)

Since the development of prices in 2021, or 2022 shows that the influence of inflation cannot be neglected, we modify the initial formula (1) into the following form:

$$NPV = \sum_0^T BCF \left(\frac{1+INF}{1+DIS} \right)^T \quad (2)$$

where: NPV – Net Present Value; BCF – basic CF (Present Value CF at the time of project acquisition); INF – Inflation; DIS – Discount Rate; T – number of years since investment (power/exponent)

The CF value is then determined by iterating between the basic CF and the NPV, a chain of CF values divided into years according to the length of the project period, at which the NPV value becomes 0, is examined (Kubica, 2023).

To determine the future value [Fact sheet] (Cambridge Dictionary) of the project and its division into individual years, we will use the formula for calculating the future value for several cash flows (3) [Fact sheet] (Saylor Academy). Own processing. (Kubica, 2023):

$$FV = \sum_0^T PV(1 + INF)^T \quad (3)$$

Where: FV – Future Value; PV – Present Value (in a given year is equal to BCF - basic CF);
INF – Inflation; T – number of years since investment (power/exponent)

The total future value of the project and its division into individual years determines the actual amount of instalments that The Czech Republic will pay each year for all provided project services. By dividing the instalment between the retrofitting of the old 16 km section and the construction of the new 32 km section, we use the expenses for the 32 km section.

Another key input for determining NPV, CF, or FV is the discount rate. The discount rate is normally calculated using the 'Adjusted Present Value' (APV) method, the 'Cash Flow to Equity' (CFE) method and

the 'Weighted Average Cost of Capital' (WACC) method. Unfortunately, none of these methods can be used in our case, because the necessary data for calculations are blacked out in the contract between the Ministry of Transport and the contractor (Kubica, 2023).

The starting point for determining the value of the discount rate is the information published on the professional server zdopravy.cz, which states in its article on the project: "*Financial closure was made with an availability payment of 17.83 billion crowns, which in nominal terms amounts to 34.61 billion over the entire duration of the contract.*" The server further states in the article that: "*the interest rate is, in the case of a PPP project on D4, fixed for the entire duration of the concession contract*" (The Ministry of Transport).

Again, with the help of an iterative calculation, the amount of the discount rate is determined, at which the parameters of the contract related to the project in question will be observed (Kubica, 2023).

The discount rate of the investment is equal to the internal rate of return (IRR) in the case that the net present value of the investment is equal to 0. The discount is therefore again determined by iteration using the method of numerical modelling according to the formula (Kubica, 2023).

$$0 = \sum_{t=0}^n \frac{CF_t}{(1 + IRR)^t} \quad (4)$$

Since this is not a standard project, it is necessary to adjust the profitability calculation and we will work with income and expenses instead of sales and costs. Return on Investment is then calculated using formula (5):

$$ROI = \frac{(incomes - expenses)}{expenses} * 100 [\%] \quad (5)$$

Expenses are calculated in FV, according to formula (3). Since the incomes from transport are not consistent in The Czech Republic, the determination of incomes for the 32 km section of the D4 highway, as well as the determination of toll prices, is calculated in a model way. In The Czech Republic, passenger cars do not pay tolls, the collection of tolls is replaced by the payment of "highway stamps" for a significant number of vehicles. This "highway stamp" covers an unlimited number of km driven, so it is not possible to transfer these incomes to our model section (Kubica, 2023).

For the above reason, the toll prices of the 37 km section of the AP-71 highway: León – Astorga in Spain, which will subsequently be converted to 32 km, were chosen as a model. The economy of Spain, per capita in purchasing power parity, corresponds to the economy of The Czech Republic, and the highway section that was chosen has a similar length and character to the model section of D4. For the auxiliary calculation (with Spanish prices), it is not decisive what toll model was chosen, because in the end the amount of the toll will be determined to create parity with the amount of the annual instalment that The Czech Republic will pay for accessibility, also converted to a 32 km section.

The calculation of income for the ROI will be carried out with the actual measured intensity and the composition of traffic on the given D4 section. The results will be compared with prices and revenues from tolls in The Czech Republic, also based on the modelling of the number of measured vehicles driven.

Given that the authors hypothesize the unprofitability of the project, logically it is necessary to check the possibilities of cross-financing from other sources arising from transport.

3. Results

From the Discount Iteration (Kubica, 2023), FV CF and PV CF, it can be seen that in the case of the contracted price for the project expressed as an NPV value of CZK 17.8 billion and an FV of CZK 34.6 billion, the discount rate determined by the iterative method (IRR) is 5.35 % (Kubica, 2023). The share of the total expenditures of PPPD4 attributed to expenditures for project administration and maintenance is calculated according to similar current expenditures of the ŘSD (road administrator) (Kubica, 2023). Out of a total of CZK 34.608 billion, CZK 3.852 billion will go to administration and maintenance. For the first annual instalment, The Czech Republic will pay CZK 1.053.94 million. The distribution of total project expenses is shown in Table 2. Detailed tables with calculations can be viewed online (Kubica, 2023).

Table 2 shows that (30,3+2,6) CZK 32.9 billion will be allocated to the new 32 km section, which is 94.97% (87.55%+7.42%) of the total costs of the project. When recalculating the total amount of the first instalment of the payment for accessibility in the amount of CZK 1,053.94 million, CZK 1,001 million

will fall from this portion to the 32 km section. CZK 1.7 billion, which is 5.03%, remains for the retrofitting and management of existing sections of the project.

Table 2. Total distribution of PPP project expenditure D4

Total distribution of PPP D4 project expenditure		
	[mil. CZK]	[%]
Expenditure for the construction of 32 km of the new highway D4	30298	87.55
Expenditure for administration and maintenance of 32 km (2568 mil. CZK)	3852	7.42
Expenditure for administration and maintenance of 16 km (1284 mil. CZK)		3.71
Expenditure for retrofitting 16 km of the old highway D4	458	1.32
Total expenditure for PPP D4 (CF)	34608	100

Source: own processing, data: The Ministry of Transport of The Czech Republic.

The Directorate of Roads and Highways operates a beta version of the Automatic Traffic Counting System – ASD (Ředitelství silnic a dálnic, 2020). From the result of the measurement using the counting device, which is located on 78.40 km of the existing D4 highway, carried out for the period from 1/1/2021 to 31/12/2021, 3 200 320 vehicles passed, which means an average of 8 768 vehicles per day.

Although the study of the traffic intensity found that the traffic intensity changes at each intersection. In our model example we work with the same traffic intensity in the entire highway section.

Table 3 shows the recalculated average toll prices in The Czech Republic as well as the recalculated toll prices in Spain. From the intensity and composition of vehicles, we will perform the calculation directly for the model 32 km section of the D4 highway, see table 4.

Table 3. Toll prices in Spain and average toll prices in The Czech Republic

Tolls - rates of The Spain		Tolls - rates of The Czech Republic		
Group (maximum permitted weight)	Average toll rate for a given group	Group (maximum permitted weight)	Interval of toll rates for a given group	Average toll rate for a given group
(0 t - 3,5t)	3,64	(0 t - 3,5t)	0	0
(3,5 t - 7,5 t)	4,92	(3,5 t - 7,5 t)	0,042 - 0,116	0,70
<7,5 t - 12 t)		<7,5 t - 12 t)	0,861 - 2,408	
≥12 t)	5.96	≥12 t)	2,253 - 6,295	3,93

EUR = 25,645 CZK

Source: own processing (2023), data: (Road and Motorway Directorate CZE and ESP)

Given that the toll rates in The Czech Republic reflect the emission class, which cannot be determined from the composition of the vehicles, the average toll price is determined as an arithmetic average. The Spanish toll rates are converted by the average annual exchange rate of 2020 and adapted to the 32 km model section.

From the Table 4 below, it is clear that with Czech prices, we will collect 39.88 million CZK per year for the 32 km section. For comparison, if we used Spanish prices, we would have collected CZK 400.73 million.

When comparing the ROI calculation with toll incomes in the amount of CZK 39.88 million per year (table 4) calculated with Czech prices vs. ROI with toll incomes calculated with toll prices in Spain to the amount of CZK 400.73 per year (Table 4) and with annual expenses for the 32 km new section to the amount of CZK 1001 million, we get the following results. ROI from tolls with Czech prices is -96%. Since the toll provides only one part of the income, it is necessary to treat this result as such. As a result, only 4% of the expenditure for the availability of the 32 km section will be paid from the toll revenue.

Much more interesting is the result of the model example with Spanish toll prices, where the ROI came out to be -60%. If we were to collect tolls on the 32km section of the Highway D4 project according to the Spanish price list and with the current intensity and composition of traffic on Highway D4, the project would create a loss of 60%, i.e. it would be unprofitable.

By dividing the service price for the 32 km section (CZK 1,001 million) by the total collection of tolls with Spanish prices (CZK 400.73 million), we obtain a multiple of how many times the current prices must be higher in order to be able to cover the repayment for availability. The prices would have to be

2.5x higher than the current prices in the model example, which gives us the answer to the second research question. In order to pay the instalment for availability, we would have to collect 9.09 CZK from passenger cars, 12.29 CZK from trucks and 14.89 CZK from trucks for each kilometre driven.

Table 4. Comparison of tolls for the 32 km PPP D4 section (Spanish and Czech prices)

Composition and intensity of traffic D4 (at 78.4 km)			Tolls - rates of the Czech Republic			Tolls - rates of the Spain		
	vehicle per year	vehicle per day	average toll rate [CZK/km]	toll vehicle/km [mil. CZK]	toll vehicle/32 km [mil. CZK]	toll [CZK/km]	toll vehicle/km [mil. CZK]	toll vehicle/32 km [mil. CZK]
Others	189070	518	0	0	0	3.64	0.69	22
Motorcycles	30660	84	0	0	0	3.64	0.11	4
Cars	2149485	5889	0	0	0	3.64	7.82	250
Cars with trailers	64970	178	0	0	0	3.64	0.24	8
Vans	318280	872	0	0	0	3.64	1.16	37
Lorries (LGV)	159140	436	0.70	0.11	4	4.92	0.78	25
Buses	11315	31	3.93	0.04	1	5.96	0.07	2
Lorries with trailers	50735	139	3.93	0.20	6	5.96	0.30	10
Trucks (HGV)	226665	621	3.93	0.89	29	5.96	1.35	43
		8768						400.73
					39.88			

Source: own processing (2023), data: (Road and Motorway Directorate CZE and ESP)

Table 5. The resulting cost-effective toll prices for paying the full instalment for availability

Composition and intensity of traffic D4 (at 78.4 km)			Profitable prices		
	vehicle per year	vehicle per day	toll [CZK/km]	toll vehicle/km [mil. CZK]	toll vehicle/32 km [mil. CZK]
Others	189070	518	9.09	1.72	55
Motorcycles	30660	84	9.09	0.28	9
Cars	2149485	5889	9.09	19.54	625
Cars with trailers	64970	178	9.09	0.59	19
Vans	318280	872	9.09	2.89	93
Lorries (LGV)	159140	436	12.29	1.96	63
Buses	11315	31	14.89	0.17	5
Lorries with trailers	50735	139	14.89	0.76	24
Trucks (HGV)	226665	621	14.89	3.37	108
		8768			1001

Source: own processing (2023)

From table 5 above, it explains that the investment of the PPPD4 project, if financed only from tolls, would be profitable with the above prices, which are valid for the same composition and intensity of vehicles. These prices are 2.5 times higher than the prices in Spain and it is not realistic for them to be paid by the user. Also, it should be added that the expenses of 1001 in the model example are increased every year, so the prices correspond to profitability only for the first year, they would have to be increased proportionally every year.

Road transport is not a legal entity, and therefore the revenues are revenues from the state budget, insurance companies and other entities, or from subsidies from various budgets. Funds are redistributed and some of them are not returned to transport, so Table 6 cannot be viewed as a profit and loss statement, but only as an overview of revenues and costs thematically linked to road transport.

Losses from traffic accidents cannot be excluded, which mainly include the costs of HZS, the police, courts, health and social expenses, such as disability pensions and the other costs of people injured in accidents, as well as material damages, etc. A comparison of revenues and costs from road transport, which do not depend on subsidies, results in a loss of CZK 8.5 billion.

Of the 27.8 billion CZK collected for liability insurance for damage from the operation of motor vehicles, in 2020, 13.1 billion CZK was for the payment of material damages from traffic accidents, and 14.7 billion CZK from collections were the costs and profit of insurance companies. Of the total 23.9 billion CZK of accident insurance in 2020, 12.6 billion CZK was used to cover claims and 11.3 billion CZK went to the costs and profits of insurance companies.

Table 6. Overview of revenues and costs thematically connected with road transport

CZK billion	Measurable income	CZK billion	Measurable expenses
5.8	fees for using highways and expressways	81.4	losses from traffic accidents
11.5	toll (collection 2020)	0.4	Road tax administration (1/15 of the tax)
5.9	road tax	0.8	Toll collection costs
77.9	consumption tax (only mineral oils converted to road transport, 2020)	23.4	Total expenditure on repairs and maintenance of road infrastructure
27.8	motor vehicle liability insurance (2020)	0.6	SFDI activity costs
23.9	accident insurance (2020)	1.6	Costs of purchasing buses - part covered by subsidy
152.8	Revenues without subsidies - subtotal	43.4	Investment construction (2020) covered by subsidies
43.4	Subsidy for investment costs	9.7	Costs for purchasing part of tickets for passengers - regular bus transport without public transport (2020)
29.7	Coverage of remaining accident costs from social, health insurance and the state budget (note: this is not income from transport)		
1.6	Subsidy for the purchase of buses		
9.7	Subsidies for public passenger transport - Regular bus transport without public transport (2020)		
84.4	Subsidy proceeds		
237.3	Total revenues	161.3	Total expenses

Source: own processing (2023), data: (The Ministry of Transportation of The Czech Republic 2021)

4. Discussion

The weak side of dividing the ratio of the total price of the project into the price for construction, management, maintenance and retrofitting, consists of deriving the prices of management and maintenance and retrofitting from already implemented projects, especially ŘSD, which may differ from the prices offered by the concessionaire. Given that the expenses for administration, maintenance and retrofitting are marginal compared to the price of the construction of a new 32 km section of highway, any deviation from the actual costs of administration, maintenance and retrofitting is also marginal.

The partial result is the total price at the end of the project, which is shown in table 2 as Future Value and was calculated at CZK 34.6 billion. This is the price that The Czech Republic will pay for the concessionaire's project in annual instalments over 24 years and four months. The last column in Table 2 is a control calculation, where each relevant annual instalment corresponds to the net present (residual) value in the given year, i.e. the value calculated on the date of signing the contract.

In order for income to be equal to expenses, a car driver would have to pay CZK 291 and a truck driver CZK 476 to drive on the model 32 km section D4, which is unfeasible from a commercial point of view. It is worth noting the fact that the project is profitable only if the prices are 2.5 times higher than the prices in Spain. For the overall assessment of the effectiveness of the project, 2.5 times higher prices in combination with the absolute price for driving the given section are economically unacceptable, despite the fact that the density and structure of traffic, the nature and number of objects of the two assessed highways may differ. The fact that the toll income is not enough to cover the project's expenses means that the project is also cross-financed from other sources.

The analysis of income and expenses from Table 6 is a very complicated task because in fact tax revenues are income of the state budget and not directly from road transport. For example, the SFDI budget received CZK 8.4 billion (The Ministry of Transport) from consumption tax collection, while the share of road transport in the collection of this tax amounted to CZK 77.9 billion, i.e. the difference of this amount remained in the state budget. In the same year, SFDI received a subsidy of CZK 37.3 billion from the state budget. The transport financing system does not make it possible to find out in a simple way what percentage of this transport is financed by subsidies, because part of the subsidies is provided by the state,

part by municipalities and subsidies from The EU. Some subsidies (e.g. for vehicle fleets) are drawn directly by commercial companies. This ignorance creates a paradigm that transport in The Czech Republic is financially healthy.

The authors compiled Table 6 in order to find out what part of the road transport costs is financed from revenues that are not thematically connected with transport and what part must therefore be subsidized from other sources. The results proves whether transport will generate enough resources to finance the PPP D4 project, or whether its financing will once again be a claim on the state budget.

From the balance of unsubsidized incomes from road transport in the amount of CZK 152.8 billion and expenses in the amount of CZK 161.3 billion, it shows that road transport created a loss of CZK 8.5 billion in 2020. The disputable point of this assessment is the non-inclusion of part of the revenues, specifically CZK 29.7 billion, which cover the relevant part of the costs of the loss of traffic accidents. This part of the costs is covered by social and health insurance as well as the budgets of the Police of The Czech Republic and the HZS. According to the authors, these costs are not covered by revenue from transport, and their inclusion would unjustifiably favour road transport when making comparisons with other types of transport. Even if we recognized these revenues, road transport was in surplus by CZK 21.2 billion in 2020.

If the financing of transport is perceived by the Government of The Czech Republic as a whole and the financing of the PPP D4 project is part of this whole, it is important to take into account the result of financing all types of transport. Road and rail transport account for 98% (The Ministry of Transport) of all transport services implemented in The Czech Republic, therefore the authors evaluated the revenues and costs of rail transport as well, respectively and of both dominant modes of transport as a whole.

Railway transport revenues, which cover operating costs, are made up of only 25% of sales (CZK 8.5 billion) and 75%, CZK 34 billion of costs must be subsidized. In railway transport, investment costs for construction in the amount of CZK 29.6 billion were 100% covered by subsidies. Part of the subsidy of CZK 15.5 billion was received from SFDI (state transport infrastructure fund). So, in effect, this organization received a subsidy in order to provide a subsidy. In 2020, railway transport needed CZK 72.1 billion to cover overhead and investment costs from subsidies. Subsidies were also provided in rail transport for fares, purchase of seats, etc., these are not included in this amount (The Ministry of transport and railway administration).

Even the potential profit of CZK 21.2 billion for road transport cannot offset the huge loss of rail transport. It is clear from the above that the PPP D4 project cannot be financed from the revenues of road and rail transport, because these modes of transport are collectively unprofitable in The Czech Republic.

Unprofitable transport management actually means that transport does not generate enough funds for investment. The PPP D4 project must be subsidized by the state budget.

The authors also assessed the substantive side of the project. If the realization of construction and subsequent maintenance through a PPP partner would be cheaper than when realized through ŘSD, then the savings generated are a benefit of the project. The authors cannot explicitly state this benefit, so one can only speculate. If the present value of the total benefit over the lifetime of the project exceeded the project's expenses, then the project would be profitable. However, this profitability does not change the fact that the project does not generate sufficient income from operation to cover the expenses incurred for construction and subsequent operation.

Table 6 also does not include fees that cannot be precisely quantified. Costs for health problems and global warming (CO₂), costs of congestion in road transport, costs of energy dependence in transport, costs of financing illicit activities from oil, costs of running the Ministry of Transportation, the Transport Research Centre and other institutions, as well as costs of moral damages from traffic accidents. For example more than 40,000 people have died on the roads in the past 40 years. people and more than 1 million road users have been injured (Kubica, 2017).

Although the findings are only supported by model calculations, the authors are confident that the conclusion is convincing. There is no doubt that the current way of financing transport will not be possible without the allocation of additional state income for transport, which is already a political decision.

As resources are limited, the question arises of the sustainability of the current paradigm and whether it would not be beneficial for the state and its citizens to change the current paradigm.

An apparently less significant change should occur in the overall approach to transport and strive to reduce demands for transport as such. An example is shared transport, which can significantly contribute to reducing the number of vehicles on the roads. Greater emphasis on the use of local resources can

contribute to the elimination of freight transport. Rational decision-making on the construction of new transport infrastructure can eliminate increasing maintenance expenses. For reasons of greater transparency, it is desirable to include all road transport under one legal entity owned by the state and to conduct annual financial results, which will make it clear what part of the costs is covered by subsidies.

The current state of transport, especially its extensive nature, contributes to oil exporters. Unfortunately, we have not learned from the past and we still remain in the role of the hostages. It is common knowledge that oil exporters, OPEC and associated producers artificially regulate supply in order to increase oil prices.

In order to get rid of this energy dependence, it is necessary to strive in innovative efforts to develop a new transport system. It is obvious that its development should be a European solution. If The EU were to find a solution and develop a new, profitable mode of transport, we could shift part of the transport performance from road transport. We would thereby reduce traffic congestion, due to the lower traffic density, also the accident rate and with it the cost of traffic accidents. The biggest bonus of this would be the fact that by reducing some of the transportation performance, we would reduce the demand for oil and put pressure on oil exporters who would be forced to compete. We would not tolerating the predatory business practices in oil pricing to protect consumers. With a new transport solution, we would create a new economic stimulus that The EU will need to resolve the consequences of the economic crisis.

Paradigm change is always difficult and often stressful. However, the current geopolitical situation encourages a reframing of existing schemes in many areas. Every crisis carries with it an opportunity for change. Therefore, Europe has a chance for change and it is only in the hands and heads of its inhabitants and their political representation whether they take this chance or waste it.

Conclusion

Both hypotheses formulated at the beginning of the article were confirmed. Financing the construction and operation of the given section D4 by the PPP project is unprofitable and ineffective under the given conditions. Driving one kilometer of the new section of the D4 highway costs more than today's highest toll rates, i.e. 6.295 CZK/km.

The project would be profitable if the toll rates were 9.09 CZK/km for passenger vehicles and motorcycles, 12.29 CZK/km for vans and 14.89 CZK/km for trucks. These rates are 2.5 times more expensive than the toll on the AP-71: León - Astorga, in Spain.

It is apparent from the above that cross-financing of the project is necessary. From the analysis of the total revenues and costs of road and rail transport in 2020, presented in Table 6 and also in the discussion on page 18, it follows that the revenues from these dominant modes of transport would not be able to cover the investment expenditure of the project in that year, since both modes of transport together created a loss in any given year. If the balance was similar in 2022, it would mean that the project would not be financed from transport revenues, but would have to be subsidized by the state budget.

There is no doubt that it is the correct target of the government to ensure a quality public service, but we must perceive all the connections and especially the consequences that subsidizing transport financing causes. Funds spent on subsidies must naturally be lost somewhere. It is not only correct to ask a question for the reason for what the dependence of transport on public means. It is important to scientifically investigate the causes of this addiction and try to find solutions to alleviate or prevent it. It is also necessary to examine the different impacts of the principle of dependence on financially strong states and states with lower performance in the national economy.

Precisely because The EU and The Czech Republic support the principle of the dependence of transport on funds from public sources, it is important to remember that any support for unbalanced management indicates a suboptimal allocation of resources. The approved principle, i.e. according to the theory of well-being, in The Czech Republic, society on the axis of well-being is heading towards poverty and ultimately hinders the increase in the standard of living.

The fact that the authors did not find scientific articles on the topic of transport profitability indicates a high level of paradigm in society. Society considers transport subsidies as something natural, and inevitable, and does not feel the need to look for ways to prevent waste. A neglected path is a serious, pan-European, scientific investigation of the development of a completely new, profitable type of transport, to which we would shift part of the current transport performance, from overloaded road transport and high-loss rail transport.

Resources

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The Impact of Economic Measures of EU Countries on the Development of the Recession Caused by the COVID-19 Pandemic

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Abstract

Research background: The COVID-19 crisis has revealed specific problems and, at the same time, opened up new opportunities and areas for growth. By studying a crisis, society can gain new experiences and accumulate information to help prioritise changes that can ensure economic well-being and security.

Purpose of the article: The paper contributes to the study of the crisis caused by the disease COVID-19 in Europe. The paper aims to evaluate the behaviour of 27 European Union member states to identify atypical features of the classical business cycle theory.

Methods: The impact of implementing lockdown measures against the pandemic on the economy of EU countries was evaluated. We tested whether the level of digitalisation has a statistically significant impact on economic activity during COVID-19. The DESI index was used as a factor that can strategically impact countries' economic activity. We have evaluated the situation in the analysed countries using descriptive statistics and the Fixed Effect model.

Findings & value added: According to our data, the recession has different durations for EU countries, ranging from 1 to 2 quarters. Before the pandemic spread, some adverse shocks affected economic activity in seven countries. Our analysis confirms a V-shaped recovery from recession in most EU countries. According to the regression model results, there is a positive relationship between the indicators, which is statistically significant even after adjusting for standard errors.

Keywords: COVID-19, GDP, digitalization, panel regression, European Union

JEL classification: E00, F44, E27, E47, C33

1. Introduction

The COVID-19 crisis has become an unprecedented global event. The decline in economic activity in an extremely short period reached a depth not seen since the Great Depression. The recession caused by the COVID-19 pandemic was unprecedented both in terms of its scale and origin. This was due to the speed of its spread across different sectors, the decline in economic activity, and the nature of the shock itself. When the first signs of a possible lockdown appeared, some questions arose in academic and business communities. The discussion focused on such critical issues as the probable duration of the recession, the depth of the decline, permanent losses, the stability of the recovery, possible scenarios for the shape of recovery, and more. This discussion provoked the beginning of research on the shocks, forecasting the development of the crisis and possible scenarios for recovery.

If we are talking about recovery scenarios, one of the first questions that economists discussed was about the shape of the recovery that can be. The shape of the recovery refers to the intuitive geometric characteristic of the key indicator of economic activity development. De Backer et al. (2021, p.2) proposed a schematic representation of recession in the V, U and L shapes. These scenarios answer the following questions: whether the economy will recover to its previous level, what form the recovery will take, and how long it will run. Defining only a shape as a type is not enough. Each shape may have different characteristics. Therefore, the question also arises about the intensity of the shock.

Carlsson-Szlezak et al. (2020) note that the "path" may differ in the recovery slope and the contraction depth for a V-shaped scenario. For a U-shaped crisis, the questions are how long it will take to recover to the previous level, the depth of the decline, and even if the growth slope will be restored. The level will

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probably not be the same as before the recession. An example of such a scenario is the global financial crisis 2008 in the United States, which is characterised by a U-shaped pattern. While GDP growth recovered its slope, it did not return to its previous level (Carlsson-Szlezak et al., 2020). In other words, the new growth trend runs parallel to the previous secular trend but at a lower level, and the economy is in permanent losses. Eichengreen et al.(2021) also mention one more shape, specifically the W-shape. The question of whether the shape of the recovery from the COVID-19 recession will transform from V or U-shaped to W-shaped arose because of the possibility of a second or even third wave of the pandemic and, as a result, the possibility of a new lockdown. It can be said that while the economy has an excellent chance of recovering to its previous level, the recovery may be followed by another wave of decline.

The uncertainty that accompanied the whole year 2020 was reflected in forecasts and estimates of economic indicators. The European Central Bank (ECB) Survey of Professional Forecasters (SPF) for the 3rd quarter of 2020 also shows significant pessimism and uncertainty. De Backer et al. (2021, p.1) argue that the range of expected GDP growth for 2021 (2% to 10%) published by the ECB is unprecedented and indicates the problem's complexity. The lowest estimate of 2% GDP growth in 2021 for the euro area means an L-shaped, worst-case scenario. The highest forecast of 10%, respectively, indicates a V-shape and a quick recovery. De Backer et al. (2021, p.2) investigated this topic for the euro area. According to their forecast of real GDP, it is unlikely that the recovery will have a full V-shape for any of the countries. However, short-term forecasts are relatively optimistic and indicate an average between V and U. However, long-term forecasts are determined by U and L shapes, followed by significant losses (De Backer et al., 2021).

At the beginning of the pandemic, Carlsson-Szlezak et al. (2020) provided examples of two factors that could have influenced the formation of a U-shaped scenario. First, controversial central bank policies were a severe problem for that period. Second, a large-scale "freeze" of the real economy was a new case with unpredictable consequences.

Economists tend to believe that the main driver of the COVID-19 crisis was forced savings and labour hoarding due to the lockdown. During the crisis, industries that were ill-adapted to poor performance suffered the most, while industries that had experience working online before the crisis suffered much less.

Bai et al. (2021) studied the impact of information technology adaptation on economic stability during the pandemic. The authors provide the first verified results and argue for the work-from-home (WFH) feasibility of labour as a practice that increases the resilience of companies to economic shocks.

Gal et al. (2019), in a working paper by the Organization for Economic Co-operation and Development (OECD), assess whether policies that support the adoption of digital technologies will increase the productivity of companies. The paper was published before the pandemic and provides evidence that adopting digital technologies in industries, combined with quality training and enabling conditions for gaining the necessary skills, increases firm productivity and positively impacts the industry. This study was conducted for 22 industries and identifies manufacturing and routine activities as those for which the effect is most significant.

Doerr et al. (2021) examine the impact of the World Digital Competitiveness Ranking of countries on the economic performance of enterprises during the COVID-19 crisis. As the main insight of this study, the authors highlight that a one standard deviation increase in a country's technology rating leads to a 4% increase in the average firm's revenue. In the case of the pandemic, companies that are more adapted to e-commerce, logistics, and the provision of services using digital technologies have adapted faster and even turned this into a strategic advantage.

In the process of setting the aims of this paper, we decided to focus on the issue of the consequences of the COVID-19 crisis for EU countries.

The paper aims to provide an analytical view of the GDP Index, which, in our case, is the main object of study as the level of economic activity. We pay attention to the level of digitalisation DESI for EU countries, as this factor was mentioned in the review of relevant literature as one that can provide a strategic advantage during the COVID-19 crisis. We use the Stringency Index provided by The Oxford COVID-19 Government Response Tracker (OxCGRT) to reconstruct the measures taken by European governments to overcome the COVID-19 pandemic.

The paper is organised as follows. The next section describes the data and methods used. Section 3 introduces our results. Section 4 offers a discussion of our results. Section Conclusion concludes our findings. The analyses presented in this article are taken from (Hodovanska, 2023), where we also find analyses of other economic indicators.

2. Methods and Data

The main object of the paper is an indicator of the country's economic activity, namely GDP measured in chain-linked volumes. We use the year 2015 as a reference year. The sample includes 27 countries of the European Union. The study is covered in the period from 2017 to 2021, with a quarterly frequency (from the 4th quarter of 2017 to the 4th quarter of 2021, which is 17 time points). We use a balanced panel dataset with a total number of observations $N \times T$, which in our case is 459 observations. The primary data source we use in our research is the European Union Statistical Office – Eurostat database. These are mainly quarterly data in chain-linked volumes, with 2015 as the reference year. The data are seasonally and calendar-adjusted. The exception is the Digital Economy and Society Index (*DESI*), which is available with an annual frequency and is measured by weighted scores corresponding to the digital efficiency of European countries across five criteria: Connectivity, Human Capital, Use of the Internet, Integration of Digital Technology, and Digital Public Services. Annual Index values are interpolated into quarterly values.

We use the data from The Oxford COVID-19 Government Response Tracker (OxCGRT) as an indicator of the stringency (*Stringency*) of measures taken by governments in response to the spread of the COVID-19 pandemic (Hale et al., 2021). The Stringency Index reflects the degree of restrictions in 9 areas: school closures, workplace closures, public events restrictions, restrictions on gatherings, closure of public transport, stay-at-home requirements, restrictions on movement between cities/regions, international travel controls, public information campaigns (Phillips et al., 2022). As countries have reduced restrictions for the part of the population that has fulfilled the vaccination requirements, the Index reflects these differences. It is available in four versions (for the unvaccinated and vaccinated population, the average, and a weighted average based on the share of vaccinated people) (Roser, 2021). Restrictions are measured on a scale from 0 to 100. The higher value means the stricter the restrictions. The data for the Stringency Index were originally in daily frequency, so we used the quarterly average to convert the daily data to quarterly.

According to researchers Gal *et al.* (2019), Brynjolfsson *et al.* (2020), and Doerr *et al.* (2021) appeal to the positive impact of digitalisation on the economic performance of the US and individual companies, in particular during the crisis, we decide to test whether the level of digitalisation has a positive impact on the *GDP* in EU countries. We are also interested in the degree of change in the *GDP* Index under the influence of restrictions. Therefore, we propose a Fixed Effects Model at the country-quarter level from Q4 2017 to Q4 2021 in the form:

$$GDP_{i,t} = \beta_1 Stringency_{i,t} + \beta_2 DESI_{i,t} + u_{i,t}, \quad t = 1, \dots, 17; \quad i = 1, \dots, 27 \quad (1)$$

Stringency and DESI are the historical values of the appropriate indices for the i -th country in time t , and the model residuals are denoted as $u_{i,t}$.

3. Results

A slowdown in economic activity was already observed in Croatia and Greece during the 3rd quarter of 2019. Also, starting in the 4th quarter of 2019, the GDP Index began to decline in 5 other countries: Finland, Austria, France, Italy, and Denmark. Most countries enter a phase of economic recession beginning in 1st quarter of 2020, specifically at the onset of the recession, the leading cause of which is the shock caused by the anti-pandemic restrictions. The exceptions were countries such as Estonia, Ireland, Lithuania, Poland, and Romania. These countries entered a recession in the 2nd quarter of 2020. And up to this point, they continued to increase the value of the GDP Index.

We date the bottom of the recession by the second quarter of 2020. The recession in EU countries mainly lasts for two quarters, but in the case of five countries, it is one quarter. From the 3rd quarter of 2020, the countries (in this case, synchronised) enter the recovery phase. Luxembourg and Ireland are recovering the fastest. In the 3rd quarter of 2020, these countries reached the level before the economic downturn and continued the growth trend. A similar trend of rapid recovery was demonstrated in Estonia, for which the period of decline lasted the first quarter, while it took the second quarter to recover. Lithuania, Croatia, and Denmark fully restored their pre-crisis economic activity levels in 1st quarter of 2021 despite having different recovery scenarios. Denmark recovered by about 92% in the 1st quarter. Croatia gradually restores the lost value over three quarters, and after economic activity reaches the previous level, the growth rate slows significantly. With the start of the recovery phase, Lithuania's GDP Index regained about 50% of its lost value in 3rd quarter 2020 and fully recovered over the next two quarters.

Most countries recovered the economic activity lost during the recession in the 2nd and 3rd quarters of 2021 (8 and 7 countries, respectively). France also managed to recover from a prolonged period of decline

by the end of 2021, recovering by 80% in 3rd quarter of 2020 but slowing dramatically in 4th quarter of 2020. By the end of 2021, 6 countries (Spain, Germany, Czech, Portugal, Slovakia, and Italy) had not recovered their pre-crisis GDP Index level.

We recorded the most significant drop in the GDP index for the entire period under review in all countries during the second quarter of 2020. Moreover, Spain (-18.722), Malta and Hungary (-17.242 and -17.034, respectively), Croatia and Portugal (-16.554 and -16.286, respectively) showed the most significant decline in 2nd quarter of 2020 compared to the previous quarter. The smallest decline in 2nd quarter of 2020 was observed in Bulgaria (-5.331), Luxembourg (-6.101), and Lithuania (-6.334). Meanwhile, for Luxembourg, the recovery of its GDP Index level lasted one quarter, and for Lithuania, two quarters. The recovery lasted four quarters for Bulgaria despite a relatively small decline during the recession.

Throughout the entire time series, 11 countries went through a period of recovery without recurrent downturns. Despite the different pace (from 2 to 5 quarters), all 11 countries (Bulgaria, Denmark, Estonia, Greece, Croatia, Cyprus, Lithuania, Hungary, Poland, Romania, and Sweden) can have a V-shaped recovery.

Countries that experienced one downturn are Belgium, the Czech Republic, Finland, Germany, France, Italy, Malta, the Netherlands, Portugal, Slovakia, and Slovenia. This economic contraction falls mainly on the 4th quarter of 2020 or the 1st quarter of 2021, which may result from the second wave of the lockdown. It should be noted that 5 out of 6 countries that did not restore the pre-crisis value of the GDP Index by the end of 2021 experienced a repeated economic decline in one quarter. This decline is between -0.546 and -2.703. The decline is less significant for the rest of the countries and ranges from -0.018 to -0.548.

Despite the rapid recovery from the recession, Ireland and Luxembourg experienced two more economic activity downturns during the period we are analysing. While this decline is not deep enough to affect the overall pattern for Luxembourg, it causes a second recession for Ireland. Thus, we observe a W-shaped recovery for Ireland.

The recovery scenario is somewhat different for Austria, which reached a pre-crisis level of economic activity in 3rd quarter of 2021. Nevertheless, Austria is the only country that has experienced a downturn in three out of six episodes during the recovery. By the recession's trough, Austria had lost 15.176 points, while the recurrent downturns during the recovery had a further 4.481 points. Although compared to the recession of the first quarters of 2020, the recessions of the 4th quarter of 2020 and 1st quarter of 2021 are almost five times smaller, we can describe the shape of Austria's recovery as W-shaped, even though it is not as pronounced as the shape of Ireland's.

The EU countries experienced two waves of increased restrictions during 2020 and 2021. However, while the first wave had the same timeline for all countries, countries differed in the duration and intensity of restrictions in the second wave. The first wave began in the first quarter of 2020 and lasted until the middle of the year, significantly reducing restrictions in the 3rd quarter. Governments introduced the second wave in the 4th quarter of 2020, which generally peaks in the 1st quarter of 2021. Thus, governments are taking a preventative step for the cold season. The quarantine softening comes during the warmer seasons, which are economically important for countries with vital agricultural and tourism sectors. However, a significant reduction of restrictions starts only from mid-2021, which overlaps with the increasing vaccination coverage. Vaccination starts in the EU in the 4th quarter of 2020 for nineteen countries and in the 1st quarter of 2021 for eight countries.

The degree of restrictions imposed in the 1st quarter of 2020 ranges from 15.47 to 57.72 points. Consequently, the countries that immediately implemented higher restrictions (from 43.33 to 57.34 points) moved more smoothly to tightening in the next quarter (on average +17.77 points). For countries with low restrictions (from 15.47 to 33.02) in the first quarter of 2020, the transition to the next quarter adds an average of +42.7 points to the restriction policy. As a result, the values for the 1st and 2nd quarters are cumulated, and the range of values for all countries shrinks. However, the difference between the maximum and minimum at the peak of the first wave differs by 25.28 points, with Latvia showing the lowest value of restrictiveness (56.87 points) and Ireland the highest (82.15 points).

Regarding the second wave, its duration is generally longer, mainly four quarters, compared to 2 quarters of the first wave. The exception is Denmark, with a duration of 3 quarters. We observe differences in the wave shape for the two groups of countries, which is a consequence of the more substantial stability of restrictions for some countries. Another peculiarity is that the second wave in the Czech Republic (58.86 compared to 73.69 points) and Slovenia (61.9 compared to 74.35 points) significantly differed from the first wave. Italy demonstrated the same level of restrictions for the peaks of both waves (77.27 and 77.31 points).

Further, we have analysed whether the growth rate of the DESI Index changed during the crisis, the leading cause of which was distancing and lockdown. We will briefly comment on the most significant changes in the ranking of countries according to the DESI Index. Over the five years from 2017 to 2021, the European countries accelerated the DESI Index growth rate. On average, for EU countries over five years, the growth rate is the highest in 2021. From 2017 to 2019, the DESI Index grew by an average of +2.4% per year, while the growth in 2020 was +3% weighted points and in 2021 +4.4% weighted points. In 2021, the DESI Index for European countries increased by 12.2% of weighted points compared to 2017. Even though in 2020 there was a slowdown in the growth rate compared to 2019, the upward trend continues.

Meanwhile, in 2021, the growth rate accelerates by more than 40% compared to the previous year. In 2018, the growth rate of the DESI Index ranged from +1.1% to +3.1%. The lowest growth is demonstrated by Greece and Cyprus, which occupy 26th and 22nd places in the ranking at the end of 2018. In 2019, the growth boundaries shifted by 0.5%, and the growth rate range varied from +1.6% (Latvia) to +3.7% (Italy and Finland, respectively). In the first year of the pandemic, the range variates from +1.8% (Bulgaria) to +4.3% (Finland), with an average growth rate declining compared to the previous year. Then, in 2021, all countries accelerated the Index's growth rate, ranging from +2% (Latvia) to +9.3% (Denmark).

Thus, it can be stated that the upward trend was already present in the pre-crisis period, but it was prolonged and did not significantly impact the situation in the coming years. For example, at their average growth rate in 2018 and 2019, the countries in the rankings below the European level as of 2017 would need up to 4 years on average to at least reach the 2017 European value of the DESI Index. In an identical situation, but with the average growth rate of 2020 and 2021, it would take just over two years. By the end of 2021, Denmark's most significant increase in the DESI Index is observed (+9.3% in 2021), which allows Denmark to become the leader in the ranking in 2021, overtaking Finland, which was in first place during the previous four years. Germany has significantly improved its Index score since 2020, rising five places in the ranking during 2021. Ireland and Austria improved their rankings by three places in 2021, with an increase of +6.3% and +6.9%, respectively. For the rest of the countries, there are no significant changes in the ranking or unexpectedly significant increases in the DESI Index.

According to the summary statistics presented in Table 1, the average *GDP* Index of the countries is 111.9, with a standard deviation of 9 units. We observed that the *GDP* Index reached the lowest standard deviation with the tightest range of values (from 86 to 158.2 points). The highest standard deviation corresponds to the *Stringency* Index (15.45), averaging 52.98 points. The average Value of the *DESI* Index reaches 40.29 points with a standard deviation equal to 9.19. For our dataset, the difference between the mean and median for the variables varies from 0.01 (*Stringency* Index) to 1.5 (*GDP* Index). Moreover, the first and third quartiles (Q_1 and Q_3) and median values are presented.

Table 1. Summary statistics

Panel: Country-level variables								
Variable	Obs. (n)	Mean	Std. Dev.	Min	Max	Q_1	Median	Q_3
<i>GDP Index</i>	459	111.90	9.00	86.00	158.20	106.80	110.40	116.20
<i>DESI Index</i>	459	40.29	9.19	19.40	65.30	33.81	40.22	46.65
<i>Stringency Index</i>	216	52.98	15.45	15.47	86.16	41.75	52.97	65.04

Source: Own processing (2023)

The results of the Fixed Effects Model (1) are presented in Table 2. In the case of the model (1), the residuals are not symmetrical. The median is almost zero, and the difference between the maximum and minimum values of the residuals in absolute terms is 3.7. Because the minimum and maximum values of the residuals are pretty significant (-14.28 and 17.98, respectively), it should be clarified that some of the predicted values for the *GDP* Index will differ significantly from the actual values.

This model omits Intercept. The coefficients for the independent variables, according to the *p*-value, are statistically significant at the 1% significance level. Thus, the coefficients of the variables *Stringency* and *DESI* are statistically significant. The estimated coefficients are intuitive and consistent with the information obtained from the literature review. According to the model's coefficients, a ten-point increase in the *DESI* is associated with a 13.2-point increase in the *GDP* Index *ceteris paribus*.

Table 2. Summary for Fixed Effects Model

Coefficients	Estimate	Std.Error	t value	p-value	
<i>Stringency</i>	-0.1429***	0.0098	-14.58	<2e-16	
<i>DESI</i>	1.3218***	0.0746	17.72	<2e-16	
Residual standard error: 3.855 on 430 degrees of freedom					
Multiple R-squared (full model): 0.8278 Adj. R-squared: 0.8166					
Multiple R-squared (proj model): 0.4242 Adj. R-squared: 0.3867					
F-statistic (full model): 73.85 on 28 and 430 DF, <i>p</i> -value: < 2.2e-16					
F-statistic (project model): 158.4 on 2 and 430 DF, <i>p</i> -value: < 2.2e-17					
Residuals:	Min	Q ₁	Median	Q ₃	Max
	-14.2768	-1.838	0.2833	1.9756	17.9761

Source: Own processing (2023)

*** means significant at a 1% confidence level

According to the coefficient of the *Stringency* Index, a ten-point increase in the *Stringency* Index will cause a drop in the *GDP* Index by 1.4 points *ceteris paribus*. If we consider that in the first quarter of 2020, EU countries, on average, implemented restrictions with a score of 36 points, then according to this level of restrictions, the *GDP* Index will fall by 5.04 points *ceteris paribus* on average per country.

The standard errors are no more than 7% of the slopes for both variables. However, according to the results of the tests for the presence of heteroscedasticity in the regression model and serial correlation of the residuals, we need to estimate cluster-robust standard errors. We reject the zero hypothesis (H_0) of the Breusch-Pagan Test and accept the alternate hypothesis of this test (H_1), according to which the residuals in the regression model are distributed with different variances. Similarly, based on the results of the Breusch-Godfrey test, we reject the zero hypothesis (H_0) and accept the alternative hypothesis (H_1), which states that there exists autocorrelation in some order.

Due to the heteroscedasticity and autocorrelated residuals of the Fixed Effect model (see Table 2), we have found the model with edited standard errors. The results are presented in Table 3. Even though the standard errors of the estimated coefficients have increased significantly, these coefficients are still statistically significant. According to the *F* statistic, the model is statistically significant at the 1% level. The residual standard error is equal to 3.855 for both models. We can conclude that both regression models predict the *GDP* Index with an average error of about 3.855. We also want to highlight what the prefixes mean for the *F*-statistic and the Coefficient of Determination (*R*-squared) - complete and projected model. A full model includes dummy variables for each country. Their values for the dummy variables of each country are given in Table 3. The statistics for the Projected model correspond to the within-estimator model (without country-specific constants). For us, the statistics for the entire model are more important. According to the *R*-squared of the entire model, the variation of the dependent variable *GDP* Index is covered by 82.78% by our model.

Table 3. Summary for Fixed Effects Model 1 with Clustered SE

Coefficients	Estimate	Std.Error	t value	p-value	
<i>Stringency</i>	-0.142863***	0.01548	-9.227	1.10e-09	
<i>DESI</i>	1.321804***	0.18002	7.343	8.49e-08	
Residual standard error: 3.855 on 430 degrees of freedom					
Multiple <i>R</i> -squared (full model): 0.8278 Adj. <i>R</i> -squared: 0.8166					
Multiple <i>R</i> -squared (proj model): 0.4242 Adj. <i>R</i> -squared: 0.3867					
<i>F</i> -statistic (full model, *iid*): 73.85 on 28 and 430 <i>DF</i> , <i>p</i> -value: < 2.2e-16					
<i>F</i> -statistic (project model): 50.98 on 2 and 26 <i>DF</i> , <i>p</i> -value: < 1.007e-09					
Residuals:	Min	1Q	Median	3Q	Max
	-14.2768	-1.838	0.2833	1.9756	17.9761

Source: Own processing (2023)

*** means significant at a 1% confidence level

4. Discussion

When assessing the critical indicator of economic activity, it is worth noting that a particular economic shock has a negative impact even before the pandemic and restrictions began. However, this shock affects only a small number of countries. These are seven countries where the decline in economic activity begins 1-2 quarters earlier and does not significantly impact economic activity. Despite the primarily pessimistic forecasts regarding recovery scenarios, EU countries have generally overcome the effects of the crisis under the V-shaped scenario. 21 out of 27 countries fully restored their pre-crisis *GDP* Index levels by the end of 2021.

Nevertheless, the recovery duration is also an issue, as, despite the rapid growth in the first quarter of 2020, the recovery phase lasts 4 to 5 quarters for most countries, while recessions last 1 to 2 quarters. The *GDP* Index experienced 1 to 3 repeated declines for 16 of 27 countries, while economic expectations are generally positive. However, in such an unstable situation as the pandemic, it is difficult to judge the significance of the expectations because decisions and amendments to the policy of restrictions change without proper prior communication and timing in conditions when different sectors of the economy depend on the policies of other countries and factors which impossible to influence. It is also reflected in the re-implementation of restrictive measures in Q4 2020 and Q1 2021, which does not negatively affect economic expectations, while more than half of the countries experienced a repeated decline in *GDP* in these quarters.

In such circumstances, however, the strategic advantage is the ability to adapt the economy to new conditions, which, together with the willingness to adopt new technologies, can positively affect economic activity. For this purpose, the level of adoption of digital technologies and the ability of companies to implement and maintain them play an important role. Our findings are confirmed by several studies both in the pre-crisis period and that directly describe the effect of increasing the level of digitisation on the economic performance of companies during the COVID-19 crisis. Countries that have recovered their *GDP* level in the first two quarters after the bottom of the recession are in the top 10 of the *DESI* ranking as of 2019. Also, according to the regression model results, a one-point increase in the *DESI* Index corresponds to a 1.3-point increase in the *GDP* value of the Index. However, it should be considered that this is only a characteristic of how the *GDP* Index changes over time on average for a country when the *DESI* increases by one point. It is interesting that in 2020, we did not observe a significant positive jump in the *DESI* Index. For ten countries, the growth rate is declining, while the rest do not show the significant change that we would expect. A significant increase compared to previous years is observed starting in 2021. Even though the growth rate of the *DESI* Index increased by the end of 2021, it is not significantly higher for most countries. On average, EU countries' growth rate in 2021 increased by only 1.5 points compared to 2019. Most countries have not picked up the trend towards the adoption of digital technologies and support for the development of digital infrastructure to the extent that it could be a game-changer for stabilising economic activity in the EU. For example, on average, the *DESI* Index for EU countries increased by 1 point per quarter, with its highest rate in 2021.

Conclusion

The paper analysed the development of the recession in EU countries caused by COVID-19. We paid attention to the level of digitalisation *DESI* for EU countries, as this factor was mentioned in the review of relevant literature as one that can provide a strategic advantage during the COVID-19 crisis. Moreover, we have used the Stringency Index to reconstruct the measures taken by European governments to overcome the COVID-19 pandemic.

The purpose of the descriptive analysis was to assess the fundamental changes that occurred with the indicators during different stages of the business cycle and describe the specifics of these changes in comparison with the traditional behaviour of the indicators, as well as to compare the forecasts of the early stages of the COVID-19 crisis with the actual situation as it looks in the post-crisis period. Finally, we investigate the policy of restrictions and the impact of the level of digitalisation on the *GDP* Index using a panel data regression model.

We started with a descriptive analysis of the *GDP* Index. We assessed the changes that occurred from quarter to quarter and determined the starting point of the recession, its duration, and the depth of the decline in economic activity. In our analysis of the *GDP* Index, we identified the form of recovery and its numerical characteristics. According to our data, the recession has a different duration for EU countries, ranging from 1 to 2 quarters. There was a particular negative shock that affected economic activity in seven countries before the spread of the pandemic. The magnitude of the *GDP* Index decline during the

entire period of contraction (from Q4 to Q1, depending on the country) ranges from -6.334 (Lithuania) to -24.819 (Spain) points. 11 countries went through a period of recovery without further declines. Despite the different paces (from 2 to 5 quarters), for all 11 countries, the shape of the recovery can be considered V-shaped. For Ireland and Austria, the recovery was W-shaped. However, the scenarios differed in the pattern. Six countries did not restore their pre-crisis GDP index levels by the end of 2021. For the rest of the countries, the shape of the recovery could resemble a V-shape. However, during the recovery period, the countries experienced repeated episodes of decline from 1 to 2 times, which slowed the recovery and affected the shape.

The opinions of scientists were strongly divided. Among the optimistic forecasts was a V-shaped rapid recovery, as the crisis caused restrictive measures that physically impeded consumption, and when the restrictions were lifted, consumption would return to the previous level. However, these forecasts do not consider the situation's instability and the long period of overcoming the pandemic, accompanied by several waves of infection and consequent restrictions. According to the reconstruction of EU restrictions, after the first wave lasted two quarters, the second wave lasted from 3 to 4 quarters. Furthermore, governments have not provided sufficient support for adopting digital technologies that could stimulate the economy while avoiding the risks of increased morbidity resulting from direct incentives to the most affected markets. Businesses are left alone to deal with complex changes at a critical moment because governments act very slowly when it is necessary to implement changes quickly. The government's reflection on the importance of developing the level of digitisation comes with a delay and takes the form of strategies for the next nine years. According to the descriptive analysis, the growth of the DESI Index slowed down on average in 2020. Only 12 countries in 2021 show a significant increase in the DESI Index compared to previous periods. During the crisis, countries with higher digital infrastructure, human capital, and experience implementing changes have better conditions. Governments did not pay enough attention to digital capability development when fighting the pandemic wildfire. We use Fixed Effect Estimation to analyse the relationship between countries' digitalisation levels and changes in the GDP Index. According to the regression model results, there is a positive relationship between the indicators, which is statistically significant even after adjusting for standard errors.

Additionally, we conducted tests to check the data structure and identify abnormal behaviour of the indicators. It should be added that a clear outlier in our dataset is Ireland, for which the pattern of GDP differs significantly from what we observe for other countries.

We would also like to draw attention to the fact that the study of the impact of restrictive measures on various sectors of the economy is complicated by insufficient data. Broader generalisable analyses for EU countries will require significant efforts to collect data directly from governments. While collecting data for this paper, we also encountered missing data, significantly limiting the research.

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Determinants of External Business Environment Causing the Need for Building Corporate Agility in the Context of the Corona Crisis Impacts

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Abstract

Research background: The coronavirus pandemic in 2020 brought significant impacts on the economy of countries in addition to health consequences for the population. The most economically affected countries were countries with a worse pandemic situation, with long-lasting anti-pandemic measures, including the Slovak Republic. As a result of the measures taken to prevent the spread of the disease, many companies in Slovakia had to reduce or completely suspend their business activities.

Purpose of the article: The aim of the paper is to evaluate the adverse impact of the pandemic on the economy of small and medium-sized enterprises in the Slovak Republic through factors determining the decline in economic activity of business entities and selected economic indicators. The impact of the pandemic on the SME economy was the most significant impact on the performance of the Slovak economy. This was the reason for focusing this article on SMEs.

Methods: The secondary empirical research was performed. The research was based on the analysis of secondary data from statistical databases and official reports of Slovak government institutions. Methods of descriptive statistics and economic analysis were applied by processing data and findings formulation.

Findings & Value added: The result of the analysis is the identification of factors of the external environment of Slovak companies provoking the need for change and building corporate agility in the context of the impacts of the corona crisis. The increase in output and value added in SMEs in Slovakia already in the first quarter of 2021 indicate the ability of SMEs in the Slovak Republic to adapt to change.

Keywords: corona crisis, small and medium enterprises, external determinants, enterprise agility

JEL classification: E20, O12

1. Introduction

The year 2020 was exceptional in terms of the development of exogenous factors that changed the development of the Slovak and global economy in an extraordinary way. The COVID-19 pandemic was unquestionably a central factor in the economic environment in 2020 and 2021. The decline in economic activity did not occur only in Slovakia, but was also symptomatic of other countries. In the European Union as a whole, economic performance declined mainly due to the downturn in major EU economies (Fuentes & Moder, 2021).

The non-cyclical crisis caused by the COVID-19 uncontrollable spreading showed that its kind of crisis cannot be predicted (Iacob et al., 2021). The economic recession caused by the COVID-19 pandemic had a more significant impact on businesses than the 2008 crisis. As a result of the various measures taken to prevent the spread of the disease, many companies had to reduce or completely suspend their business activities, causing considerable problems for the economies of the affected countries. The pandemic limited the possibility for large masses of people to continue their professional activities due to the measures of physical distancing, which affected production capacity and ultimately the aggregate supply of the economy (Oncioiu et al., 2021). Direct effects of the corona crisis in reduced income, job losses, customer preferences, low demand, cash flow problems, obstacles to the free flow of capital, labour and trade were observed in most of countries (Balasoiu, 2021; Abd Aziz et al., 2022; Turnea et al., 2020)

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In the Slovak economy, the GDP contraction in 2020 was 4.4%. Also in 2021, the Slovak economy was affected by the COVID-19 pandemic, but less significantly than in 2020. In addition to the ongoing pandemic, the Slovak economy was also hampered by supply chain problems, shortages of commodities (including energy), and rising commodity prices. According to data from the Slovak Statistical Office, Slovakia's GDP growth in 2021 was 3.0% and GDP growth slowed to 1.7% in 2022 (SBA, 2022). The negative impact of the pandemic was also in the increase of the gross government debt, which reached 58.9% of GDP in 2020 and exceeded the threshold allowed in the EU, rising to 61.8% of GDP in 2021. Similarly to Slovakia, at the time of the pandemic, other countries started to adopt comparable measures, resulting in (temporary) disruption of global supply and demand chains with an impact on foreign trade. Consumer price developments in 2021 were characterised by rising dynamics. At the beginning of the year, inflation was still at 1%, while in the last quarter of 2021 it had already exceeded 5%. The annual inflation rate increased to 3.2% in 2020 compared to 2021. The increase in the price level was decisively influenced by fuel prices, but also by food prices (NBS, 2022).

The slump in the Slovak economy was related to a decline in domestic demand. Final household consumption fell by 1.1%. Public final consumption stagnated after the previous growth. Investment activity also experienced a negative development in 2020. Gross capital formation fell by 12% year-on-year. Total exports of goods and services also declined by 7.5% compared to 2019. The decline in the performance of the Slovak economy was also reflected in the labour market. In the months of April and May 2020, there has already been a year-on-year decline in employment in almost the entire spectrum of sectors. (Bečka, 2020)

Small and medium-sized enterprises are among the most vulnerable categories of enterprises in times of crisis. The effects of the coronary crisis on the economy of SMEs have been studied and analysed in countries across the world in publications by authors such as Birbirenko et al. (2020), Langworthy et al. (2021), Gashi et al. (2021), Clampit et al. (2021), Abuhussein et al. (2023). Limited access to liquidity, lack of strong state support, poorly prepared and motivated human resources, low digitalization are the weaknesses of SMEs are the main obstacles to resilience in this crisis (Iancu et al., 2022). Among other factors influencing the ability of SMEs to survive and master corona crisis are employee and customer satisfaction in the changing situations. (Khan et al., 2022; Fasth et al., 2022; Thekkoote, 2023). The importance of strategic flexibility, innovation-oriented strategies, implementation of agile behaviour and dynamic capabilities, applying creativity to adapt to new conditions was highlighted as the matter for the survival in emerging economies (Chomicki & Mierzejewska, 2020; Thukral, 2021; Yaya et al., 2022; Chen et al., 2023), According to Zahoor et al. (2022), the agile adaptation and new opportunity utilization were the primary means of dealing with the disruptions the COVID-19 pandemic brought about in SMEs of Finland.

In the long term, the position of small and medium-sized enterprises (SMEs) in the national economy of the Slovak Republic is significant, especially in terms of their contribution to total employment, added value and support for economic development. The importance of SMEs can also be observed in the structure of economically active business entities. Small and medium-sized enterprises account for 99.9% of the total number of business entities in the Slovak economy. They account for almost two thirds of employment in the business economy and contribute more than half of the total value added.

The impact of the pandemic on the SME economy is therefore the most significant impact on the performance of the Slovak economy. This was the reason for focusing this article on SMEs. The aim of the paper is to evaluate the adverse impact of the pandemic on the economy of small and medium-sized enterprises in the Slovak Republic through factors determining the decline in economic activity of business entities and selected economic indicators.

2. Methods

A review of a large number of scientific papers focusing on the impact of the COVID19 pandemic on SMEs in countries around the world showed the importance of addressing this topic and was the inspiration for the objectives and methodology of the paper.

The method used in the paper was secondary empirical research based on the analysis of data from statistical databases and official reports of Slovak government institutions in the years 2020 and 2021. Main sources of data were the Slovak Business Agency, OECD reports, Eurostat data, Slovak National Bank reports and reports of the National Council of the Slovak Republic.

Methods of descriptive statistics and economic analysis were used. Trends in absolute and relative frequency during the period 2017 – 2021 were applied to describe the development in Slovak SMEs

sector. Indicators of the development of economic indicators and their indices of change were applied to show the impact of pandemic period on the economic results of Slovak SMEs. In the paper the following economic indicators of SMEs in Slovakia in the period 2019 – 2021 were analysed: number of employees, gross production, added value, and profit before taxation.

On the basis of the comparison of economic results with anti-pandemic measures in the Slovak Republic connections were deduced, factors determining the decline in economic activity of business entities were identified, and conclusions were drawn.

3. Results

3.1 Anti-pandemic measures of the Slovak government and support for SMEs

In 2020, a number of important pieces of legislation were adopted to address the economic, social and economic emergency situation that arose in the Slovak Republic due to the outbreak of the COVID-19 pandemic. Among the most important measures with an impact on SMEs is the entry into force of Act No 198/2020 Coll. A package of 115 measures to improve the business environment and reduce the administrative burden has been incorporated into the text of the Act. Other measures include: the introduction of tenant protection and temporary protection for entrepreneurs; the provision of financial assistance to ensure the liquidity of SMEs; the regulation of the provision of rent subsidies; the provision of subsidies to support small and medium-sized enterprises; the suspension of trades for less than 6 months; the regulation of the so-called 'home-office'; as well as other provisions of emergency measures in connection with the COVID-19 pandemic in the financial sector, and others. (SBA, 2020)

The anti-pandemic measures adopted in the Slovak Republic can be divided into two groups based on the time of adoption, namely measures adopted during the first wave of the pandemic and measures adopted during the second wave of the pandemic. Most of the anti-pandemic measures taken were of a nationwide nature. However, some of the measures taken also targeted businesses operating in specific areas where the risk of disease spread was higher.

The first anti-pandemic measure during the first wave of the pandemic, which came into force on 10.3.2020, was a ban on gatherings associated with the organisation of public, mass, cultural and social events, which naturally affected businesses with a high concentration of people (theatres, cinemas, shops, sports and cultural events). Following the worsening epidemiological situation, a state of emergency and a state of emergency has been declared as of 12.3.2020. The state of emergency ended on 13.06.2020 after the first wave of the pandemic, but the state of emergency is still in place. Another important nationwide measure, which came into force on 25.3.2020, was a ban on "going out and about in public without covering the upper respiratory tract. The disinfection measures increased the costs for businesses, which included additional costs for the procurement of disinfectants. Domestic businesses were also largely affected by the change in the border regime. In addition to the closure of border crossings, increased attention was paid to persons crossing the border after March 16, 2020 (SBA, 2021c).

In addition to area-wide measures, specific anti-pandemic measures have been taken for a limited group of businesses operating in sectors with a higher risk of disease spread: accommodation and catering, other services, trade and transport. The relaxation of area-wide measures occurred only in the 3rd quarter of 2020.

The second wave of the pandemic began to spread massively in Slovakia in September 2020. As during the first wave, both nationwide and specific anti-pandemic measures were taken during the second wave of the pandemic, partially or completely restricting the operations of enterprises operating in the most affected sectors. The nationwide lockdown began at 5 a.m. on Saturday, December 19, 2020, and was coupled with a curfew. At the end of January 2021, businesses in which this was possible were advised to introduce a home office, which became mandatory on 01.03.2021. In February 2021, the so-called COVID-automatic became applicable in Slovakia. Restrictions were of different extent in different regions of the Slovak Republic depending on the increase in the number of persons infected with coronavirus (NR SR, 2021).

3.2 Business areas at risk and impact of quarantine measures

One of the worst affected and most at-risk sectors in the first wave of the pandemic was accommodation and catering, which was already experiencing restrictions or a complete ban on operations as early as March 2020. Thus, accommodation and catering was among the sectors first affected by the

restrictions associated with the coronavirus pandemic and, conversely, was the last to be affected by the relaxation. However, other sectors - particularly those using long-term employee accommodation services - were also affected by the restriction or ban on the operation of accommodation and catering establishments. During the first wave of the pandemic, businesses in the accommodation and catering sector were caught off guard by the obligation to close their establishments within a day. Although catering establishments were closed for only one month and accommodation establishments for about two months, by the start of the second wave of the pandemic, entrepreneurs were only able to partially compensate for the quantified losses (NBS, 2022).

Another sector that was heavily affected by the pandemic was the other services sector, where we can include, for example, education, health and social assistance, which covers a wide range of activities - from health care provided by trained health professionals in hospitals and other facilities, to home care, to social work activities without the involvement of health care professionals. Within the other services sector, culture, entertainment and recreation (live performances, museum activities, gambling activities, sports and recreational activities) and personal service activities such as hairdressing, beauty and other personal care services also form a significant group. (SBA, 2020)

The more than two-month closure of businesses in the other services sector has complicated operations, particularly in those establishments that cater to a large number of customers, such as swimming pools and cultural events. The possibility of low numbers of customers was unprofitable for these businesses, which is why they did not reopen until a longer period of time had elapsed. However, the rapid onset of the second wave of the pandemic caused the rapid closure of businesses again, which automatically had an impact on the businesses' revenues.

In addition to the sectors mentioned above, trade - and retail outlets in particular - were also affected by the major restrictions and closures. During the first wave of the pandemic, almost all retail outlets were closed. Those businesses that were allowed to remain open had to meet stringent hygiene conditions to prevent the spread of the coronavirus. The limitation of the number of people in the establishment, as well as the rising costs of improving hygiene levels, reduced the bottom line of businesses, which saw their operating costs rise and their revenues fall.

The last sector directly affected by the ban and restrictions was the transport sector. The border regime is linked to this and other sectors. Travel restrictions and border closures during the first wave of the pandemic almost completely halted international passenger transport and significantly reduced international freight transport, which in turn had an impact on all sectors of the Slovak Republic that rely on the import and export of goods. Industrial production in particular has been affected.

According to the SK NACE classification, a total of 53 243 small and medium-sized enterprises in Slovakia are active in the sectors most affected by the quarantine measures. These entities, which have been forced to close their establishments, account for 8.9% of the total number of active small and medium-sized enterprises. Micro-enterprises employing fewer than 10 employees dominate the total number of SMEs most at risk. They account for 96.2% of the total. Small enterprises (10-49 employees) represent 3.4% and medium-sized enterprises (50-249 employees) 0.4%. In the structure of endangered SMEs by legal form, sole traders predominate. Sole traders account for almost two thirds (59.7%) of the total number of SMEs at risk. More than one third (37.4%) is represented by enterprises (legal entities) and 2.9% by freelancers. The quarantine measures necessitated the closure of establishments operated by SMEs mainly in the retail, accommodation and catering, transport and commercial and other services sectors. Table 1 shows the number of SMEs most at risk.

Table 1. Structure of most vulnerable SMEs by sector (SK NACE)

Sector of SMEs at risk	Number of SMEs most at risk
Retail	4,187
Accommodation and catering	19,419
Transport	7,884
Business services	1,478
Other services	20,275

Source: SBA, 2020

In the retail sector, retailers of furniture (720 SMEs), computers (691) and second-hand goods (598) had to reduce their business. In the accommodation and catering sector, the most threatened are

entrepreneurs providing catering (6 962 SMEs), other specialised catering establishments (4 371) and hospitality (3 885). Existential problems in the transport sector are mainly experienced by entrepreneurs providing other passenger land transport (3 485 SMEs) and taxi services (2 193). Business service entrepreneurs such as travel agencies (623 SMEs) and travel agencies (507) also have to cope with a difficult situation. Most of the SMEs that have had to reduce their business due to the quarantine measures are in other services (37.0%). The main activities of these entrepreneurs are, for example, the provision of hairdressing and beauty services (11,195 SMEs), physical well-being services (3,267), or entertainment and leisure activities (1,489) (SBA, 2021a).

3.3 Impact of the pandemic on the economy of SMEs in the Slovak Republic

The number of small and medium-sized enterprises is one of the key quantitative indicators characterising the state of the SME sector. The development of the number of SMEs created was very dynamic during the period analysed, but it can be stated that the number of business entities created falling into the SME size category during and after the two waves of the pandemic (unlike micro-enterprises) did not reach the pre-pandemic values. The absolute majority of business start-ups are micro or small enterprises. In 2020, 83 173 business entities (all SMEs) were created. Compared to 2019, the number of business entities created decreased by 2.01%. From the evolution of the number of business entities dissolved during 2020, it can be noted that entrepreneurs did not cease their business activities immediately after the outbreak of the pandemic. The unclear epidemiological situation and the deteriorating performance of businesses caused the end of the most affected businesses only in the 3rd and 4th quarter of 2020. In 2020, 47,648 business entities closed down - 8,449 (or 15.06%) fewer than in 2019. The number of business entities closing down increased to 51,724 in 2021. The lower number of business entities closing down was also due to the adoption of corona support measures, the use of which was conditional on maintaining business activity. The number of business closures decreased most significantly in the liberal professions (by 32.1%). More than four-fifths of the total number of disappeared entities were sole proprietorships (82.1%) (SBA, 2021a).

Due to the higher number of established business entities than closed ones, a net increase of 14.9% was registered in Slovakia in 2021. This is the highest level of net gain in the past 10 years. In a year-on-year comparison, the number of SMEs increased by 37 138 entities (Eurostat, 2021). The evolution of the number of SMEs in the Slovak Republic in the period 2017-2021 is shown in the graph in Figure 1.

In line with the long-term development tendencies observed in the sectoral structure of SMEs, the most significant representation in 2020 was also of entities operating in the service sector (47.4%). A slight increase in representation has been observed in recent years in the construction sector, which accounted for 18.1% of all entities in the SME size category in 2020. 16.9% of SMEs were active in trade, 13.6% in industry and 4.0% in agriculture. Disrupted buyer-supplier chains during 2020 (especially during the first wave) and declining demand also negatively affected our pro-export oriented SMEs (SBA, 2020).

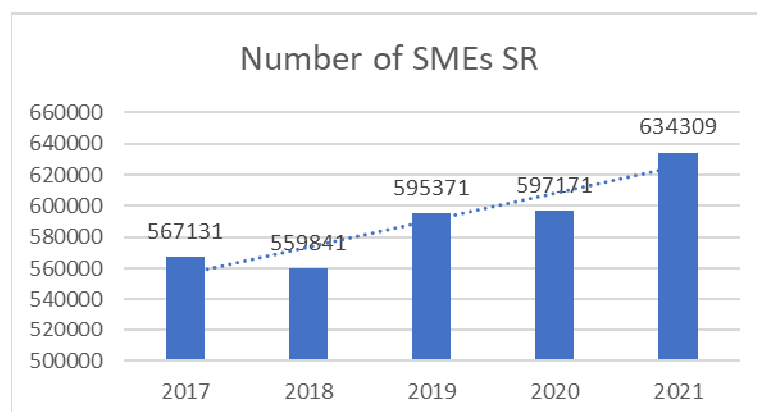


Figure 1. Development of the SME population in the period 2017-21
Source: own processing according to data of SBA (2022)

Employment

Micro-enterprises (including FO-entrepreneurs) have long been the most important contributors to SME employment. In 2021, their share was 46.1%. Small and medium-sized enterprises have a significantly lower share (14.1% each) (SBA, 2022). Table 2 provides an overview of the evolution of the number of persons employed in SMEs from 2017 to 2021, with the percentage change in employment.

Table 2. Number of persons employed in SMEs and trend in the change in employment share

Years	Number of employees in SMEs in the Slovak Republic	Change in employment
2017	1,387,848	+1.40%
2018	1,407,324	+1.40%
2019	1,430,804	+1.70%
2020	1,400,859	-2.10%
2021	1,389,960	-0.80%

Source: SBA, 2022

Employment in the corporate sector decreased by 1.0% (by 18.3 thousand persons) to 1,870.6 thousand persons. In 2021, the share of persons employed in the profit-oriented corporate sector in the total number of employed persons in the national economy of the Slovak Republic decreased to 79.4%. Entrepreneurs operating in the accommodation and restaurant services sector in particular had problems retaining their employees. Employers operating in these sectors faced the problem of redundancies, with employment falling by 9.2% and 7.2% respectively. Only two industries, information and communication activities and selected market services, experienced an increase in firm employment in 2021 (SBA, 2022).

Gross production

In 2020, non-financial SMEs produced products and services with a total volume of EUR 62 889 million, which represents 45.31% of the total gross output of non-financial corporations in the Slovak Republic in that year. The volume of gross output of SMEs thus decreased by EUR 3 196 million (or 4,84 %) year-on-year in 2020 due to the pandemic. Despite the fact that the gross output of small and medium-sized enterprises decreased significantly in Q2 2020, micro-enterprises paradoxically produced more goods and services in the same period (Q2 2020) than in Q1. In the second half of the year, the gross output of non-financial corporations started to increase gradually. SMEs failed to match the output of 2019 even at the end of 2020. The increase in the output of the orpti of 2019 occurred only in Q1 2021. Changes in the output of SMEs SR are shown in Table 3.

Table 3. Year-on-year comparison of gross output of SMEs in the Slovak Republic in the period 1Q 2019 - 1Q 2021

Size	1Q 20 / 1Q 19	2Q 20 / 2Q 19	3Q 20 / 3Q 19	4Q 20 / 4Q 19	1Q 21 / 1Q 20
Micro	↑ 1.47 %	↓ 5.27 %	↓ 3.51 %	↑ 2.47 %	↑ 1.90 %
Small	↓ 0.44 %	↓ 11.99 %	↓ 2.81 %	↓ 5.45 %	↑ 2.97 %
Medium	↓ 1.48 %	↓ 15.23 %	↓ 7.37 %	↓ 4.69 %	↑ 0.14 %
TOTAL	↓ 3.93 %	↓ 20.09 %	↓ 1.19 %	↑ 1.28 %	↑ 4.39 %

Source: SBA, 2021c

Added value

Non-financial business entities belonging to the size category of micro, small and medium-sized enterprises generated an added value of EUR 24,096 million in 2020, which represents 53.63% of the total added value of non-financial corporations in the Slovak Republic in the respective year. Thus, compared to 2019, due to the pandemic, the value added of SMEs decreased by EUR 973 million (or 3.88%). The second wave of the pandemic had a greater impact on the value added of micro-entrepreneurs, which did not reach the value of the pre-pandemic period even in Q1 2021. In relative terms, the most pronounced declines in value added were recorded by accommodation and food services, transport, industry and construction. In contrast to gross output, the value added of non-financial enterprises recorded a year-on-year increase in values in Q3 2020 in as many as 7 sectors. Table 4 shows the changes in the value added of SMEs in the Slovak Republic.

Table 4. Year-on-year comparison of value added of SMEs in the Slovak Republic in the period 1Q 2019 - 1Q 2021

Size	1Q 20 / 1Q 19	2Q 20 / 2Q 19	3Q 20 / 3Q 19	4Q 20 / 4Q 19	1Q 21 / 1Q 20
Micro	↓ 0.18 %	↓ 7.18 %	↓ 0.52 %	↓ 4.54 %	↑ 0.69 %
Small	↓ 0.42 %	↓ 11.35 %	↓ 9.68 %	↓ 8.28 %	↑ 3.64 %
Medium	↓ 0.53 %	↓ 10.12 %	↑ 0.82 %	↑ 3.94 %	↑ 4.70 %
TOTAL	↑ 0.79 %	↓ 13.22 %	↑ 3.75 %	↑ 2.56 %	↑ 2.85 %

Source: SBA, 2021c

Profit

Profit is a measure of the success or failure of the transformation process - i.e. it measures the effect created in the transformation process and is summarised by a qualitative indicator of corporate performance. Non-financial SMEs reported a total profit of EUR 4 790 million in 2020, which represents 53.09% of the profit generated by all non-financial companies in the Slovak Republic in total in 2020. Thus, compared to 2019, which was not affected by the pandemic, non-financial SMEs reported a lower profit of EUR 640 million (or 11.78%). Microenterprises made higher profits in the first half of 2020 than in the second half. Paradoxically, they reported the highest profits during the first wave of the pandemic - in Q2 2020. The impact of the second wave of the pandemic was more pronounced for micro and small businesses, which is also related to their sectoral structure. The volume of profits made by micro and small enterprises in Q1 2021 did not exceed the volume of profits made before the pandemics, and decreased in comparison with 2020, with small enterprises declining the most, by 47%. Table 5 shows the changes in the profits of SMEs SR.

Table 5. Year-on-year comparison of profits of SMEs in the Slovak Republic in the period 1Q 2019 - 1Q 2021

Size	1Q 20 / 1Q 19	2Q 20 / 2Q 19	3Q 20 / 3Q 19	4Q 20 / 4Q 19	1Q 21 / 1Q 20
Micro	↓ 2.15 %	↓ 12.45 %	↑ 1.92 %	↓ 56.03 %	↓ 19.26 %
Small	↑ 5.34 %	↓ 7.38 %	↓ 14.72 %	↑ 12.82 %	↓ 47.08 %
Medium	↓ 37.62 %	↓ 17.32 %	↓ 20.12 %	↑ 63.26 %	↑ 102.76 %
TOTAL	↓ 11.31 %	↓ 30.07 %	↑ 17.85 %	↓ 18.98 %	↑ 16.18 %

Source: SBA, 2021c

4. Discussion

Already in the period before the pandemic, at the end of 2019, there was a decline in global demand, which was exacerbated by the pandemic measures in place. In the case of the Slovak Republic, there was a decline in industrial production, further extensive restrictions in the service sector and other sectors, and the overall situation led to a reduction in consumption, followed by a decline in production, which was ultimately reflected in a decline in GDP in 2020. Sharp declines in demand and production due to blockades and supply chain disruptions led to a historic contraction in activity in Q2 2020. Factories remained operational and were helped by strong export demand and inventory replenishment. Overall, the pandemic effect in 2020 was milder than the euro area average and smaller than initially expected. Due to the restrictions, more than 3,000 trades were also suspended in early 2020 (Bečka, 2020).

After a slowdown in the first quarter, economic growth picked up in the second quarter of 2021, helped by easing measures and a gradual recovery in economic activity, especially in the services sector. The fiscal support will be partly offset by the use of grants from the EU's Recovery and Resilience Facility, which could amount to EUR 6.3 billion over 2021-2026 (OECD, 2020).

The negative impact of the coronary crisis on the Slovak economy in 2020 was also reflected in the development of the economic performance of the small and medium-sized enterprise sector. In 2020, the growth trend of all important economic indicators of SMEs was interrupted. The impact of the pandemic was also felt in the area of innovative activity of enterprises. SMEs in particular have been reassessing their planned innovation activities or have suspended them altogether. (SBA, 2021b)

Even in 2021, businesses did not have sufficient scope for a significant improvement in investment activity. This is because a stronger take-off in investment activity was hampered by input shortages (especially in industrial production; as a supply shock), but also by rapidly rising input prices, primarily due to the impact of the opening up of the economy and the easing of anti-pandemic measures. A

significant part of the services sector was closed (due to the COVID-19 pandemic). Consumption was more goods-oriented, which caused a stronger growth in global demand for consumer goods, affecting the availability of some components and materials (SBA, 2021c).

In the long term, the sectoral structure of SMEs is characterised by an increasing representation of the service sector, accompanied by a decline in the trade sector. The representation of agriculture and industry has remained unchanged in recent years. The construction sector has shown a slight increase in recent years. The sectoral structure is highly differentiated in terms of size categories of enterprises. SMEs with a higher number of employees are characterised by a higher representation of industry. Micro and small enterprises, on the other hand, have a higher share of construction and services. In contrast to the year in which the corona crisis broke out (2020), SMEs in 2021 were already better able to cope with the negative impacts of the pandemic, which was reflected in the increased number of active SMEs in Slovakia.

The quarantine measures significantly affect small and medium-sized enterprises (SMEs), which, due to the economic downturn, have problems with cash flow and maintaining employment. During the 2020 and 2021 pandemics, retention of employees was particularly difficult for accommodation and restaurant service businesses. The construction and industrial sectors were among the other sectors with significant employment declines. The only sector of the economy in which labour demand grew was the information and communication services sector. As a result of the measures taken, owners of retail establishments were also forced to partially or completely reduce their activities, which caused a significant drop in sales in the retail sector, which fell more during 2020 than in 2009.

Based on the results presented, it can be concluded that profit is the indicator most affected by the impact of the pandemic. Similarly to gross output and value added, SMEs' profit experienced the most significant decline in the first half of 2020 - specifically in Q2, when the first wave of the pandemic was raging. In Q4 2020, with the escalation of the second wave of the pandemic, the bottom line of non-financial enterprises deteriorated again, especially for micro enterprises. Compared to the same period of the previous year, only small and medium-sized enterprises reported higher profits in Q4 2020.

The growth in economic performance has not been confined to Slovakia, but has also been characteristic of other EU countries. Among the V4 countries, the Hungarian economy performed best, growing by 7.1%. Poland's gross domestic product increased by 5%. The Czech Republic (growth of 3.3%) and Slovakia (growth of 3.0%) were well behind Poland. In the European Union as a whole, performance increased by more than 5%, mainly due to the growth of major European Union economies such as France, Spain and Italy. The performance of the Slovak economy in 2021 was almost the lowest in the EU. Thus, the Slovak economy's performance in 2021 lagged behind not only the V4 countries, but also most EU countries (Eutostat, 2021).

Conclusion

The emergency situation associated with COVID-19 raises specific needs for structural changes in both enterprises and institutions. In the context of the pandemic, it also appears that the country's technological readiness and the associated digital transformation, may be key in this regard in the near term. On the other hand, the deteriorating investment climate may lead to a slowdown in the necessary structural changes. One of the most vulnerable and most affected groups of businesses are SMEs, which have in some cases been existentially impacted by the anti-pandemic measures. The impact of the coronavirus has also been reflected in the economic performance of the SME sector. Lack of demand, low liquidity and not inconsiderable fixed costs have been a burden for many of them as a result of the coronary crisis.

The coronacrisis has shown that the need to learn and adapt is essential for survival. The increase in the number of SMEs in the Slovak Republic, the increase in output and value added in SMEs in the Slovak Republic already in the first quarter of 2021 indicate the ability of SMEs in the Slovak Republic to adapt to change. The agility of enterprises as the need to adapt to new conditions, to react quickly and flexibly, or to focus on creating value for the customer are in demand in various sectors. While a small organisation is often naturally agile, larger medium and large enterprises need to increase their agility with increasing uncertainty, ambiguity and variability of problems and the environment.

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The Impact of Geopolitical Risk on Industrial Production in Taiwan

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Abstract

Research background: The Russo-Ukrainian war and the risk of a Sino-Taiwanese war make it necessary to examine the impact of a positive shock to the geopolitical risk index on the economy. Indeed, the evidence from the United States shows that a positive shock to the geopolitical risk index has a negative impact on economic activity. It is therefore important to measure and monitor geopolitical risk.

Purpose of the article: The purpose of the article is to examine the impact of a positive shock to the geopolitical risk index on the industrial production index for Taiwan, a semiconductor manufacturer.

Methods: I use two vector autoregressive models and monthly data from 2003 to 2023 to examine the relationship between the above indices.

Findings and added value: I find that a positive shock to the geopolitical risk index causes a decline in the industrial production index for Taiwan, which is consistent with the literature on the impact of geopolitical risk on the economy. The article has important implications. First, it is necessary to monitor geopolitical risk. Second, it is necessary to control geopolitical risk. And finally, it is necessary to increase the resilience of the industry and its supply chains to geopolitical risk.

Keywords: geopolitical risk, industrial production, Taiwan

JEL classification: E32, F51

1. Introduction

The escalation of the Russo-Ukrainian war in February 2022 and the risk of a Sino-Taiwanese war have changed the geopolitical situation in the world. The geopolitical tensions in the Taiwan Strait have led to concerns about the supply of semiconductors (Semiconductor Industry Association, 2023). It is therefore important to examine the impact of geopolitical risk on industrial production.

In this study, I focus on Taiwan, an island country in East Asia known for its semiconductor industry (Semiconductor Industry Association, 2023, pp. 20–21). I examine the relationship between the geopolitical risk index developed by Caldara and Iacovielli (2022) and the industrial production index for Taiwan. The geopolitical risk index depends on the number of articles in ten newspapers (Chicago Tribune, Financial Times, Los Angeles Times, The Daily Telegraph, The Globe and Mail, The Guardian, The New York Times, The Wall Street Journal, The Washington Post, USA Today) about geopolitical tensions. In addition to the geopolitical risk index, I also use its two sub-indices: the geopolitical acts index and the geopolitical threats index.

The geopolitical risk index enables policymakers to monitor and control geopolitical risks. This is important because evidence shows that geopolitical risk has a negative impact on the economy, and much of this evidence applies to the United States (see, for example, Alam et al., 2023; Caldara & Iacoviello, 2022; Fiorillo et al., 2023; Gkillas et al., 2018; He, 2023; Nguyen & Thuy, 2023; Yang & Yang, 2021).

Caldara and Iacovielli (2022) found that a positive shock to the geopolitical risk index causes a long-term increase in the geopolitical risk index, a short-term increase in the CBOE Volatility Index (VIX), a long-term decline in real private fixed investment per capita, a long-term decline in nonfarm payrolls in private sector per capita, a short-term decline in the West Texas Intermediate oil price, and a short-term decline in the 2-year Treasury note yield at constant maturity. They also found that a positive shock to the geopolitical acts index has a negative impact on the economy. This is also true for a positive shock to the geopolitical threats index. The evidence for the United States shows that geopolitical risk has a negative

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impact on the stock market. For example, He (2023) found that a positive shock to the geopolitical risk index causes a short-term decline in the sentiment index developed by Baker and Wurgler (2006). This is consistent with the findings of Caldara and Iacoviello (2022).

The rest of this article is divided into four sections. In Section 2, I describe the methods I used in this study. In Section 3, I present the results of this study and in Section 4, I discuss the results.

2. Methods

In this study, I use two VAR models. First, I use a VAR model with five variables and five lags. The order of the variables is as follows: the natural logarithm of the geopolitical risk index (\ln_gri), the natural logarithm of the TAIEX (\ln_taidx), the interest rate for Taiwan (ir), the natural logarithm of the unemployment rate for Taiwan (\ln_ur) and the natural logarithm of the industrial production index for Taiwan (\ln_ipi). I chose the number of lags based on the Akaike information criterion and the final prediction error. I use monthly data from July 2003 to March 2023.

Second, I use a VAR model with six variables and two lags. The order of the variables is as follows: the natural logarithm of geopolitical acts (\ln_gai), the natural logarithm of geopolitical threats (\ln_gti), the natural logarithm of the TAIEX (\ln_taidx), the interest rate for Taiwan (ir), the natural logarithm of the unemployment rate for Taiwan (\ln_ur) and the natural logarithm of the industrial production index for Taiwan (\ln_ipi). I chose the number of lags based on the Akaike information criterion, the final prediction error and the Hannan and Quinn information criterion. Variable descriptions and sources can be found in Table 1.

Table 1. Variable descriptions and sources

Variable	Description	Source
\ln_gri	Geopolitical risk index, index	Caldara & Iacoviello (2022), https://www.matteoiacoviello.com/gpr.htm
\ln_gai	Geopolitical acts index, index	Caldara & Iacoviello (2022), https://www.matteoiacoviello.com/gpr.htm
\ln_gti	Geopolitical threats index, index	Caldara & Iacoviello (2022), https://www.matteoiacoviello.com/gpr.htm
\ln_taidx	TAIEX, index	Taiwan Stock Exchange Corporation, https://www.twse.com.tw/en/
ir	Discount rate, %	Central Bank of the Republic of China, https://www.cbc.gov.tw/en/
\ln_ur	Unemployment rate, %, seasonally adjusted	Directorat-General of Budget, Accounting and Statistics, https://eng.dgbas.gov.tw/
\ln_ipi	Industrial production index, index, seasonally adjusted	Directorat-General of Budget, Accounting and Statistics, https://eng.dgbas.gov.tw/

3. Results

In this section, I examine the impact of a positive shock to the geopolitical risk index on the industrial production index for Taiwan. I also examine the impact of a positive shock to the geopolitical acts index and the geopolitical threats index on the industrial production index for Taiwan. As I mentioned in the previous section, I use two VAR models. Both satisfy the stability condition as all eigenvalues lie within the unit circle. The descriptive statistics can be found in Table 2.

Table 2. Descriptive statistics

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
\ln_gri	237	4.56	0.23	4.10	5.79	1.13	5.87
\ln_gai	237	4.48	0.36	3.35	5.54	0.05	3.52
\ln_gti	237	4.58	4.58	3.97	6.02	1.27	6.37
\ln_taidx	237	22.90	0.31	22.17	23.63	0.45	3.01
ir	237	1.75	0.59	1.13	3.63	1.53	4.85
\ln_ur	237	1.42	0.12	1.28	1.80	1.55	4.86
\ln_ipi	237	4.51	0.23	3.95	4.95	-0.20	2.20

Source: Own calculations

Figure 1 shows the movement of the geopolitical risk index, the geopolitical actions index and the geopolitical threats index from July 2003 to March 2023.

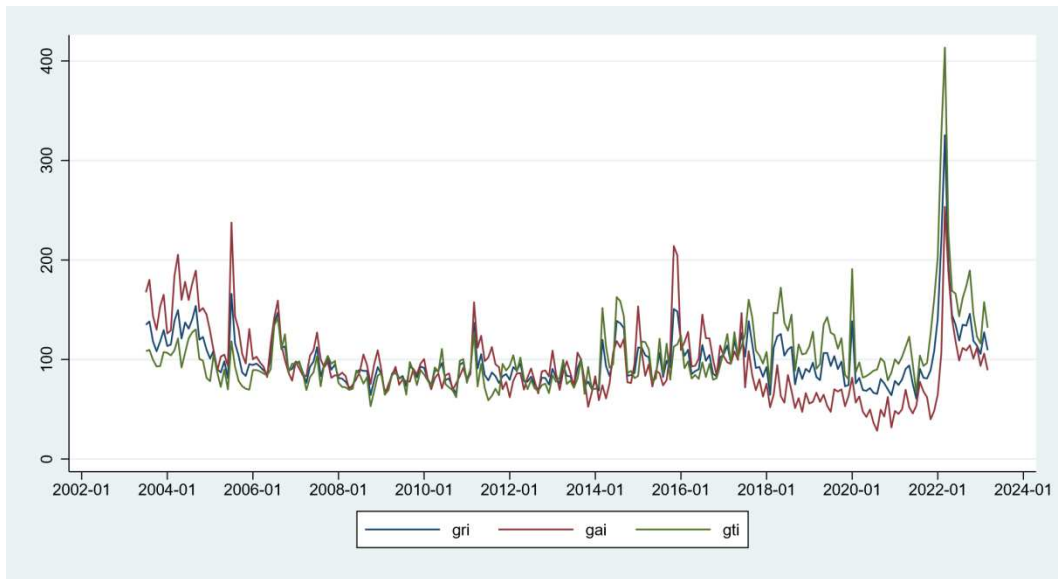


Figure 1. Geopolitical risk index and its sub-indices

Notes: The horizontal axis of the graph is in months. 2002-01 stands for January 2002.

Source: Caldara & Iacoviello (2022), <https://www.matteoiacoviello.com/gpr.htm>

During the observed period, the geopolitical risk index peaked at 325.44 in March 2022 (see Figure 1), indicating that it reached its highest point shortly after the escalation of the Russo-Ukrainian war in February 2022. This is not surprising, as the escalation had a negative impact on geopolitics in the region and the world. Both sub-indices also peaked in March 2022: the geopolitical acts index at 253.42 and the geopolitical threats index at 413.42. This means that escalation of war is an important factor in geopolitical risk.

In the rest of this section, I present the results of the analysis of the impulse–response functions. First, I focus on the impact of the geopolitical risk index on the industrial production index for Taiwan.

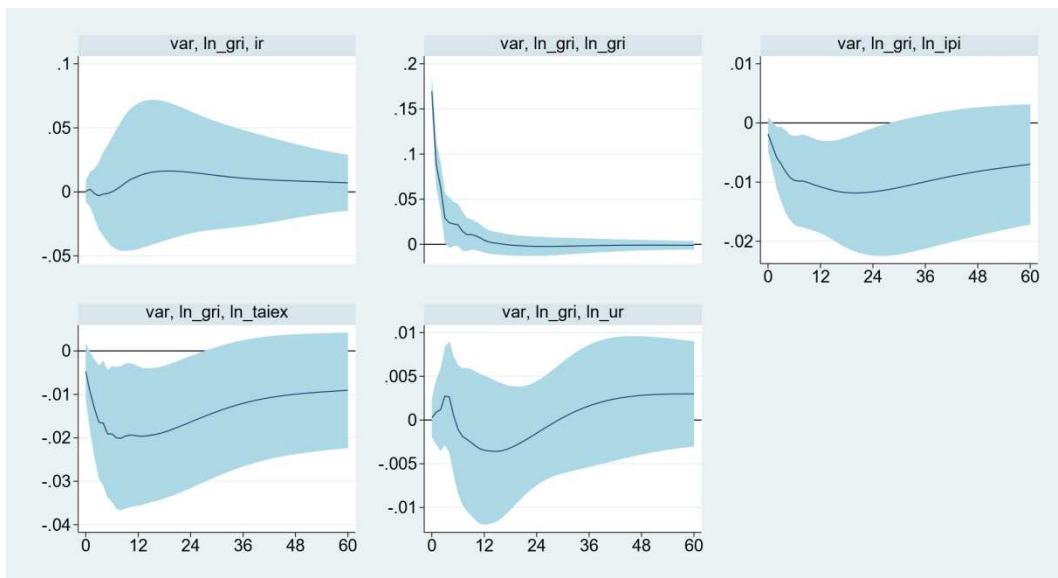


Figure 2. The orthogonalised impulse–response functions in the case of a positive shock to \ln_gri .

Notes: The horizontal axis of each graph is in units of time and the vertical axis of each graph is in units of the variable. Each graph shows the impact of an innovation over a 60-month period. The confidence level for confidence intervals is 95.

Source: Own calculations

Figure 2 shows that a positive shock to \ln_gri has a negative impact on \ln_ipi that is statistically significant between the second and the twenty-seventh month after the shock. In other words, a one-time increase in the geopolitical risk index causes a long-term decline in the industrial production index for Taiwan. Figure 2 also shows that a positive shock to \ln_gri also has a negative impact on \ln_taiex that is

statistically significant between the first and the twenty-seventh month after the shock. This means that a one-time increase in the geopolitical risk index causes a long-term decline in the stock market index for Taiwan.

Moreover, Figure 2 shows, that a positive shock to \ln_gri has no impact on ir and \ln_ur , which is not consistent with my expectations. I expected the positive shock to \ln_gri to have a negative impact on ir and a positive impact on \ln_ur .

Second, I focus on the impact of the geopolitical actions index on the variable of interest.

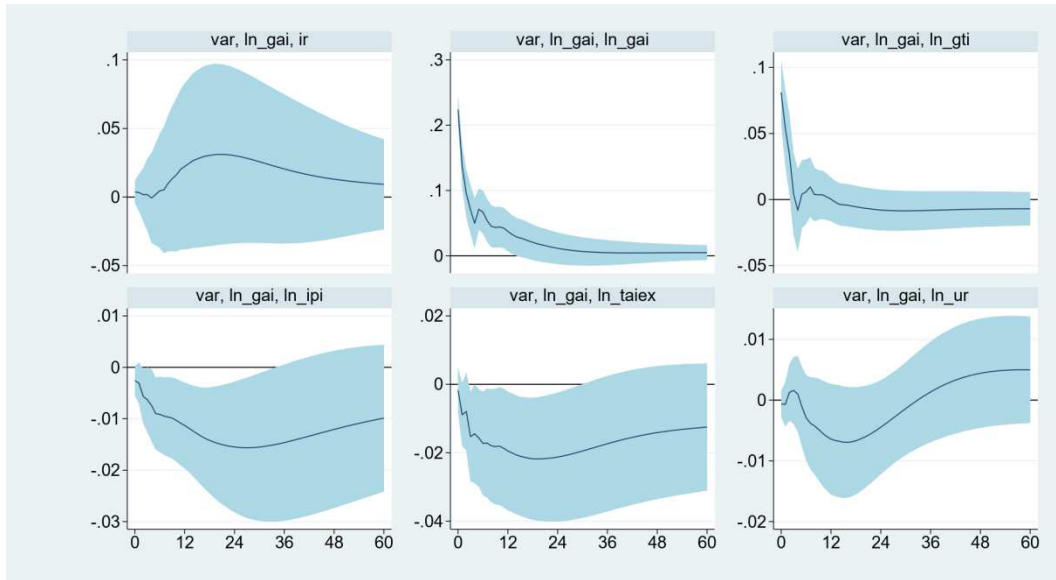


Figure 3. The orthogonalised impulse–response functions in the case of a positive shock to \ln_gai

Notes: See notes in Figure 2.

Source: Own calculations

Figure 3 shows that a positive shock to \ln_gai has a negative impact on \ln_ipi that is statistically significant between the second and the thirty-fourth month after the shock, which is seven months longer than in the previous case. Figure 3 also shows that a positive shock to \ln_gai also has a negative impact on \ln_taiex that is statistically significant between the third and the twenty-ninth month after the shock, which is longer than in the previous case. Figure 3 also shows that a positive shock to \ln_gai has a positive impact on both \ln_gai and \ln_gti .

Finally, I focus on the impact of the geopolitical threats index on the industrial production index for Taiwan.

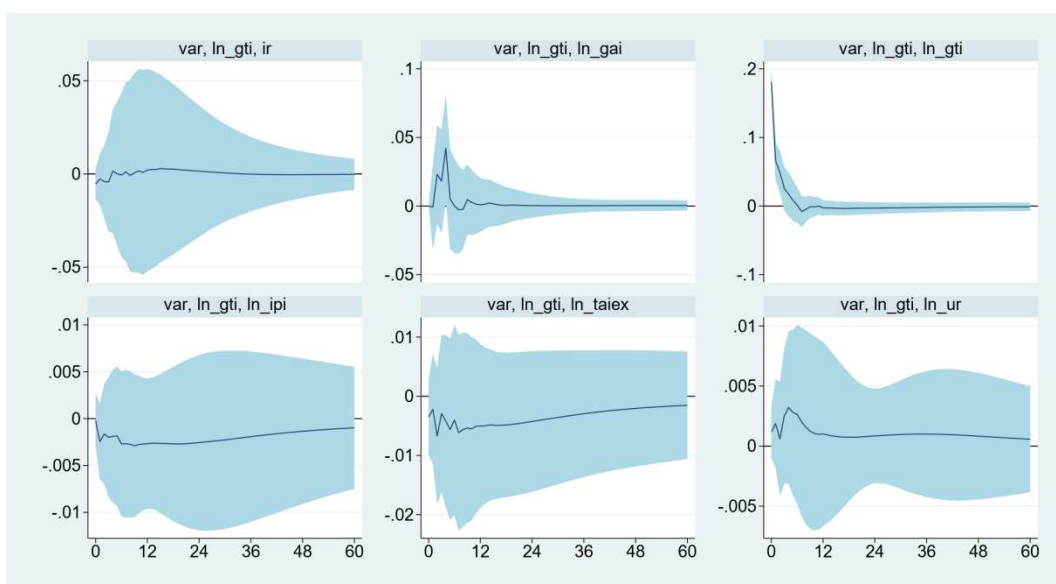


Figure 4. The orthogonalised impulse–response functions in the case of a positive shock to \ln_gti

Notes: See notes in Figure 2.

Source: Own calculations

Figure 4 shows that a positive shock to *ln_gti* has no impact on other variables except *ln_gti*. This means that threats are not as harmful as acts.

4. Discussion

In this study, I show that an unexpected increase in the geopolitical risk index causes a decline in the industrial production index for Taiwan. This result shows how important it is for industries to manage geopolitical risk by diversifying their production geographically. This applies to both domestic and foreign industrials. Since Taiwan is a major manufacturer of semiconductors (Semiconductor Industry Association, 2023, pp. 20–21), this is particularly important for manufacturers of electronics. The reality is that a potential Sino-Taiwanese conflict could lead to disruptions in the supply of semiconductors, which would have a negative impact on industrial production in the world (Gao et al., 2023; Zhang & Zhu, 2023). Therefore, it is important for China and Taiwan to defuse tensions in the South China Sea.

Conclusion

The geopolitical situation in the Taiwan Strait and in the world is very difficult, partly because of the consolidation of geopolitical power (Kim & Cho, 2022; Lee, 2022). The geopolitical tensions between China and Taiwan on the one hand, and between China and the United States on the other, have led to concerns about peace and prosperity in the region.

This study contributes to the literature on the impact of geopolitical risk on the economy. Using data for Taiwan, I found that a positive shock to the geopolitical risk index causes a decline in the industrial production index and the stock market index, which is in line with my expectations. This is also true for a positive shock to the geopolitical acts index, but not for a positive shock to the geopolitical threats index. Surprisingly, I found that a positive shock to the geopolitical risk index has no impact on the policy rate and the unemployment rate, which is also true for a positive shock to the geopolitical acts index and a positive shock to the geopolitical threats index.

These findings have important implications. First, there is a need to monitor geopolitical risk. The geopolitical risk index enables policymakers to monitor geopolitical risk in the world in general and in selected countries in particular. Second, there is a need to control geopolitical risk. This applies to both domestic and foreign industrial companies. Finally, there is a need to increase the resilience of industry and its supply chains to geopolitical risk.

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Understanding the Migration Intention of Graduates in Sri Lanka During the Crisis Recovery Period

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Abstract

Research background: Sri Lanka was under the limelight of the world last year due to the political and economic crisis which resulted in a civil movement that ousted an executive president with a two-thirds majority power in the parliament. The crisis caused significant harm to the nation with negative effects in the short run as well as in the long run. One such long-term adverse effect is the severe brain drain that the country currently experiences.

Purpose of the article: Through this study, researchers attempted to understand the factors contributing to intensifying the recent graduates' intention to migrate using a quantitative approach. Through the lenses of the push and pull factors model of migration, researchers attempt to understand which factors have made a dominant contribution during the recovery period.

Methods The survey method was used to collect data from 232 respondents using self-guided structured questionnaires which were analyzed using SPSS 20. The sample consisted of recent Sri Lankan graduates who were selected using the convenience sampling technique.

Findings & Value added: The regression analysis revealed that in the presence of all studied factors in the push and pull factors model of migration, social push, political push, and economic pull factors significantly affect the migration intention of fresh graduates in Sri Lanka. However, the study revealed that the impact made by economic push, social pull, and political pull factors is insignificant.

Keywords: migration, crisis, graduates, Sri Lanka, push-pull model

JEL classification: 0150, R23

1. Introduction

History provides ample evidence of human migration prompted by expectations of better opportunities in life created by favorable social, economic, and political circumstances in regions of immigration (Kandemir, 2012). Hence, throughout the history of mankind, human beings have been moving from place to place seeking opportunities to improve their standard of living (Mishchuk & Grishnova, 2015). Extant literature defines migration as a movement that involves a change of residence for a substantial duration, which in a way facilitates the migrants to achieve their desired life (Sinha, 2005). Hence, the willingness to migrate has proven to be an outcome of migrants' expectations of favorable social, economic, and political circumstances in their surroundings (Iravani, 2011).

At present, the research site -Sri Lanka, is in the process of recovering from a severe economic and political crisis, which has led the people into complexities in achieving their desired social life expectations (Kaur, 2022; Koop, 2022). The mismanagement of domestic fiscal policy and inaccurate decisions made by the ousted political regime in its recent political history have depleted the quality of life of its citizens, which has motivated the youth to seek opportunities for migration (George et al., 2022; Sharma & Anawade, 2022).

Emigration has been an evident phenomenon in the history of Sri Lanka since the late 1970s owing to significant changes adopted in accordance with the introduced open economic policy in 1977. Hence,

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emigration has never been a major topic of discussion in Sri Lanka until the recent few years as the major proportion of Sri Lankan migrants earlier comprised unskilled labor to the Gulf countries (Collyer et al., 2009). Further, even the emigration statistics from the late 1970s until 2019 presented only a consistent gradual improvement. However, by the end of the calendar year 2019, the total number of migrants from Sri Lanka was about 203,087, which can be observed as a significant increment in comparison to the 5716 emigrations recorded as the average number of emigrations recorded per annum since 1986 to 2019. Further, 311,056 legal emigrations were recorded in 2022 which was a 153% growth compared to the emigrations recorded in 2019 before imposing covid 19 international travel restrictions (SLBFE, 2022).

Apart from the severity of the matter depicted by the drastic rise in the total number of emigrations, the SLBFE statistics also highlight the change in the manpower of emigrations. The report accentuates a significant rise in professional and skilled labor migration compared to previous years (SLBFE, 2022). This development is of significant importance in the purview of brain drain and subsequent national policy preparation as the emigration of skilled labor and professionals is considered to be a severe concern in comparison to the emigration of unskilled labor (Ramanayake & Wijetunga, 2018)

Recent studies conducted in the research site affirm the growing tendency for graduates in Sri Lanka to migrate (Dharmadasa et al., 2019; Weerasinghe & Kumar, 2014). This phenomenon can be defined as the brain drain, which is a transfer of human capital from less developed economies to more developed nations (Williams & Baláz, 2005). Brain drain, or human capital flight, is regarded as an economic cost to a nation that affects virtually all aspects of a country's operations (Dodani & Laporte, 2005; Irvani, 2011). Accentuating the importance of the phenomena, this study focuses on understanding the causes prompting the migration intention of recent graduates in Sri Lanka even during the recovery period of a multidimensional crisis in which the country currently is in.

Scholars have been contemplating the factors that have caused such significant emigrations from developing countries similar to Sri Lanka. To understand this phenomenon in the current study, the researchers are building their hypothesis based on the "Push and Pull Factors Model" (Ravenstein, 1885). The aforementioned model attempts to study how economic, societal, and political factors cause human migration (Zanabazar et al., 2021). Hence, through the lenses of the 'push and pull factors model', researchers attempt to understand the causes contributing to the decision by recent graduates in Sri Lanka to migrate.

2. Literature Review

2.1. Migration and Brain drain

The movement of individuals from their birth or residing country to settle permanently in another country could be identified as migration (Urbanski, 2022). During the history of humankind, millions of people have moved to other countries yearly in hopes of becoming citizens. Migration has been there since the beginning and can be considered as the calculated decision arrived at by individuals to enjoy opportunities that they would not otherwise receive in their home countries. (Urbanski, 2022; Lull, 2018). Many of the recent studies in the domain of migration have highlighted that a significant number of students are considering traveling abroad and leaving their country across the world in order to thrive in their careers and personal lives expecting monetary and nonmonetary returns (Cattaneo et al., 2019; Tuckman, 1970). Apart from seeking career and personal development, literature discloses that favorable social and political conditions prevail in the migrating country together with the discontent with negative practices of the same aspects back in the home country as dominant factors for students to lean into studying abroad. (Nghia, 2019).

As much as we focus on understanding the factors driving fresh graduates' intention to migrate, the migration of those individuals for further studies or career opportunities is not without any consequences. This international migration of skilled workers also known as the 'brain drain' shorthand developing countries of their human capital which is considered to be a scarce resource and a critical aspect (Docquier et al., 2007). The crucial areas of a nation such as social, economic, and political dimensions of development may be affected because of skilled labor migration. Many recent studies have discovered that a significant number of highly skilled workforce in developed nations come from poorer, isolated, and underdeveloped or developing economies. Eventually, the performances of the developing nations' economies will deplete, which may cause negative economic consequences to the source regions. (Ekanayake & Amirthalingam, 2022; Kone & Özden, 2017). Similarly, the brain drains cause rising societal issues as well. Due to the skilled labor migration the quality of services that are being provided to

migrant's origin society will deplete further as the inadequacy of manpower will occur in the health, educational, and business sector (Adeyemi et al., 2018; Lien & Wang, 2005).

These skilled workers migration is often seen as more disastrous than unskilled migration because it can lead to a loss of human capital which was developed by the developing nations through extensive education and training (Khadria, 2002). The extant literature argues that this can have a negative impact on the developing country's economic growth and development as it undermines a developing country's productive capacity (Lowell & Findlay, 2001). Hence the emigration taking place in large volumes in developing countries poses considerable concerns about the return on the investment made in developing the workforce.

Skilled laborers are often more productive and contribute significantly to the economy where their migration slows the GDP growth and adversely affects those who remain, as a consequence of increment in poverty and inequality (Lowell & Findlay, 2001). The decline in skilled labor will lead to a decline in the technological potential of developing countries and cause a number of social problems since working in another country separately from their own family can lead to psychological losses from both ends (Hamidov, 2022). The impact of skilled workers' migration can vary significantly based on individual circumstances, host country policies, and the economic needs of the source and host nations. Hence, a subtle approach is necessary to understand the full implications of skilled workers' migration (Clemens & Pritchett, 2019).

Scholars are of the opinion that international migration is fundamentally steered by structural economic, political, and social factors such as labor market demand, income inequalities, and conflicts in the home country among many other factors which we can categorize as push and pull factors. (De Haas, 2019). While international migration is an occurrence across the world 'brain drain' is a notable concern in developing countries, in other words, third world countries, where a competent and educated group of the population leave the home country in search of a better future and broader opportunities created by favorable social, political, and economic conditions (Roudgar, 2015). In light of this existing knowledge, the current study attempts to understand the factors that contribute to graduates' intention to migrate during a recovery period of a crisis.

2.2. Theory on Push and Pull Factors of Migration

The push-pull factor theory was originally proposed by Ernest Ravenstein in 1885. The theory was formulated based on Ravenstein's observations of migration trends within Europe. His research revealed that rural-to-urban migration and migration from economically disadvantaged regions to those with higher economic prospects were recurring patterns that he identified through his observations (Ravenstein, 1885). The push-pull factor theory serves as a versatile framework for comprehending various migration patterns, encompassing international, internal, and refugee migrations. It provides valuable insights into the multifaceted motivations that drive people to relocate (Castles, 2014).

The push-pull factor theory is a prominent migration theory that offers insights into the underlying reasons behind human decisions to migrate between different destinations (Urbanski, 2022). The migration theory on push and pull factors portrays that individuals are compelled to leave their home countries either due to negative or "push" factors such as poverty, unemployment, political instability or war in their home country or favorable developments in foreign destinations (referred to as "pull" factors) such as economic opportunities, political stability, and family connections (Stanojoska & Petrevski, 2012). "Push factors are conditions that propel people to leave the origin country, while pull factors are conditions that entice people to enter a destination country" (Simpson, 2022, p. 2). The association between migration and social, economic, or political factors is a complex phenomenon that has been the subject of much research. (Urbanski, 2022). Some scholars argue that social factors, such as family ties and cultural norms, are the most important determinants of migration. Others argue that economic factors, such as poverty and unemployment are more important (Carling & Schewel, 2017). Still others argue that political factors, such as war and political instability are the most important among others.

The push-pull factor theory is a dynamic theory that recognizes a broader scope of causes behind the intention to migrate which could change over time, over diverse communities and contexts (Mazzarol & Soutar, 2002). For example, a country that is experiencing political instability may initially be a push factor for migration (Parkins, 2010). However, even if the political situation stabilizes, better employment opportunities in other nations would operate as a pull factor for migrants who are seeking economic opportunities (Nikou & Luukkonen, 2023). Assigning relative importance to push and pull factors is challenging, however, it is important to consider both types of factors when analyzing the migration patterns

of fresh graduates. For example, a fresh graduate may be motivated to move by a combination of economic push factors such as limited job opportunities in their home country, and social pull factors such as the presence of family or friends in the destination country while certain other factors remain not as significant as former (Mazzarol & Soutar, 2002). Hence, such a model with a broader scope would enable this study to assess the combined effect made by these multiple factors on the intention of fresh graduates to migrate.

Recent studies conducted in Sri Lanka in the domain of migration have revealed that social factors such as family ties and cultural norms (Ekanayake & Amirthalingam, 2019), economic factors such as high employment rate in other nations and low wages in the home country (Ekanayake & Amirthalingam, 2019; de Silva et al., 2010) together with limited opportunities for professional development and political instability in Sri Lanka have propelled many to migrate (de Silva et al., 2010; Mazzarol & Soutar, 2002; Weeraratne, 2022). In order to gain a comprehensive understanding of fresh graduates' migration intention, it is imperative to acknowledge the interplay between these push and pull factors. Typically, both types of factors play a role in the decision to migrate (Mazzarol & Soutar, 2002). Hence, this study focuses on understanding which factors are more dominant in contributing to the migration intention of fresh graduates in Sri Lanka.

3. Methods

3.1 Data Collection and Analysis

Data were collected from 232 graduates who recently completed their first degree from any university in Sri Lanka (State or Private) in any stream of studies. The sample was collected through non non-probability convenience sampling technique using both online questionnaires and printed questionnaires which were self-guided and structured. The questionnaire consisted of two main sections. The initial section consisted of collecting demographic data and section two was dedicated to collecting data for the six independent variables and the dependent variable. Table 3.1 provided below presents the operationalization of the independent and dependent variables tested with 5-point Likert scales. The data collected were later analyzed with SPSS 25 software.

Table 3.1 Operationalization of variables

Construct	Items	Source
Economic Push Factors	<ol style="list-style-type: none"> 1. Income distribution among citizens in Sri Lanka is unfair. 2. It is difficult to find suitable jobs for graduates in Sri Lanka. 3. Salaries paid for jobs in Sri Lanka are inadequate. 	Urbanski, 2022
Social Push Factors.	<ol style="list-style-type: none"> 1. Social discrimination in Sri Lanka is high. 2. Social welfare facilities in Sri Lanka are inadequate. 3. Social security in Sri Lanka is unsatisfactory. 4. Satisfying basic health needs in Sri Lanka is challenging. 5. The Education system in Sri Lanka is poor. 	
Political Push Factors.	<ol style="list-style-type: none"> 1. Political corruption in Sri Lanka is high. 2. Conflicts among major political parties in Sri Lanka are high. 3. The administrative system in Sri Lanka is poor. 4. Human rights violation in Sri Lanka are high. 5. Accountability and Transparency in decision making in Sri Lanka are satisfactory. 	
Economic Pull Factors.	<ol style="list-style-type: none"> 1. I migrate expecting higher wages in the migrated country. 2. I migrate to improve my living standard. 3. I migrate for career development in the migrated country. 4. I migrate due to high job opportunities in the migrated country. 5. I migrate expecting enhanced welfare standards in the migrated country. 6. I migrate expecting favourable work conditions in the migrated country. 	

Social Pull Factors.	1. I migrate to be free from discrimination in the migrated country. 2. I migrate expecting better medicine and healthcare in the migrated country. 3. I migrate expecting enhanced social welfare facilities in the migrated country.	
Political Pull Factors	1. I migrate expecting political security in the migrated country. 2. I migrate expecting political freedom in the migrated country. 3. I migrate expecting democracy in the migrated country. 4. I migrate expecting political stability in the migrated country. 5. I migrate expecting value for human civil rights in the migrated country.	
Intention to Migrate	1. I am considering migrating from Sri Lanka to my desired country. 2. The likelihood of me migrating to the desired country is high. 3. I am determined to migrate to the desired country.	Hou & Shiau, 2020

3.2. Conceptual Framework

The conceptual Framework developed for the study is presented in figure 3.1 provided below. The proposed conceptual framework and the hypotheses developed attempt to study the impact of the three push factors and 03 pull factors selected as independent variables on the dependent variable – intention to migrate.

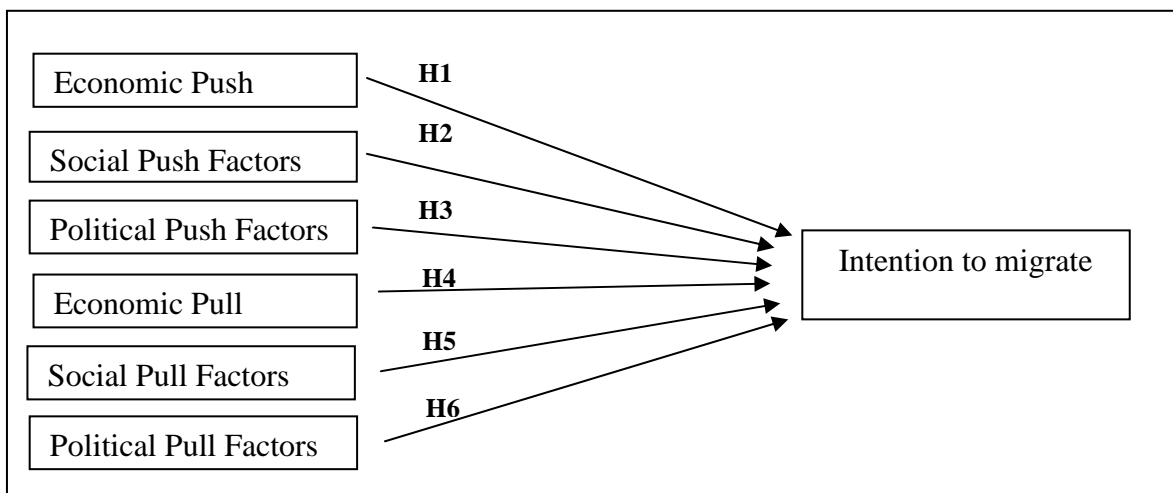


Figure 3.1. Conceptual Framework

Source: Wijesinghe et al (2023)

Hypotheses;

H1: Economic Push Factors significantly affect fresh graduates' intention to migrate.

H2: Social Push Factors significantly affect fresh graduates' intention to migrate.

H3: Political Push Factors significantly affect fresh graduates' intention to migrate.

H4: Economic Pull Factors significantly affect fresh graduates' intention to migrate.

H5: Social Pull Factors significantly affect fresh graduates' intention to migrate.

H6: Political Pull Factors significantly affect fresh graduates' intention to migrate.

4. Results

4.1. Validity and Reliability

With the objective of testing the suitability of data to be used in the subsequent analysis, researchers initially tested the validity and reliability of the scales used. Table 4.1 provided below are the outcomes of

the statistical calculations performed using the outer loadings for each item in the construct extracted through a factor analysis. The Kaiser-Meyer-Olkin measure or the KMO value of .919 for the factor analysis established sampling adequacy or the suitability of the data to conduct the factor analysis while the Bartlett's Test of Sphericity was significant at .000 which further supported the fitness of data to conduct the factor analysis.

Table 4.1 Validity and Reliability

	Cronbach Alpha	AVE	Composite Reliability	PHE	PHS	PHP	PLE	PLS	PLP
PHE	0.821	0.5662	0.7965	0.7525					
PHS	0.806	0.5674	0.8651	.477**	0.7532				
PHP	0.925	0.6032	0.8834	.543**	.513**	0.7767			
PLE	0.919	0.8066	0.8744	.507**	.431**	.570**	0.8981		
PLS	0.833	0.5341	0.7734	.366**	.437**	.410**	.581**	0.7308	
PLP	0.944	0.6281	0.8939	.436**	.440**	.568**	.612**	.606**	0.7925
IM	0.925	0.6040	0.8207	.473**	.485**	.576**	.637**	.480**	.538**

Source: Wijesinghe et al (2023)

As provided in the table above, the scales used in the study presented statistical evidence to hold both convergent and discriminant validity. The values of the Average Variance Extracted (AVE) of each construct used which were above 0.5 establish the convergent validity (Fornell and Larcker, 1981). Discriminant validity or the constructs' empirical uniqueness from other constructs (Hair et al. 2017) has been established as presented in the above table, which involves a comparison among the square roots of the AVE against the inter-construct correlations. Based on the values provided above, it could be concluded that the constructs used in the study possess discriminant validity as the *square root values* of AVE extracted (*values presented in bold numbers*) for each construct is higher than inter construct correlation value (Fornell and Larcker, 1981). The Cronbach alpha values and the values of composite reliability presented in the table above establishes the internal consistency of the data collected. Literature recommends scales with Cronbach alpha and composite reliability values greater than 0.7 as scales with internal consistency (Hair et al. 2017; Norman & Streiner, 1994).

4.2. Demographic statistics and intention to migrate

The study involved data collected from 232 respondents of which 106 (45.7%) were male respondents while 126 (54.3%) were female respondents. Out of the total participants, the majority of them belonged to the age group of 22-25 years (62.9%) which was followed by 41 respondents with in the age group 18-21 years (17.7%). Number of respondents representing the age groups 26-29 years and above 30 years were 36 (15.5%) and 9 (3.8%) respectively.

Analyzing the monthly income of the respondents, the sample comprised 62 respondents (26.7%) who earned a monthly income that was above LKR 50,000 and less than LKR 100,000. This largest composition was followed by 45 respondents (19.4%) who earned an income of less than LKR 50,000 per month. The third largest composition of the sample in terms of monthly income was 32 respondents (13.8%) who earned an income above LKR 250,000 per month. Out of the 232 respondents, 142 respondents have graduated from state universities while 90 of the sample have graduated from private universities.

The study findings revealed Australia as the most preferred destination of migration of Sri Lankan graduates. Out of the 232 respondents, 82 (65.3%) expressed Australia to be their most preferred destination which was followed by 54 (23.3%) respondents who prefer Europe. 16% of the sample or 37 out of the 232 declared Canada as their most preferred destination of migration while 26 (11.2%) preferred New Zealand. Among the popular migrating destinations of Sri Lankans, the United States ranks 5th with 10.3% of the sample preference.

The severity of the brain draining in Sri Lanka which is about to occur is reflected by the 44% of the respondents' non-willingness to return to Sri Lanka if migrated for any cause. Only 56% of the population is willing to return back once their task is accomplished after migrating. An important outcome generated through the analysis was the absence of any statistically significant difference in the intention to migrate

between graduates from state universities and private universities. The mean values of the intention to migrate by state university graduates and private university graduates were 4.1831 and 4.1741 respectively. The Levene's test was insignificant at .938 with a t value of .078.

4.3. Regression Analysis: Exploring the factors driving migration

The study conducted mainly aimed to understand which factors are causing fresh graduates to migrate from Sri Lanka. Accordingly, a regression analysis was performed with 06 independent variables (i.e., economic push factors, social push factors, political push factors, economic pull factors, social pull factors, and political pull factors) to test the relative impact on the dependent variable, intention to migrate. As per the model summary of the analysis, the adjusted R square value of .494 denoted the ability of the selected independent variables to explain 49% of the variance in the intention to migrate. Further, the fitness of the model used was supported by the significant p-value of the ANOVA table as provided below.

Table 4.4 Regression Model Summary

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.712 ^a	.507	.494	.61337		
a. Predictors: (Constant), Economic Push Factors, Social Push Factors, Political Push Factors, Economic Pull Factors, Social Pull Factors, Political Pull Factors						
ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87.089	6	14.515	38.580	.000 ^b
	Residual	84.650	225	.376		
	Total	171.739	231			
a. Dependent Variable: Intention to Migrate						
b. Predictors: (Constant), Economic Push Factors, Social Push Factors, Political Push Factors, Economic Pull Factors, Social Pull Factors, Political Pull Factors						

Source: Wijesinghe et al (2023)

Table 4.5 Table of coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.238	.268		.887	.376
	Economic Push Factors	.066	.061	.064	1.076	.283
	Social Push Factors	.141	.059	.139	2.366	.019
	Political Push Factors	.193	.064	.199	3.027	.003
	Economic Pull Factors	.389	.078	.340	5.005	.000
	Social Pull Factors	.064	.067	.061	.961	.338
	Political Pull Factors	.088	.066	.090	1.324	.187
a. Dependent Variable: Intention to Migrate						

Source: Wijesinghe et al (2023)

As provided in the table above, the regression analysis establishes that, out of the six (06) factors studied, only three (03) factors are causing a significant impact. Accordingly, apart from social push factors, political push factors, and economic pull factors, none of the other factors are causing a significant impact as the significance value is greater than 0.05 (95% confidence level). Among the three factors

identified, economic pull factors present more impact compared to other factors as the standardized beta coefficient of economic pull factors (.340) is greater than .139 and .199 beta coefficients of social push factors and political push factors. Accordingly, it could be concluded that the driving forces behind the migration intention of Sri Lankan fresh graduates are favorable economic drivers in their preferred overseas destination and unfavorable social aspects and political conditions in Sri Lanka.

5. Discussion

The main aim of this study was to explore the factors that drive the intention of fresh graduates to migrate from Sri Lanka. The study was guided by the push and pull model of migration which considered economic, social, and political factors as driving push and pull factors of migration. Conceptually push factors of migration refer to those life situations that cause dissatisfaction with one's present locale while pull factors refer to those appealing attributes that exist in distant places (Dorigo and Tobler, 1983). The current study was conducted to understand which among the selected factors impact on the migration intention of recent graduates in Sri Lanka during a unique development in world history. According to the findings, it was evident that, not all factors tested significantly affect the intention of Sri Lankan fresh graduates to migrate, instead some of those.

As per the findings of the study, the most dominant factor causing fresh graduates to migrate from Sri Lanka is the favourable economic conditions expected in overseas destinations. Accordingly, the expectation of earning higher wages, improving the standard of living and exploring the abundance of quality jobs in overseas nations dominantly affect the intention to migrate. However, an interesting outcome which is noteworthy is the insignificant impact made by economic push factors to migrate ($t=1.076$, $p=0.283$). Conversely, in many of the studies that were conducted to understand the causes behind brain drain, unfavorable economic conditions in the migrants' own locale were found to be significant (Kabbash et al. 2021; Kanayo, 2019). The observation is especially important considering the economic crisis that the country is progressing through. Even though an opinion has been established in the society upholding that, the inability to secure employment opportunities that provide satisfactory income to fresh graduates is the driving force behind labour migration in Sri Lanka, the outcomes of the regression analysis contradicted this perspective as in the presence of other factors, economic push factors are causing relatively an insignificant impact.

This phenomenon of relative insignificant role played by economic push factors to migrate in comparison to economic pull factors has been observed in extant literature. The regression analysis of Urbanski (2022), a similar study conducted in Poland and Romania concluded that economic pull factors operate as the main determinants of human migration to Poland and Romania while the role played by economic push factors to migrate was insignificant. Further in many similar studies (Simpson, 2022; Mayda, 2010), especially the studies which were conducted in low-income earning developing countries, researchers concluded that seeking better working conditions and salaries was the main cause behind labour migration from developing nations (Abdelaziz et al., 2018).

Based on the outcomes of the study, the researcher interprets the crisis prevailing in Sri Lanka which drives the brain drain to be social and political in nature. Critical social aspects such as social discrimination, availability of social welfare facilities of medical services and education together with social security for citizens are at an unsatisfactory level as such factors have significantly caused fresh graduates from Sri Lanka to consider migrating. Dail (1988) resulted in similar findings which concluded that social factors such as social discrimination and low standards of education pushes citizens of developing countries to developed countries.

Similar to the unfavourable social situation in the country, the political crisis has also caused to fuel up the intention of youth to migrate. The study revealed that the combined effect made by the political corruption, conflicts between major political parties, poor governance and administration system has significantly driven ($t=3.072$ $p=0.03$) the intention of Sri Lankan youth to migrate. Even though the unfavourable negative developments in the country encourage people to migrate, favourable social conditions and political conditions are not sought after significant factors in intended destination of visit. In other words, the role played by these favourable social factors and political factors in desired destinations of migration do not significantly affect the intention to migrate. These findings challenge certain studies such as Dail (1988) which held that favorable factors in developed countries significantly affect. In a nutshell, based on the research findings, it could be concluded that hypotheses 02, 03, and 04 are supported while hypotheses 01, 05, and 06 are not supported.

Conclusion

Based on the research findings, it could be concluded that fresh graduates of Sri Lanka are considering the option of migration with the hope of better employment opportunities and salary levels. However, it is important to understand that, dissatisfaction with employment opportunities and perceived less earnings from employment are not significant causes behind migration intention. Hence, in economic perspective, the migration intention is supported more by the expectations of a better life than the lower standards experienced in Sri Lanka. Conversely to the outcome of the economic factors, push factors are dominant in social and political perspectives. This establishes that, rather than the economic crisis in terms of employment, income distribution or employment earnings; the crisis in Sri Lanka is rather social and political in nature. However, the expectations of favorable social and political circumstances in the migrating country do not significantly affect the migration intention.

While the push-pull factor theory provides valuable insights into migration, it is not without limitations. It is a static theory that overlooks the dynamic nature of migration. Moreover, it does not account for the agency individuals exercise in their migration decisions. Additionally, assigning relative importance to push and pull factors proves challenging (Stanojoska & Petrevski, 2012). The push-pull factor theory offers a nuanced understanding of migration dynamics, yet it is essential to recognize its limitations. A comprehensive comprehension of migration necessitates the incorporation of other variables such as networks, policy impact, and individual decision-making processes (Castles & Ozkul, 2014).

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Investing in Photovoltaic Panels: A Study of Economic Development Scenarios

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Abstract

Research background: The background of the research is based on a project carried out at the Institute of Management of STU, which dealt with the issue of microgrids and renewable resources.

Purpose of the article: Investments in renewable resources bring with them not only an ecological aspect, but also an economic one, which is often motivating. Today, we live in uncertainty and the probability of a financial and economic crisis is high. The purpose of this paper is to identify the impact of major economic variables such as inflation, energy price growth, interest rates and grants on investment in photovoltaic systems from a business perspective.

Methods: A mathematical model was created to simulate economic variables, which was able to assess data on energy consumption and production on an hourly basis. Consumption data were obtained from typical consumption diagrams provided by energy distribution companies, production data from the PVGIS tool. The impact of economic variables on selected investment evaluation methods such as net present value, internal rate of return, simple payback period and discounted payback period was analysed.

Findings & Value added: Using a simulation using several economic scenarios, we found that inflation has an ambiguous impact according to the selected investment evaluation methods, real discount rate slightly negative effect, escalation rate of electricity prices significantly positive effect, debt parameters negative effect and non-refundable financing significantly positive effect.

Keywords: photovoltaic system, renewable energy, investment evaluation, economic scenarios

JEL classification: Q42, Q29, Q55, O13

1. Introduction

Investing in photovoltaic panels offers several compelling advantages. First and foremost, solar energy is a renewable resource that is abundantly available and free of cost. Unlike fossil fuels, which are finite and contribute to environmental degradation, sunlight is an inexhaustible source of clean energy. By harnessing solar power, individuals and organizations can significantly reduce their carbon footprint and contribute to a more sustainable energy system (Ramshani, Khojandi, Li, & Omitaomu, 2020).

From a financial perspective, investing in photovoltaic panels can offer attractive returns over the long term (Chiaroni et al., 2014). The cost of solar panels has been steadily declining, making them a more affordable option for both residential and commercial installations (Mah et al., 2018). Furthermore, many countries and regions provide various incentives and government-backed schemes, such as tax credits, feed-in tariffs, and grants, to encourage the adoption of solar energy (D'Adamo, Gastaldi, & Morone, 2020). These incentives can significantly improve the financial viability of solar panel investments and accelerate the payback period.

Moreover, solar panels have a long lifespan and require minimal maintenance. With advances in technology and manufacturing processes, photovoltaic panels are becoming more durable, efficient, and resistant to environmental factors (Jiang et al., 2021). This longevity and reliability make solar panel investments appealing for individuals and organizations seeking stable and predictable returns.

Investing in photovoltaic panels can also serve as a hedge against rising electricity costs. As the demand for electricity continues to grow, traditional energy prices are expected to rise. Installing solar

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panels allows individuals and organizations to generate their own electricity and reduce their dependence on the grid, thus mitigating the impact of future price increases (Reis, Almeida, Silva, & Brito, 2019).

It is worth noting that investing in photovoltaic panels involves certain considerations. Factors such as sunlight availability, installation costs, and regulatory frameworks in your region can impact the feasibility and profitability of solar panel investments. Therefore, it is crucial to conduct thorough research, assess the potential for solar energy in your area, and consult with experts or solar energy companies before making any investment decisions (Wu, Wang, Ji, Song, & Ke, 2019).

The main objective of this paper is to use selected economic indicators such as inflation, energy prices, interest rates, grants for photovoltaic systems to evaluate their impact on the return on investment from the point of view of businesses.

2. Methods

The data we used in the simulation were mainly drawn from publicly available sources. Data on typical consumption diagrams were downloaded from the official website of the Energy distributor for the western Slovakia (“Hodnoty - Západoslovenská Distribučná, a. s.,” n.d.). The consumption type diagram is a sequence of values of the average hourly consumption of electricity per year, based on which the amount of electricity consumption by electricity consumers with type C metering is determined. They serve as a substitute method to determine the daily consumption diagram, which is necessary to account for deviations. This method is used for sampling points without continuous measurement. Subsequently, calculations were used to obtain the hourly consumption of electricity. TDD1, which is for entrepreneurs and single-tariff products, was used as a typical consumption diagram in the simulation.

We obtained data on weather conditions and solar gain from the European Commission tool – PVGIS (Photovoltaic Geographical Information System) (“JRC Photovoltaic Geographical Information System (PVGIS) - European Commission,” n.d.). We obtained data on photovoltaic equipment on market research and a solution proposal from several suppliers for a specific installation. The installation should have been carried out on the roof of the company operating in western Slovakia. Subsequently, we created a simulation application in the Microsoft Excel calculation processor on which we implemented the simulation, the data of which are presented in the results of this publication. From financial parameters, we calculated the net present value (NPV), the payback period, the discounted payback period and the internal rate of return (IRR). The calculations used in these methods are widely known (Zatrochova & Katrencik, 2023).

A solar power plant is significantly dependent on the weather. Not every year is the same, and therefore the profit from the solar power plant varies from year to year. In our work, we considered weather conditions for 16 years (2005-2020), from which we used average values in the simulation.

In our work, we are considering the installation of a photovoltaic system under a company operating in Slovak conditions. This is a model example, and the very structure and focus of the company in this case is not essential. The legislative rules applicable in the territory of Slovakia are essential, especially in the areas of taxes, the functioning of the distribution system and subsidies.

3. Results

In this section, it is necessary to introduce in detail the parameters of the simulation and the limiting conditions that were considered. Subsequently, the results of individual simulation scenarios based on the changes in input parameters will be presented.

3.1 Design of the Photovoltaic System

In the simulation of photovoltaic systems, the geographic location of the installation itself plays an important role. In our simulation, we consider the location of western Slovakia with the following parameters:

- Lat: 48.230, Lon: 17.375,
- Elevation: 137 m,
- PVGIS ver. 5.2,
- solar radiation database: PVGIS-SARAH 2.

As part of price surveys and offers from several suppliers of photovoltaic systems, we obtained a proposal for a photovoltaic system. The premise for the design of the installation was data on the average annual consumption of the company and the spatial availability of the installation. We estimate the

company's annual consumption at 70 MWh and the installation on the roof of the building. By default, the roof of buildings is usually unused, and the installation of photovoltaic systems can serve as a suitable use of free space.

The total power of the photovoltaic installation was considered to be 59 kWp and consisted of the following components:

- crystalline silocon panels with a power of 455 Wp in the number of 130 pcs,
- 60 000 W inverter,
- aluminium frame,
- communication module,
- electrical switchboards AC and DC
- fuses and wiring,
- installation,
- grid interconnection, engineering and permitting.

The PVGIS tool makes it possible to calculate the solar gain of such an installation on an hourly basis based on the selection of a specific location, selection of PV technology, installed power and information about the azimuth and tilt of the panels. This is a freely available online tool of the European Commission, which is often used in practice for such calculations.

Figure 1 shows the monthly energy output of the PV system in the first year at the simulated location.

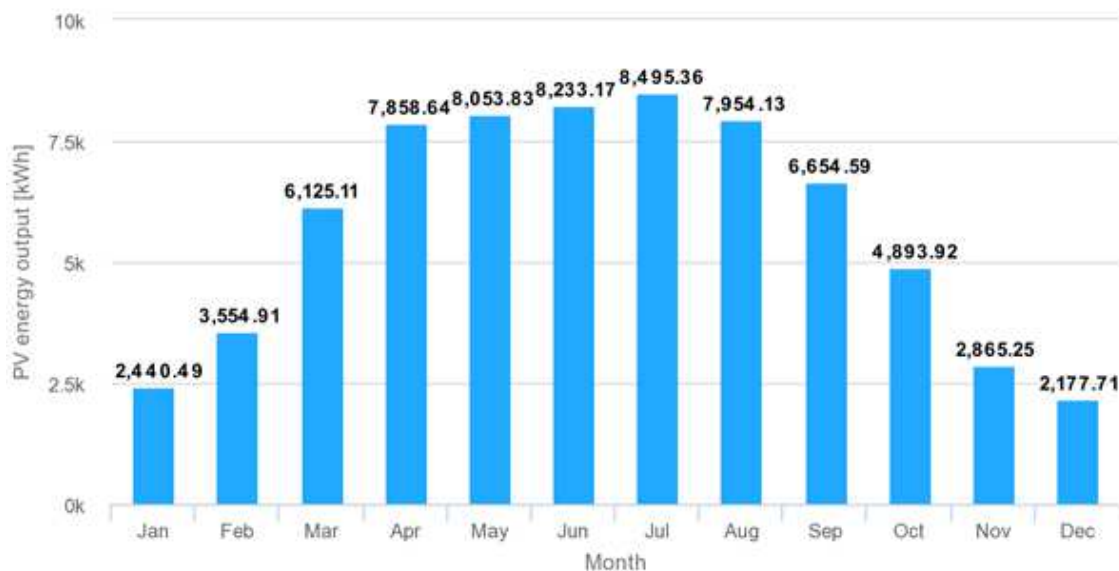


Figure 1. Monthly energy output of the simulated PV system in the first year
Source: own processing using PVGIS (2023)

The performance of a photovoltaic device is dependent to a large extent on the weather. The weather is not the same every year and therefore in the simulation we considered the average performance, which we calculated as a simple average for 16 years (2005-2020). According to typical consumption diagram, estimated yearly consumption of electricity, maximum reserve capacity, and number of phases, we were able to calculate hourly consumption of electricity during the year (Janicek, Ponican, & Sadlon, 2019). This was later used to calculate the electricity delivered from the PV system and consumed by the company and the electricity that was generated by the electricity PV system and sold to the supplier (excess). The profit used in the calculation of the investment return was composed of the price of electricity produced by the system and consumed by the company and the price of electricity sold by the company. In the calculations of electricity generated by the PV system we considered the losses of various reasons (shading, soiling, losses on the AC/DC side of the systems, and so on). We estimate these losses at 10%. The annual degradation rate of the electricity generated by the PV system was set at 0,55%.

Figure 2 shows that the main excess of electricity generated occurs in the warmer months of the year (April to September). The smaller the granularity of the data, the more accurate the results. In our work, we used hourly production and consumption data, which we consider to be sufficiently accurate. Of course, if we were to think about seconds, the results would be slightly more accurate, but the complexity of the

calculations would increase by an order of magnitude. The value of the electricity that the company produces with the PV system and consumes is higher than the value of the electricity that the company sells.

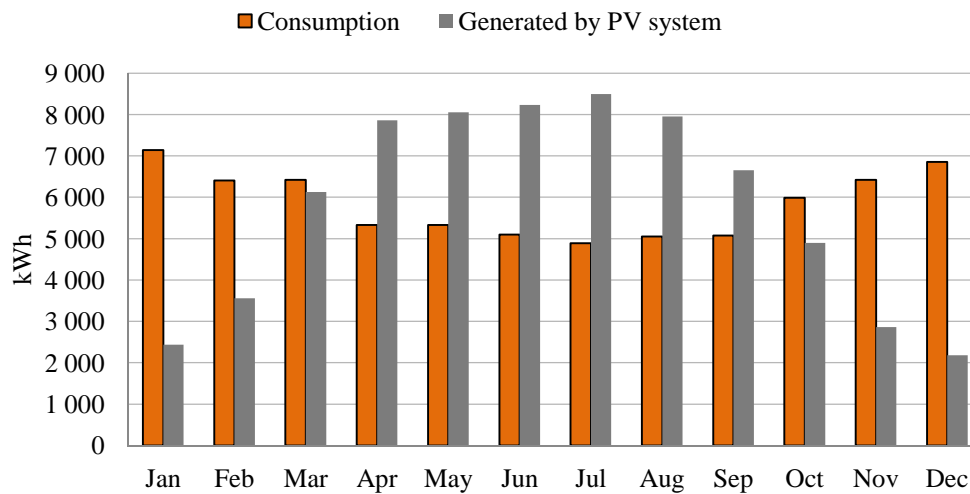


Figure 2. Electricity consumed and generated by the PV system in the first year
Source: own processing

Estimated installation costs can be found in Table 1. Total Direct Capital costs consisted of modules, inverter frame and installation costs. We calculate contingency at 5% of Total Direct Capital Costs. The interconnection and permit were calculated at 1 400 €. The system needs maintenance and we estimate the yearly maintenance cost 2 500 € per year with the yearly escalation rate at 0,5 % per year.

Table 1. Estimated costs of PV system

Costs	in EUR without VAT
Modules (130 units)	27 000,00
Inverter (1 unit)	3 700,00
Other Material and Frame	33 000,00
Installation Labor	16 000,00
Contingency (5% of Direct Capital Costs)	3 985,00
Total Direct Capital Cost	83 685,00
Grid interconnection, engineering and permitting	1 400,00
Total Indirect Capital Cost	1 400,00
Total Installed Cost	85 085,00
Operation and Maintenance Cost per Year	2 500,00

Source: own processing

Cash flow, which is entered into the investment calculations, consisted of net profit after tax. In addition to the installation costs shown in Table 1, the costs of obtaining foreign capital and interest were also considered in the simulation. The income tax rate was 21% and the depreciation of the equipment was considered for 12 years in an even way (8.33% of the total installed costs per year). The salvage value of the PV system after the lifetime was estimated at 10%.

In various scenarios, only one parameter will change. The input parameters were the same for the entire analyzed period. The default values of the input parameters will be:

- inflation – 2,5 %,
- lifetime of PV system – 25 years,
- real discount rate – 3,0 %,
- electricity rates: fixed monthly charge 3 €, rate for buying electricity 0,5 €/kWh (electricity generated by the PV system and consumed in the company) and rate for selling electricity

0,057 €/kWh (excess of electricity generated by the PV system). The yearly escalation rate was set at 1 %/year.

The typical lifetime of PV systems is 25 years. The analysis period in our research was set according to the standard lifetime of the photovoltaic systems. We considered long-term inflation as the average value of inflation in the Eurozone for the period 1985-2021 according to World Bank data - 2.5% (“World Bank Open Data,” n.d.). The real discount rate used in calculation of nominal discount rate that was used in Net Present Value (NPV) was set at 3.0 %. We set the real discount rate at this value after careful consideration. The value was derived from the Weighted Average Cost of Capital (WACC) for PV systems estimated for Slovakia by a survey and impact analysis published by AURES 2 (European research project on auction designs for renewable energy support – Auctions for Renewable Energy Support) in March 2021 (Roth et al., 2021). The electricity rates were established according to the official price list of the largest electricity supplier operating in the selected region.

3.2 Investment Simulation Without Debt

In the first simulation, we considered that the company made the investment from its own resources without the need for additional financing. The input parameters that we changed in the simulation were:

- inflation,
- real discount rate,
- electricity rates.

Figure 3 shows the changes in financial parameters when the inflation was increasing. Because the nominal discount rate was rising along with inflation, NPV had an increasingly lower value. On the other hand, the IRR was rising with inflation. This happened because due to the higher inflation the profit of the company was rising (inflation raised energy prices and the company saved more costs by producing its own energy). The discount payback period uses a nominal discount rate and therefore was rising as well. Ultimately, the results of the financial parameters show conflicting recommendations. According to NPV and discounted payback period, inflation growth has a negative effect on financial parameters of investment in PV systems and according to IRR and simple payback period has a positive effect.

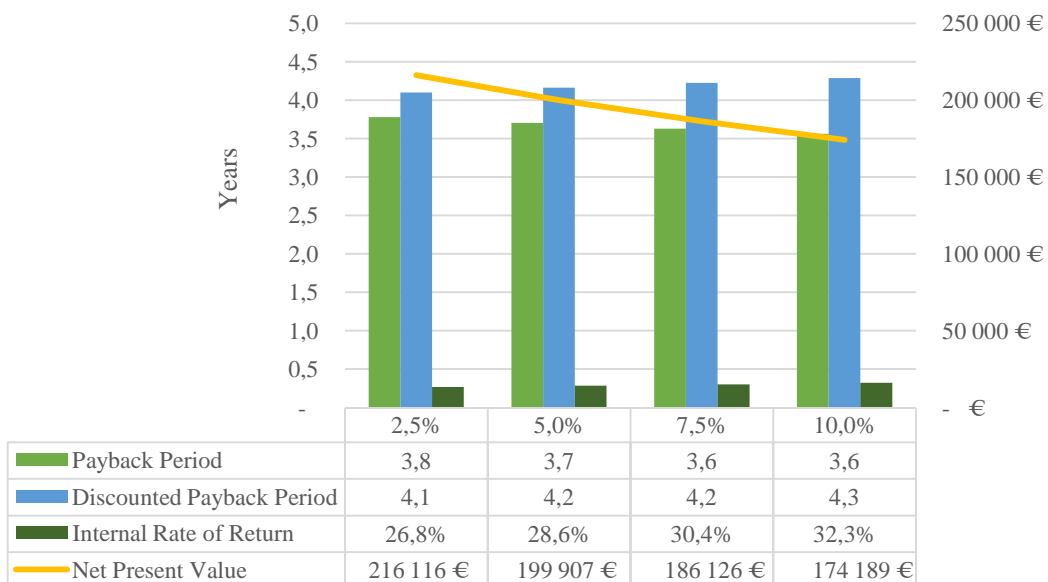


Figure 3. Financial parameters of investment in PV system according to the changes of inflation
Source: own processing

When we changed the real discount rate, the payback periods and IRR stayed the same. NPV was decreasing and discounted payback period was increasing. Increasing the real discount rate has

a negative impact on the calculated financial parameters of the investment. Data can be seen in Figure 4.

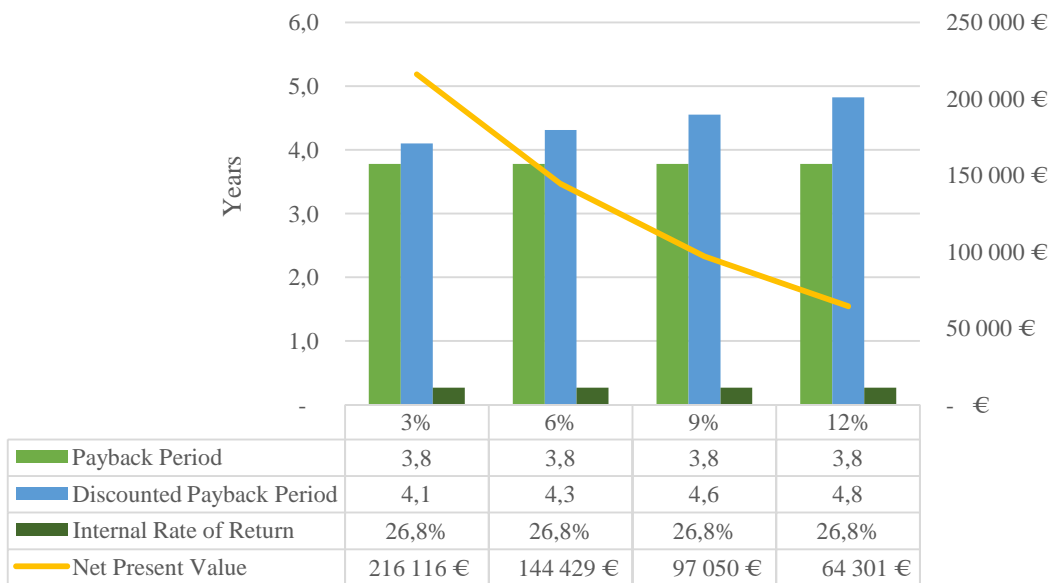


Figure 4. Financial parameters of investment in PV system according to changes of inflation
Source: own processing

Next, we changed the annual escalation rate of the purchase price of electricity. The default value was 1 %/year and we calculated financial parameters for 3%, 6% and 12% per year. As can be seen in Figure 5, the increase in the purchase price of electricity has a significant positive effect on the financial parameters. NPV increased dramatically, IRR increased and payback periods decreased. All parameters showed a positive trend.

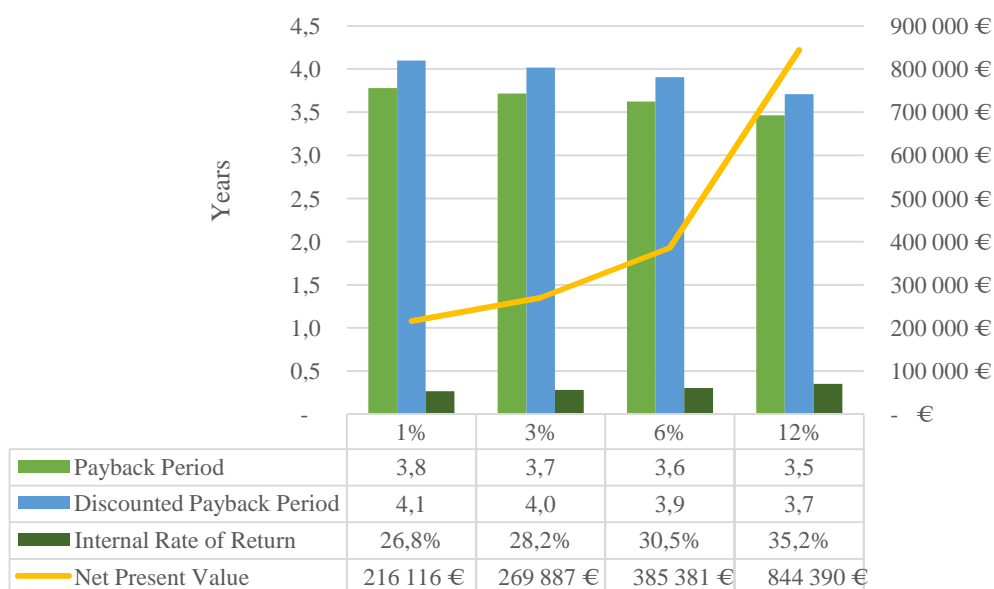


Figure 5. Financial parameters of investment in PV system according to the changes in the purchase price of electricity
Source: own processing

When we changed the annual escalation rate of the selling price, the effect on financial parameters was also positive but not as positive as when we changed the annual escalation rate of the purchase price of electricity. That is due to the lesser amount of electricity that is sold and also due to the smaller selling price (compared to the purchase price).

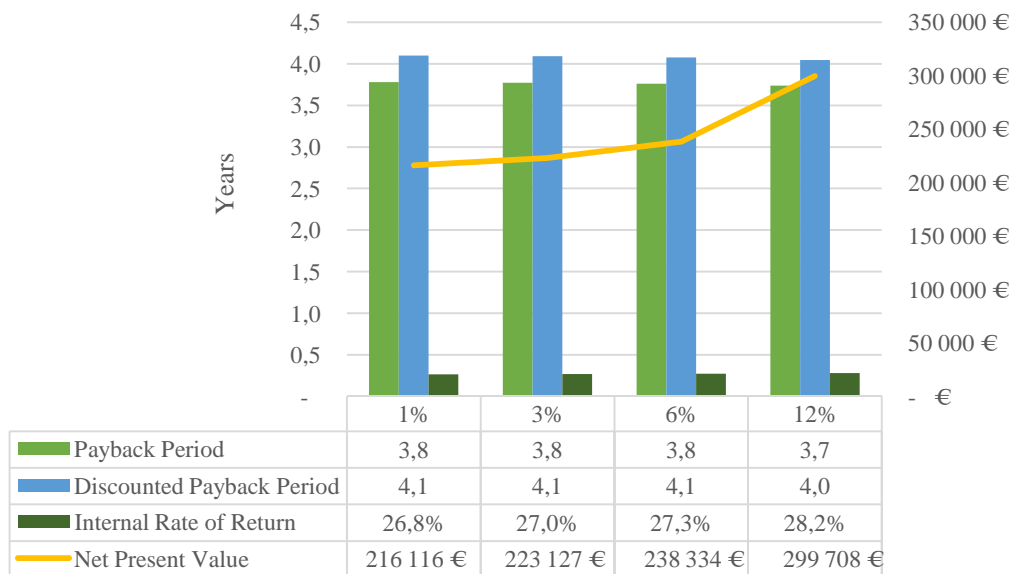


Figure 6. Financial parameters of investment in PV system according to the changes in the selling price of electricity

Source: own processing

3.3 Investment Simulation with Debt

In this part of the work, we examine how the amount of foreign capital needed to acquire a PV system and the amount of interest rate will affect the investment. We will start from the default parameters described in the chapter above and we will gradually change the loan parameters. The default parameters for the interest rate were set at 3,57% p.a. We obtained these data from the statistics of the National Bank of Slovakia as average interest rates on new bank loans for non-financial institutions with a maturity of more than 5 years (“Priemerné úrokové miery z úverov bánk,” n.d.). The default value of maturity of the loan was set at 5 years.

Figure 7 shows the changes of financial parameters of investment evaluation in PV systems according to the changes in the % of loan of total invested capital. The data shows clear negative effect on financial parameters.

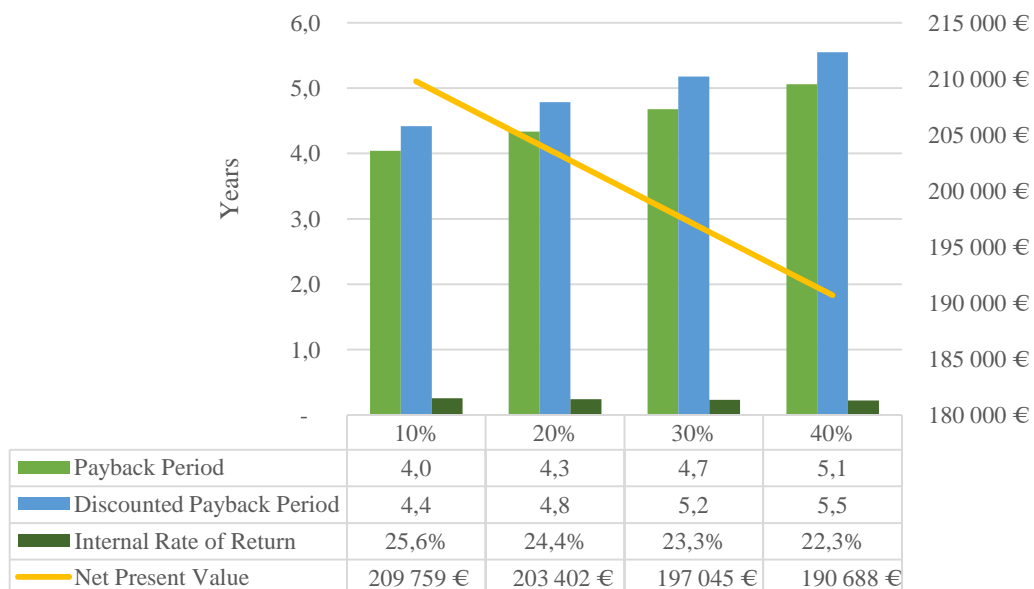


Figure 7. Financial parameters of investment in the PV system according to the changes in % of loan

Source: own processing

Changing the interest rate of the loan has a slightly negative effect on the financial parameters of the investment. When the percentage of debt was higher, the effect of the interest rate was also higher. Data are presented in Table 2.

Table 2. Financial parameters of investment evaluation according to changes in interest rate of the debt

Debt percent	10%				20%				30%			
	3,6%	5,0%	7,0%	9,0%	3,6%	5,0%	7,0%	9,0%	3,6%	5,0%	7,0%	9,0%
Interest rate	3,6%	5,0%	7,0%	9,0%	3,6%	5,0%	7,0%	9,0%	3,6%	5,0%	7,0%	9,0%
Payback Period	4,0	4,1	4,1	4,1	4,3	4,4	4,4	4,4	4,7	4,7	4,8	4,9
Discounted Payback Period	4,4	4,4	4,5	4,5	4,8	4,8	4,9	4,9	5,2	5,2	5,3	5,4
Net Present Value	209 759 €	209 499 €	209 129 €	208 751 €	203 402 €	202 883 €	202 143 €	201 387 €	197 045 €	196 267 €	195 157 €	194 023 €
Internal Rate of Return	25,6%	25,6%	25,5%	25,4%	24,4%	24,4%	24,2%	24,1%	23,3%	23,2%	23,0%	22,8%

Source: own processing

3.4 Investment Simulation with the Grant

Currently, we can observe a significant trend in the support of green technology and green energy by the state (Fang, 2023). The European Union has a green strategy (European Green Deal) and has a plan to have at least a 42,5% share of renewable energy in gross final consumption by 2030. In addition, OECD and the BRICS countries have implemented policies to limit global warming (Escoffier, Hache, Mignon & Paris, 2021). It is therefore appropriate to consider that businesses can obtain various forms of support and subsidies/grants for investments in renewable energy sources. In our simulation we calculated with the non-refundable grant, which will decrease the amount of money needed to cover the investment costs for the business.

Obtaining a grant has a significant impact on the evaluated financial parameters. The data are presented in Figure 8. Payback periods decreased significantly and the IRR increased significantly. This form of support from the state can significantly motivate businesses to make such an investment and help fulfill the EU's strategic goals in this area.

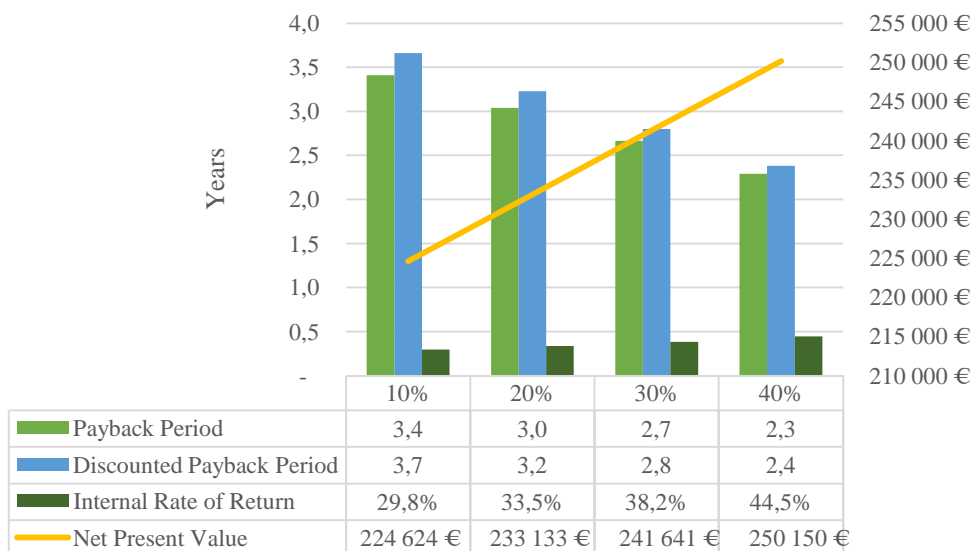


Figure 8. Financial parameters of investment in the PV system according to the changes in funding

Source: own processing

4. Discussion

In various scenarios of the development of economic parameters, we presented the impact of economic parameters on the economic performance of the investment on selected financial indicators. An increase in inflation according to selected financial parameters is an ambiguous outcome. According to NPV and the discounted payback period, the impact is negative, and according to IRR and simple payback period, it is positive. Increasing the real discount rate has a slightly negative effect on the

investment - IRR and payback period did not change, while NPV and discounted payback period changed negatively. Increasing the purchase price of electricity has a strong positive effect, and increasing the selling price of energy has a slightly positive effect.

When looking at the investment in the PV system using foreign resources, the change in the percentage of foreign resources in the total financing was significantly negative. As the level of indebtedness increased, the assessed financial parameters worsened. Increasing the interest rate of the loan had a slightly negative effect on the evaluated financial parameters, while the degree of negative effect also increased with increasing percentage of debt.

If the company received non-returnable funds, for example in the form of a grant, the financial parameters of the investment would improve with the increasing amount of the grant.

Conclusion

If we look at the investment in the PV system as a whole, the financial parameters of this investment are good. Of the monitored economic variables, only the deterioration of financing conditions clearly has a negative impact on investment. Inflation was evaluated by the monitored financial parameters of the investment as ambiguous. Financial support in the form of a non-refundable loan or grant was identified as a significantly positive economic variable.

In conclusion, investing in photovoltaic panels offers a compelling opportunity to contribute to a sustainable energy future while earning financial returns. With the declining costs of solar panels, government incentives, and environmental benefits associated with solar energy, this form of investment has gained popularity in recent years. By harnessing the power of the sun, individuals and organizations can not only reduce their carbon footprint but also enjoy the long-term financial benefits of clean and renewable energy.

Many studies rely on historical data that might not accurately reflect future performance. The quality and consistency of data can vary, leading to potential inaccuracies in predicting investment returns. Investment returns are highly dependent on location-specific factors like solar irradiance, climate, local policies, and grid dynamics. Many studies might not adequately address these regional variations. Also, the rapid pace of technological advancements in solar technology can render research outdated quickly. New technologies can influence the performance and costs of PV systems, affecting return calculations.

Future research can focus on developing more sophisticated models that integrate various influencing factors, such as technological advancements, climate variability, electricity price projections, and policy changes, could enhance return predictions. With the growing importance of energy storage and grid integration, future research could investigate how combining PV systems with energy storage impacts overall investment returns. Comparative studies could assess investment returns of PV systems against other renewable energy technologies or traditional investment options, providing a broader context for decision-making.

In summary, the limitations in current research on investment returns in photovoltaic systems point toward the need for more comprehensive, dynamic, and region-specific analyses that consider a wide range of influencing factors. Future research should aim to provide more accurate and adaptable models for investors considering solar PV investments.

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Application of Machine Learning Algorithms for Prediction of Unemployment Duration

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Abstract

Research background: Unemployment affects individuals' financial stability and well-being while also posing challenges to social cohesion, economic growth, and overall societal development. Therefore, using machine learning models for predicting every jobseeker's unemployment duration has great potential, mainly in identifying individuals threatened by long-term unemployment.

Purpose of the article: This paper presents two machine learning models for predicting the duration of unemployment with high accuracy and precision, where the focus is not only on the predictions themselves but also on identifying important factors that influence the duration of unemployment of the jobseekers.

Methods: In the paper, we used real data on registrations of citizens in Slovakia in the database of jobseekers. We used jobseekers' characteristics and variables describing their previous unemployment history as the input variables. Two machine learning algorithms, classification and regression tree (CART) and neural networks (NN), are employed for prediction modelling.

Findings & Value added: The developed models exhibit strong performance in predicting unemployment duration. Both models have an accuracy of over 77% and, furthermore, excel in identifying the most problematic group of jobseekers with potential unemployment durations exceeding 12 months, with a prediction accuracy of almost 92%. The study also highlights the key predictors of unemployment duration. This information allows for the identification of high-risk jobseekers threatened by long-term unemployment and can assist policymakers, job placement agencies, and individuals in making informed decisions and implementing targeted interventions to mitigate the risk of long-term unemployment.

Keywords: unemployment, prediction models, neural networks, classification and regression tree

JEL classification: E24, J64, C5

1. Introduction

Unemployment duration has far-reaching implications for individuals and societies, encompassing various socio-economic factors. It is a multifaceted issue that not only affects individuals' financial stability and well-being but also poses challenges to social cohesion, economic growth, and overall societal development. Consequently, predicting unemployment duration plays an important role in understanding and addressing this complex phenomenon.

Traditionally, predicting unemployment duration has relied on simplistic approaches, such as categorising individuals into binary groups based on short-term or long-term unemployment. However, this oversimplification fails to capture the nuanced dynamics and potential risk factors associated with unemployment duration. To overcome these limitations, recent research has turned to advanced machine learning techniques and comprehensive analysis of jobseeker characteristics to develop more robust and accurate prediction models. By using machine learning algorithms and considering a wide range of input variables, including demographic factors, educational background, and the course of an individual's previous unemployment, it is possible to find patterns and associations among the unemployment duration

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and mentioned input variables. Models predicting the duration of a jobseeker's unemployment have the potential to provide actionable insights, identify the individuals with a risk of facing long-term unemployment, aid policymakers, job placement agencies, and individuals in making informed decisions, implementing targeted interventions, and allocating resources effectively to mitigate the risks associated with long-term unemployment.

Given the significance of understanding and predicting unemployment duration, this study contributes to the existing body of literature by employing advanced machine learning methods and comprehensive data analysis techniques. The objective is to develop models with high accuracy of predicting the duration of unemployment, considering four possible unemployment durations, with a main focus on the high-risk group of unemployment duration over 12 months. Moreover, the objective is also to identify the most critical factors dependent with unemployment duration. By doing so, this research aims to provide valuable insights and practical tools for addressing the challenges posed by unemployment duration and fostering more effective interventions and support systems.

The rest of the paper is structured as follows. The Literature review section highlights some interesting studies in the field of predicting unemployment using machine learning algorithms. Next, the Methodology and Data section describes the methods used in the study and the database used for creating the models. The Results section presents the two models created for predicting unemployment duration and identifies the most important predictors within them. The Discussion section analyses the results of this study and compares them with the findings of similar studies published so far. Finally, the Conclusion section summarises the main points.

1.1 Literature review

Prediction of unemployment using machine learning algorithms is a topic that has been analysed by numerous authors worldwide. Some studies have focused on predicting the unemployment rate in selected countries, while another group aimed at predicting an individual's unemployment status. An example of a study from the first mentioned group is Kouziokas (2017), where artificial neural networks were employed to create models for predicting unemployment. The models considered several economic factors, and the results demonstrated high prediction accuracy. In a consecutive study by Kouziokas (2019), artificial neural networks were also used to predict unemployment in the UK, achieving high prediction accuracy. The author emphasises that such predictions can be valuable in implementing proactive measures to prevent an increase in unemployment. Mutascu and Hegerty (2023) focused on predicting unemployment in a sample of 23 advanced and developed countries from 1998 to 2016 using artificial neural networks. Their predictions demonstrated high precision. Katris (2020) predicted unemployment rates in several countries using time series models (FARIMA and GARCH) and machine learning models (support vector regression, neural networks, and multivariate regression). Xu et al. (2013) presented a data mining framework that utilised search engine query data to predict unemployment rates. The tools employed by the authors for predicting the unemployment trend include, among others, neural networks and support vector regression.

Within the group of studies aimed at predicting individuals' unemployment, Viljanen and Pahikkala (2020) focused their study on predicting the probabilities of transitioning into unemployment, leaving unemployment and remaining unemployed. The authors employed a Markov chain model with person-specific transition rates, which were fitted using three linear models (simple linear, mixed effects, and machine learning models) based on unemployment history—Adeliyi et al. (2022) analysed factors influencing female unemployment in Nigeria. The authors developed a prediction model using random forest and compared it with seven other prediction models created through various machine learning methods. According to commonly used evaluation metrics, the random forest model outperformed the other selected models. Zhao (2020) employed machine learning models such as logistic regression, random forest and XGBoost to develop a highly accurate model for predicting the potential risks of long-term unemployment using data from European public authorities for employment services. Chodorow-Reich and Coglianesi (2021) proposed a three-stage approach based on the simulation of factor flows with the aim of predicting the distribution of the duration of unemployment.

2. Methods and data

In this study, we employed two machine learning algorithms, namely neural network (NN) and classification and regression tree (CART), to predict the duration of unemployment. Neural network models can find hidden complex patterns and nonlinear relationships within the data and usually achieve high prediction accuracy and precision (Frnda et al., 2019).

The neural network model used in this study was a multilayer perceptron network. This network consists of an input layer, one or more hidden layers, and an output layer. Each layer consists of a set of artificial neurons (nodes) connected through weighted connections. The model uses a forward process to transform the input data from the input layers to the output layer, which generates predictions (Frnda et al., 2022). Due to the complexity of this model's structure, it is considered a black box, as it is impossible to describe all the connections among the neurons in the network, implying that the final model is then uninterpretable. Nevertheless, we can assess its prediction performance for all groups given by the target variable values and determine the importance of predictors used in the model.

In contrast, the Classification and Regression Tree (CART) approach has the advantage of being interpretable while also being capable of capturing nonlinear relationships between inputs and outcome. The CART algorithm operates by partitioning the data into two subsets based on the values of predictor variables. In each step, the algorithm identifies the best predictor variable and corresponding split point that optimally divides the data. The objective is to maximise the homogeneity within each resulting subset concerning the target variable (in this case, unemployment duration) and maximise the heterogeneity between the two subsets. The splitting process is repeated for each subset until stop criteria, such as a minimum number of cases in a parent and child node or maximum tree depth, are met. Subsequently, the tree is usually pruned to avoid the problem of overfitting. Pruning means removing nodes or branches from the tree that have not significantly contributed to the model's prediction accuracy (Durica et al., 2019; Gabrikova & Svabova, 2022).

The resulting CART model takes the form of a decision if-then tree structure, with each parent node representing a split based on a specified value of the input variable and each leaf node representing a prediction of the unemployment duration. The model predicts the duration of unemployment as the mode of the target variable within the leaf node.

We used a dataset described in the following paragraph to train both models. The dataset was randomly divided into training and testing samples, where the training set was used for models training, and the testing set was subsequently used for evaluating the models' performance on data not used in their learning process (Gajdosikova et al., 2023; Larose & Larose, 2017). The training set was balanced by boosting in terms of the number of cases in subgroups given by the categories of unemployment duration. This involved multiplying the less numerous groups to achieve a comparable number of cases to the most numerous group (Ripley, 2008).

The performance of both models was evaluated using various metrics such as sensitivity, specificity, precision, accuracy and F-measure (Chowdary et al., 2014; Manning et al., 2008). These metrics provided insights into the models' accuracy and allowed comparisons between the two prediction models. All of the mentioned metrics were calculated from the confusion matrix (Jagannathan et al., 2021), which describes the numbers of jobseekers correctly and incorrectly classified into one of the groups of unemployment duration. Since the target variable has four possible values, it was necessary to recalculate the number of cases in the confusion matrix using micro- or macro-averages. In this study, we used macro-averaging of the confusion matrices, wherein in individual confusion matrix was constructed for each category of the target variable (i.e. of unemployment duration). The evaluation metrics were calculated for each matrix and these were then averaged (Luo & Uzuner, 2014).

All calculations were performed using the IBM SPSS Modeler 18.3 data mining software. One advantage of using this software is its capability to utilise the created prediction models for future predictions solely by using new data.

2.1 Data used in the study

In this study, we used the database of jobseekers obtained from the Central Office of Labour, Social Affairs and Family (COLSAF) of the Slovak Republic (SR). This database includes all registrations of unemployed individuals in the database of jobseekers. Registration in this database is compulsory in Slovakia to access benefits for the unemployed, such as state-paid insurance, unemployment allowance, or the possibility of participation in intervention programs of the active labour market policy. The database contains various data on the jobseekers, including their age (at the date of registration), the highest level of education, gender, nationality, number of children etc. Furthermore, using anonymised identification numbers of the jobseekers, we were able to add variables describing their previous unemployment experiences. All the input variables used in the study are listed in Table 1. Additionally, the outcome variable used in this study is listed in the last row of the table.

Table 1. Variables used in the study

Variable name	Variable description	Possible values
gender	jobseeker's gender	male, female
nationality	jobseeker's nationality	Slovak, Hungarian, Czech, Roma, unknown or other nationality
marital status	jobseeker's marital status	single, married, divorced, widow, unknown
permanent residence	jobseeker's permanent residence	Eastern Slovakia, Western Slovakia, Central Slovakia, Bratislava region
education	jobseeker's highest completed education	non-finished primary, primary, lower secondary vocational, secondary vocational, complete secondary, general secondary, higher vocational, university 1st grade, university 2nd grade, university 3rd grade, unknown
disadvantage: school-leaver	disadvantaged jobseeker	no, yes
disadvantage: over 50 years	disadvantaged jobseeker	no, yes
disadvantage: long-term unemployed	disadvantaged jobseeker	no, yes
disadvantage: health	disadvantaged jobseeker	no, yes
disadvantage: no paid job	disadvantaged jobseeker	no, yes
disadvantage: low education	disadvantaged jobseeker	no, yes
disadvantage: organisational reasons	disadvantaged jobseeker	no, yes
disadvantage: others	disadvantaged jobseeker	no, yes
children	number of children	0, 1, 2, 3, 4 and more
intervention	intervened jobseeker	no, yes
previous registrations	number of all previous registrations	0, 1, 2, 3, 4, 5 and more
previous non-interventions	number of previous registrations without intervention	0, 1, 2, 3 or more
previous interventions	number of previous registrations with intervention	0, 1, 2, 3, 4 and more
age	jobseeker's age at the date of registration	min 15.0; max 78.0; average 34.9
cumulative	cumulative number of days of all previous registrations before the period under review	min 0; max 33,722; average 1155
work experience before registration	number of days from the last occupation to the current registration	min 0; max 15,805; average 415
average unemployment	the average number of days spent in unemployment per year from 15 years of age	min 0; max 365; average 45
unemployment duration	duration of the current registration in months (categorised)	up to 3, 3 – 6, 6 – 12, more than 12

Source: authors (2023)

The database consists of a total of 524,304 registrations of jobseekers in the COLSAF database, covering the period from 04/2010 to 06/2019. This time frame is determined by the data availability from COLSAF SR. As mentioned above, the target (outcome) variable in this study is the *unemployment duration*, which refers to the length of unemployment at a particular jobseeker registration in the database. We categorised the registration durations into four categories, as mentioned in Table 1. Based on these categories, the data contains the following numbers of registrations.

We would like to emphasise that each case in the dataset does not represent an individual jobseeker but rather a jobseeker's registration in the database. That means each jobseeker could have one or more registrations during the period under review, and their unemployment history is also considered using the variables mentioned in Table 1.

Table 2. Distribution of target variable

Category of unemployment duration	Proportion of registrations in %	Number of cases
up to 3 months	23.85	250,069
3 – 6 months	21.34	223,743
6 – 12 months	26.10	273,701
more than 12 months	28.71	301,011

Source: authors (2023)

3. Results

Figure 1 depicts the CART model for predicting the unemployment duration of jobseekers. In each terminal node of the tree, the modal category of unemployment duration is predicted. Therefore, if a jobseeker falls into a terminal node based on the fulfilment of the dividing conditions, the predicted unemployment duration will correspond to one of the four categories.

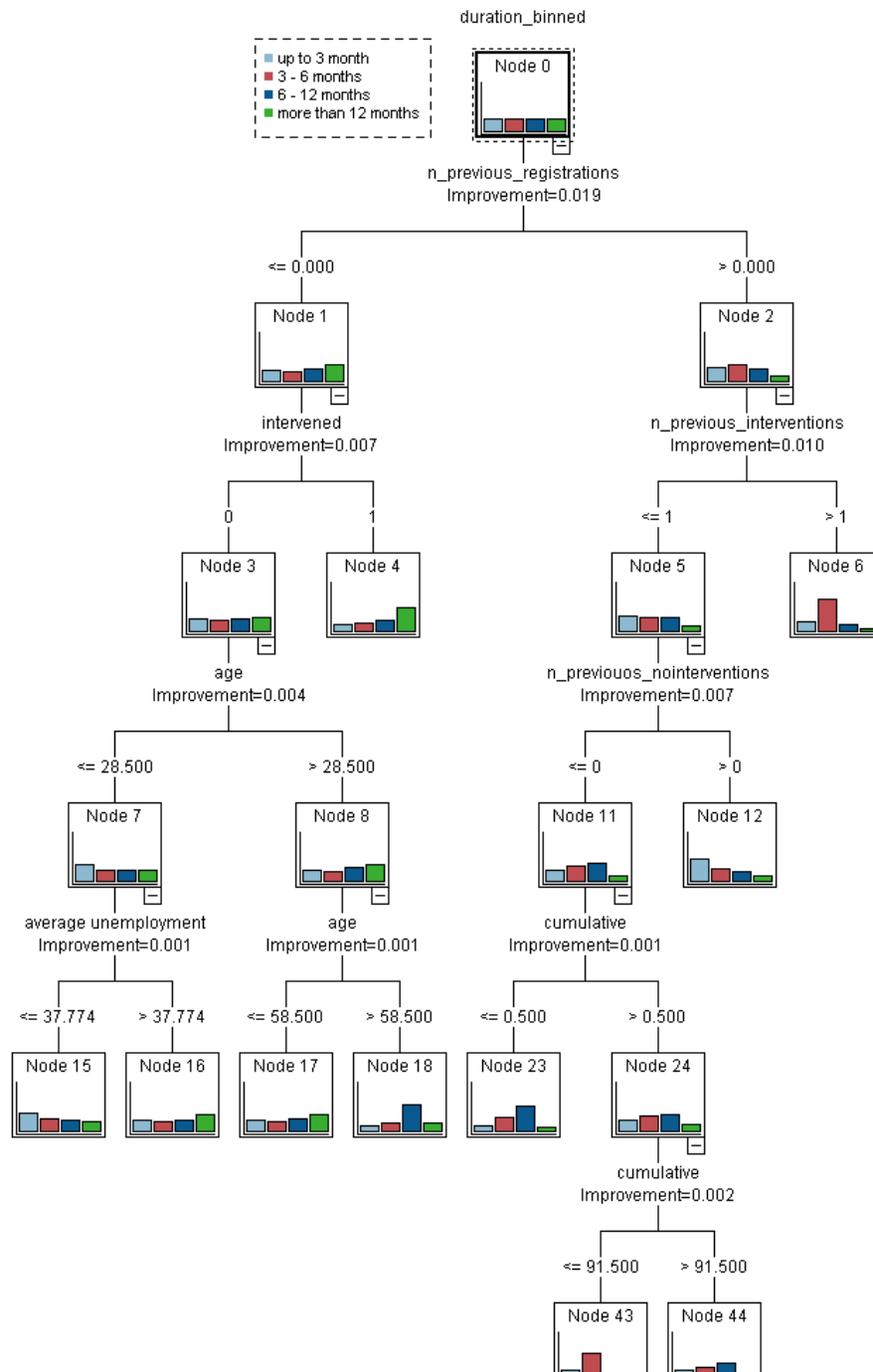


Figure 1. CART model
Source: own processing (2023)

In order of importance, the most important predictors for the unemployment duration were the number of previous registrations, the number of previous registrations *without* and *with interventions*, *cumulative days of previous unemployment*, *intervention* at the current registration, *age*, and *average unemployment* per year.

The confusion matrix in Table 3 presents the number of cases from the testing sample that the model correctly and incorrectly classified into the respective categories of unemployment duration.

Table 3. Classification table of the CART model

unemployment duration	up to 3 months	3 - 6 months	6 - 12 months	more than 12 months	correct [%]
up to 3 months	86,484	10,519	25,631	2,391	69.2
3 - 6 months	54,710	25,734	29,698	1,890	23.0
6 - 12 months	64,445	8,266	60,991	2,974	44.6
more than 12 months	11,136	2,691	22,551	114,202	75.8
sum	216,775	47,210	138,871	121,457	54.8

Source: authors (2023)

The NN model used the following input variables as the most important predictors: *average unemployment*, *disadvantage long-term unemployed*, *previous registrations*, *cumulative*, *previous interventions*, *intervention*, *work experience before registration*, *previous non-interventions* and *age*. The order of predictor importance is depicted in Figure 2. Other variables were also included in the NN model but are not displayed in the figure for better readability.

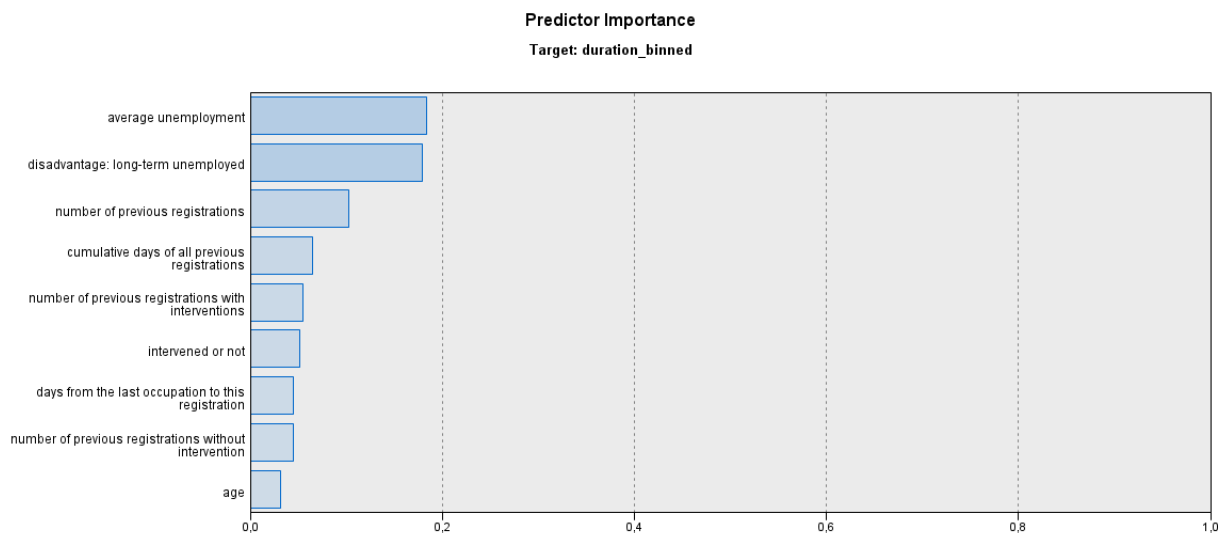


Figure 2. Predictors' importance in the NN model

Source: author (2023)

NN model achieved the following correct and incorrect predictions of unemployment duration in individual categories, as shown in Table 4.

Table 4. Classification table of the neural network model

unemployment duration	up to 3 months	3 - 6 months	6 - 12 months	more than 12 months	correct [%]
up to 3 months	75,822	5,957	39,745	3,499	60.6
3 - 6 months	44,407	21,090	43,537	2,998	18.8
6 - 12 months	46,482	3,280	81,706	5,208	59.8
more than 12 months	8,994	1,430	22,362	117,787	78.2
sum	175,705	31,757	187,350	129,492	56.5

Source: authors (2023)

The performance of both models was evaluated and compared using evaluation metrics; their values are presented in Table 5. The metrics are listed for each category of unemployment duration, allowing for an assessment of the model's performance in predicting each specific category of unemployment duration. Finally, the macro-average of the partial confusion matrices was employed to calculate the evaluation metrics for the overall model.

Table 5. Evaluation measures of both models

Model	Unemployment duration	sensitivity	precision	accuracy
CART	up to 3 months	69.17	39.90	39.90
	3 - 6 months	22.97	54.51	79.44
	6 - 12 months	44.62	43.92	70.71
	more than 12 months	75.84	94.03	91.68
	macro-average	53.15	58.09	77.41
NN	up to 3 months	60.65	43.15	43.15
	3 - 6 months	18.82	66.41	80.62
	6 - 12 months	59.78	43.61	69.37
	more than 12 months	78.23	90.96	91.51
	macro-average	54.37	61.03	78.27

Source: authors (2023)

Both models demonstrate their best performance in identifying the most high-risk group of potentially long-term unemployed individuals threatened by an unemployment duration of more than 12 months. The sensitivity of identification in this category exceeds 75 % for both models, with precision over 90 % and accuracy exceeding 91 %. Moreover, both models achieved high sensitivity in accurately identifying the least problematic group of jobseekers unemployed for up to 3 months, with a sensitivity of over 60 %. However, the most challenging category to predict is the registrations lasting from 3 to 6 months, with a sensitivity of only around 20 %. This result is lower than that of a naive model with random category predictions.

Overall, both models demonstrate strong predictive performance in the testing set, with an average accuracy exceeding 77 %.

4. Discussion

We can conclude that both models agreed on the most important variables influencing unemployment duration. In this sense, both models include the *number of previous registrations*, *number of previous registration without and with interventions*, *cumulative days of previous unemployment*, *intervention at a current registration*, *age*, and *average unemployment per year* as the most important predictors for the duration of unemployment. These findings suggest that the jobseeker's history of previous unemployment plays a significant role in determining their unemployment duration.

If we compare our results with those of similar studies, we can conclude that the performance of the prediction models based on machine learning techniques for predicting unemployment is at a very high level. For example, we can mention the study conducted by Adeliyi et al. (2022), where the authors employed eight different machine learning models to predict unemployment among women in Nigeria, with a special focus on identifying the factors that most influence women's unemployment. The models were developed using data from nearly 42,000 female study participants aged 15 to 49. Similar to our study, input variables such as the highest level of education, region, age etc., were employed. The models achieved prediction accuracies ranging from 68 % (naive Bayes) to almost 87 % (random forest) with similar precision levels. In this regard, we consider our models to be slightly more precise. However, the main difference is that the mentioned study aimed to predict whether a woman is likely to be unemployed or not, while our study focused solely on individuals who were already registered as unemployed jobseekers, with an emphasis on predicting the duration of their unemployment.

In this study, the agreement between the two models in individual predictions of unemployment duration was over 66 %. A similar performance of the prediction models was achieved in the study by Viljanen and Pahikkala (2020). The authors employed the linear model, the linear mixed effects model and the linear machine learning model. Compared to our study, these authors focused on predicting the risk of unemployment exit, entry and prevalence. Their training set consisted of 10,000 persons from 2013 to 2016, and the models achieved performance ranging from 0.67 to 0.80. The authors emphasise that predicting the exact timing of transitions from and into unemployment is difficult, with a models'

performance of 0.67 and 0.69. However, the overall unemployment prevalence can be predicted by the machine learning model with a high precision of 0.80. These precisions are similar to those presented in this study.

Conclusion

The use of machine learning models has garnered significant attention in recent years, and it has great potential to be used also in predicting unemployment. Among the machine learning methods, CART and neural networks are powerful tools because of their ability to capture complex hidden relationships. Both these methods demonstrated their high prediction accuracy. While both models have shown promise, the choice between CART and neural networks depends on the specific context, data availability, and the desired balance between interpretability (CART) and performance (NN).

The developed models demonstrated significant potential for practical applications in identifying the key factors influencing unemployment duration and categorising individuals into groups based on their possible duration of unemployment. These models are particularly valuable in identifying the most at-risk and vulnerable group of long-term unemployed individuals. The usability of the models in practice is not only attributed to their pretty high predictive power but also the creation of the models as a data-mining task. This allows for the deployment of the models, monitoring their performance and precision in practice and, if necessary, adjusting the model and its coefficients to adapt to changing conditions in the labour market or to the changed distribution of the population of jobseekers.

However, it is important to admit that this study and its results have several limitations. One of these limitations is the low sensitivity in identifying a specific category of unemployment duration. Even though this category may not be considered the most problematic, improving the performance of both models in correctly identifying this category of unemployed individuals would further enhance their overall performance.

Another limitation to consider is the fact that the models were created using data from a period before the COVID-19 pandemic. Therefore, there is a possibility that the coefficients of the models may need to be re-estimated in case it is found that the population of jobseekers will have changed characteristics or behaviour as a result of the pandemic crisis. However, the data-mining approach employed in predicting unemployment duration allows for the flexibility to address such updates of the models.

A possible future research direction could involve exploring the application of advanced ensemble techniques to address the issue of predicting unemployment duration, incorporating additional available data sources. Furthermore, drawing inspiration from similar studies, if suitable data is available, it would be beneficial to predict not only the duration of unemployment for individuals already unemployed but also to predict the likelihood of being unemployed.

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The Analysis of Characteristics of Potential Peer-to-Peer Investors in the Slovak Republic

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Abstract

Research background: Peer-to-Peer (P2P) lending has been the subject of many articles recently. The idea provides a relatively uncontrolled non-regulated platform for crowd lending, the possibility to obtain loans directly from other individuals – investors. They behave according to the cultural and economic factors of their country of residence. Several authors also deal with investors' trust in P2P platforms, perceived risk of investment, and rationality of decision making.

Purpose of the article: The aim of this article is to define the characteristics of potential P2P investors, the biggest differences in willingness to invest between groups of potential investors and the aspects that significantly influence the willingness to invest.

Methods: In order to achieve goals, a survey with 479 respondents was conducted, and the answers were processed via statistical methods of non-parametrical Mann-Whitney U-test, Pearson and Spearman correlation, OLS model and multiple linear regression models.

Findings & Value added: The results suggest that the biggest impact on willingness to invest in P2P platforms lies in the level of education and perceived importance of high revenue, possible choice of borrower and no bank involved. No statistically significant influence of gender, discretionary income, or previous investing experience on the willingness to invest, was found. The findings in this article can help educational institutions raising awareness of P2P lending and the marketing department of P2P lending platforms target potential investors with higher accuracy, who, on the other hand, will be able to make more informed decisions.

Keywords: P2P lending, investors, willingness to invest, perceived pros and cons

JEL classification: E00, E02

1. Introduction

The topic of peer-to-peer (P2P) lending has been frequently researched during last years by several authors using secondary data provided by P2P platforms, namely Wang (2011), Emekter et al. (2015), Jin & Zhu (2015), Miller (2015), Serrano-Cinca (2015), Guo et al. (2016), and Lyócsa & Vašaničová (2022). Other authors research the view of investors and potential investors, for example Zhang et al. (2020) find out using vector autoregressive that investor sentiment can predict the stability of P2P lending platforms. Kim (2020) studies the determinants of Chinese investors leaving the P2P market and their investment patterns. Yan et al. (2018) examine how to persuade investors to develop initial trust in P2P platforms. In Malaysia, Khan (2022) also studies the trust of investors in P2P lending platforms and finds out that investors' income and age are positively related to this trust. The rationality of decision-making of investors is the subject of the paper of authors Chen et al. (2017). The relationship between successful borrowing times, successful loans and default loans is identified by Wang et al. (2019). Hu et al. (2019) study investors' ability to properly identify default risk when investing in P2P lending. The main goal of this paper is to describe typical attributes of potential investors in P2P lending and to identify predictors that affect their willingness to invest in P2P lending. The secondary objective is to find out whether there are significant differences in the willingness to invest in P2P lending between groups of different discretionary income, gender, level of education and former investing experience.

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2. Methods

As a part of the research, a questionnaire was formed and a survey with 479 participants aged 16 – 88 was conducted in the beginning of 2023. All calculations were performed using Gretl software. The sample of respondents was composed of potential investors in P2P lending in Slovakia. The following variables were defined:

- *Gender, Age, Educ* are demographic variables of gender (0 – man, 1 – woman), age and highest achieved education (1 – primary; 2 – secondary school; university: 3 – stage one, bachelor study; 4 – stage two, master / engineer study; 5 – stage three – PhD. study),
- *IncCat, DiscInc, PerImpRet, Invest, NrPlat, WillInvP2P* are economic and financial variables of **Income Category** (0 – no income, 1 – from 646 € to 971 €, 2 – less than 1295 €, 3 – less than 1620 €, 4 – less than 1944 €, 5 – less than 291 €, 6 – more than 2590 €), **Discretionary Income** (0 – less than 0 €, 1 – less than 50 €, 2 – less than 100 €, 3 – less than 150 €, 4 – less than 200 €, 5 – less than 250 €, 6 – less than 300€, 7 – greater than or equal to 300 €), **Perceived Importance of Return** on investment (0 – least important, 10 – very important), **Investing** experience (0 – no, 1 – yes), **Number of Platforms** for P2P lending known and **Willingness to Invest in P2P** lending (0 – no, 10 – very willing),
- *ProsChoiceAmount, ProsDiver, ProsChoiceBorr, ProsPassInc, ProsAnon, ProsNoBank, ProsHighRev, ConRisk, ConReclaim, ConTax, ConCrash* are variables of the perceived importance of the **Pros** and **Cons** of investing in P2P lending (0 – not important, 10 – very important), in particular the freedom of **Choice of Amount** to be invested, the possibility to **Diversify** portfolio, the freedom of **Choice of Borrower**, investment perceived as a **Passive Income**, **Anonymity**, **No Bank** involvement, **Higher Revenues**, high **Risk** of investment, possible problems when **Reclaiming** an investment, **Taxation** of income and possible **Crash** of the P2P platform,
- *InflPurp, InflGen, InflAge, InflApp, InflEth, InflEduc, InflEc* are variables of the perceived **Influence** of borrowers' attributes on the investment decision, specifically the **Purpose** of the investment (borrowers project), **Gender**, **Age**, **Appearance**, **Ethnicity** / nationality, level of **Education** and **Economic** status.

The frequencies of the categorical and ordinal variables are shown in Table 1.

Table 1. Frequency table

	0	1	2	3	4	5	6	7
<i>Gender</i>	161	318	.	.	.	.	.	.
<i>Educ</i>	.	19	362	44	52	2	.	.
<i>IncCat</i>	148	126	74	32	16	12	13	.
<i>DiscInc</i>	55	67	38	44	39	43	39	139
<i>Invest</i>	248	231	.	.	.	.	.	.

Source: author's own calculations

Typical potential investor is a woman with finished secondary school of lower income category, relatively high discretionary income, and no former experience with investing. When using weighted values (multiplied by *WillInvP2P* percentage), the highest average willingness to invest in P2P lending can be seen among women, people who finished primary school, with lower income than 646 €, monthly discretionary income less than 50 €, without former investing experience and knowing no P2P lending platforms. The potential investor most willing to invest in P2P lending considers the most important pros – high revenue (2.11) and choice of borrower (1.92) – and cons – risk of platform crash (2.249) – and is mostly influenced by (interested in) economic status (1.938) of borrower and the purpose of his investment, resp. project (1.903). Descriptive statistics of other variables are presented in Table 2.

Table 2. Descriptive statistics

	Mean	Median	Min	Max	Std. Dev.	IQ range	Miss. obs.
<i>PerImpRet</i>	6.086	7	0	10	3.358	7	0
<i>NrPlat</i>	0.639	0	0	8	1.265	1	0
<i>WillInvP2P</i>	3.493	4	0	10	2.44	3	0
<i>ProsChoiceAmount</i>	5.29	5	0	10	3.309	6	0
<i>ProsDiver</i>	5.146	5	0	10	3.076	6	0
<i>ProsChoiceBorr</i>	5.345	5	0	10	3.207	6	0
<i>ProsPassInc</i>	5.568	6	0	10	3.227	5	0
<i>ProsAnon</i>	5.426	6	0	10	3.247	6	0
<i>ProsNoBank</i>	4.927	5	0	10	3.125	6	0
<i>ProsHighRev</i>	5.704	6	0	10	3.194	5	0
<i>ConRisk</i>	5.944	6	0	10	3.339	6	0
<i>ConReclaim</i>	5.664	6	0	10	3.202	5	0
<i>ConTax</i>	5.522	6	0	10	3.152	6	0
<i>ConCrash</i>	6.33	7	0	10	3.462	7	0
<i>InflPurp</i>	5.35	5	0	10	3.438	7	24
<i>InflGen</i>	2.099	1	0	10	2.63	3.75	15
<i>InflAge</i>	4.248	4	0	10	3.119	5	19
<i>InflApp</i>	2.369	1	0	10	2.723	4	15
<i>InflEth</i>	2.717	2	0	10	2.914	5	13
<i>InflEduc</i>	4.487	5	0	10	3.165	5	11
<i>InflEc</i>	5.555	6	0	10	3.278	7	27

Source: author's own calculations

In this paper following research questions were conducted:

- *Q1*: Is there any relationship between discretionary income and willingness to invest in P2P lending?
- *Q2*: Is there any difference between men and women in willingness to invest in P2P lending?
- *Q3*: Does the level of education influence the willingness to invest in P2P lending?
- *Q4*: Does former investing experience affect willingness to invest in P2P lending?
- *Q5*: What are the most influential predictors of willingness to invest in P2P lending?

3. Results

Research question *Q1* is answered using OLS model with results in Table 3:

Table 3. OLS model for Q1 (n=464)

	Coefficient	Std. Error	t-ratio	p-value	Mean dep. var.	3.4806	S.D. dep. var.	2.4476
<i>const</i>	3.6409	0.2085	17.46	< 0.0001	Sum sq. resid.	2768.787	S.E. of regression	2.4481
<i>DispInc</i>	-0.0401	0.0438	-0.9169	0.3597	R-squared	0.0018	Adjusted R-squared	-0.0003

Source: author's own calculations

Results suggest that the less discretionary income one has, the slightly more willing one is to invest in P2P lending. The regression coefficient is, however, insignificant ($p = 0.36$) and the coefficient of determination R^2 is close to 0. We can therefore assume that there is **no significant relationship** between the discretionary income and willingness to invest in P2P lending.

Gender differences in willingness to invest in P2P lending in *Q2* are tested using Mann Whitney U-test. The variable *WillInvP2P* does not follow normal distribution ($p = 0.002$). The results of the test can be seen in Table 4 below.

Table 4. Mann Whitney U-test for Q2

	n	w	U	z		one-tailed p-value		
<i>Gender = 0</i>	161	38363	25876	0.194	P (Z > z₁)	0.577	two-tailed p-value	0.847
<i>Gender = 1</i>	318	76597	25322	-0.194	P (Z > z₂)	0.423		

Source: author's own calculations

As a result, the *p*-value (0.847) is greater than 0.05, therefore there is **no significant difference** in willingness to invest in P2P lending between men and women. We cannot say that the willingness to invest in P2P lending is influenced by gender.

The level of highest achieved education (*Educ*) and its influence on the willingness to invest in P2P lending (*WillInvP2P*) is the subject of research question **Q3**. The relationship between the variables (potential influence) is tested using nonparametric Spearman correlation with the following results:

Spearman's rank correlation coefficient (rho) = 0.04818691, Under the null hypothesis of no correlation: t(477) = 1.05364, with two-tailed p-value 0.2926

The alternative hypothesis of a significant correlation is rejected ($0.2926 > 0.05$), thus according to data the level of education does not correlate with the willingness to invest in P2P lending, suggesting that the variable *WillInvP2P* is **not influenced** by variable *Educ*. This is confirmed by the univariate regression with the dependent variable *WillInvP2P*, dummy variables *Educ1-Educ4* and insignificant regression coefficients with the following *p*-values:

Educ1 p-value 0.212, Educ2 p-value 0.129, Educ3 p-value 0.279, Educ4 p-value 0.179

Possible effects of former investing experience on willingness to invest in P2P lending (**Q4**) are tested using Pearson correlation.

corr(WillInvP2P, Invest) = 0.05860192,
Under the null hypothesis of no correlation:
t(477) = 1.28209, with two-tailed p-value 0.2004

No significant correlation between the variables *WillInvP2P* and *Invest* was identified ($p = 0.2 > 0.05$), therefore we can assume that there is no significant relationship between former investing experience and willingness to invest in P2P lending; respectively, former experience in investing **does not** statistically significantly **affect** willingness to invest in P2P lending.

The final research question **Q5** is answered via series of multiple linear regression models. Insignificant variables from research questions **Q1-Q4** were also used in the models, because of possible significant impact in conjunction with other observed variables. The models describe the dependence of the dependent variable *WillInvP2P* on other variables and are formulated as follows:

$$\begin{aligned} WillInvP2P_i = & \beta_0 + \beta_1 Gender_i + \beta_2 Age_i + \beta_3 Educ_i + \beta_4 IncCat_i + \beta_5 DiscInc_i + \beta_6 PerImpRet_i + \\ & \beta_7 Invest_i + \beta_8 NrPlat_i + \beta_9 ProsChoiceAmount_i + \beta_{10} ProsDiver_i + \beta_{11} ProsChoiceBorr_i + \beta_{12} ProsPassInc_i + \\ & \beta_{13} ProsAnon_i + \beta_{14} ProsNoBank_i + \beta_{15} ProsHighRev_i + \beta_{16} ConRisk_i + \beta_{17} ConReclaim_i + \beta_{18} ConTax_i + \\ & \beta_{19} ConCrash_i + \beta_{20} InflPurp_i + \beta_{21} InflGen_i + \beta_{22} InflAge_i + \beta_{23} InflApp_i + \beta_{24} InflEth_i + \beta_{25} InflEduc_i + \\ & \beta_{26} InflEc_i + u_i, i = 1, 2, \dots, n. \end{aligned}$$

Created models M_i with regression coefficients β_i and adjusted coefficient of determination (*Adj. R²*) can be seen in Table 5.

Table 5. Multiple linear regression models M1-M4 for Q5

	M ₁ n=365	M ₂ n=365	M ₃ n=367	M ₄ n=369		M ₁	M ₂	M ₃	M ₄
β_0	3.282 ^a	3.268 ^a	3.311 ^a	3.326 ^a	β_{14}	0.12	0.119	0.122 ^c	0.139 ^c
β_1	-0.005	.	.	.	β_{15}	0.225 ^a	0.231 ^a	0.235 ^a	0.237 ^a
β_2	-0.072 ^a	-0.072 ^a	-0.072 ^a	-0.073 ^a	β_{16}	-0.004	.	.	.
β_3	0.471 ^a	0.474 ^a	0.472 ^a	0.486 ^a	β_{17}	-0.199 ^b	-0.202 ^a	-0.21 ^a	-0.218 ^a
β_4	0.123	0.122	0.14	0.144	β_{18}	0.021	0.024	.	.
β_5	-0.053	-0.054	-0.057	-0.053	β_{19}	0.052	0.049	0.056	0.056
β_6	-0.077	-0.075	-0.077	-0.059	β_{20}	0.085 ^c	0.084 ^c	0.082 ^c	0.076 ^c
β_7	0.157	0.157	0.135	.	β_{21}	0.15 ^b	0.15 ^b	0.141 ^b	0.144 ^b
β_8	0.194 ^c	0.197 ^b	0.187 ^c	0.199 ^b	β_{22}	-0.037	-0.037	-0.042	.
β_9	-0.029	-0.021	.	.	β_{23}	-0.109 ^c	-0.107 ^c	-0.117 ^b	-0.128 ^b
β_{10}	0.024	.	.	.	β_{24}	0.131 ^b	0.132 ^b	0.135 ^b	0.117 ^b
β_{11}	-0.132	-0.126	-0.126 ^c	-0.109	β_{25}	-0.034	-0.034	.	.
β_{12}	0.047	0.05	0.057	.	β_{26}	0.073	0.073	0.051	0.048
β_{13}	-0.055	-0.056	-0.065	-0.064	R^2	0.218	0.217	0.217	0.215
					$Adj. R^2$	0.157	0.164	0.172	0.177

^a significant at 0.01 level ^b significant at 0.05 level ^c significant at 0.1 level

Source: author's own calculations

No problem with either multicollinearity or heteroskedasticity was identified. Among the models M_1 - M_4 , model M_4 best describes the influence of the predictors on the variable *WillInvP2P*. Its adjusted R^2 ($Adj. R^2$) is 0.177. 21.5 % of the variability observed in the dependent variable *WillInvP2P* is explained by the regression model M_4 ($R^2 = 0.215$). Model M_3 and M_4 both have more than half of the significant predictors. The most significant regression coefficients are (in order) β_0 , β_2 , β_3 , β_{15} , β_{17} , β_{21} , β_{24} , β_8 , β_{23} , β_{20} , β_{14} and β_{11} . We can observe a positive influence of the variables *Educ*, *NrPlat*, *ProsNoBank*, *ProsHighRev*, *InflPurp*, *InflGen*, *InflEth* and a negative influence of the variables *Age*, *ProsChoiceBorr*, *ConReclaim*, *InflApp* on the dependent variable *WillInvP2P*. Therefore, according to results, the willingness to invest in P2P lending is mainly **positively influenced** by

- the level of education of the potential investor (*Educ*),
- the degree of perceived importance of the high earning potential of such an investment (*ProsHighRev*),
- the number of known P2P lending platforms (*NrPlat*),
- likelihood of being influenced by the gender of the borrower (*InflGen*),
- perceived importance of involving no bank in investment in P2P lending (*ProsNoBank*),
- likelihood of being influenced by borrower's ethnicity/nationality (*InflEth*),
- the probability of being influenced by the purpose of the investment – the borrower's project (*InflPurp*).

On the other hand, **negative impact** on the willingness to invest in P2P lending can be observed on

- the perceived importance of risk, the probability of loan not being repaid – default (*ConReclaim*),
- the likelihood of being influenced by the borrower's appearance – platform dependent (*InflApp*),
- perceived importance of being able to choose the borrower – investment (*ProsChoiceBorr*),
- the age of the potential investor (*Age*).

In addition to M_1 - M_4 , other suitable models are suggested in Table 6.

Table 6. Multiple linear regression models M5-M8 for Q5

	M ₅ n=369	M ₆ n=382	M ₇ n=390	M ₈ n=443		M ₅	M ₆	M ₇	M ₈
β_0	3,31 ^a	3,323 ^a	3,13 ^a	2,961 ^a	β_{15}	0,235 ^a	0,237 ^a	0,231 ^a	0,229 ^a
β_2	-0,071 ^a	-0,07 ^a	-0,07 ^a	-0,064 ^a	β_{17}	-0,187 ^a	-0,194 ^a	-0,197 ^a	-0,172 ^a
β_3	0,493 ^a	0,479 ^a	0,467 ^b	0,514 ^a	β_{20}	0,085 ^c	0,092 ^b	0,084 ^b	0,082 ^b
β_4	0,147	0,129	0,094	.	β_{21}	0,13 ^b	0,122 ^b	0,121 ^b	0,122 ^b
β_5	-0,062	-0,047	.	.	β_{23}	-0,127 ^b	-0,11 ^c	-0,11 ^c	-0,124 ^b
β_6	-0,058	-0,045	.	.	β_{24}	0,118 ^b	0,102 ^c	0,093	0,076
β_8	0,198 ^b	0,208 ^b	0,204 ^b	0,238 ^a	β_{26}	0,044	.	.	.
β_{11}	-0,119 ^c	-0,089	-0,088	-0,087	.	.	.	.	.
β_{14}	0,112 ^c	0,106 ^c	0,088	0,076	R^2	0.212	0.200	0.192	0.182
					$Adj. R^2$	0.178	0.169	0.167	0.161

^a significant at 0.01 level ^b significant at 0.05 level ^c significant at 0.1 level

Source: author's own calculations

The problem with heteroskedasticity in model M_7 was corrected using robust standard errors HC3. The most suitable model appears to be M_5 with $Adj. R^2$ of 0.1782 explaining the amount of variability observed in the variable $WillInvP2P$ (R^2) comparable to model M_4 . After model M_5 , we can observe decline in models' reliability when reducing number of independent variables. All models M_5 - M_8 , confirm the positivity and negativity of the influence of the predictors described above.

4. Discussion

In this paper the following research questions were conducted and answered using statistical tests and models: $Q1$ – Is there any relationship between discretionary income and willingness to invest in P2P lending? $Q2$ – Is there any difference between men and women in willingness to invest in P2P lending? $Q3$ – Does the level of education influence the willingness to invest in P2P lending? $Q4$ – Does former investing experience affect willingness to invest in P2P lending? $Q5$ – What are the most influential predictors of willingness to invest in P2P lending? Question $Q1$ was answered using an OLS model with an insignificant regression coefficient and therefore discretionary income itself cannot reliably define potential investor's willingness to invest in P2P lending. If discretionary income had some significance in influence on the variable $WillInvP2P$, it would be in conjunction with other variables defining potential investor's behavior. $Q2$ was tested using the Mann Whitney U-test with a p -value greater than 0.05 and thus no significant difference in willingness to invest in P2P lending between the two genders was identified. Gender itself isn't enough of a predictor of the decision to make such an investment. According to the tested data, there is no significant correlation between the level of education alone and the willingness to invest in P2P lending ($Q3$). The reason for this might be the fragmentation of the sample into many levels of education, the unknown field of study or the subjectively perceived significance and importance of the pros and cons of such an investment. The results of $Q5$ put education in a different perspective. Former investing experience ($Q4$) does not reliably affect willingness to invest in P2P lending. This finding makes it easier for P2P lending platform providers to inform potential investors about this investment opportunity. While finding the most significant group of predictors affecting potential investor's willingness to invest in P2P lending several multiple linear regression models were created. The most suitable model describing the influence of predictors on variable $WillInvP2P$ is model M_5 , which explains more than 20 % of variability of mentioned dependent variable. Despite the answer of $Q3$, education proves to be of a significant influence in combination with other predictors in the models, namely the number of known P2P lending platforms, the perceived importance of the pros (high income, no bank involved, choice of borrower) and cons (potential problems in reclaiming an investment) and the likelihood of being influenced by the borrower's gender, ethnicity (nationality) or appearance. Younger, more educated people who are able to take the risk of investing in relatively high-yield investments, and who value no bank involvement and freedom of choice, are much more likely to invest in P2P lending. The number of potential investors could be increased by raising awareness of the pros and cons of such investments, especially among the younger generation.

Conclusion

In this paper 479 respondents and their answers on the topic of *investing in P2P lending* were tested, which revealed that most likely investors with the highest willingness to invest in P2P lending in the conditions of Slovakia are women, people who have finished primary school, who have lower income than 646 €, monthly discretionary income less than 50 €, no previous investment experience and do not know P2P lending platforms. In general, investors consider high revenue, choice of borrower and risk of platform crash as the most important and influential factors when considering such an investment.

No statistically significant difference in willingness to invest in P2P lending was found between groups with different levels of discretionary income, gender, and previous investment experience. The level of education itself also does not affect the mentioned willingness. However, studying economic field of studies at universities or boosting financial literacy in secondary schools might raise awareness about these potential investments and help to achieve better informed decisions for investors. Raising awareness of the pros and cons of investing in P2P lending could be in the interest of institutions providing educational programs in financial literacy, economics, and business. The specifics of such an impact require further research.

Multiple linear regression models answering research question Q5 suggest that the willingness to invest in P2P lending is statistically significantly influenced by the level of education of the potential investor combined with the level of perceived importance of the high earning potential of such an investment, the number of P2P lending platforms known, the perceived importance of not involving a bank in investment in P2P lending and the likelihood of being influenced by the borrower's gender, ethnicity or nationality and the purpose of the investment – the borrower's project. The age of the investor, the probability of being influenced by the borrower's appearance (platform dependent) and the perceived importance of the possibility of the borrower defaulting on the loan and the ability to choose the borrower all have a negative impact on the willingness to invest in P2P lending. Other statistical models (e.g. non-linear) describing the behavior of P2P lending investors will be the subject of further research.

All of the above research questions were answered and set goals were reached. The results of this paper could help to optimize decision making in the management of P2P lending platforms, assist in education to improve financial literacy and serve as a good basis for further research.

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One Problem, Different Consequences: Innovation and Quality Standards in the Presence of Informal Competition

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Abstract

Research background: There is a vivid discussion on the potential relationship between quality standards and innovation. Quality standards are often seen as the factor supporting product and service innovation. However, both have their own specifics and different determinates at a micro and macro level. While shadow and informal economy remain a problem, especially in Eastern and Southern European States, we decided to focus our analysis on its potential consequences on quality certification and innovation. Firms' decision-making on the introduction of quality standards and innovation can be affected by competition from unregistered and informal firms.

Purpose of the article: The paper aims to identify the potential consequences of competition from informal sector on a quality standards certification and innovation.

Methods: The analysis is based on the data from a World Bank enterprise survey collected between 2018 and 2020 in selected European countries (EU and non-EU countries). Firstly, we looked in more detail at the characteristics of firms in the sample that applied international quality standards. Secondly, we also examine the introduction of product and service innovation. The focus is on the differences between firms having problems with informal competition and those without such competition. We used standard t-tests and nonparametric tests of hypotheses.

Findings & Value added: The results indicate that there a significantly fewer firms adopting quality certification in the presence of informal competition. On the other hand, firms having informal competitors tend to innovate more. It seems that informal competition similar to formal competition could in fact increase the efforts of enterprises to innovate their products and services.

Keywords: innovation, standards, quality certification, informal sector, shadow economy

JEL classification: O17, O31, L15

1. Introduction

During the recent economic phase often referred to as the sixth Kondratieff wave innovation appears to be one of the crucial engines of economic growth and prosperity. Due to this fact, national and international economic policies should be focused on supporting innovation activities and adoption in both private and public sectors. The innovation of products and services are among those types of innovation which are the most common and the most evident. These types of innovation are closely related to standards and quality certification. Quality standards can be applied to improve the successful introduction of innovative products and services on the market. Standards can represent a signal of the quality of newly developed products and services for customers or play another role in supporting innovation such as assuring interoperability. Both innovation activities of firms and standardisation can be closely related, but they can also have completely different causes and determinants. One of the potential problems that can affect both are activities of firms from the informal sector. This problem is especially valid for countries with a higher share of the shadow economy. The informal firms that bypass state regulations and taxation may be at an advantage and cause problems for properly registered companies. However, this competitive pressure can cause companies to decide to innovate more or try to differentiate themselves from informal

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competition with quality certificates. Hence, the competition from the informal sector could lead to positive as well as negative effects on both innovation and quality certification.

The concept of "innovation" is the subject of study of several disciplines, as a result of which the understanding of the concept is quite broad. Schumpeter (1982), which may be called the founder of the theory of innovation in the economy generally, regarded innovation as the economic impact of technological change, as the use of new combinations of existing productive forces to solve the problems of business. According to Twiss and Goodridge (1989), innovation - a process that combines science, technology, economics and management, as it is to achieve novelty and extends from the emergence of the idea to its commercialization in the form of production, exchange, consumption. The simplest definition of innovations is doing something different. Innovation is a word that often is used in the business world and for companies this usually mean something risky, costly and time consuming (Costello & Prohaska, 2013). Innovation can also be explained as a new idea, product, device or novelty. It is a mind-set, a way of thinking beyond the present and into the future. Innovations is important for companies and when used well it can be a process, strategy and management technique (Kuczmarksi, 2003). Innovation can at a fundamental level be the process of generating and combining ideas to make a relationship between present accomplishments and past experiences to solve a future problem. This is often associated with technological feats and it play a critical role in the world economy (Baskaran & Mehta, 2016). Innovation is big in the business world and is sustainable to create value and be strong in the competitive environment.

Certification is "an explicit and formal process for adding visible, salient, and credible extrinsic information about a product or service" (Starr & Brodie, 2016, p. 718). A certification can indicate intangible benefits or attributes to customers to signify a level of status and quality assurance (Cavanaugh, 2010). Despite the added complexity and cost of certification (Jahn et al., 2005), the value-added for certification differs across certification types, locations, industries, organizations and particular products within the organization (Klochov et al., 2016). There are several applications and motivations for certifications in the private and public sectors in multidisciplinary fields. Motivations for implementing certifications include but are not limited to regulating the safety of products or services (Landi & Nicholson, 2011; Rierson, 2017; Yu et al., 2016), being used as a label for competitive advantage and differentiation (Claver et al., 2006; Hernandez-Perlines, 2016) and being implemented for qualitative improvements on systems and processes in both tangible and intangible industries (Aba & Badar, 2013; Dragusanu et al., 2014).

Singer compared the informal sector to a giraffe in that it is difficult to define by usual standards, but easy to recognize when you meet one. Lautier (1990) counters that the informal sector is "a unicorn because the literature abounds with definitions, but you will never have the opportunity to meet one, because it does not exist (Charmes, 2016, p.6). This disagreement on the best faunal metaphor for the informal sector gives us an idea of how challenging the debate on the definition of informality is. An important source of misunderstandings on the definition of informal sector consists in the divergence of research goals among scholars from different disciplines. For instance, the "economic" concept of informal sector (or of its seeming synonyms, e.g., shadow, unofficial, hidden, black, underground economy) has a different meaning to the concept of informality used by statisticians in national accounting (e.g., non-observed economy (NOE), underground production), etc. Although there have been some attempts to reconcile these definitional approaches (Dell'Anno, 2007, 2016; OECD, 2002; Quiros-Romero et al., 2021), a common solution is still not available. According to the strand of literature that focuses on informality from an "economic" perspective, Feige (2016) proposes a taxonomy based on noncompliant behaviors. He points out that noncompliance and "unobservability" are common features in all behaviors in unobserved economies. Accordingly, what distinguishes one unobserved economy from another is a particular rule being violated. Specifically, Feige offers the following definitions: "unreported economy" as when the noncompliance consists in the circumvention of the fiscal code by tax evasion; "unrecorded economy" as when the added informal value added arises from violations of the rules of national income accounting; "illegal economy" as the contravention of rules governing the production and distribution of prohibited goods and services.

In our paper, we examine the potential relationship between the informal sector and innovation as well as the adoption of international quality standards by firms. This problem has so far been rather on the fringes of the interest of economic research and our paper provides new insight. The analysis is based on the micro-level data from the World Bank Enterprise survey from 26 European countries. in firms. Firstly, we examine the share of respondents who innovate and those who adopt quality certificates based on the number of employees. Next, we did the same classification according to the number of competitors in the market. We analysed the potential relationship between both of them and competition from the informal sector. Finally, we make conclusions of the paper with a summary of the most important findings and their implications.

2. Methodology and data

The focus of the paper is on the examination of the potential consequences of the informal sector on quality certification and innovation at the firms' level. It aims to identify the potential relationship among the informal sector, quality standards certification and innovation. To achieve this aim, we analyse the data from the World Bank Enterprise Survey database (World Bank, 2021) which includes firm-level data. Available data was collected by a questionnaire survey of private sector firms. The main objective is to capture nonbiased data based on firms' experiences and enterprises' perceptions of the environment in which they operate. These data are used by the World Bank and other institutions as a benchmark indicator capturing the quality of the business environment. As of December 2019, it covers over 180,000 firms in 150 countries (World Bank, 2021). In our analysis, we focused our attention only on European countries where the data were available at least for years 2018 or 2019. There are 17 EU member states and 9 non-EU European countries. The mentioned data have been analysed and the results are interpreted in the next part of the paper. We concentrate especially on questions related to the informal sector, innovation activities and quality certification. Analysed variables are all based on answers to these questions. We examine and display the data using several graphic methods, and subsequently, we also use hypothesis testing methodology. Specifically, we used testing for the agreement of mean values by means of the parametric t-test and the Wilcoxon non-parametric test. Regarding on rather high number of observations, the results of both tests are similar. In the next section, we show the results in more detail.

3. Results

The results are divided into two main parts. Firstly, we look more in detail on firms' quality certification, characteristic of firms with quality certification and we also examine their attitudes on obstacles related to informal competition. The second part of the analysis is focused on innovation of products and services and its potential relationship to quality certification and competition form informal economy.

The size of the company could be one of the factors affecting the innovation activities. Our analysis is focused especially on innovation of products and services. The share of innovative firms varies among different size classes of firms. More innovation of products and services can be seen in larger firms with over 1000 employees. When we further classified firms into groups with and without quality certification the differences are even more significant. The results can be seen in Figure 1. Firms with quality certification appears to be more innovative across all tree size categories. However, the difference in innovation activity between firms with and without certification is the most significant for the large firms. We can say that large firms with quality certification tend to innovate their products or services the most.



Figure 1. The share of respondents with and without quality certificates classified based on the innovation of products/services and their size

Source: Authors own processing (2023)

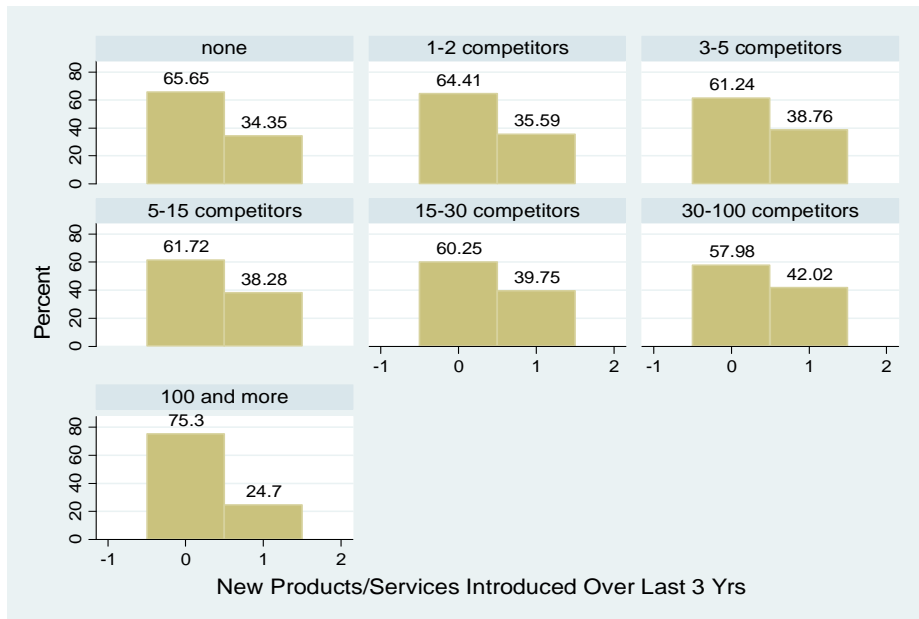


Figure 2. The share of respondents with and without innovation of products/services classified based on the number of reported competitors in the market
Source: Authors own processing (2023)

Hence, it is likely that there is some kind of connection between quality certification and innovation, which we will examine in more detail further. Next, we look at the differences in the share of innovative and certified firms with different levels of competition. In this phase, we did not differentiate between formal and informal competition. As it can be seen in Figure 2 and Figure 3 based on the graphs there is no clear evidence for any potential effects of the competition in general. For innovation, the share of innovative firms is slightly growing with the competition to some point, but it is the lowest for those with over 100 competitors. The quality certification shows no significant trend with increasing competition. However, it is also the lowest for firms with more than 100 competitors.

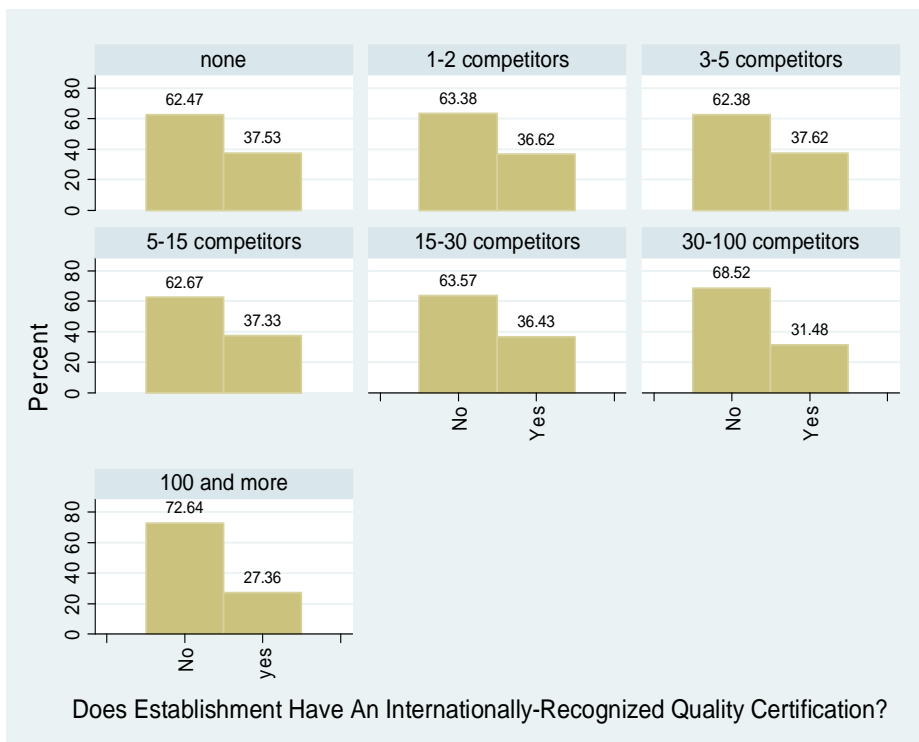


Figure 3. The share of respondents with and without quality certification classified based on the number of reported competitors in the market
Source: Authors own processing (2023)

The informal sector also represents the competition for firms in the formal sector. However, there can be some specifics. The informal activities are not regulated and taxed.

Furthermore, these informal competitors are not able to do quality certification, apply for the patent or officially participate in research. More informal competition mostly means a higher share of the informal economy. Hence, overall informal competition can have different effects on innovation and quality certification compared to competition in general. The differences in innovation activities and quality certification for firms with informal and without informal competition can be seen in Figure 4. On one hand, firms with informal competition tend to be more innovative. On the other hand, they less frequently adopt internationally recognised quality standards compared to those without competition from the informal sector. These results are somewhat surprising and need to be further examined and explained. The difference of almost six percentage points in both cases seems to be substantial.

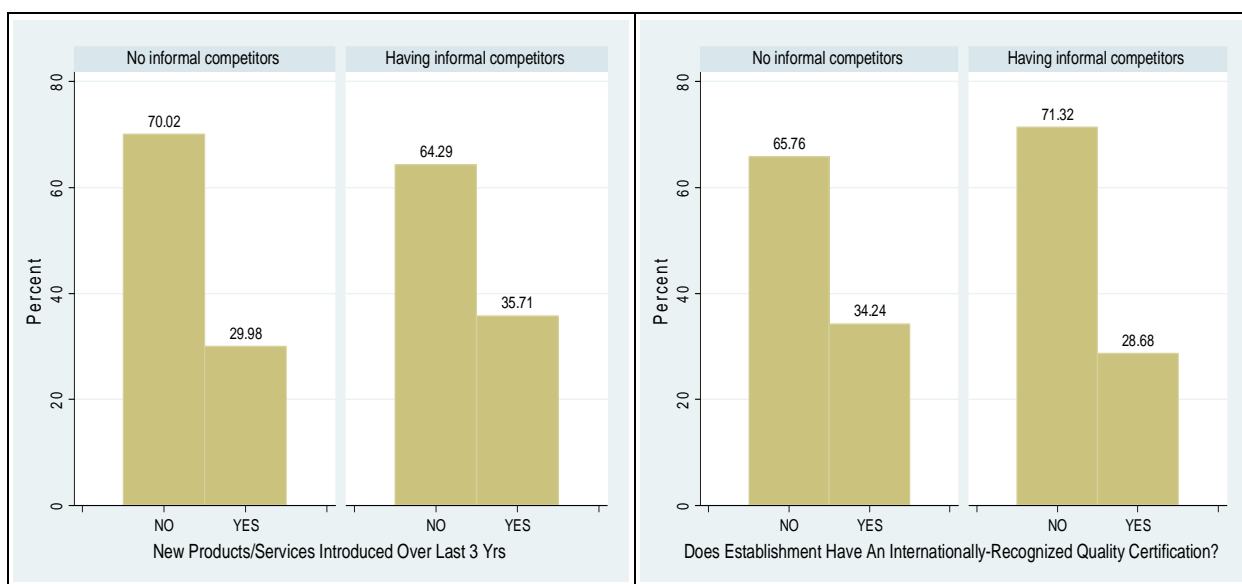


Figure 4. Share of establishments with internationally recognized quality certificates (left graph) and innovation of products or services over last 3 years (right graph) with and without informal or unregistered competitors

Source: Authors own processing (2023)

To examine this problem in more detail we used another question from the questionnaire survey which is focused on firms' attitudes to the informal sector as an obstacle for their operations. Results are shown in Figures 5 and 6. Firms reported how serious are their problems related to the practices of competitors in the informal sector. A higher share of innovative firms appears to be the groups that are reporting major and severe obstacles in the informal sector. Hence, firms dealing with significant problems related to informal competition tend to be more innovative compared to those with only moderate problems or without these problems. We can assume that more severe competition from unregulated firms could be one of the reasons. However, this assumed correlation can be an effect of many other factors or unobservables. The results could also be attributed to potential information or confirmation biases. The situation in the field of quality certification appears to be contrasting. The firms that reported no problems with competition from the informal sector are the most frequent adopters of quality certification. On the contrary, the lowest share of certificated firms is among those with severe problems with the informal sector and those who did not have enough knowledge to respond to this question. The results suggest that more significant problems in the informal sector can be related to less frequent adoption of international quality standards.

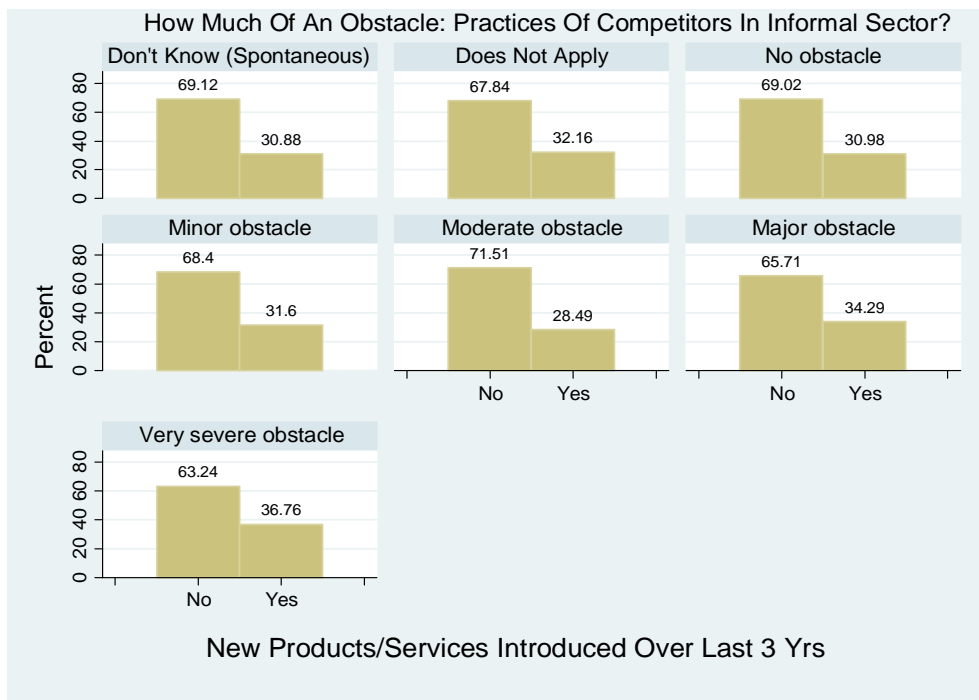


Figure 5. Classification of respondents based on their views of problems related to informal competition and the frequency of introducing innovative goods and services
Source: Authors own processing (2023)

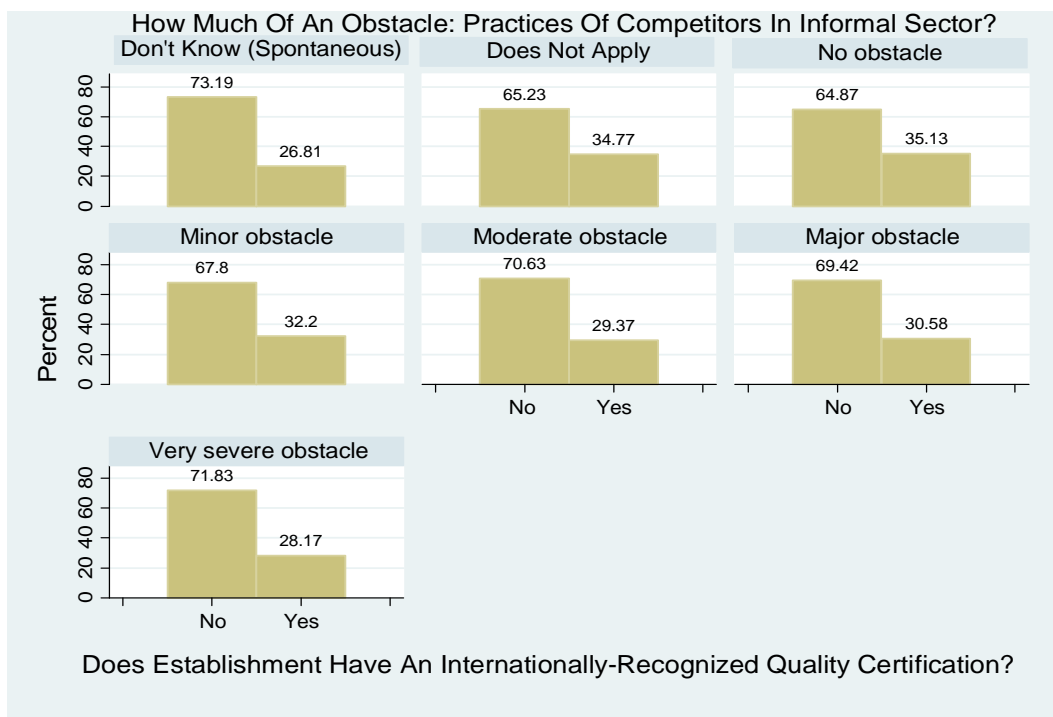


Figure 6. Classification of respondents based on their views of problems related to informal competition and the frequency of adopting quality certification
Source: Authors own processing (2023)

The differences in the share of innovative firms have been also tested by the t-test and Wilcoxon test. The results are shown in Table 1. Both are paired difference tests testing the mean differences in both groups. The results indicate a statistically significant difference in innovation among firms with and without informal competition. This is true for the whole sample as well as for firms with different numbers of competitors from zero to 30. The same is true for the firms with over 100 competitors.

Table 1. Innovation of products and services – mean differences

Number of all competitors:	No informal competition	Having informal competition	Diff.	Mean-comparison t-test (t-stat)	Wilcoxon test (z-stat)	Obs.
Whole sample	0.342	0.287	0.056	6.42***	6.41***	14032
No competitors	0.381	0.314	0.066	0.77	0.78	408
1 or 2 competitors	0.364	0.376	-0.012	-0.306	-0.306	406
3-5 competitors	0.387	0.351	0.036	1.66*	1.66*	2827
5-15 competitors	0.391	0.319	0.072	3.41***	3.14***	2479
15-30 competitors	0.390	0.311	0.079	1.8*	1.8*	541
30-100 competitors	0.348	0.273	0.075	1.34	1.33	291
More than 100 or too many	0.289	0.249	0.041	3.15***	3.15***	5064

Source: Authors own processing (2023)

The same two tests have been used to test the differences in the average share of certified firms. The results are summarised in Table 2 and they are again rather diverse. The difference in the opposite way is statistically significant at the 1% level for the whole sample. When we split the sample into groups of firms based on the competition the results are slightly less conclusive. The share of firms with quality certification is significantly lower in the presence of informal competition at a 1% level of significance for firms having overall from five to fifteen competitors and for those having more than 100 competitors.

Table 2. Quality certification – mean differences

Number of all competitors:	No informal competition	Having informal competition	Diff.	Mean-comparison t-test (t-stat)	Wilcoxon test (z-stat)	Obs.
Whole sample	0.342	0.287	0.056	6.42***	6.41***	14032
No competitors	0.381	0.314	0.066	0.77	0.78	408
1 or 2 competitors	0.364	0.376	-0.012	-0.306	-0.306	406
3-5 competitors	0.387	0.351	0.036	1.66*	1.66*	2827
5-15 competitors	0.391	0.319	0.072	3.41***	3.14***	2479
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30-100 competitors	0.348	0.273	0.075	1.34	1.33	291
More than 100 or too many	0.289	0.249	0.041	3.15***	3.15***	5064

Source: Authors own processing (2023)

Despite some interesting and promising results achieved by our analysis in this paper, there are several limitations to our approach. First, the probit or logit regression model should be used to determine the potential causality while considering different control variables and factors such as for example the size of the firm, country, and competition. This approach could be used in the further continuation of this research. Moreover, there are also some limitations related to the data from the questionnaire survey provided by the World Bank. The questions and procedures in used in the survey were accurate, but the data can still be biased due to selection, information, and confirmation biases.

4. Discussion

When examining the comparison of the results of our research and other studies, we did not come across the connection of the components we investigated, the informal sector, innovations and quality certification. The standards are a kind of added value to the entire research and bring interesting findings. On the other hand, when comparing the research results, ours results show that exposure to informal competition increases the likelihood of innovation by formal firms. We argue that formal firms use innovation as a channel via which they can protect and sustain their competitive advantage vis-à-vis informal firms. Our arguments are consistent with prior literature that shows a positive relationship between performance and innovation (Hana, 2013; Martín-de Castro et al., 2013; Tushman & Nadler, 1986). The results hold true for various sub-samples based on the size of firms and on the location of firms. de Beer et al. (2016) note that firms in the informal economy have limited skills, use simpler technologies, and face limitations in technical upgrading. According to them, these factors lead to lower innovation among informal firms. Furthermore, innovation allows firms to offer continuous realignment and

integration of technical, market, and knowledge resources (Danneels, 2002; Zollo & Winter 2002). That is, innovation translates the available resources into sustainable competitive advantage relative to informal firms (Lawson & Samson 2001).

Conclusion

Our results show potential relationships between the informal economy and innovation as well as the informal economy and standards adoption. Interestingly we found two very diverse facts. The informal sector seems to have different consequences for innovation activities compared to quality certification. Based on the analysis we can say that firms that face competition from the informal sector tend to innovate their products and services more often compared to those without informal competitors. The same is true for those who respond that the informal economy is a major or very severe obstacle for them. We found that this effect cannot be attributed only to the competition itself, but there are also other reasons. Perhaps firms tend to innovate their products and services to distinguish them from firms in the informal sector. The potential effect of the informal economy should be examined in more detail in future research. On the other hand, we found that firms with informal competitors are less likely to adopt international quality certification. Hence, the informal sector appears to have more negative potential effects on quality certification in general. However, both potential effects should be further examined and analysed by regression analysis to determine the potential casual effect while including other control variables.

Acknowledgements

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Towards a New Mentality in the Business Game – Future Generations as Major Stakeholders

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Abstract

Research background: There are aspects that today seem to be suitable for the current framework of the business game. Tomorrow, however, will need an improvement in this regard. Aspects, notions, mentality, rules, framework – all these must be redesigned in order to provide future generations with resources in sufficient quantity. The historical and current approaches could lead to overconsumption in this sense and the future generations will realize that they will not have enough resources at hand in order to make themselves a living.

Purpose of the article: Adverse selection, asymmetric information and moral hazard are among the terms this paper uses to describe how the business game is actually played. A Rawlsian “veil of ignorance” might be a step that should be taken in the process of devising a new strategy. This strategy has to be oriented towards future generations and their future and unknown needs. This paper aims to introduce the idea of an open contract between the current and future generations, a contract that will change the assumptions currently being made and reshape the framework for the aforementioned business game. Sustainable business game – this will be the way of the future.

Methods: The research method used in this paper was a descriptive one, starting with a short review of the domain’s dedicated literature. Placing different perspectives in their own spot and mirroring various views, this paper tries to reveal a feeble red line which spans from the current generations to the future ones, in terms of their economic interests.

Findings & Value added: Typically, a contract has two or more parties related by some mutual interests. However, this paper aims to pinpoint a sui generis type of contract, an open one, capable of encompassing parties that are not in the same time corridor. A difficult thing to comprehend, but a necessary one, given the behavior of current generations, in terms of doing business.

Keywords: sustainable business game, adverse selection, future generations, stakeholders

JEL classification: D63, D86, G41

1. Introduction

Throughout history, at almost every moment of it, there have been conflictual situations between generations, generated by the different endowment of knowledge, skills and abilities. Typically, these conflicts regarded generations which were contemporaneous for a time and they intersected for a while physically and temporally. This paper tries to bring to light a conflict between generations that does not present simultaneity. This is a conflict with parties that are distant in terms of timescale, a conflict between current and future generations. Like any conflict, this one has many facets and this paper is concerned with only one of them – its economic aspect. However, the paper aims to transform this conflict in a game – a business game. Every game has its own rules and ethics and Koehn (Koehn, 1997) considers that this particular game has a „special ethic”, allowing for usually immoral practices as well. Another author (Lu, 2008) believes this game originates from war games, however, as a competitive game and the competition is about resources. This game is about different

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interests, some of them manifested – the current generations and some of them not yet expressed – the future generations` interests.

There cannot be a balance between the current general interest of shareholders and the future generations interest. The shareholders` desire is to receive as much money as possible for their investments and no one could ever deny their claim. The issue here is related to the amount that the shareholders would consider as being enough for them as a worthy reward for their participation in the business.

It is, perhaps, the moment when shareholders could consider the future generations` interests as one of their goals. “*Après nous, le déluge*” is a mid XVIIth century attitude, an obsolete one and it cannot serve as a modern shield for the investors` motivations. Investors need to think in other terms, by setting a significance threshold for their expectations and, in the meantime, integrate some other considerations in their enoughness. Among the said considerations, being thoughtful related to the future generations` needs could be a very sensible approach.

2. Methods

The aim of this paper is to identify a way through which future generations` interests could be considered in today`s ongoing business environment. There are relatively few solid opinions oriented towards the conceptualization of the future generations as major stakeholders, given their poor ability to stand for their future needs and interests.

The research process presented in the paper is divided into two parts, considering its content. Of course, the actual status of the research in this domain was presented, alongside with the theoretical concepts used and with the Sustainable Development Goals, stated by the UN. Then, for the sake of this research endeavor, two major research questions were posed:

Research question no. 1: Are the current generations able to understand that the future ones could have needs and interests of their own?

Research question no. 2: Are there some certain methods/instruments/ways through which these needs and interests could be taken into account and, at the same time, make major stakeholders from the future generations?

Placing different perspectives in their own spot and mirroring various views (including author`s opinions), this paper tries to reveal a feeble red line which spans from the current generations to the future ones, in terms of their economic interests.

3. Results

As results, the possible answers to the posed questions will be revealed, as they were identified by the authors. Additionally, a *sui generis* type of contract will be proposed. Typically, a contract has two or more parties related by some mutual interests. However, this paper aims to pinpoint a different kind of contract, an open one, capable of encompassing parties that are not in the same time corridor. A difficult thing to comprehend, but a necessary one, given the behavior of current generations, in terms of doing business.

4. Discussion

Certain notions will be used to describe, as accurate as possible, the view of the authors upon this topic. Adverse selection, moral hazard, asymmetric information, greenwashing and many others are among these notions. Some of them are serving the purpose in their original meaning, others being placed under an unusual light, in order to reveal new facets of them, as logical argumentation instruments.

Especially when it comes to a *sui generis* type of adverse selection. Usually, the adverse selection refers to a situation in which the parties are contemporaneous with each other and one or some of the said parties are at a disadvantage compared to the other/s. In this case, the seemingly contradictory interests of the shareholders/investors are not simultaneous with those that future generations might express for themselves. Not only the adverse selection presents, in this case, some particularities, but also the moral hazard and the asymmetric information concepts are to be placed under the scope and to be analyzed.

The time difference, between the moments in which the mentioned interests are manifested, pushes the concept of asymmetric information to its crispiest maximum, considering that the two exponents of interests are as separated as they seem plainly detached. It cannot exist a greater time separation than

this, between the future generations` and today`s investors` interests. However, adverse selection is just a particular case for asymmetric information – “Adverse selection occurs when asymmetric information is exploited” (what-difference-between-moral-hazard-and-adverse-selection, n.d.). The following image depicts the authors` vision on this time separation and on the difference between the two instances.

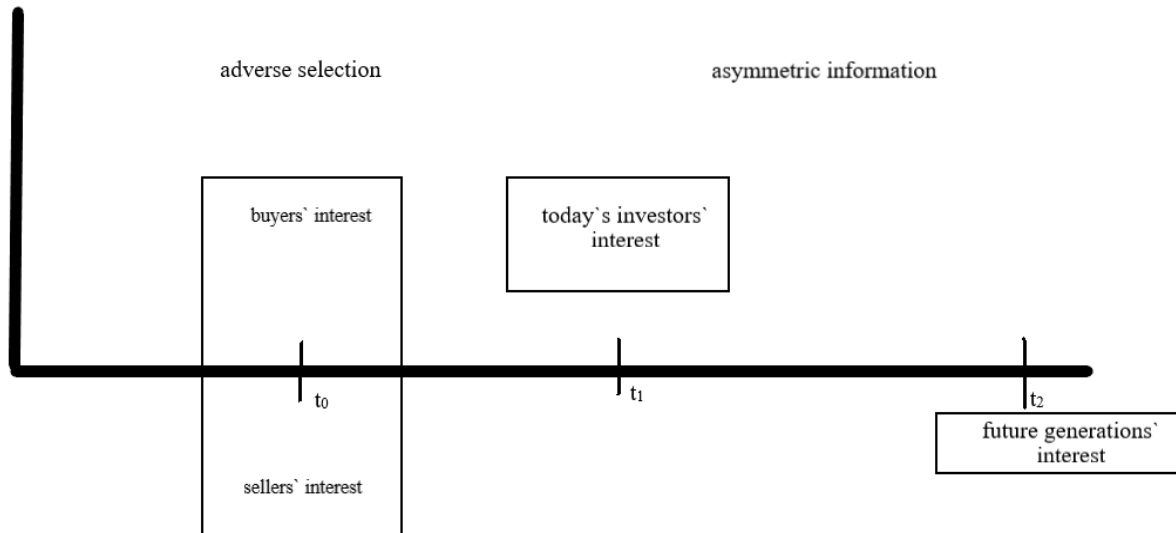


Figure 1. Timeframe in which adverse selection and asymmetric information could occur
 Source: elaborated by the authors

In the picture above, t_0 , t_1 and t_2 , respectively, are different moments in time in a logical and chronological order.

As a support for this last paragraph`s idea, an article, written in 2006 (de Jong, P.; Ferris, S., 2006) consider that, in insurance business, adverse selection “is not, at present, a severe problem for insurers”, but it may become if some exogenous factors are influencing the market. Among those exogenous factors, one can identify the authorities that can impose various restrictions, as well as the increase that may appear in the level of knowledge of the counterparties, i.e. insurance buyers. Two words could be stressed in the assertion mentioned authors have made and these words are **at present**. Getting out from the insurance business scenario, and going back to the problem at stake, that of the future generations` interests and their inability to be a part in the trade, it is necessary to enhance the level of awareness for the present actors of the economic system. This awareness should be directed to the future generations and their potential future needs. They will need a neat and tidy environment, some resources to be able to make themselves a living, well preserved beautiful landscapes and educated and healthy people, as well.

The Sustainable Development Goals - SDGs

The issue here is that not only the care for environment and for the amount and quality of resources actual generation should be concerned of. Another important thing, probably the most important of all, is the quality of the education and of the health status that the actual generation is providing to the future ones. This standpoint should be one of the utmost importance for future generations. It is also included in the UN 17 SDGs, number three and four in the SDGs` matrix – good health and well-being and quality education, respectively. Access to qualitative educational system, with a steadily improved curriculum, alongside with a continuous preoccupation for some enhanced characteristics of the healthcare system, all these could form a future oriented program.

In fact, many elements in the SDGs` matrix refer to issues related to the future generations and their interests. In the following part of the paper, those elements will be ranked depending on their degree of association with the future generations` interests, according to authors` opinion.

Firstly, in Figure no 2, the UN matrix of SDGs is presented.



Figure 2. The UN matrix of Sustainable Development Goals

Source: <https://www.un.org/sustainabledevelopment/news/communications-material/> 02/08/2023

As the matrix shows, almost all of the elements are somehow related to the future generations` interests, but some of them are more directly linked with these interests than others. Moreover, some of them seem not to be in association with the potential needs of the future generations, being in connection only with the actual requirements for a better world.

In the following table (Table no 1), these elements will be grouped from the strongest association with the future generations` interests, and to those that are relatively weakly connected with the said interests. The analysis will try to present the elements in a matter of degree approach.

Table 1. Several degrees of association between the elements in the SDGs matrix and future generations` interests

Degree level	UN SDGs elements
1	3. Good health and well-being 4. Quality education 6. Clean water and sanitation 13. Climate action 14. Life below water 15. Life on land
2	5. Gender equality 10. Reduced inequalities 16. Peace, justice and strong institutions
3	11. Sustainable cities and communities 12. Responsible consumption and production
4	1.No poverty 2. Zero hunger 7. Affordable and clean energy 8. Decent work and economic growth 9. Industry innovation and infrastructure 17. Partnerships for the goals

Source: made by authors, based on the UN SDGs matrix, presented in Figure 2

In the first degree of association with the future generations as major stakeholders (Abrudan, L.C.; Matei, M.C.;Abrudan, M.M., 2021), this paper is placing six elements, as well as in the last degree, while in the middle are three for the second rank and two for the third, respectively. Of course, this distribution is a matter of debate, but from the authors` standpoint, which is rallied with the possible vision of the future generations.

This distribution is based on the perceived, at authors' level, relationship of all the elements with the potential needs the future generations may have. A good health status, based on a neat and tidy environment, with clean water, climate issues awareness, concerns related to the quality of life (in water and on land), has to be a corollary of all these and a desire every self-aware human being should possess. Alongside with a well-maintained and improved education system. All these attributes of a good life are goals that could be achieved through a careful way of thinking from the current generations' standpoint. This is the first degree of association.

The second bracket, which has three elements, refers to a softer approach, not as direct related to the future generations' needs as the first degree. Some solved issues regarding the inequality of any kind between the human beings (regardless if the inequalities refer to gender aspects or to income, economic or of other nature), could provide a strong foundation for the quality of the future social relationships. Reliable institutions, which can provide perceived trust in them, alongside with a fair and impartial justice and, of course, the generally desired peace, all these can lead to a better way of life, characterized by a perceived safety and many other reliefs related to the every day's dreads.

Sustainable cities and communities are a necessary condition for a continuous development process. Better managed and maintained, at all levels, the future communities, cities or other forms of organization, will be able to provide better conditions for the future generations as they come and on a regular basis. On the other hand, the consumption and production issues related to the resources that are processed into production factors should be seen in a different light. Future generations will need a certain amount of resources to make a living and to thrive and it is better to make the consumption plans according to this aspect.

The fourth degree of association was considered as being weakly related to the future generations' interests and more linked to the current issues that actual generations have to cope with. These elements from the last bracket, as well, could influence the well-being of the future generations, but authors consider that they are momentarily.

Examples of how the things are going

Regardless of their level of association with future or current generations' interests, these Sustainable Development Goals are to be complied with. The point is that current generations, through some of their representants, act slow in this direction. Especially when it comes to reconfiguring the business game's framework. This framework viewed through its ongoing process of adaptation to the continuously changing character of the needs, will be a legacy to future generations. Financial crisis, as a result of the misuse of the said framework elements, have a recurrence based on a perpetual lack of understanding, at the level of those who are in charge.

In this sense, returning to the adverse selection and its relationships with the future generations, there is need to bring another element into discussion. Moral hazard, a related concept to those that have been put in the light, plays an interesting role in this scenario. Natural greed, inherent to the human being, alongside the "*carpe diem*" and the other above mentioned adage, could serve as a handy excuse for the nowadays investors. Especially when the said investors receive the support of the financial advisers and scholars. Another professional category which easily could back this propensity is represented by the managerial and executive instances at company's level. Fiduciary duty, in the same phrase with the general interest of the shareholders, could absolutely provide this type of support.

An useful example of how things are happening, is represented by the derivatives markets, of any kind. There is only a 15 years timespan since the last significant financial crisis and the havoc it created. (Attar, A.; Mariotti, T.; Salanié, F., 2014) appraised these financial assets and introduced the idea that derivatives as structural financial assets usually rely on a plethora of underlying assets, with significant differences between them, and „their designers are likely to hold private information about their quality” this way creating „an adverse selection problem”. Authors of the article delivered a short inventory of these assets – „mortgage-backed securites, collateralized debt obligations and credit default swaps”. Let alone that some of them were rightly entitled toxic assets. Even though the authors linked this existing adverse selection with the liquidity provision, one can identify many other problems related to this situation, form ethical, going through legal and ending with economical and financial stability on short run. All these financial shocks could lead to the occurrence of a distrust atmosphere on long term. In the financial field information of a good quality and availability is an asset per se and the lack of it, especially when this lackness is valid only for one of the parties, raises some serious suspicions regarding the whole system. Of course, in this matter are involved many aspects, not only the lack of information, and one of them was mentioned earlier in the paper – natural greed of the human being. In terms of sustainability, the

behavior of the market's actors, both sellers and buyers, should consider the future of the system. Even though the crisis was not about physical resources but about financial ones, the stability of the economic system is also a legacy that current generations leave to the future ones.

Could be the time to stop or to put some strict limits to casino-capitalism. The banks forgot their primal functions and they entered (and even invented) the toxic assets markets, in order to make more money for their investors (see the amalgamation of the already discussed two elements – general interest of the shareholders and fiduciary duty). The revenues generated by the spread between the two iconic interest rates – credit and deposit, were no more satisfactory, thus other sources of revenues have been sought and/or created. The ever permanent need for improving or enhancing the outcomes (financially speaking), has led to an un-orthodox (eufemistic term) approach of the markets. These financial innovations stimulated an increase in the velocity of money. As a scenario – on a certain market a financial asset is traded. The market will tend toward equilibrium, which means that the economic profits will be zero. A newly invented or innovated financial asset will take the stage, boosting the velocity of money and the volatility of the market. And so on and so forth. The infusion of the newly invented financial assets (e.g. Residential Mortgage-Backed Securities) which were capable to provide a higher remuneration, based on high volumes and, allegedly, high stability, has eventually led to the necessity of a transfusion, concretized in the so-called bailouts. Thus, the securities were no more secure.

The main property of these financial assets is that they are helpful, to a certain extent, for the market, regardless of its type. Real and financial economy are both affected by these assets because of their underlying assets. These assets that rely on other assets are valuable to the economic environment due to their contribution in smoothening the asperities of the price. Through their insertion in the market they produce a narrowing of the spread between the demand and supply prices, usually on a downward trend. Another valuable characteristic is that they are maintaining and increasing the market's liquidity, one of the market's most valuable feature. Alongside with the volatility they provide the market with attractiveness, speculators and hedgers being interested in trading on markets that exhibit this set of features. The presence of the hedgers brings to light another valuable facet of these assets – they are useful risk management instruments.

Another problem, in the same category, is related to the perpetual economic growth. This mantra leads to the idea that a business that does not grow is misconducted. Higher revenues are mandatory in the concept of doing business, being in contradiction with the aforementioned enoughness. This is not wrong when the business is at the beginning of it, or when the size of the revenues is not satisfactory, or in other appropriate circumstances, but when should the size of the revenues be considered satisfactory? When is enough? The issue here is related to the subsequent aspect of considering the increase in the size of the revenues, i.e. a higher level of resources consumption. After a certain treshold of the revenue the inherent need of it tends to fade, remaining just the carrying on sentiment that the revenue is pursued just for the sake of the it, without considering its size anymore.

Another opinion, regarding these issues, is expressed by Bosch-Badia et al. (Bosch-Badia, M.T.; Montlor-Serrats, J.;Tarrazon-Rodon, M.A., 2018) who put together sustainability and ethics with united efforts towards promoting the SDGs and a fairer financial markets. The mentioned authors reiterate the logical nature of the SDGs as long term oriented goals and they promote a more long-run approach for the investors on financial markets.

In another article, a recent one, (Liu, Y., Niu, J., Zhou, Y., & Huang, R., 2023) authors are proposing a combined method, using the social responsibility, green activities and stakeholders management, in order to find a more sustainable development for the corporate environment.

The business game

The business game is an infinite one and it must be played by some different sets of rules than in the case of the finite games. The mindset for the former type of games needs to be adjusted, as well. Using a finite mindset – i.e. the dichotomy of winner – loser, in an infinite game leads eventually to some serious disruptions in the game. The “decline of trust, cooperation and innovation” (Sinek, 2019) is among these disruptions. Adapting the mindset, making it an infinite one, could lead to a new perspective on the game. Transposing the current generations – future generations framework into this sort of infinite game, the actual mindset must move from the aforementioned dichotomy to a newly designed set of rules, projected on a longer period of time, realizing that in this structure there is no winner or defeated, and moreover, remaining prisoners of a finite mentality, in the long run there will only be widespread disappointment. A specific characteristic for infinite games is that they stand the test of time while the participants' time runs

out. The ongoing process of creating the new generations, which will form future generations, will result in a bitter distrust in the current generations` abilities to manage the resources at hand, followed by disappointment in this sense. Psychologically put, this issue could lead also to a lack of fervor towards pursuing their goals from the future generations` standpoint.

Being number one in the business game can be confusing, or even deceiving both to company and its stakeholders. In this infinite kind of game there are too many metrics which measure the parameters of the company`s activity. These metrics are both quantitative and qualitative approaches related. In the following table some of these metrics will be presented, without pretending to be an exhaustive presentation.

Table 2. Descriptors of the company`s economic performance

Quantitative indicators	Qualitative indicators
profitability	customers` preference
market share	reputation
EBIT	prestige
asset turnover and other activity ratios	social importance
	attitude

Source: elaborated by the authors

Besides, another issue should be taken into account – the timespan. It is difficult for a company to keep up with its competition in a long run. One could be the first in the rank for a month, a year or so, but it cannot be forever. Companies are coming and going on the markets, being able to occupy a front place in the rankings for a certain period, but not forever. Generations are changing, the customers` preference is changing as well, the reputation, the prestige and a company`s social importance fade, or even disappear as could the company. Let alone that all these are perceived in a matter of degree not as an absolute value.

In fact, the business game has to be played for the good of it, not for the good of some evanescent company or person. Sinek`s consideration regarding the effects of the ripples that a company, or a person, generates in the pursuit of its own goals, could be correlated with other ideas regarding a more sustainable approach to the business game. The triple bottom line stated by (Elkington, 1998), the ESG criteria, the aforementioned SDGs, the Equator Principles are among these ways of thinking. Indeed, the said ripples could and, in fact, are producing powerful, at some extent, effects in the business environment, in society as a whole. An important aspect regarding these effects is that they are also projected into the future, affecting even people who are not yet been born.

What will happen in the future?

What will happen in the future is the future generations` problem, one could say, but the things are not like that. Of course, free market and liberal economy are both valuable concepts, but there has to be a balance point between them and the future generations` interests. Many companies and individuals act like there is no tomorrow, behind the shield of general interest of the shareholders and of the fiduciary duty, considering, under the moral hazard sentiment, that they do not make any mistake thinking in this manner. They fall here under the exclusion ability hypothesis, by having the right to use what they have at hand, being the owners of what they use, excluding others (i.e. future generations) from using their actual resources. Exclusion ability comes along with the concept of rivalry in consumption, which considers that if one is using a piece of a resource, that piece will be no more available for other potential consumers.

In this sense, if the debate is focused on future generations` interests, then they are *sine qua non* excluded from the usage of the nowadays-consumed resources. They are not even allowed to have the quality of rivals in consumption, the only quality they will be entitled to will be the consumers of the leftovers.

Another idea, in this sense, was presented in (Rothschild, M.; Stiglitz, J., 1976), where authors discuss the externalities that are caused by one of the parties in the insurance business. This idea can be extrapolated to the current generations vs future generations situation. In the article written by the two mentioned authors, the externalities are caused by the high-risk individuals, who are the beneficiaries of a better trade than the low-risk individuals are. In the said situation, current generations are considered in the high-risk category, their behavior being able to inflict future conjunctures, leaving the future generations to cope with them. Indeed, future generations have no say in this matter. The fact that these generations are not contemporaneous with each other might lead to the idea that they cannot be the two

parties of the same contract, but this is a fallacy, even though the said generations are not living at the same time. The current paper is trying to induce the idea that current and future generations are parties of the one and same contract, despite their distance on the time scale.

This situation is not for the future generations only. The environment (with all its attributes) could be in the same circumstance. The difference in this case is not about the time scale, the environment being contemporaneous with current generations. The difference lays in the lack of the ability, from the human beings' standpoint, to consider environment as a stakeholder. Various species of plants and animals are endangered due to the unconscious behavior of the human being. Of course, there are concerns related to them, concerns that are transposed in potential ways of action.

Climate change, life on land and below water, as components of the SDGs, are bivalent, in this sense. They could be viewed both as a current conditioning and towards the future generations oriented. The current actions that are taken, in this sense, will lead to an enhanced quality of these attributes with immediate impact and with a delayed benefit, as well.

The main issue here is that there were and still are opinions (Sober, 1988) according to which the environmental attributes should not be considered as potential stakeholders, because they cannot be subject of an interest. Fortunately, more and more scholars, practitioners and opinion vectors are trying to change this state of affairs.

Conclusion

However, the current paper's idea is to conceptualize the role of all possible stakeholders as active parties of the proposed *sui generis* type of contract – a new business framework, based on a new mindset. Nonetheless, there is a need for more advised voices and actions in this sense. The exponents of these voices could fill in many roles in this endeavor. There is need for regulators, auditors, influencers (in the proper sense of the word) and integrity whistleblowers. The need for the latter comes from the occurrence of so-called greenwashing phenomenon. There are companies that are claiming that they are following the sustainability principles (i.e. ESG criteria) and are acting accordingly, but, in fact, they are just hiding beyond these principles, continuing to perform their activity in a manner characterized by the neglect of these principles. Attracting money from the investors, claiming that the ESG criteria are respected, taking advantage from the low level of the knowledge of the investors (adverse selection, in a way) and using that money to fund activities that are not complying with sustainability principles – that is one good example of greenwashing. There are many reasons for which the investors are less informed. Among them, one could find the lack of time investors have to seek for such details, as well as the credulity of which investors are capable.

Pareto's principle of well-being, on a long run could be a powerful driver in obtaining a sound business environment. Managers have to orient their companies' activity towards sustainability, in order to acquire such a business framework worthy to be considered a proper legacy. As it was stated in the paper, education of any kind, in terms of economics, could contribute to acquiring this goal, as well. If the investors, managers, employees – all reasonable stakeholders, would enhance their quality (expanding, in a good way, their mindset) as actors or resources, the project of this sort of contract could be operational at some moment in the future.

Two research questions were posed at the beginning of this paper and it is the moment to try to answer them, based on all the data presented.

First question, *Are the current generations able to understand that the future ones could have needs and interests of their own?*

A short and exhaustive answer to this question is very hard to propose, however the current mentality with which current generations are endowed – business game as finite and extremely competitive one, does not allow us to think that, in a plenary mode, the current generations are able to realise that the future ones could have needs and interests of their own. Neither are they seriously concern about how to modify the current mindset from the finite nature of the business game towards an infinite approach.

Considering the second research question: *Are there some certain methods/instruments/ways through which these needs and interests could be taken into account and, at the same time, make major stakeholders from the future generations?*, the answer could be as well hard to get.

Before trying to answer this second question, it will be presented another opinion, expressed in an article (Groves, 2019) where the authors reflects on the „ethical and political significance of sustainability“ and „acknowledges the otherness of the future and of nature, while also affirming responsibilities towards both“.

Going back to trying to answer to the second research question, the already mention union between sustainability and ethics could be considered as being somehow broad, however a good start. It is the same in the case of considering the SDGs as instruments, or better said, the subsequent policies originating in the implementation of SDGs to be considered as instruments. Besides these two, there are many elements which could provide us a combined answer. The repeatedly mentioned change in the mindset towards acquiring the attributes of an infinite game for business, could participate to the answer, as well. The proposed open contract between the current generations and the future ones could also serve as a framework through which the future generations could be viewed as major stakeholders.

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Influence of Social Capital on Economic agent's Innovative activities

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Abstract

Research background: In earlier studies, the authors has been identified the important dimensions of social capital, made attempts to study the structure of social capital in economic systems using the example of the Russian economy. The article examines the influence of some elements of social capital on the innovative activity of firms on the example of the Russian economy.

Purpose of the article: The practical significance of this study lies in the fact that all the main provisions and conclusions of the article can be used in scientific and pedagogical activities when considering issues about the nature and trends in the development of innovative activity of economic agents, will become the basis for further development of methods for quantifying social capital. This will expand the boundaries of factors influencing to innovation processes in economic systems.

Methods: Based on the application of the phenomenological method, the analysis of scientific sources and statistical data, it is shown that the indicator of the age at which 90% of respondents consider their education completed has a close directly proportional relationship with the indicator of organizations' expenditures on technological innovations (the correlation coefficient is 0.9549).

Findings & Value added: The results of the study can be used to improve the knowledge about the role of social relation on the innovative processess.

Keywords: socio-economic development, social capital, innovations, economic agent's, Russia

JEL classification: O11, O39, O53

1. Introduction

Many modern papers are currently devoted to the study of features of innovation activities and sustainable development in different countries. The innovative activity of firms is often positioned as a condition for the successful growth and sustainable development of enterprises, and the national economy as a whole. This thesis is confirmed theoretically, as well as by quantitative estimates. Thus, according to some authors (Tellis et. al., 2009), radical innovation is an important factor in the firm's and state's growth and success. This is also relevant in the context of digitalization of all aspects of socio-economic development, which changes not only the technology, but also the features of the relationship between different groups of economic agents.

According to the research results of Zemtsov and Chernov (2019), firms in the high-tech sectors of the Russian economy that conduct export activities and/or are part of state corporations are growing faster. These conclusions generally correspond to the results obtained earlier by foreign researchers. Although some authors note that the study of export performance is still limited by conflicting empirical test results and the shortcomings of statistical methodologies in different countries (Chen et. al., 2016).

In addition, research in recent years has focused less on the influence of regional and other external factors on the innovation activity of firms. Regional factors, such as access to capital, technology, and markets in research of Zemtsov and Chernov (2019), were statistically insignificant. The author also

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concludes that according to the results of quantitative analysis in Russian economy, firms in none of the high-tech industries had significant advantages in growth, all other things being equal.

This does not indicate a decrease in the previously identified role of these factors, since favorable regional conditions are really important for the emergence and development of innovative business structures. For example, the role of the regional environment for fast-growing firms is studied in the studies of Motoyama and Danley (2012). It is just that in recent years, the emphasis has also been placed on the importance of studying the internal factors of innovation activity of economic agents. The basis for this was the results of a cluster management study, when it turned out that most clusters are unique entrepreneurial ecosystems. Ignoring the local context, top-down initiatives by supervisors to manage cluster development are usually unsuccessful (Martin and Sunley, 2003). As a result, the researchers focused on the study of internal factors of the development of innovative activity of firms, such as the characteristics of corporate culture, opportunistic behavior in the implementation of contractual relations, social capital, culture and established business practices. In modern society, a person's life is inextricably related to his professional activities (Rudaleva and Mustafin, 2017). In the view of some researchers, corporate culture is the strongest driver of radical innovation across nations (Tellis et. al., 2009).

The influence of opportunistic behavior in the form of agency risk on the implementation of innovations is described in the works of Jia, Huang and Zhang (2019). According to the author, innovation creates significant value for the firm, but it is difficult to manage because of agency risk, which leads to investment avoidance and, consequently, to insufficient investment in innovation, and requires detailed research. Mustafin et. al indicate that innovations become the basis for the competitiveness of enterprises, lead to greater efficiency, better quality of products and services (Mustafin et. al., 2019). In addition, opportunistic behavior on the part of firms can be expressed in the use of various manipulative practices, which negatively affects the implementation of innovations by economic agents (Yakovleva et. al., 2016).

Fritsch and Storey (2014) describe in their research papers that over the past decades, the role of both formal institutions and 'soft' skills, such as social capital and the culture of entrepreneurship, has been increasingly recognized in the development of entrepreneurship in a regional context. However, they also note that in a number of high-income countries, despite the stated cultural changes, the relative position of regions in relation to innovatively active firms does not change much over a long period of time.

Social capital is an important concept in modern economic theory, largely due to its popularization by Bourdieu (1986), as well as Coleman (1987, 1988) and Putnam (1993), whose research has formed a generalized understanding of this phenomenon. For example, R. Putnam defines social capital as "the characteristics of social life – networks, norms and trust – that encourage participants to work together more effectively to achieve common goals" (Putnam, 1996, p.66). The role of social capital is especially increasing in the context of the spread of digital technologies and qualitative structural changes in communication processes in society (Iakovleva, Seliverstova and Grigoryeva, 2019).

Thus, further research on the impact of corporate culture, opportunistic behavior of economic agents in the implementation of contractual relations, social capital and the culture of entrepreneurship on the innovative activity of firms – is relevant. The purpose of this work is to study the influence of social capital' elements on the innovative activity of firms (on the example of the Russian economy).

The main hypothesis in this article is about existing statistically significant connection between the elements of social capital and the innovative activity of economic agents. Empirical analysis base on trust's measures in society and macroeconomics indicators of innovation processes.

2. Methods

According to the statistical methodology in Russian government institutes, an organization that carried out innovative activities in the reporting period is an organization that had expenses for innovations in the reporting period. Innovation statistics have been maintained in Russia since 1994. Data on technological innovations are collected in 1994, and on organizational innovations – 2000, marketing innovations – since 2006, environmental innovations – since 2009.

The main indicators of innovation activity of economic agents are:

- the indicators of the share of organizations that carry out innovations;
- the volume of innovative goods, works, services;
- the costs of technological innovations of organizations.

Most of the indicators of various types and elements of social capital of the World Values Survey (WVS) are reduced to assessing the level of trust (trust in the family, trust in acquaintances, trust in

strangers, and trust in the majority). Therefore, to study the internal factors of innovation activity, we selected and analyzed the dynamics of several indicators from the World Values Survey (WVS) database:

- Trust in the Majority (Q57: Most people can be trusted);
- At what age did you finish your education (V 249: At what age did you finish your education).

The data was selected for Russia, for the entire available time interval 1990-2020. Data analysis was applied by analyzing the sum of accumulated frequencies, using the method of comparative analysis of time series data, and correlation analysis.

3. Results

Russia is a developing country, which for two decades has passed the stage of the formation of a new civilizational model (Mustafin et. al., 2019). As a result of the analysis of the dynamics of trust in the framework of the study of social capital in Russia, Almakaeva and Volchenko (2018) come to the conclusion about the growth of trust in power structures and political institutions in Russia in 2006-2017. Trust in strangers people also increases.

The dynamics of condemnation of illegal actions in Russia decreases from 1990 to 2017 (receiving bribes, illegal receipt of benefits, non-payment of taxes). This may indicate an increase in opportunistic behavior on the part of various groups of economic agents. The dynamics of trust in acquaintances and the assessment of the importance of friends also have contradictory trends. As a result, the authors conclude that there are different determining factors for different types of social capital, as well as for indicators within the same type of social capital (Almakaeva and Volchenko, 2018). Indeed, social capital is a complex phenomenon that is difficult to quantify.

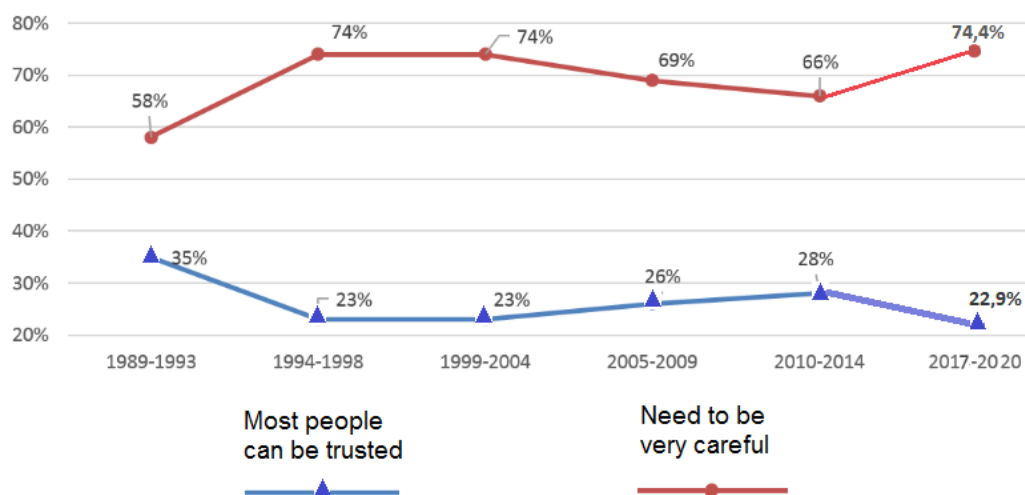


Figure 1. Dynamics of trust in the majority in Russia, according to WVS database, in percent
Source: compiled by the authors according to WVS database

Figure 1 shows the dynamics of trust in the majority in Russia, which shows that the share of people who are wary of the majority opinion has been declining over the past decade, and for those who trust it is increasing – which in general may indicate a positive dynamics of social capital in Russia up to 2014-2015. But according to the 2017-2020 study' results, the trends of divergence in society have intensified again.

The readiness of society for the knowledge economy and innovation is also an element of social capital, as well as trust indicators, and can be partially assessed taking into account the respondents' commitment to the concept of lifelong learning, which is expressed in a subjective assessment of the age at which the respondent completed his education.

Thus, according to WVS, in the 5th and 6th waves of values research in Russia, there was a percentage of people who do not consider their education completed and, therefore, found it difficult to answer this question (5 and 4 percent of respondents, respectively). According to surveys of the 4th wave, more than 90% of respondents considered their education completed at the age of 25. According to surveys of the 5th wave, 90% is achieved only by the age of 34, and according to the 6th wave-after 45

years (Figure 2). The results of the 7th wave of studies were published in 2020 and did not include this question, apparently based on the continuation of the stable trend outlined in previous surveys.

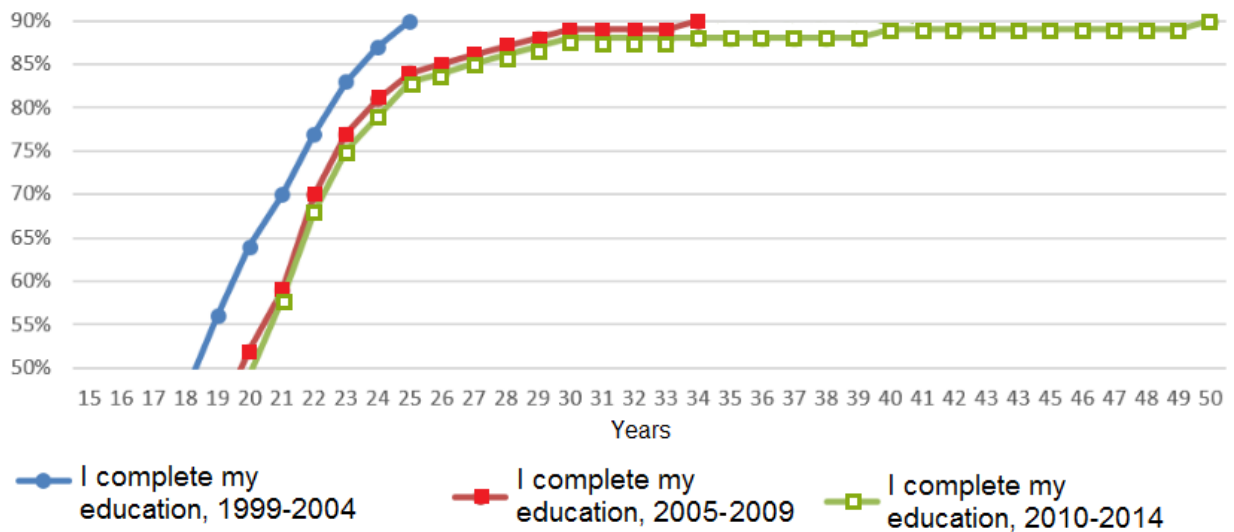


Figure 2. The ratio of the proportion of respondents who consider their education completed and their age, the sum of accumulated frequencies, in percent, 1999-2014
 Source: compiled by the authors according to WVS database

Thus, according to WVS, in the 5th and 6th waves of values research in Russia, there was a percentage of people who do not consider their education completed and, therefore, found it difficult to answer this question (5 and 4 percent of respondents, respectively). According to surveys of the 4th wave, more than 90% of respondents considered their education completed at the age of 25. According to surveys of the 5th wave, 90% is achieved only by the age of 34, and according to the 6th wave-after 45 years (Figure 2). The results of the 7th wave of studies were published in 2020 and did not include this question, apparently based on the continuation of the stable trend outlined in previous surveys.

In our opinion, this characterizes positive changes in the public consciousness – it demonstrates a higher potential readiness of people to retrain, learn new things (including innovations).

Thus, the increase in the level of trust in the majority reflects, all other things being equal, the increase in social capital in society. The respondents' acceptance of the concept of continuing education (Figure 2) also reflects, other things being equal, an increase in social capital due to closer interaction of economic agents and readiness for change. These changes, all other things being equal, create a positive basis for increasing the innovative activity of economic agents in the Russian economy.

4. Discussion

Authors tried to correlate these results with the indicators of innovation activity of economic agents on the example of the Russian economy, taking as a key indicator of the innovation activity of firms the costs of organizations for technological innovations, which corresponds to the methodology of accounting for innovations of Rosstat.

According to the studied indicators, we constructed a correlation matrix (Table 1).

An interesting conclusion was that the indicator of the age at which 90 % of respondents consider their education completed has a close directly proportional relationship with the indicator of organizations' expenditures on technological innovations (the correlation coefficient is 0.9549, which is greater than the threshold value of 0.7 and means that there is a strong relationship between the studied factors).

This point can be explained by the transformation of the respondents' worldview in terms of change management, increased readiness for innovation through the adoption of the concept of continuing education and geographical mobility specific to young people. And be one of the internal conditions for the innovation activity of economic agents, and increase the corresponding costs.

Table 1. Correlation matrix of indicators, for Russia

Indicators	The share of respondents who trust the majority, in percent	The age at which 90% of respondents consider their education completed, in years	Costs for technological innovations of organizations (Statistic data for Russian economy), in mln rubles	p-value
The share of respondents who trust the majority, in percent	1	-0.0054	-0.0804	< 0.01
The age at which 90% of respondents consider their education completed, in years	-0.0054	1	0.9549	
Costs for technological innovations of organizations (Statistic data for Russian economy), in mln rubles	-0.0804	0.9549	1	

Source: compiled by authors.

At the same time, it is interesting that the indicator of respondents' confidence in the majority has an extremely weak relationship (correlation coefficients are significantly less than 0.3) with the studied factors. This may be due to the small sample size (data is available only for the previous 6 waves of the WVS study) or the presence of a significant number of different indirect effects that reduce the direct impact of the level of trust in society on the costs of technological innovation.

Conclusion

Like the category of social capital, the concept of innovation activity of economic agents is often difficult to identify and difficult to measure, a complex phenomenon, which entails the complexity of the study of this phenomenon (Grigoryeva and Grigoryeva, 2015).

Statistical accounting of innovations is imperfect due to the wide variety of strategies and actions of economic agents in the development and implementation of innovations. However, the available statistical data give general ideas about the dynamics of individual indicators of innovation activity of economic agents, which is important given the lack of other opportunities to obtain such information at the macroeconomic level.

At the same time, the results obtained suggest a confirmation of the hypothesis that there is a connection between the elements of social capital and the innovative activity of economic agents. The results obtained can serve as a basis for further research in this area, in particular, we assume that there are statistically significant differences in the strength of the relationship between the elements of social capital and the innovation activity of economic agents for different groups of countries.

Thus, the analysis of the influence of the elements of social capital and on the innovative activity of economic agents allows us to talk about contradictory trends, which is shown by the example of the Russian economy. The analysis of statistical data showed a close, directly proportional relationship between the indicator of age at which 90% of respondents consider their education completed and the indicator of organizations' expenditures on technological innovations (the correlation coefficient is 0.9549 – which is significantly more than 0.7). At the same time, the hypothesis that there is a statistically significant relationship between innovation costs and indicators of trust in society has not been confirmed. The reliance on the international experience, taking into account certain features of the Russian economy, will help to avoid protracted crises and unfavorable circumstances (Vasilova et al., 2018).

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2. Management

An Analytical View of the Development of Human Capital from the Point of View of the Current Needs of the Labor Market

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Abstract

Research background: The paper focuses on human capital and emphasizes the importance of continuous development to secure employment in the labor market. It explores how globalization, digitization, and aging populations drive the need for new skill sets.

Purpose of the article: The aim of the paper is to provide an analytical view of the problem of the mismatch between supply and demand for skills in the labor market and to point out the need for innovations in the field of education and human capital development.

Methods: The aim of the research is to compare Slovakia and the average of EU countries in the area of supply and demand for selected types of skills. For comparison purposes, an analysis of secondary data was performed, which was drawn from the Skills for Job database published by the OECD. The indicators were calculated by the OECD using data from the European Union Labour Force Survey.

Findings & Value added: Through the analysis and comparison of secondary data, drawn from the Skills for Job database, an up-to-date view of the situation in the area of supply and demand for selected types of skills is provided, thereby pointing out existing deficiencies and especially needs in the area of lifelong learning and development. Based on the data presented the overall cognitive, communication, and digital skills in the Slovak Republic appear to be inadequate. This trend is also observed in the EU, except for communication skills, which can be deemed sufficient based on the average of EU countries when evaluating the labor market.

Keywords: human resources, human capital, labor market, skills, education

JEL classification: J24, I25

1. Introduction

Over the past few decades, the labor market has undergone substantial structural changes, leading to an environment marked by uncertainty and unpredictability. Technological innovations, increased emphasis on efficiency, intensified international competition, and novel work arrangements define the current labor market trend. With the information revolution and knowledge-based economy taking precedence over the industrial revolution, work tasks have become less stable, focusing more on IT technologies and creative skills. As a result, individuals must prioritize adaptability and embrace lifelong learning to thrive in the dynamic labor market landscape.

1.1 Theoretical overview of the issue

As the labor market's external landscape experiences shift, so do the factors concerning employees themselves. One prominent aspect is the phenomenon of career change, which is characterized by frequent changes (Nyström, Dahlgren & Dahlgren, 2008). This evolution has resulted in novel conditions and prerequisites in the labor market. It is evident that in a rapidly changing technological and social environment, mere completion of studies is insufficient to be a proficient employee (Suhányi et al., 2017). To remain competitive in the labor market, secure income, and attain social status, individuals must consistently invest in skill development to stay relevant amidst increasing competition (Clarke, 2008). Employers must actively seek pertinent competencies, encompassing knowledge, skills, and attitudes, to thrive in this evolving landscape (Brown, Hesketh & Williams, 2003; Knight & Yorke, 2004).

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The significance of altering education approaches and fostering adult skill development is widely recognized, particularly when considering the future of economic and social progress (Pater et al., 2022). Discussions surrounding growth drivers, such as globalization and technological advancements, underscore the importance of high-quality skills relevant to the labor market, as they are critical for competitiveness and employability (OECD, 2019). Ensuring productivity growth and securing good jobs requires a strong emphasis on skills. Fundamental skills like literacy, mathematical literacy, and ICT literacy serve as essential prerequisites for easy entry into the labor market and for adults to maintain stable and high-quality employment (Stef & Mirea, 2021). To build a successful career, individuals must embrace a mindset of continuous learning and adaptability to navigate changing working conditions and career paths (Riel et al., 2012).

The overarching goal of education is to enhance employees' productivity in various ways. However, education may not always directly equip individuals for the specific tasks they will encounter in their professional roles (Helms Jørgensen, 2004). Adult education and training play a crucial role in preparing individuals to face challenges by fostering their capacity to develop and adapt to different job requirements (Sala, 2011). To ensure a steady supply of qualified labor, the dynamic and evolving labor market necessitates increased investments in learning and education (Livingstone, 2010). While the demand for more educated individuals has risen, it remains uncertain whether the current workforce precisely matches the present workplace demands (Rasovec & Vavrinova, 2014).

Identifying a universal set of competencies that employers seek in today's employees might be elusive; however, specific types of competencies tend to emerge consistently in studies exploring current workforce demands (Pool & Sewell, 2007). In addition to job-specific skills, labor market requirements include an ethical aspect that encompasses integrity and the ability to comprehend and respect the explicit and implicit rules, values, and norms present within an organization. This ethical dimension is fundamental in interpreting diverse contexts and aligning with the distinct organizational culture (Nilsson, 2010).

Instead, labor market demands are intertwined with a broader spectrum of general competencies and personal traits (Tomlinson, 2008). Employees are expected to possess flexibility, adaptability, and a continuous learning mindset throughout their careers (Nyström, Dahlgren & Dahlgren, 2008). Workers must be capable of gaining a comprehensive understanding of diverse tasks within the organization, functioning effectively in multidisciplinary environments, and fostering collaboration and communication with others (Perry et al., 2014).

The domain of education and development is going through significant transformations, in parallel with changes in our work environment (virtual work arrangements) and work methods (increased technology adoption) (Štefko et al., 2021). Adaptability to change has emerged as a constant aspect of work, and for numerous workers, the challenge lies not in accessing information but in making coherent sense of the abundance of available data. As Kraiger (2014) points out, the need for employee training is set to continually increase, with a rising preference for technology-based training over traditional face-to-face training.

1.2 Trends in skills demand

According to the international group of stakeholders engaged in the OECD Future of Education and Skills 2030 project, skills are defined as the capabilities and requirements needed to execute specific tasks and effectively apply one's knowledge to achieve objectives. These skills are an integral aspect of a comprehensive notion of competence, which encompasses the utilization of knowledge, skills, attitudes, and values to meet intricate demands.

OECD Learning Compass 2030 distinguishes three different types of skills (OECD, 2018):

- cognitive and metacognitive skills that include critical thinking, creative thinking, learning and self regulation;
- social and emotional skills, which include empathy, self-efficacy, responsibility and cooperation;
- practical and physical skills that include the ability to use new information and means of communication.

Cognitive skills encompass a range of thinking strategies that enable individuals to utilize language, numbers, reasoning, and acquired knowledge. These skills encompass verbal and non-verbal abilities, as well as higher-order thinking skills. Additionally, metacognitive skills involve learning capabilities and the adeptness to apply one's knowledge, skills, attitudes, and values (OECD, 2018).

Social and emotional skills are a set of individual abilities that can be expressed in consistent patterns of thought, feeling and behavior that enable people to develop and nurture relationships at home, at school, at work and in the community, to carry out their civic responsibilities.

Physical skills are a set of abilities to use physical tools, operations and functions. They include manual skills, such as the ability to use information and operate technological devices and new machines, play musical instruments, play sports, etc. (OECD, 2016).

2. Methods

The aim of the paper is to provide an analytical view of the problem of the mismatch between supply and demand for skills in the labor market. The gap between the skills sought by employers and the skills possessed by workers is becoming progressively more demanding. This predicament is driven by factors such as digitization, globalization, and the rapid aging of the population, all of which contribute to an imbalance in the availability and demand for skills.

The aim of the research is to compare Slovakia and the average of EU countries in the area of supply and demand for selected types of skills. For comparison purposes, an analysis of secondary data was performed, which was drawn from the Skills for Job database published by the OECD. The indicators were calculated by the OECD using data from the European Union Labour Force Survey (LFS: EU). The OECD Skills database presents an overview of the discrepancy between skill demand and supply across different countries for various job positions (OECD, 2023).

The subject of the comparison are 4 groups of skills, namely cognitive, communication, digital and social skills.

Skills are defined as hard-to-find (or in shortage) when employers are unable to hire employees with the required skills on the labor market and at normal wages and working conditions. Surplus skills refer to situations where the supply of a particular skill outweighs the demand for it.

The tables show the comparison of the Slovak Republic compared to the EU average with regard to the mentioned types of skills (updated for 2022), namely:

1. cognitive skills
2. communication skills
3. digital skills
4. social skills

Positive values indicate a shortage of skills, while negative values indicate an excess of skills. The greater the absolute value, the greater the imbalance. A value of 1 represents the largest shortage and a value of -1 the largest surplus.

Through the analysis and comparison of secondary data, drawn from the Skills for Job database, an up-to-date view of the situation in the area of supply and demand for selected types of skills is provided, thereby pointing out existing deficiencies and especially needs in the area of lifelong learning and development.

3. Results

The first group of skills that are the subject of research are cognitive skills. In the group of cognitive skills, the subjects of research were skills such as (1) Learning, (2) Originality, (3) Quantitative abilities and (4) Reasoning and Problem-solving.

Deficiencies in Learning and Problem-Solving skills were observed, both in Slovakia and the EU average. Particularly, there is a notable deficit in learning skills compared to other types of skills within the EU average.

Table 1. State in the field of demand and supply of cognitive skills

	Learning	Originality	Quantitative abilities	Reasoning and Problem-solving
Slovakia	0.093	-0.002	-0.060	0.036
EU average	0.201	-0.002	-0.151	0.030

(Source: <https://stats.oecd.org/>)

Based on the data presented in Table 1, it can be assumed that skills such as Learning, Reasoning and Problem-solving are insufficiently developed within the EU and also within the Slovak Republic. These

are precisely the skills that are in high demand on the market. The reason is precisely the changes related to the nature of work, where a higher level of intellectual and critical thinking is often required. It can be assumed, it is the learning methods based on memorizing a large amount of information that are used in schools that hinder the development of skills such as Reasoning and Problem-solving. The development of skills such as Reasoning and Problem-solving requires the development of critical thinking, which must be developed already at an early school age.

The second group of skills that received attention is communication skills. The following types of skills were monitored in this group, namely (1) Active Listening, (2) Communications and Media, (3) Reading Comprehension and (4) Speaking.

Regarding communication skills, the Slovak Republic exhibits a deficiency in two specific areas: Reading Comprehension and Speaking. However, the EU average shows contrasting results, with both Reading Comprehension and Speaking skills reported as surplus.

Based on these findings, it can be assumed that there is a lack of an innovative approach to education in schools that would develop the skills necessary for the current needs of the labor market. Reading Comprehension is a fundamental skill for the development of critical thinking, which guarantees that an individual in the future will be able to evaluate a lot of information in terms of importance for his work, which is especially necessary in the current era of information overload. Similarly, the skill of Speaking requires development already at an early school age. Speaking is an essential skill for any profession where communication with people is necessary. The development of these skills requires a change of approach in education of students.

Table 2. State in the field of demand and supply of communicative skills

	Active Listening	Communications and Media	Reading Comprehension	Speaking
Slovakia	-0.081	-0.011	0.037	0.019
EU average	-0.203	-0.064	-0.013	-0.046

(Source: <https://stats.oecd.org/>)

An important set of skills for which demand will grow significantly in the future is digital skills. Digital skills appear to be the most in short supply among the other skill groups, which points to the fact that digitization represents a very fast process to which education is not able to respond quickly enough. Unlike the EU average, SR has a better result in the Computer programming, where it turns out that there is enough labor with the given type of skills. However, unlike the EU average, there is a lack of workforce in Slovakia that would master Digital data processing and Web development.

Compared to other groups of skills, digital skills can be considered a new type of skills brought about by the new, digital age. Therefore, in the case of employees, lifelong learning plays an important role, which must be seen as an essential part of development for employment on the labor market. The lack of digital skills is a problem affecting most EU countries, not only Slovakia. It is important that countries know how to provide opportunities for the development of digital skills, not only within the framework of school education, but also within the framework of lifelong learning.

Table 3. Status of demand and supply of digital skills

	Computer Programming	Digital Content Creation	Digital Data Processing	ICT Safety, Networks	Web Development
Slovakia	-0.022	0.086	0.034	0.010	0.005
EU average	0.060	0.107	-0.002	0.020	-0.007

(Source: <https://stats.oecd.org/>)

Within the social skills group, attention was paid to skills such as (1) Coordination, (2) Decision Making and (3) Persuasion and Negotiation. Social skills are generally considered to be in surplus, which is a positive assessment. There are no notable discrepancies in the demand and supply of these skills between Slovakia and the EU average within the specified group. However, the skill of Persuasion and Negotiation was found to be deficient.

Table 4. Status in the field of demand and supply of social skills

	Coordination	Decision Making	Persuasion and Negotiation
Slovakia	-0.043	-0,015	0.039
EU average	-0.083	-0.032	0.021

(Source: <https://stats.oecd.org/>)

When considering the total values, the overall cognitive, communication, and digital skills in the Slovak Republic appear to be inadequate. This trend is also observed in the EU, except for communication skills, which can be deemed sufficient based on the average of EU countries when evaluating the labor market.

The results prove the fact that school education systems are not able to respond quickly enough to the development of new skills that are currently needed for the labor market. As it is very difficult to implement changes in educational systems, it is important to support lifelong learning programs for adults in particular. In the case of Slovakia, the participation in adult education can be evaluated rather negatively, since in 2021 it was only at the level of 4.8%, which makes it one of the countries with the lowest rate of adult education in EU (Eurostat, 2022).

Table 5. Comparison of cognitive, communication, digital and social skills

	Cognitive Skills	Communication Skills	Digital Skills	Social Skills
Slovakia	0.035	0.015	0.058	-0.019
EU average	0.059	-0.119	0.058	-0.090

(Source: <https://stats.oecd.org/>)

4. Discussion

It is very important that the skills of workers are in line with the needs of the labor market. Skills imbalances, either shortages (when adequate skills are difficult to find in the current labor market) or surpluses (when certain skills are in excess in the labor market compared to demand and therefore easy to find), can slow the adoption of new technologies, cause delays in production, increase labor turnover and reduce productivity. Individuals lacking the "right" skills would also face poor labor market outcomes.

If the mismatch between offered and required skills, which can take various forms, persists, it can lead to short- and long-term economic and social losses for people, employers and society alike. Based on the analysis of the state of individual types and areas, it concerns the imbalance that exists on the labor market in terms of demand and supply of skills. This use applies not only to Slovakia, but also to the average of EU countries. According to the data from the OECD Skills database for Job, it is evident that the Slovak Republic exhibits varying rates of skill discrepancies. The highest discrepancy rate is observed in digital skills, with a recorded value of 0.058, followed by cognitive skills at 0.038 and communication skills at 0.015. Interestingly, an excess of social skills was recorded, which is regarded as a positive finding. Additionally, when analyzing specific skill types, the most significant lack of skills was found in the Learning skill (0.093).

Based on the comparison of Slovakia and the EU average, no differences were found in the area of lack and excess of cognitive skills. Learning and problem-solving skills were found to be lacking. An interesting finding is that these are precisely the skills that need to be developed at an early school age. School education systems and specific ways of educating children play a big role here, which in the case of Slovakia are often based on the passive reception of a large amount of information, which does not force students to analyze and evaluate the information (Suhányi et al. 2017). The absence of the development of cognitive skills is then an obstacle to the acquisition of further knowledge.

In the case of communication skills, unlike the EU average, there is a problem with the lack of two types of skills, namely Speaking and Reading Comprehension. These are skills whose development begins already in childhood and which represent prerequisites for the acquisition and development of other skills. As with cognitive skills, school education systems play a major role.

Digital skills are a particular problem. Based on the results of the analysis, these are the most in-demand skills. Due to the fact that the IT sphere is a very dynamically developing field, school systems are not able to respond quickly and flexibly to the demands of the labor market (Spiezia, 2017). Therefore,

lifelong learning systems and also the approach of adult workers themselves play an important role here. Lifelong learning systems are a natural part of skills development.

In the case of social skills, there is no difference between the Slovak Republic and the EU average, as Persuasion and Negotiation are insufficient in both cases. These skills are important in many jobs, especially in areas such as marketing, sales, advertising, and many lifelong learning courses focus on their development (Arntz et al., 2016).

Conclusion

The paper points to the issue of skills mismatch in the labor market. Through the analysis and comparison of data from the Skills for Job database, it provides an up-to-date view of the surplus and shortage of selected types of skills within the Slovak Republic, thus pointing to the need for innovations in the field of educational systems as well as the importance of lifelong learning.

Imbalances in the labor market's skill supply and demand are brought about by structural shifts. To empower the workforce to meet both present and future employer needs proficiently, it is vital to adopt proactive and innovative education and development initiatives designed to align with the labor market's requirements. Given the continuous growth in demand, especially for digital skills, as confirmed by OECD Skill results for Jobs, prioritizing the development of these proficiencies becomes crucial. The most effective approach to address the mismatch between skill demand and supply is through training and development. Ensuring educational programs are constantly evolving to meet the labor market's needs and are attractive to employees fosters a keen interest in self-education and further personal development.

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Examining Leadership in Terms of Entrepreneurial Skills Enhancement and Bossing Elimination

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Abstract

Research background: One of the main duties of entrepreneurs is to create a favorable and comfortable work environment for their subordinates or employees. It is, therefore, necessary for them to enhance managerial and leadership skills and in this context to deem tendencies to bossing as dangerous in their entrepreneurial activities.

Purpose of the article: The main objective of the presented research is to examine the possible existence of statistically significant correlations between the selected leadership styles and the tendencies to bossing.

Methods: The research data were obtained from 197 respondents aged from 21 to 67 years ($M = 34.57$ years), 55% women and 45% men from various areas of business. To assess the preference of the examined attributes, two methodologies were used: Paternalistic leadership scales (to assess leadership behavior) measuring the factors of Benevolent, Moral, and Authoritarian leadership, and the BOSS methodology (to assess downward workplace bullying, i.e. bossing), which measures Communication-Aimed and Psyche-Aimed Bossing.

Findings & Value added: The results confirmed existence of several statistically significant links between leadership styles and tendencies to bossing of the respondents, pointing to behavioral errors commonly found in the workplace among managers and employees, or supervisors and subordinates. The necessity to study these errors has, thus, been accentuated, particularly in the context of entrepreneurship, where these deviations were found to occur.

Keywords: bossing, leadership, entrepreneur, skills

JEL classification: D23, D91

1. Introduction

Human resource management is currently manifesting itself as a synthesizing scientific discipline that explains the processes of personnel management, drawing on the knowledge of management, economics, psychology, sociology and corporate culture in a dynamic development atmosphere (Antošová 2008). Implementing good human resource management practices and aligning these practices with the company's business strategy has a significant impact on performance. Naturally, all macroeconomic positive implications are obvious here (Rose, Kumar 2006).

The success and competitiveness of the company is decided by the people and their knowledge. The basic condition for the success of any organization is therefore to be aware of the value and importance of a person in the work process. In this context, Budiman et al. (2018) highlight one of the basic tasks of managers, which is to motivate employees to high performance in a constantly changing environment. Motivation can be achieved through many ways, including coaching (Miško et al. 2022). However, according to Birknerová and Frankovský (2017), we often witness many cases of undesirable behavior that is contrary to the expectations, rules and standards of the organization.

The presented paper brings the focus of audience to some of the behavioral errors, which are commonly found in the workplace among managers and employees, or supervisors and subordinates. Human resource management is a broad context within which several phenomena can be observed, some of them positive, such as work engagement, job satisfaction and personal well-being, other rather negative,

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such as aggression, bullying, or abusive supervision i.e. bossing, which lead to trauma, anxiety, and stress. The main objective of the contribution is to examine the leadership styles of managers in possible connection with the perception of bossing in managerial work and thus contribute theoretically and empirically to this area of knowledge.

1.1 Leadership as an entrepreneurial skill

In terms of the development of entrepreneurial skills, it is necessary to pay attention to the personal potential of managers, specifically the identification of its strengths and weaknesses, analysis of personal development needs of managers, as well as creating a personal profile and personal development plan for managers. This includes mastering appropriate leadership styles. Extensive knowledge from the literature on leadership behavior of entrepreneurs or managers of private companies confirms that leadership is and always will be an important factor for employee motivation, well-being and performance (Albrecht 2005). Behavioral theories about leadership argue that effective leaders need to have highly task-oriented and relationship-oriented competencies (Rowley, Hossain, Barry 2010). However, a thorough review of the literature shows that public sector research is primarily focused on the impact of role-oriented leaders' competencies (such as knowledge, expertise and technical skills) on employees and organizational outcomes. Studies focusing on the impact of leadership relationship competencies, such as creating an atmosphere of trust, showing attention and empathy for subordinates, humor and their impact on employee satisfaction, health and healthy workplace (e.g. Horváthová, Mokrá, Konečný 2023), attitudes and final performance are a rarity in public sector research.

The ethical behavior of leaders has recently come to the fore, especially given the financial crisis that has swept over the economically developed world (Eisenbeiss 2012). Given the adverse impact that such deliberate and illegal unethical practices may have on business, industry and ordinary people in the wider community, researchers have paid and continue to pay close attention to ethical decision-making and practices by leaders (e.g. Eisenbeiss 2012; Stenmark, Mumford 2011; Tomkova et al. 2021; and others).

1.2 Bossing and leadership

In every field, besides mobbing, one can find a boss who resorts to bullying subordinates. Abusive supervision or bossing is a very specific mode of bullying in the workplace, i.e. mobbing and persecution by the boss, where the psychological coercion is initiated by the superior (Novák 2004). Bossing is a specific form of mobbing where the aggressor is the manager or executive. Attacks are targeted at their subordinates in the form of pressure to enforce their obedience, respect and adaptation, possibly enforcing the "voluntary" resignation of a subordinate from the workplace (Topa, Moriano 2013). Russo and Popović (2016) also present bossing as a phenomenon occurring frequently in the workplace, where one or more supervisors apply ongoing aggression on a selected subordinate or group of subordinates.

Dabu and Drăghici (2013) present an overview of bullying practices in business organizations and its consequences on human health, citing Shahbazi et al. (2013, p. 1816), who studied the relationships between workplace bullying and three leadership styles, namely Benevolent leadership (Cheng, Chou, Wu 2004), Moral leadership (Hayek, et al. 2010), and Authoritarian leadership (Salin, Hoel, 2011), which are the very factors comprising the paternalistic leadership style as defined by Farh and Cheng (2000).

Ambrose and Ganegoda (2020) have recently examined how abusive behaviors of supervisors are perceived by their managers as well as their subordinates, and found out that in the manager–supervisor–subordinate triads, there are differences between managers' and subordinates' view of abusive supervision, i.e. bossing.

These two above research studies have inspired us to move the topics of bossing and leadership to the level of their interconnection, which is the essence of the next, analytical part of the presented research study.

2. Methods

The main objective of the presented research is to examine the possible existence of statistically significant correlations between the selected leadership styles and the tendencies to bossing. The following research methodologies were used to determine the assessment of the preference of the examined attributes:

1. Paternalistic leadership scales (Cheng et al. 2004)

The questionnaire based on the original methodology by Cheng et al. (2000) contains 26 items aimed at paternalistic leadership styles, with the respondents having the opportunity to mark their answers on a

6-point scale from 1 (I absolutely disagree) to 6 (I absolutely agree). The methodology enables identification of three attributes of leadership behavior:

- *Benevolent leadership* – leader demonstrates individual, holistic and complex care for their subordinates and their subjective well-being; sample item: „My supervisor ordinarily shows a kind concern for my comfort.“;
- *Moral leadership* – leader demonstrates excellent personal qualities, integrity, self-discipline, role-modelling, and unselfishness; sample item: „My supervisor does not take advantage of me for personal gain.“;
- *Authoritarian leadership* – leader exhibits an absolute authority, power and control over subordinates and requires their unquestionable obedience, respect, and rule following; sample item: „My supervisor always behaves in a commanding fashion in front of employees.“.

The internal reliability coefficient was 0.94 for the benevolent leadership scale, 0.90 for the moral leadership scale, and 0.89 for the authoritarian leadership scale.

2. BOSS methodology – downward workplace bullying (Birknerová, Zbihlejšová, Droppa 2021)

The BOSS methodology is aimed at the issue of assessing bossing on the basis of a psychometric approach. The BOSS methodology contains 17 items describing various forms of workplace bossing. The role of the respondents is to assess each item on a 5-point scale (1 = absolutely disagree, 2 = rather disagree, 3 = neither disagree nor agree, 4 = rather agree, 5 = absolutely agree). It specifies two bossing factors:

- *Communication-Aimed Bossing*: Respondents with high scores in a given factor feel that their superior does not allow them to comment on criticism, does not invite them to the operational or informal meetings of the working team, does not provide them with a turn to speak according to their interest during meetings, does not allow them access to undistorted information to fulfill their tasks, communicates with them minimally, abruptly terminates the conversation when they enter the room, carries out senseless and unjustified actions against their will, spreads gossip, defamation, unsubstantiated claims, half-truths, and intrigues about them, and ignores their opinions and casts doubt on their views.
- *Psyche-Aimed Bossing*: Respondents who score high in a given factor feel that they are criticized by their superior for their political, religious, and other convictions, that the superior damages their belongings and the results of their work, threatens them with physical violence, sexually harasses them, questions their mental state, gives them defamatory nicknames, and denies them additional business education.

The extracted factors explain 54.180% of the variance.

The research data were collected in the period from September 2022 to March 2023 using the non-probability quota sampling method from the total number of 197 respondents. The age of the research participants ranged from 21 to 67 years ($M = 34.57$ years), 55% of them classified themselves as women ($N = 108$) and 45% as men ($N = 89$). The respondents were from various areas of business: 25% of them work in Trade, 20% in Services, 11% in Transportation, 8% in Education, 8% in Production, 5% deal with real estate, 5% work in Administration, 5% in Healthcare, 3% in Banking, 3% in Insurance, the rest work in the Energy sector and other work areas such as I.T. or Gastronomy.

The overall statistical evaluation was processed in the R ver. 4.1.2 software (R Core Team 2022) and IBM SPSS 26. Statistical significance was verified for all tests based on the resulting p-value at the $\alpha = 0.05$.

3. Results

To fulfill the research objective, the normal distribution of individual monitored variables was verified using the Shapiro-Wilk test (Table 1). Since in all cases (within all variables) a significant violation of the normal distribution was demonstrated, the non-parametric Spearman correlation coefficient was subsequently used to analyze the studied variables (Figures 1, 2 and 3). The resulting value of this coefficient always comes from the interval -1 (maximum negative correlation, when the increasing value of one variable directly proportionally decreases the value of the other variable) to +1 (both values increase directly proportionally). A value equal to zero symbolizes that there is no correlation (relationship) between the variables.

Table 1. Descriptive statistics of monitored variables and assessment of data normality using the Shapiro-Wilk test

	Bossing	Benevolent leadership	Moral leadership	Authoritarian leadership
Shapiro-Wilk W	0.931	0.969	0.963	0.982
Shapiro-Wilk p	< .001	< .001	< .001	0.013
Mean	2.11	3.83	3.95	2.98
Median	1.87	3.92	4.02	3.03
Modus	1.00	3.92	5.19	3.26
Standard deviation	0.85	1.17	1.05	1.16
Variance	0.72	1.35	1.05	1.26
Range	3.90	5.00	5.00	5.00
Minimum	1.00	1.00	1.00	1.00
Maximum	4.89	6.00	6.00	6.00

Source: own processing

Based on subsequent analyses, we verified the existence of statistically significant correlations between Bossing and three attributes of Paternalistic leadership. As for the Benevolent leadership style, we noted a statistically highly significant correlation between indecisiveness and the tendency to overthink ($R = -0.47$; $p < 0.001$). Based on the value of the correlation coefficient ($R = -0.47$), we evaluate this relationship as moderately strong (interval 0.3 to 0.7) and negative (as the value of Benevolent leadership increases, the value of Bossing decreases). It is possible to state that there is a statistically significant medium strong negative correlation between Benevolent leadership and Bossing. The links between the monitored variables are illustrated in Figure 1.

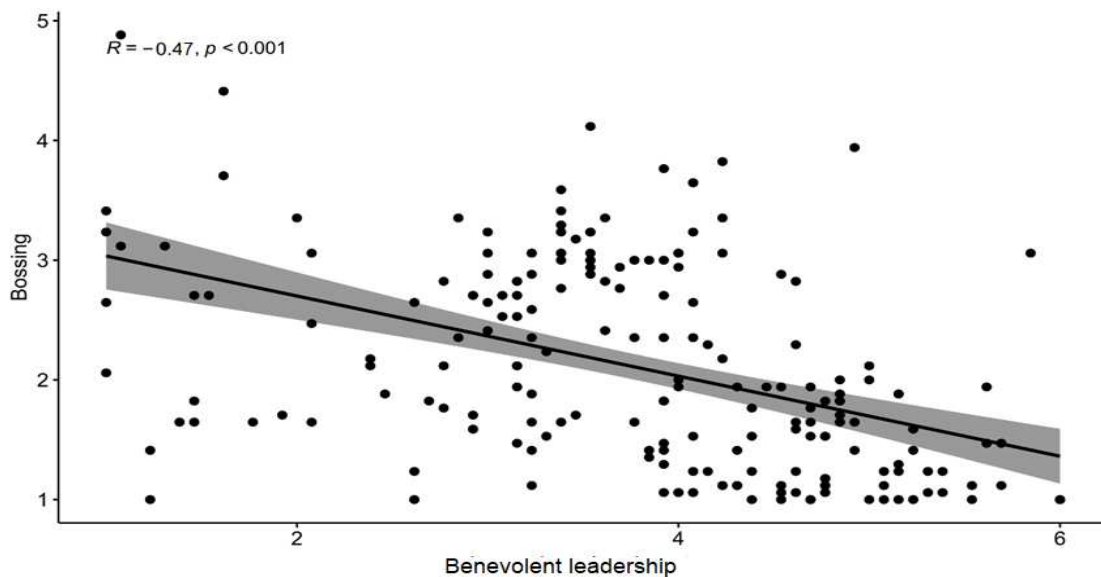


Figure 1. Correlations between Bossing and Benevolent leadership

Source: own processing

Respondents who scored high in the factor of Benevolent leadership evaluate their supervisor as a family member, someone who cares about them and encourages them, is also interested in their personal life, helps them when they are in need and tries to understand what is the reason why they don't perform well.

When analyzing the links between Bossing and Moral leadership style, a statistically highly significant correlation between the variables was also confirmed ($R = -0.50$; $p < 0.001$). Based on the value of the correlation coefficient ($R = -0.50$), this relationship can be assessed as moderately strong (interval 0.3 to 0.7) and negative (as the value of Moral leadership increases, the value of Bossing

decreases). Therefore, there is a statistically significant moderately strong negative relationship between Moral leadership and Bossing. This relationship between the monitored variables is shown in Figure 2.

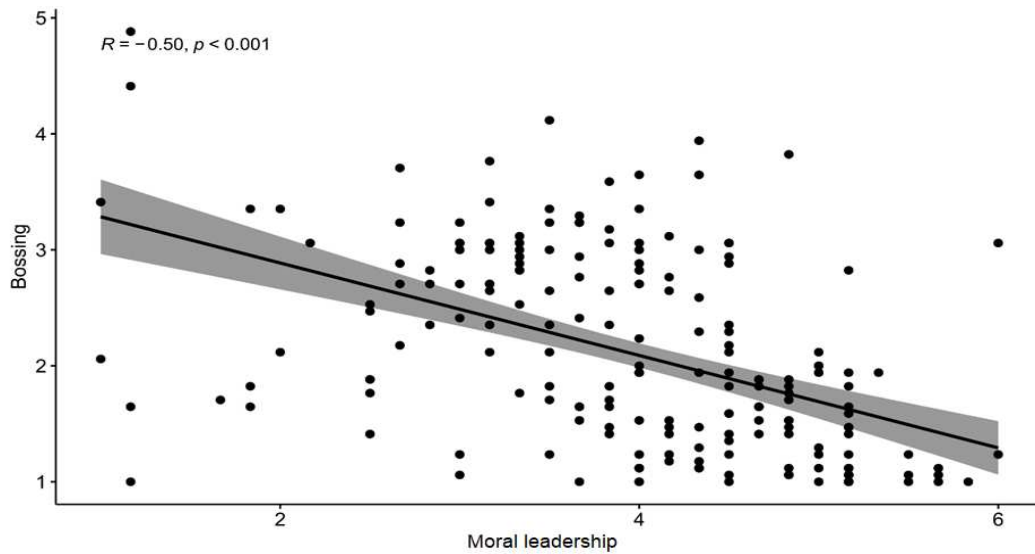


Figure 2. Correlations between Bossing and Moral leadership
Source: own processing

Based on the results, the respondents who scored high in the Moral leadership factor evaluate their superior as someone who does not envy the abilities and strengths of others, does not try to get special privileges with the help of his privileges, does not take credit for the achievements and contributions of others, does not use them expressly only for his own benefit and ultimately does not even use personal relationships to obtain illegal personal gains.

A statistically highly significant correlation was confirmed between Bossing and an Authoritarian leadership style ($R = 0.60$; $p < 0.001$). Based on the value of the correlation coefficient ($R = 0.60$), this relationship may be regarded as moderately strong (interval 0.3 to 0.7) and positive (as the value of Authoritarian leadership increases, the value of Bossing increases). Thus, there is a statistically significant moderately strong positive relationship between Authoritarian leadership and Bossing. The relationship between the observed variables is shown in Figure 3.

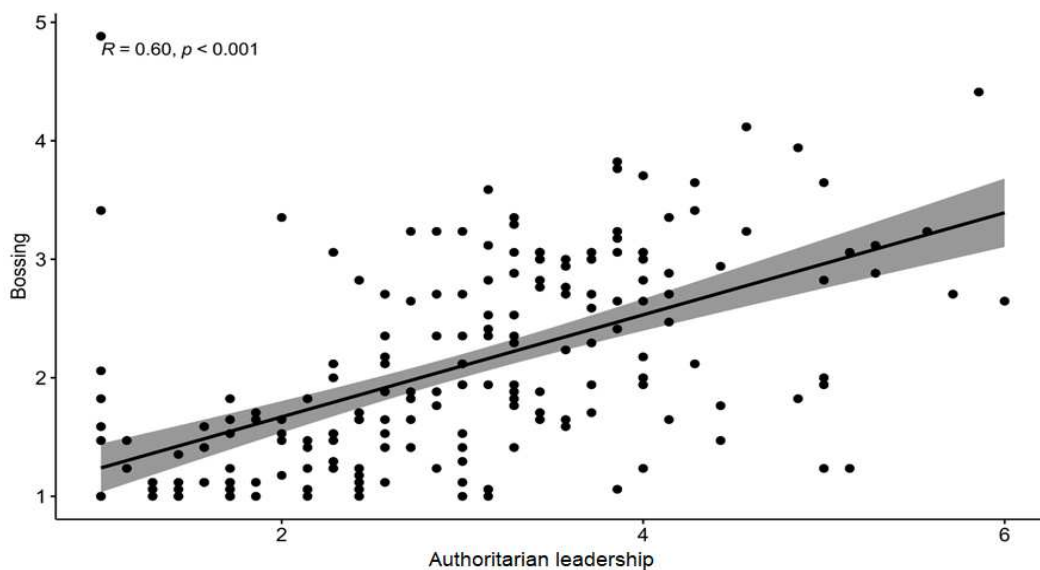


Figure 3. Correlations between Bossing and Authoritarian leadership
Source: own processing

Respondents scoring high in the factor of Authoritarian leadership rate their superior as a person who always has the last word, has a habit of behaving in a commanding manner, when working with them, one can feel under pressure, emphasizes the need to achieve the best performance of all and insists on following their own rules, on the basis of which they apply strict discipline.

Based on these analyses, it can be concluded that the main objective of the presented research, which was to examine the possible existence of statistically significant correlations between the selected leadership styles and the tendencies to bossing, was fulfilled and existence of these links was confirmed.

4. Discussion

Within the main research objective, which is to find out whether there are statistically significant connections between selected undesirable forms of business behavior and paternalistic leadership attributes, we focused primarily on the connection between bossing (as an undesirable form of business behavior) and moral, benevolent and authoritative leadership styles (as paternalistic leadership attributes). Bossing, however, is referred to by many foreign authors rather as the term "abusive supervision", which in literal translation we understand as abusive supervision. Yu, Duffy, and Tepper (2018) report that the domain of abusive supervisory behavior consists of hostile acts that include yelling at direct reports and belittling, blaming, and ostracizing them. Richard et al. (2020) argue that abusive supervision lacks an ethical element and define it as the extent to which a direct supervisor engages in consistent hostile verbal and nonverbal actions toward a subordinate.

When it comes to the links between abusive supervision and leadership styles, the findings by Li et al. (2019) across three studies show that authoritarian leadership and abusive supervision moderate each other's effects in suppressing subordinates' proactive behavior. Khan et al. (2010) confirmed the relationship between abusive supervision or bossing and negative employee results, i.e. work tension, emotional exhaustion and intention to turnover. In the context of developing countries, they found a positive empirical result for all the hypotheses they established, that is, the more bossing is applied, the higher the tension at work, emotional exhaustion, and turnover intention.

Watkins, Fehr and He (2019) examined how leaders' perceptions of the instrumental benefits of abusive supervision shape their tendencies to abuse their employees. They did so by conducting a between-subjects experiment by randomly assigning participants to one of two experimental conditions, observing several variables, e.g. Abusive supervision, Instrumentality beliefs manipulation, and Empathic concern. Results of their study provide evidence that some leaders consider abuse to be instrumental in nature.

Stempel and Rigotti (2018) investigated the role of gender in abusive leadership practices, along with the effects of abusive leadership on employee health. Their findings suggest that although there were no gender differences detected between the ratings for female and male leaders regarding abusive supervision, they confirm that the leaders' gender did play a role in employees' perceptions of abuse, and that the perceived abusive supervision is more strongly related to increased emotional exhaustion and somatic stress when the leader is male. In addition, Kernan et al. (2011) found in their research that the effects of abusive supervision on workers' work-related attitudes were moderated by some, but not all, cultural values. In the future studies of this issue, the gender and cultural contexts should, therefore, also be considered.

Conclusion

The presented research study was designed to point out certain behavioral errors, which are commonly found in the workplaces among managers and employees, or supervisors and subordinates. The main objective of the contribution was to examine the leadership styles of managers-entrepreneurs in possible connection with the perception of bossing in managerial work. The links between Benevolent leadership and Bossing, Moral leadership and Bossing, and Authoritarian leadership and Bossing have been recorded, indeed, which suggests that the analyzed predictors are identifiable at the level of practical experience rather than at the level of theoretical definition and cognition. In this context, they can be considered as essential characteristics of entrepreneurs' behavior in the social situation.

From the viewpoint of future research on the given issue in business management and area of entrepreneurship, several steps could be taken. First of all, the cultural context should be considered as a possible limitation or another study direction, as bossing can manifest itself differently within various cultures. In this sense, also the concept of staffing, i.e. upward bullying could be analyzed and further

compared within various settings. To what extent is bossing prominent on the different levels of management is yet another question provoking deeper discussion.

It can be concluded that the stated objective has been met and the paper represents a theoretical and empirical contribution to the discussed area of knowledge. Detection of the positive links between Authoritarian leadership and Bossing also imply that in the future, it is necessary to put an emphasis on prevention of the undesirable behavior occurring in the workplaces. Education in this area should be key. As bossing tends to expand in businesses across the world, it would be appropriate to put periodic training on it. A good system of education, prevention, identification of bossing attributes, transparent criteria, practices, and possibly repression could help to resolve this complicated issue.

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Risk and Crisis Management in Enterprises with the Risk of Impending Bankruptcy in the Slovak Republic

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Abstract

Research background: The current global situation and the situation in national economies means many existing businesses face of the problem of solving the post-covid period and now energy crisis. Some enterprises have reached the brink of bankruptcy. In the Slovak Republic, a new legislative regulation was adopted, which will enable companies with the threat of bankruptcy to use risk and crisis management solutions to improve and stabilize their financial situation and prevent bankruptcy. The new management in these companies can use analogous procedures that have been recorded in the past in the successful restructuring and stabilization of companies.

Purpose of the article: To find out how businesses in bankruptcy approach the stabilization of the financial situation, what is the frequency of changes with an impact on the economic result, and to propose working procedures for risk and crisis management according to the new legislation in businesses with imminent bankruptcy in the Slovak Republic.

Methods: For our research we chose the method of empirical analysis on a sample of 164 companies that were tested 3 years before entering bankruptcy with a 5-factor Altman Z-score to demonstrate riskiness, and then we followed the development of selected items of assets and liabilities and their trend in these companies.

Findings & Value added: Based on the percentage development of selected items of the financial statements, we can predict some functional measures to achieve the stabilization of a company threatened with bankruptcy in their crisis and risk management as part of preventive actions.

Keywords: risk management, crisis management, bankruptcy, enterprises in risk

JEL classification: D22, G33

1. Introduction

Currently, the much of the scientific community in the field of economics focuses on innovative processes, highly advanced technologies aimed at management, production, economic activity, digitization of the business sphere and the sphere of public administration. This trend is justified and understandable. However, the post-covid period, the crisis in international trade relations and the resulting energy crisis have put many businesses in the exact opposite position, where they are struggling with financial problems and are on the verge of bankruptcy. Our intention is to point out the possible methods and decisions of companies with prediction of distress leading to their stabilization of the financial situation in new conditions.

1.1. Management in companies facing bankruptcy

In the member countries of the European Union, the number of small and medium-sized enterprises constitutes a very high share of the total business environment. Large and decisive enterprises make up a numerically almost negligible share. For a better overview, we present the published number of enterprises by size in the countries of the European Union and in the Slovak Republic for the year 2019 (Eurostat database):

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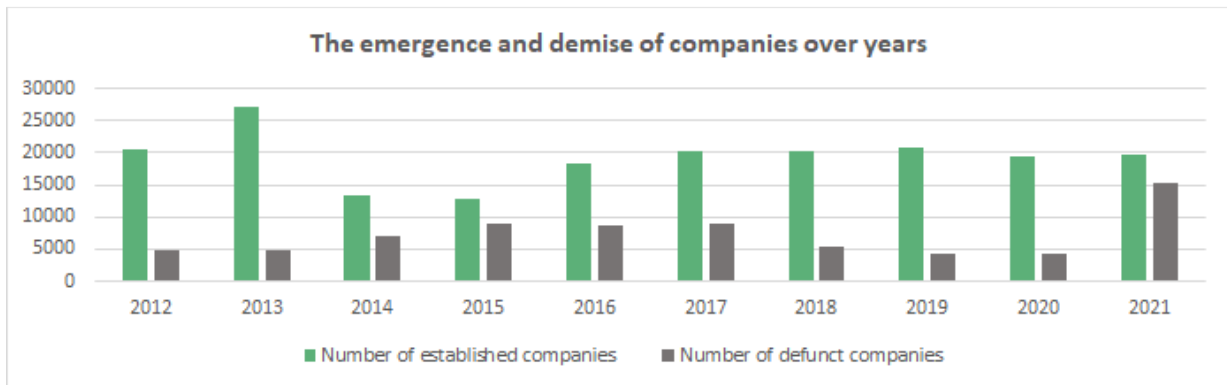
Table 1. Size structure of the business sector in the Slovak Republic and in the EU in 2019

		Enterprises size category					Total
		Micro (0 - 9)	Small (10 - 49)	Medium (50 - 249)	Large (250 +)	SME	
EÚ-27	<i>Number of business subjects in the non-financial corporate economy</i>	21 553 171	1 361 585	210 000	43 000	23 124 756	23 167 756
	<i>Share in the number of business subjects</i>	93,00%	5,90%	0,90%	0,20%	99,80%	100%
Slovakia	<i>Number of business subjects in the non-financial corporate economy</i>	497 812	11 172	2 505	594	511 489	512 083
	<i>Share in the number of business subjects</i>	97,20%	2,20%	0,50%	0,10%	99,90%	100%

Source: Eurostat. The data includes enterprises operating in industries that cover SK NACE sections B to N of division 95. At the time of material processing, the data was updated for 2019.

Among all small and medium-sized enterprises, the vast majority belong to the sphere of private enterprises. According to the data of the Statistical Office of the SR in Slovakia, these enterprises in private ownership make up 90%, international enterprises only 1.2% and foreign enterprises up to 8.8%.

Over the years from the establishment of the Slovak Republic (1993) to the present, the trend in the number of business spheres has been increasing, but in the post-covid period, the number of active companies has started to decrease, and on the contrary, there is a gradual disappearance of companies and their entry into bankruptcy. The development of bankrupt companies in Slovakia is presented below:

**Figure 1.** The emergence and demise of companies over years

Source: FINSTAT SR database

There is a realistic assumption that the number of bankrupt and dysfunctional companies will continue to increase.

Future development of the companies is highly dependent on the evaluation and analysis of financial situation as well as taken steps at present. To interpret the indicators correctly for the future position of the companies is crucial regardless of the size, the type of operational activities, or any other characteristics that companies have. (Švábová; Michaková; Ďurica; Nica; 2020). The prediction of the companies' financial distress position and risk of bankruptcy is crucial for rating agencies, managers, investors, bankers and also for the shareholders of the company itself and even more the countries' economy at large. (Alaka; 2018). Avoiding bankruptcy in a company with a threat to financial stability, even in companies in distress is the task of risk and crisis management or a professional advisor.

1.2. Management in companies facing bankruptcy

1.2.1. Risk management

In every activity, a subject carrying out it and making decisions may encounter risk. The risk for the business sector is represented by several factors, which are described in the literature in different ways, most often we talk about the threat as a result of a negative impact on business activities. Risk (Šimák; 2016) is a qualitative and quantitative expression of danger, degree or intensity of danger. It is the probability of the occurrence of a negative phenomenon and its consequences, but the result of the risk can be both a negative and a very positive consequence.

In the decision-making process, each subject usually proceeds according to a certain scheme, which could also be expressed as a flow chart with steps that are connected to each other, follow each other and lead to final decisions. Very simply and briefly, we could describe the whole process as a sequence of steps (Míka; Hudáková; Šimák; 2015):

- goal setting with identification of problems
- determination of criteria, requirements for the goal
- consultation on solution variants with their subsequent analysis, identification of positives and negatives, impacts, risks, - selection of the optimal variant,
- implementation of the adopted decision, its monitoring and evaluation,
- feedback, evaluation, drawing conclusions from possible mistakes or negative impacts.

It is important in these processes whether all risks are known in advance, or they are not known. Known risks can be included in the decision-making process, quantified based on historical experience, frequency of occurrence, geographical and macroeconomic conditions. The inefficiency of risk management occurs immediately at the first an important step. It arises when management only monitors the internal environment, while forgetting to monitor the external environment, or vice versa, monitors the external environment and does not pay close attention to the internal environment. (Halan; 2021).

In recent years, there have been such changes on a global scale, which meant and mean risks for business that were previously unknown and unforeseen. Adapting to the requirements in a short period of time is an extremely difficult task. Many companies failed to eliminate or exclude risks and are on the verge of bankruptcy. In this phase, it is appropriate to combine risk management with crisis management.

1.2.2. Crisis Management

Crisis management as a term was not understood as an economic category from the beginning of its use, but later it began to be used in solving macroeconomic and microeconomic problems. At the microeconomic level, we can understand crisis management as a system of principles and measures of economic subjects, especially industrial enterprises, aimed at solving situations threatening prosperity and economic stability. (Míka; Hudáková; Šimák; 2015)

The activity of crisis management starts only after some risks have not been managed or at a time when the risks could not be foreseen in any way. In this context, crisis management is an effort aimed at solving the emerging crisis on a micro level, which is the result of internal, but especially external causes (e.g. international conflicts, pandemic). In this sense, crisis management on a micro level implements measures to influence the course of and cope with a societal crisis, an effort to restore the functioning of business processes and ensure or improve the financial stability of the company. (Černaj; 2022). In this case certain intervention measures of the state or local government are effective. The current crisis of price development in an intense inflationary spiral, energy crisis and financial stagnation can be considered as a crisis on a societal level, as well as at the micro-level of enterprises

Solving the crisis at the lowest levels of the economy is the way to ensure that the already existing risks do not grow into consequences at the level of national economies.

1.2.3. Enterprises with the threat of bankruptcy in the Slovak Republic

We can talk about a company in decline or bankruptcy if it shows a long-term inability to fulfil its payable liabilities, a long-term unfavourable payment situation persists in it, which gradually leads to the limitation of economic activity and subsequently leads to its demise. According to the Slovak legal system, the concept of bankruptcy is associated with restructuring, or settlement. Another option is liquidation. The inclusion of a company among bankrupt companies begins with a proposal for bankruptcy or liquidation of the company.

Neither in the Slovak Republic, nor currently in other countries, is the point in time of real bankruptcy the same as the point when the company is officially declared in bankruptcy. To find out the real difference, we carried out empirical analysis in the intention of determining the prediction of the risk of bankruptcy and subsequent measures to achieve stabilization. In any case, the issue of predicting the financial situation of a company will always be up to date due to its great importance not only for the company itself but also for all the entities that come into contact with it. (Georgescu; 2017)

1.3. New institutes in enterprises with the threat of bankruptcy

In connection with global and national crises, state intervention is needed to help solve the situation. As one of the steps taken by the state in the Slovak Republic, we can consider the adoption of Act No. 111/2022 Coll. about solving the impending bankruptcy. Its validity only started in May 2022, so it is not clear whether it will live up to expectations. Its role is to enable the reversal of a critical situation by taking steps that can reverse the unfavourable situation in the long term with professional help. If this process is unsuccessful, bankruptcy proceedings follow. Proceedings before bankruptcy concern primarily companies that are partners of the public sector (they are registered in the Register of public sector partners), as well as the procedure for non-public companies.

The solution before possible bankruptcy is to apply for preventive proceedings. In this procedure, an expert advisor for preventive procedures is appointed to the position of manager or co-manager, who has all the professional, educational and knowledge prerequisites for taking measures that stabilize the financial ability of the company to fulfil its liabilities, such as:

- development of a proposal, concept and final public or non-public plan,
- determination of preventive action, most often with the help of a consultant in preventive action, an expert who performs activities comparable to a risk manager,
- the time of temporary protection before the decision to permit preventive restructuring,
- progress of preventive restructuring.

In accordance with what crisis and risk management means in practice, the individual steps will focus on activities that will show a sequence expressed graphically:

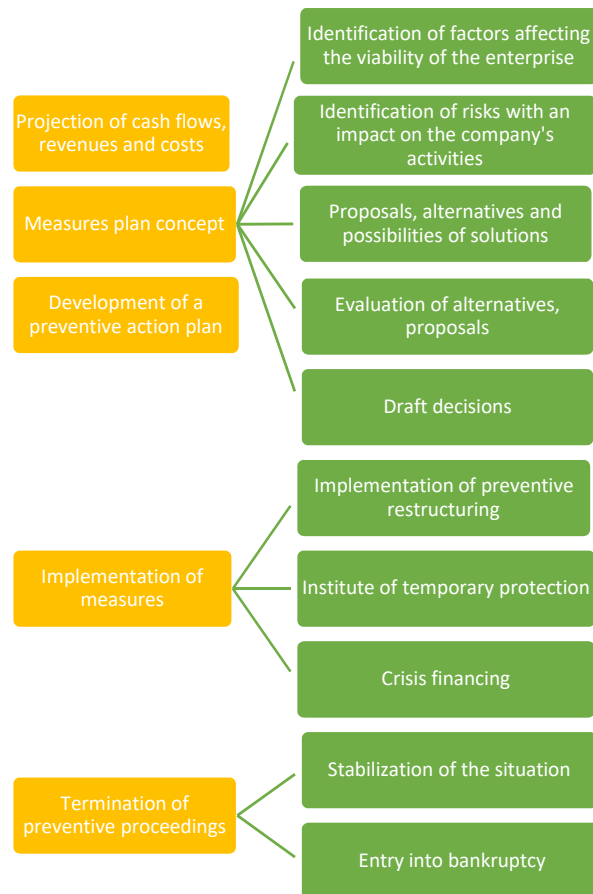


Figure 2. Preventive process in steps

Source: own processing

The result of the entire preventive procedure is the financial and production stabilization of the company, or its decline expressed by entry into correct bankruptcy.

2. Methods

For our research, we chose an empirical analysis carried out in two steps:

- analysis of the financial stability of companies in the Slovak Republic
- analysis focused on the development of selected item of financial statements of companies in distress.

In first step we tested in total a sample of 164 companies by prediction model Altman's Z-score. Many prediction models based on traditional prediction techniques have still been developed around the world. Given the different opinions of experts on various prediction methods, it can be argued that every method has its advantages and disadvantages, and also limitations of its use. (Karas; Srbová; 2019; Kováčová; Klieštík; Valášková; Durana; Juhászová; 2019)

The tested sample consisted of well-functioning enterprises as well as enterprises that went bankrupt. The sample were companies they are not trade shared on market stock. The reason was a relatively small number of companies whose shares are traded on the stock market. According to data from the Slovak Stock Exchange, there are 248 companies that are stable. A 5-factor model was used in the test. Modified models of Altman's Z-score were created for the needs of individual countries, which also included additional factors. In Slovak conditions, a factor with the assessment of liabilities and receivables after the due date is also often used. However, these data are not listed in the Register of Financial Statements of the Slovak Republic or in any other publicly available source.

The notation of the used formula lists 5 ratio indicators (Altman; 1993), each of which is multiplied by a coefficient:

$$Z = 1.2x_1 + 1.4x_2 + 3.3x_3 + 0.6x_4 + 1.0x_5$$

whereas

x_1 = net Working Capital to Total Assets ratio

x_2 = Retained Earnings of past periods to Total Assets ratio

x_3 = Earnings before Interest and Tax to Total Assets ratio, the so-called EBIT

x_4 = Market Value of Equity to Total Liabilities ratio

x_5 = Total Sales to Total Assets ratio.

When assessing individual indicators, it is necessary to start from the company's financial accounting. The calculated results are then sorted into the following statements about the risk of possible bankruptcy of the company:

$Z > 3.00$ = safe zone, business with a high probability of survival

$1.80 > Z > 2.99$ = grey zone – the risk of bankruptcy cannot be clearly determined

$1.79 > Z$ = distress zone, company in immediate danger of bankruptcy.

The test was calculated for the years 2018 - 2020 and was supposed to determine whether a company with a reported risk within 3 years actually entered bankruptcy.

The analysis also monitored companies that entered bankruptcy in the years 2020-2022 despite very positive results of their economic activity even in 2018.

In the next step of the analysis, we compared the development of selected items of the financial statements of companies that entered bankruptcy in 2020 - 2022 from the original sample of 164 companies. The number of companies in bankruptcy was 51. The comparison was based on the data listed in the Register of Financial Statements of the Slovak Republic. On the base of these indicators in the years before and during bankruptcy, we followed a development analogy that can point to working measures for the financial stabilization of companies in financial distress. We focused on:

- development of depreciation and property status. Long-term assets were calculated based on the gross balance (without influence of depreciations),
- the development of equity and the results of business operations before entering bankruptcy,
- the development of interest costs and the state of loans in companies in difficulty.

The intention was to find out whether the selected indicators have a decreasing or increasing tendency and to figure out the percentage of development. The first part of the analysis was only a starting point for monitoring the development of selected indicators of the financial statement, on the basis of which measures can be determined that lead to the improvement of the financial situation and its stabilization and could indicate the possibilities of risk management in preventive proceedings. At the same time, they must

be in accordance with the legislation, therefore it is necessary to state the legal status when interpreting the results of the analysis.

3. Results

In the Slovak Republic, according to the research we can conclude that in a selected sample of companies that officially were not in bankruptcy by the end of 2022 (Commercial Register of the SR), there is a high risk of their financial stability according to financial analysis indicators. Of the total tested group, it was found that up to 8.42% of the enterprises presented as "working" show high-risk results (the results are not in the safe zone, but in the distress zone) – the number was 8 enterprises from 97 working companies. This indicates that they are not financially stable and in a period of 1 - 2 years would enter bankruptcy, if they were unable to reverse their situation. Up to 22.7% of enterprises they entered bankruptcy had very positive results of their economic activity even in 2018 – in number there were 17 bankrupted companies from 75 well-functioning companies. Due to the influence of macroeconomic factors, changes occurred even in stable enterprises, which resulted in a significant decrease in the financial ability to fulfil their obligations. It is in these companies that risk management methods in combination with crisis management should be especially pronounced in order to reverse any negative developments and impending bankruptcy. A total of 67 companies from the examined sample entered bankruptcy.

We identified also an increased (less pronounced) risk in another 10.88% in the so-called grey zone of Altman Z-score in tested companies. These numbers are high, meaning that up to 20% of businesses need to deal with their critical situation.

Almost 23% of business subjects (22 companies) that did not enter bankruptcy experienced a distress zone of their ability to fulfil financial liabilities.

In the development of selected item of the financial statements we have identified following tendencies:

Table 2. Development of selected indicators of financial statements for 2018 - 2022 for companies in bankruptcy

Indicator	Long-term assets	Depreciation	Warehouse Stock	Equity	Loans	Interest Costs
Increase	4	2	3	2	35	12
Decrease	26	50	26	54	5	18
Without changes	35	15	36	11	27	37

Source: own processing

The procedure for averting the risk of real bankruptcy can be compared in individual companies. Individual reasons for the emergence of risks in connection with the macroeconomic climate require individual approaches to changes.

Unlike in the past, when crises arose gradually and their onset could be predicted, we are currently observing a trend when:

- crises arise after some unexpected event,
- they often threaten not only one company, but one or more industries or a geographical area,
- the crisis is often negatively influenced by opinion-forming media,
- as a result of the pressure to use scientific and technical achievements in practice, and the introduction of automation and digitization, there is a frequent susceptibility to the emergence of a crisis, especially in companies dependent on the introduction of these technologies,
- businesses are not able to deal with the situation in the most efficient way, and interventions are not fast enough, so the crisis takes on an extensive character. (Mihok; Kádárová; 2012)

The current situation can be described in many companies as a combination of internal and external reasons for their critical situation. To formulate conclusions according to the results of the analysis, it is advisable to know the past and ongoing causes of the problems of companies:

- the government's restrictive measures to prevent the spread of the contagious disease Covid-19,
- a state of war near the territory of the Slovak Republic with a significant impact on changes in the personnel policy of most employers,
- the energy crisis, which is currently taking the form of extreme price growth,
- crisis in the supply of some materials, problems in overall logistics due to the high dependence on

- the import of materials necessary for the full functionality of enterprises,
- an inflationary spiral with enormous price growth that exceeds the long-term average, documented by the following developments:

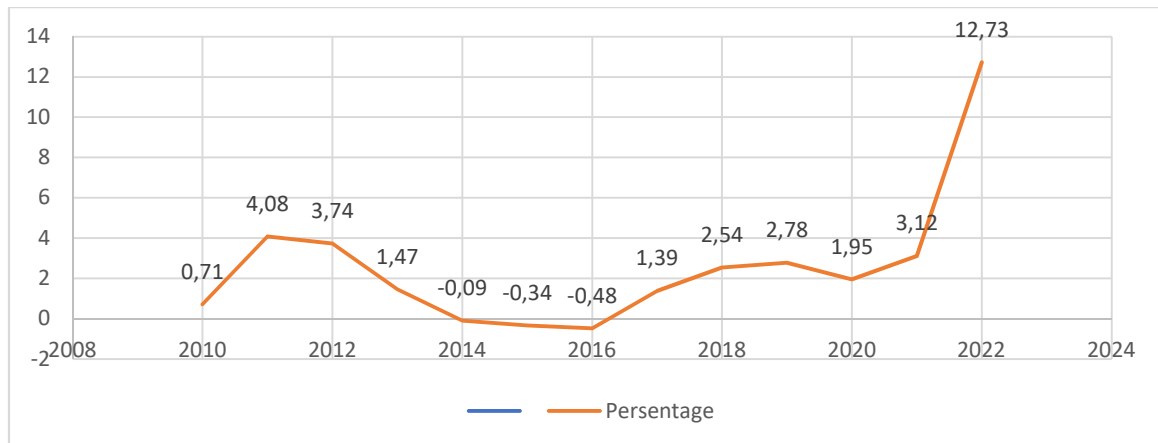


Figure 3. Development of inflation in the SR in 2010-2022 in %

Source: Statistical Office of the SR

When dealing with the critical destabilized state of the company, the advisor in preventive proceedings will certainly use the analogy for the previous restructuring and the analogy of the progress of companies in the period before bankruptcy.

In Slovakia, businesses in selected industries have fallen into crisis, and this was most pronounced in the tourism and gastronomy industries. If we abstract from strategic restructuring with strategic interventions, and the crisis did not arise as a cyclical state of the functioning of each company, we will focus on operational restructuring and measures in the company to eliminate problems.

Through an empirical analysis of the development of some balance sheet values and profit and loss statements in a selected sample of companies in the period before bankruptcy, we found that up to 62 % of some companies' procedures were analogous and aimed at achieving stabilization of the financial situation. It involved the implementation of the following measures in individual areas:

Area of production process and internal processes:

- reassessment of the use of long-term assets and sale of inefficiently used assets, which occurred in 38.8% of companies in crisis. This resulted in a decrease in gross total assets before depreciation,
- re-evaluation of the depreciation plan, the frequency of this procedure is 74% of enterprises in which there was a decrease in depreciation, which reflected a decrease in the achievement of sales (and therefore also the use of the depreciated property) and at the same time a time shift of costs to the following periods,
- changes in the logistics of permanent stocks in the warehouse, sale of long-term stocks and a change in the acceleration of stock turnover, which keeps the minimum financial value in the stocks, but in such a way that the flow of production is not interrupted. The sale of material stocks occurred in 39% of the sample,
- the search for the highest possible number of substitute material inputs, which is not a direct analogy according to the performed analysis, but becomes a necessity, as there are currently serious restrictions on the international market. The Slovak economy is highly dependent on international trade, for the import of material inputs as well as for the export of production.
- significant changes in cost intensity in all areas.

Area of customer-supplier relations:

- renegotiation of existing liabilities with an effort to reduce them so that creditors receive a reduced payment for their financial claims but higher than they would receive in the process of applying their claims in the bankruptcy process. This procedure is at the same time (only from 2021) according to the conclusions of the Court of Justice of the EU,
- conclusion of payment schedules with state institutions and creditors,

- prolongation of loans with temporary suspension of instalments. This trend was also reflected in the companies in the analysis, when the credit level did increase in 52.23% of the companies, almost 40% maintained the credit level without significant changes.

Area of personnel management:

- requests for changes in top management. The new law proposes that the role of the top manager should be taken over by an expert advisor. An analogy with the previous procedure does exist, but in the case of restructuring in bankruptcy proceedings, the trustee takes over the role, in the case of preventive proceedings this is not a condition.
- changes in the number and structure of employees, as overemployment and low efficiency of spent wage funds were often demonstrated. Due to the fast increasing spent (minimum) wage, it is very necessary to conduct a consistent personnel policy (the growth of the minimum wage for 2010-2023 reached an increase of 127%, from the start amount in 2010 EUR 307.70 to the current EUR 700.00).

Despite certain differences in the approach of the trustees in the restructuring, it is possible to assume that the professional advisor will take the positives of the restructuring process and expand them with activities that will mitigate risk factors, develop a consistent crisis business plan and will proceed to the management of the company's assets with the care of the owner.

4. Discussion

According to our analysis, the reliability of testing companies using the Altman Z-score method represented an error rate of 24% in the critical zone, 8% in the grey zone, and up to 35% in the safe zone. We compared our results with an analysis carried out in the Czech Republic (Kapounek; Hanousek; Bílý; 2022), which tested 64,842 companies using the Altman Z-score method. The error rate was 22.6% in the critical zone, 10.15% in the grey zone and 33.2% in the safe zone. Similar results are presented in the article (Valášková; Švábová; Ďurica; 2017), when the error rate for all zones is reported at an average level of 24.7% for 1-3 years before bankruptcy. The Altman Z-score reliability results of using the method are therefore very comparable.

We compared our results in the area of procedures in restructuring with the proposed procedures of other authors, e.g. in the publication *Managerial Aspects of Crisis Management* (Mihok; Kádárová; 2012) the procedures of the crisis manager are presented, which confirm the results of the analysis.

The authors divide the implemented measures into short-term and long-term. Very similar procedures are also described in internet articles (Seneši; 2014; 2016), which lead to the recovery of the company's financial stability.

Research on the effectiveness of preventive action has not yet been published, and our research did not even focus on the results of preventive action, so it is not possible to have a discussion on this topic.

Conclusion

The need to find a solution to the long-term inability of companies to pay their obligations both at the level of companies and at the level of the national economy is currently highly relevant. The phenomenon of secondary insolvency appeared massively in the countries of Eastern Europe in the period after the change of regime in the beginnings of private ownership and private business. In the following years, the development of the business environment stabilized. On the market, new businesses were and are being established and other businesses closed down. This trend did not have significant year-on-year deviations after the stabilization of the market.

However, the period of global crises means that even small businesses are getting into trouble at their own level. These are the consequences of state restrictive measures, price crises, international trade crises, a state of war or an energy crisis. All these factors represent risks that were not foreseeable and for which the private sector could not have been prepared, certainly not the area of small and medium-sized enterprises. This is the reason why many got into financial distress.

Since these are crises on a wide scale, state intervention is also necessary to manage them. It can be compensatory aid, subsidies or other forms of support for public and private enterprises. However, these measures are always only short-term and do not have a conceptual character.

In the Slovak Republic, a legislative regulation was created as a response to a social order to solve the financial distress of companies, the purpose of which is to try to reverse the negative development in companies with imminent bankruptcy. The legal framework provides assistance in the form of a period of temporary protection and preventive action, which should bring about the revitalization of businesses.

Companies are offered to move to a higher level of restructuring with the help of a professional advisor. It is not clear today whether the application of the law will bring the expected effect. In any case, it can be expected that the expert advisor will proceed with a certain analogy compared to the procedure that has been applied so far in restructuring and will extend this by the possibility of re-evaluating the contractual relations.

We tried to select the recommended measures according to the literature and to verify on the analysis whether these measures were used and with what frequency even in the previous procedure of bankruptcy trustees and companies on the verge of bankruptcy. It gives an image of the possibility to follow a proven path, but expanding it with new possibilities. However, other measures will also need to be put into practice. Currently, the temporary reduction of VAT for selected activities is not a conceptual and long-term stabilization measure, even though it can undoubtedly contribute to stabilization at least in the field of gastronomic enterprises.

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Assessing the Attributes of Social and Emotional Managerial Competence in Terms of Gender and Age of Entrepreneurs

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Abstract

Research background: Managers in any position within the corporate hierarchy must have relevant managerial competencies. With the help of key competencies, managers make an important contribution to corporate values and the achievement of desired performance. Emotional and social competence represents an important aspect of business and managerial work and is fundamental for a successful manager.

Purpose of the article: The paper focuses on the issue of social and emotional managerial competencies. The aim of the research was to find out the existence of statistically significant connections and differences between social and managerial competencies and the gender, age, and length of practice of entrepreneurs.

Methods: The data were obtained from 156 entrepreneurs, 108 of them women (69.2%) and 48 men (30.8%), aged from 20 to 65 years (mean age 37.62 years, standard deviation 10.745) with the length of experience ranged from 1 to 43 years (mean length of experience 13.49 years, standard deviation 10.854), and length of managerial experience ranged from 1 to 37 years (mean length of experience as managers 6.10 years, standard deviation 6.562). The research was conducted through a questionnaire focused on the perception and assessment of the social aspect (21 items) and emotional aspect (15 items) and using factor analysis.

Findings & Value added: The results confirmed statistically significant correlations in terms of age and length of practice of entrepreneurs. The findings did not confirm statistically significant connections in terms of gender differences. The paper contributed to the development of the research on a given issue.

Keywords: managerial competence, social competence, emotional competence, entrepreneur

JEL classification: D90, D91

1. Introduction

The subject of holistic management is a set of knowledge about the competence requirements of the subjects of management, i.e. individuals, groups of people, and the management of organisations. In addition to the professional and practical pillars, the social side of personality is increasingly emphasized. The maturity and moral qualities of an individual complete the complex picture of a person (Porvaznik, 2007). Levenson et al. (2006) examine the relationship between managerial competencies and performance at both the individual and organizational unit levels with the result that competencies are positively related to individual-level performance, and individual managerial performance may be enhanced by mentoring on a competency system. Stenberg (1997) presents a theory of managerial intelligence.

Competence is a reflection of a manager's ability to behave appropriately to the situation in accordance with the function they perform. Vodák and Kucharčíková (2011) argue that managerial competencies consist of skills and abilities that shape the manager's performance in such a way that it is perfect and all the required tasks are fulfilled. Managers must create an appropriate working environment in the team, and their role is to resolve conflicts in the workplace, evaluate subordinates, lead them, and delegate tasks.

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Kubeš et al. (2004) argue that the term key managerial competencies can be understood as those common to all managers in a company. In other words, managers in any position within the corporate hierarchy must have them. In this sense, the term key will be understood as the primary, main, most important, and necessary for the performance of managerial work. With the help of key competencies, managers make a significant contribution to corporate values and the achievement of desired performance.

Čambál et al. (2013) state that key managerial competencies can be considered as, for example, planning, strategic thinking, organizing, analysing processes, improving management, ensuring optimal number and structure of employees, developing employees, leading people, communicating effectively, conducting interviews, presenting, creating and leading teams, controlling and providing feedback, making decisions, and using creativity.

1.1 Social Managerial Competencies

According to Šramková (2022), social competence is a construct that carries the ability to combine thinking, emotions, and behaviour to cope effectively with the demands and rules of the social environment. Current research addresses, for example, the ability to form and maintain relationships, successful social problem-solving, effective communication in social relationships and various situations, decision-making skills, constructive conflict resolution, effective application of basic social skills (empathy), role they occupy in the work community. The manager's perception of their own person in the social-work group is reflected in their self-assertion, self-motivation, and self-knowledge.

Another issue are social skills of the manager in the context of social structures and relationships. In their study, Frankovský, Štefko & Baumgartner (2006) confirmed the existence of the internal structure of the described forms of behavior and defined two factors: socially negative solution and socially positive solution considering it an appropriate basis for constructing the diagnostic tool for measuring social intelligence. From the first time a manager joins a work team, they develop an attitude and a relationship with the social group to which they belong. Establishing relationships, integrating into the team, and adapting to the work environment is a critical moment that will influence the overall perception of the work environment. In defining the relevant and vital social skills in the context of the work climate, we consider the following skills to be the most important to develop: listening skills, mutual acceptance, appropriate conflict resolution, social sensitivity, value orientations, interpersonal relationships, elements of pro-social behaviour, communication for self-presentation and social relationships.

Social competence as a skill can hardly be developed by some traditional forms of education. So far, the most appropriate form of its development is social-psychological training.

1.2 Emotional managerial competencies

Emotions influence practically everything in a person's life; they determine whether we like something. They help in decision-making, they influence our choices, they contribute to who we spend time with and who we fall in love with. Emotions sometimes cause us to make a split-second decision, and then we carry the consequences for a lifetime. Emotions determine what leaders we choose and what leaders choose us. All of these reasons make emotional intelligence so invaluable (Bariso, 2019). Sorokova (2004) writes that emotional ability is a higher endowment.

The emotional competence of a manager includes skills such as sympathy, communication, humanity, courtesy, empathy, or self-confidence. Emotionally intelligent managers get along very well with other people, are good listeners, and are usually very popular in their team because they accept the people around them exactly as they are. They even know how to handle setbacks well, are persistent, and, last but not least, they can handle conflict situations sovereignly (Reichel, 2019). Soft skills such as the ability to work in a team, communication and integration skills, autonomy, responsibility, and motivation are required in professional life. Good leaders should apply a worker-centered management style, along with appropriate social know-how, and should be able to motivate employees to high performance. In reality, however, social competence is often lacking in managers. The consequence is a loss of activity and loyalty, as well as so-called "internal job resignation" by employees (Reichel, 2014).

Emotional intelligence is the ability to use emotions in ways that are beneficial to us (Bariso, 2019). It is useful to divide it into four competencies:

1. Self-awareness is the ability to recognize and understand our own emotions and how they affect us. This includes the ability to recognize one's own emotional goals, strengths, and weaknesses.

2. Self-management is the ability to manage emotions in a way that allows tasks to be accomplished and goals to be achieved. It includes self-control, which means that we can control or manage our own emotional reactions.

3. Social awareness is the ability to perceive the feelings of others correctly and to understand how these feelings influence behaviour. It is based on empathy, which enables one to perceive and understand things from the perspective of others.

4. Relationship management is the ability to get the most out of relationships with other people. This includes the art of influencing others through communication and behaviour, motivating them through explanation and persuasion.

All four abilities are interconnected and naturally complement each other. However, they are not always interdependent. We may naturally excel in some aspects and have weaknesses in others (Bariso, 2019). The research of this paper focused on the assessment of social and emotional managerial competence attributes. The aim of the research was to determine the existence of statistically significant relationships and differences in the studied phenomena in terms of gender and age of entrepreneurs.

2. Methods

156 entrepreneurs participated in the conducted research, 108 (69.2%) women and 48 (30.8%) men. The age of the interviewed entrepreneurs ranged from 20 to 65 years (mean age is 37.62 years, standard deviation is 10.745). Entrepreneurs reported their length of experience ranged from 1 to 43 years (mean length of experience is 13.49 years, standard deviation is 10.854), and length of managerial experience ranged from 1 to 37 years (mean length of experience as managers is 6.10 years, standard deviation is 6.562).

The research was conducted through a questionnaire focused on the perception and assessment of the social aspect (21 items). Through factor analysis, we extracted four factors:

- F1: Open communication: I create a friendly atmosphere before negotiations, meetings, and appointments. During meetings, negotiations, appointments, and interviews I act friendly. I talk openly about disagreements and inconsistencies. I consider the ability to listen actively to be important in my work as a manager. I consider non-verbal communication to be important.
- F2: Assertive communication: I consider my communication and behaviour to be assertive. I consider the development of assertive behaviour in manager communication to be important. Communication is important in a manager's job. I prefer formal communication in managerial work. When communicating with employees, I prefer interviewing. I arouse respect in subordinates.
- F3: Aggressive communication: I arouse fear in subordinates. I react angrily when subordinates fail to accomplish assigned tasks. I consider my communication and behaviour to be aggressive. I prefer manipulative practices when communicating with employees.
- F4: Positive communication: I consider my communication and behaviour to be active. I prefer formal communication in my managerial work. It is very important for me to set a direction to follow. I am goal-oriented and always finish things. If my team accomplishes all tasks, I feel excited. I can learn from past mistakes and avoid them.

The questionnaire was also used to measure the assessment of the emotional aspect (15 items) by entrepreneurs. Through factor analysis, we extracted four factors:

- F1: Empathy: I consider empathy, as the ability to empathize with the world of others, to be important in the work of a manager. I consider eye contact and facial expressions to be important when communicating with employees in order to reach a quicker agreement. I can understand what others are really thinking through their facial expressions, and body language. I can anticipate how others will react to my behaviour.
- F2: Emotional maturity: I can get rid of negative feelings that prevent me from doing my job. I can successfully establish new relationships with new people. I can cope easily with new situations. I can recognize the feelings and moods of others. I can look at things from the perspective of others.
- F3: Communication barriers: poor listening skills is the most common barrier to communication. Lack of concentration is the most common barrier to communication. Difference of opinion is the most common barrier occurring in communication.

- F4: Negative feelings: if my subordinates fail, I feel sad. If my subordinates fail, I feel guilty. Dislike is the most common barrier occurring in communication.

The individual items were assessed by the entrepreneurs on a six-point Likert response scale, with the individual scales being 0 - definitely no, 1 - no, 2 - rather no than yes, 3 - rather yes than no, 4 - yes, 5 - definitely yes. We established hypotheses, which were tested by correlation analysis (Pearson correlation coefficient) and difference analysis (t-test for two independent samples) in IBM SPSS Statistics 26 statistical software.

- H1a: We assume that there are statistically significant gender differences in the assessment of social managerial competence attributes.
- H1b: We assume that there are statistically significant gender differences in the assessment of emotional managerial competence attributes.
- H2a: We assume that there are statistically significant connections between the assessment of the attributes of social managerial competence and the age and length of practice.
- H2b: We assume that there are statistically significant connections between the assessment of the attributes of emotional managerial competence and the age and length of practice.

3. Results

Hypothesis H1a: "We assume that there are statistically significant differences in the assessment of social managerial competence attributes in terms of gender" was assessed by t-test for two independent samples. We present the results of the difference analysis in Table 1.

Table 1. Gender differences between n assessing the attributes of social managerial competence

	Gender	N	Average	Standard deviation	t	Significance
F1 Open communication	female	108	4.9000	0.87989	0.293	0.770
	male	48	4.8583	0.66391	0.326	0.745
F2 Assertive communication	female	108	4.6173	0.85266	-0.279	0.781
	male	48	4.6563	0.68365	-0.304	0.762
F3 Aggressive communication	female	108	2.1713	0.85219	-1.244	0.215
	male	48	2.3594	0.91371	-1.211	0.229
F4 Positive communication	female	108	4.8457	0.59711	1,561	0.121
	male	48	4.6806	0.63751	1,522	0.132

Source: own processing (2023)

The differential analysis shows that there are no statistically significant differences between the attributes of social managerial competence and the gender of entrepreneurs. It means that male entrepreneurs and female entrepreneurs use individual types of communication to the same extent. All entrepreneurs interviewed state that their communication is open, assertive, and positive. They assessed the aggressive form of communication on a scale of disagreement rather than disagreeing with the given form of communication.

We can state that Hypothesis H1a: "We assume that there are statistically significant differences in the evaluation of the attributes of social managerial competence in terms of gender" was not confirmed with the performed analysis.

The existence of statistically significant differences in the evaluation of the attributes of emotional managerial competence from the point of view of gender was again determined by means of t-tests for two independent samples in the statistical program IBM SPSS Statistics 26. We established hypothesis H1b: "We assume that there are statistically significant differences in the evaluation of the attributes of emotional managerial competence from the point of view of gender." The results of the differential analysis are processed in Table 2.

Table 2. Gender differences in the assessment of attributes of emotional managerial competence

	Gender	N	Average	Standard deviation	t	Significance
F1 Empathy	female	108	4.7130	0.79412	0.315	0.753
	male	48	4.6719	0.64238	0.342	0.733
F2 Emotional maturity	female	108	4.4593	0.63732	-0.749	0.455
	male	48	4.5458	0.72844	-0.711	0.479
F3 Barriers in communication	female	108	4.4846	0.99049	0.376	0.707
	male	48	4.4236	0.79222	0.409	0.683
F4 Negative feelings	female	108	3.8025	0.87783	-0.217	0.828
	male	48	3.8333	0.66311	-0.242	0.809

Source: own processing (2023)

Based on the difference analysis of the research, we found that there is no statistically significant difference even in the evaluation of the attributes of emotional managerial competence from the point of view of the gender of the addressed entrepreneurs. It means that female entrepreneurs use the same level of empathy in their managerial work as male entrepreneurs, they are emotionally mature, they are not affected by negative feelings and they perceive barriers in communication in the same way. All attributes were assessed by entrepreneurs on a scale “yes” to “definitely yes”.

We can state that Hypothesis H1b: "We assume that there are statistically significant differences in the evaluation of the attributes of emotional management competence from the point of view of gender" was not accepted in view of the performed analysis.

The aim of the research was also to find out the existence of statistically significant connections in the investigated phenomena in terms of the age and length of practice of entrepreneurs. To verify the goal, we established hypothesis H2a: "We assume that there are statistically significant connections between the evaluation of the attributes of social managerial competence, age and length of practice". The results of the correlation analysis (Pearson's correlation coefficient) are processed in Table 3.

Table 3. Connections between the assessment of the attributes of social managerial competence, age and length of practice

	F1 Open communication	F2 Assertive communication	F3 Aggressive communication	F4 Positive communication
Age	,191*	0.149	-0.111	0.117
	0.017	0.063	0.169	0.144
Length of practice	,203*	,189*	-0.089	0.065
	0.011	0.018	0.269	0.418
Length of managerial practice	,250**	,177*	-0.050	0.095
	0.002	0.045	0.535	0.236

Source: own processing (2023)

From the point of view of the correlation analyses presented in Table 3, we can conclude that there are statistically significant positive correlations between Open and Assertive Communication and the age and length of experience of entrepreneurs. It means that the older the entrepreneurs are, as well as the longer their experience, the more open and assertive the communication becomes. Older entrepreneurs create a friendly atmosphere, talk more openly about disagreements, consider active listening and the development of assertive behaviour in their work important, and prefer formal communication and respect.

We can state that hypothesis H2a: "We assume that there are statistically significant connections between assessing the attributes of social managerial competence and the age and length of practice" has been accepted.

In order to verify the goal, we also established hypothesis H2b: "We assume that there are statistically significant connections between assessing the attributes of emotional managerial competence and the age and length of practice". We described the results of the correlation analysis (Pearson's correlation coefficient) in Table 4.

Table 4. Relationships between assessing emotional managerial competence attributes and the age and length of practice

	F1 Empathy	F2 Emotional maturity	F3 Barriers in communication	F4 Negative feelings
Age	-0.001	0.014	0.074	-0.027
	0.992	0.860	0.358	0.736
Length of practice	0.043	0.033	0.092	-0.050
	0.593	0.681	0.253	0.536
The length of the managerial practice	0.074	,156*	0.023	-0.055
	0.357	0.049	0.773	0.496

Source: own processing (2023)

From the results of the correlation analysis, we found that there are statistically significant connections between the evaluation of the attributes of emotional managerial competence in terms of age and length of practice in one aspect, which is Emotional Maturity. From the above, it follows that the longer the length of management experience of the entrepreneurs addressed, the more they are able to get rid of negative feelings, successfully establish new relationships, cope with new situations, and look at things from the perspective of others.

We can state that hypothesis H2b: "We assume that there are statistically significant connections between the assessment of the attributes of emotional management competence and the age and length of practice" was accepted in one aspect.

4. Discussion

Emotional and social competence represents an important aspect of business and managerial work. Mental well-being, self-control, emotional maturity, sociability, as well as effective communication are fundamental qualities of a successful manager.

In research, Arruda (2017) observed an increasing need for emotional and social competence in managers and executives. He states that successful international companies place a high emphasis on emotional and social intelligence when hiring new employees. Both employees and managers who do not have sufficiently developed given competence are considered threatening to the operation and success of the organization. Groves (2005) talks about leadership model consisting of social and emotional skills.

Miško, Vagaš (2018) investigated gender differences in the emotional intelligence of managers using the TEIQue methodology - assessment of trait emotional intelligence. They recorded a higher score in the Self-Control factor for men and a lower score in the Emotionality factor. The authors claim that the use of emotions in managerial work supports the creation of a suitable work environment and better relationships in the workplace. Their research showed that female managers are better at expressing emotions than male managers. Petrides, Furnham (2006) point to gender differences in professional interests and coping with stress. The authors argue that more socially and emotionally intelligent managers cope with stress better.

Goleman, Boyatzis (2008) state that there are differences between men and women, especially in the sensitivity of women and greater social trust in men. The authors identified the mentioned differences in the managerial environment. In our research, we did not confirm statistically significant gender differences in the investigated phenomena. Male entrepreneurs, as well as female entrepreneurs, rated

themselves in the attributes of social and emotional competence on a positive agreement scale. Both men and women attach an equally positive meaning to social and emotional competencies in their managerial work.

Birknerová, Frankovský (2017) investigated the correlations between social intelligence and length of managerial practice. The authors claim that the length of practice of managers is related to the opportunity to gain many life experience. By analyzing the obtained data, they confirmed the existence of statistically significant connections between the length of practice of managers and the attributes of social intelligence. The authors noted negative correlations in relation to empathy, manipulation, social information processing, and social receptivity. Frankovský, Ištvaníková & Štefko (2009) obtained research results that contributed to a solution to the issues of trans-situational stability and selection of behaviour strategies based on the situation.

The research carried out by us shows that the assessment and understanding of the attributes of social managerial competence are related to the age as well as the length of practice of entrepreneurs. We found that there are statistically significant positive correlations between the Open and Assertive communication of entrepreneurs and the age and length of practice of entrepreneurs. Within the attributes of emotional competence, we noted one correlation between the length of practice and the Emotional Maturity aspect.

Several other authors pay attention to similar issues in their studies e.g. Connelly, Crook, Combs, Ketchen & Aguinis, H. (2018); Baron & Tang (2009); Greven, Kruse, Vos, Strese & Brettel (2023); Cortes, Jaimovich & Siu (2021); Distel, A.P., Sofka, W., de Faria, P. et al. (2022); van Knippenberg & Dwertmann (2022) or Campbell, Bilgili, Crossland & Ajay, B. (2023).

Conclusion

In the research, we paid attention to assessing the attributes of social and emotional competence, namely open, assertive, aggressive, and positive communication, empathy, emotional maturity, barriers in communication, and negative feelings. To conclude, they represent an important aspect of business work. The development of social and emotional competencies in managers is connected with the application of social psychology knowledge. One of the possibilities for using this knowledge is social-psychological training, which has expanded into the field of organizational psychology or its management. It teaches sensitive perceptions of persons and certain situations. Following this perception, it teaches the creation of a wide range of actions and reactions in critical and complex situations. For managers in the business environment, regardless of gender and age, lifelong development, education, and enhancement of their skills and knowledge in the field of soft skills are necessary.

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Connections between Organizational Culture and the Economy of the Organization

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Abstract

Research background: The problem of ethics, values, and economic indicators represents a complex challenge in understanding how organizations function within their structures, processes, culture, and economy.

Purpose of the article: The aim of this article is to explore the interconnectivity and impact of various factors that influence organizational culture within a company, including employee satisfaction.

Methods: Factor analysis will be used to identify key factors and interrelationships that affect organizational behavior and decision-making processes. By employing the DMAIC method (Define, Measure, Analyze, Improve, Control), this study systematically examines the external, internal, and deep environment, as proposed by Edgar Schein. These three dimensions play a crucial role in shaping organizational ethics, values, and economic indicators. The external environment encompasses factors such as market dynamics, legal and regulatory frameworks, relationships with suppliers, customers, and public influence, among others. The internal environment focuses on organizational structures, processes, and cultural norms that govern individual and collective behavior within the organization. The deep environment represents the fundamental assumptions, beliefs, and values that form the basis of organizational identification and guide its ethical decision-making.

Through factor analysis of these dimensions, this article aims to uncover patterns and relationships that shed light on how organizations address ethical challenges within their economic context.

Findings & Value added: The findings of this article have the potential to contribute to the development of frameworks and strategies for organizations to improve their ethical performance, align values with economic indicators, and promote a culture of responsible decision-making. Understanding and addressing the complex interaction of ethics, values, and economic indicators are crucial for organizations to operate sustainably and responsibly in today's rapidly changing and evolving environment.

Keywords: values, organizational culture, dimensions

JEL classification: A13, M14

1. Introduction

In the 1970s, the topic of Corporate Social Responsibility aroused a very difficult debate. This debate has generated a great deal of interest in the nature of what an organization fundamentally is and, furthermore, what role organizations should play in society. At its core, this debate reveals how important an organization is, and how relevant it is to modern society (or rather post-modern society).

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Nadler and Tushman define an organization as a complex social system (Nadler, Tushman, 1980). This definition is very general, and any social system that shows signs of complexity can be placed under this definition. On the other hand, one can imagine an organization that is made up of individuals, and such an organization no longer falls under this definition. Michael Armstrong defines an organization as (Armstrong, 2015. p. 161.): "An organization is an entity that exists to enable the achievement of the organization's goals through the collective efforts of the people who work in or for the organization."

Armstrong's definition has significantly narrowed the field of defined, but in doing so, it has specified the descriptiveness of the phenomenon we wish to know. The problem with this definition is the term subject, which needs to be changed to object. For the term subject is accompanied by attributes such as: will, thought and action. The subject that claims such a name must have all these attributes. It makes decisions on the basis of free will, is characterized by logical-critical thinking, and acts. Armstrong ascribes subjective attributes to the object; he assumes that the organization thinks and defines, wills and acts, acts and creates. Another problem of the organization that Michael Armstrong defines is the objectification of the organization. Although he speaks of the subject, he nevertheless defines the organization through what. However, such a conception of organization is wrong because in an organization, or rather behind every organization, there are real subjects - people who think, will and act. For this reason, we will define organization as based on Ghoshal and Barlett's definition (Ghoshal and Barlett, 1995): "(...) a portfolio of dynamic processes that overlay and control the vertical, authority-based processes of a hierarchical structure. "Horizontal tasks", cooperation and networking between organizational units are promoted, at the expense of "vertical tasks".

In this definition, the subject of the action, which is a human being, is concealed. However, this definition very accurately describes the organization as a social system that is hierarchically controlled, and in which dynamic processes lead to the achievement of set goals. If we use this definition, it will make it easier for us to examine the first question as a basic theory, i.e.: how do organizations function with respect to their structure, processes and culture? The question of the structure, processes and culture of an organization would not be fully answered if we did not include the economics of the organization and financial transactions. How do organizations work? This is a very complex question that needs to be looked at from a multidisciplinary perspective. How do organizations work with respect to their structure, processes, culture and economics?

1.1 Organizational Culture in the Stakeholder Theory

Since the late 1970s, the phenomenon of organization and the role of economics cannot be viewed in the same way. This debate has been influenced by Milton Friedman with his 'Fundamentally Subversive Doctrine' (Friedman, 1962). In this doctrine, Milton Friedman lays down the fundamental axiological value of freedom. Without this premise, no organization can do business. In his article *The Social Responsibility of Business is to Increase Its Profits*, Milton Friedman adds below:

"There is one and only one social responsibility of business--to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud." (Friedman, 1970. p. 7).

By the early 1970s, the phenomenon of organization ceased to be understood only in terms of shareholder theory. Shareholder theory was simple and elegant and can be expressed as follows: The only business of business is business. The problem with this theory is the absolute reduction of the problem of organization to the single purpose of profit. However, everyone knows that the activity of any organisation transcends the environment of the organisation itself and has often very positive, but often devastating, effects on its environment. Profit maximization is an elegant theory for the organization itself, or more accurately, for the owners of that organization. However, the consequences of profit maximization efforts are already felt in the environment of the organization itself, for example among the employees.

"Nobel prizewinning economist Milton Friedman famously wrote that the social responsibility of business is to increase its profits (Friedman, 1970, p. 126). He did not believe that company leaders had any social responsibility, be it for eliminating discrimination, avoiding pollution, or creating jobs." (Schroeder, 2002. p. 260).

The traditional view of the organization through shareholder theory was modified by Andrew Pettigrew. He noted the relationship between culture and organizational performance. In other

words, an organization is not defined by the profit generated by the products or services that the organization offers to its customers, but by something more. Andrew Pettigew called this "something" organizational culture. This is an area that has been neglected, underestimated, or even deliberately overlooked by economists and financial analysts. The model was developed by Edgar Schein divides the organization into three basic parts: external, internal, and deep environment (Schein, 2004, p. 95).

Another milestone that developed organizational culture was Charles Handy, who developed this aspect into a theory that is an intermediate between shareholder theory and stakeholder theory. This theory is another important milestone towards a holistic view of the functioning of organizations. However, it does not provide simple answers to how organizations work and what processes lead to the success and sustainable development of an organization (Collier, and Roberts, 2001).

The last theory that offers a holistic view of how organizations function is the stakeholder theory. Edward R. Freeman defines stakeholder theory as follows: "Stakeholder theory is a set of propositions that suggest that managers of firms have obligations to some group of stakeholders. Stakeholder theory is usually juxtaposed with stockholder theory: the view that managers have a fiduciary duty to act in the interests of stockholders. The stakeholder is an ironic twist of the stockholder to signal that firms may well have broader obligations than the traditional economic theory has assumed," (Freeman, 2005. p. 496).

Freeman presents stakeholder theory against the traditional shareholder theory, which was presented by Milton Friedman. While shareholder theory is based on the utilitarian behaviour of all market stakeholders, the question arises whether stakeholder theory is also based on the utilitarian behaviour of all stakeholders. In utilitarian conception, every subject who participates in economic activity is merely a means of this activity. In Kant's ethics, by contrast, the person is the end of all action. From the categorical imperative two important premises for economic life in society can be derived, namely: the responsibility of man for his actions and the dignity of man as an end in himself. Although no such studies are available, it can be assumed that stakeholder theory is based on this ethical foundation.

In the absence of studies, it is important to examine the ethical foundations on which stakeholder theory is based. Another important question is the effectiveness of this theory in practise. Is this theory not only useful for contemporary practise, but is it useful in the longer term? Is it sustainable? In order to answer this question, we need to ask: is this theory measurable? There are a number of questions that arise with stakeholder theory, including what needs to be measured and how does one measure what needs to be measured? These are still not fully explored areas, which Michael Armstrong calls 'the black box of management' (Armstrong, 2014., p.101.). The reason is quite simple. We know and can quantify economic inputs, we know and can quantify outputs in the form of products, services, or something else. But what processes take place between inputs and outputs? That is a much more complex question. The answer to this question will not be found in the analysis of a classical organizational structure, nor will it be found in the organizational environment. It is the overall structure of the processes that occur within organizations.

To understand these processes, a much broader view of the black box of management is needed. Freeman argues that an approach to stakeholder theory necessarily needs several areas of analysis (Freeman, 2005. p. 496): "Any business needs to be understood at three levels of analysis. The first concerns how the business as a whole fits into the larger environment, or the rational level. The second concerns how the business relates to its environment as a matter of standard operating procedures and routine management processes, or the process level. The third concerns how the business executes actual transactions or deals or contracts with those individuals who have a stake."

Freeman distinguishes the following areas that are important to analyze. Although Freeman calls these areas in different ways, it corresponds to Edgar Schein's classic division of organizational culture (see table 1.).

Table 1. Organizational culture

E. R Freeman Theory Stakeholders		E. Schein Organizational culture	
Rational Level	How the business as a whole fits into its larger environment, or the rational level.	External Environment	How management interacts with the external environment.
Process Level	How does the business relate to its environment as a matter of standard operating procedures and routine management processes, or the process level.	Internal Environment	How management interacted with the internal environment.
Transactional Level	How the business executes actual transactions, or deals or contracts with those individuals who have a stake.	Deap Environment	Location and output of the source.

Source: Based by autors's studys, 2023.

We can find at Rational Level, which can also be called the external environment of the organization: the financial community, activists, suppliers, government, political parties, consumer protection authority, trade associations and competitors. Process Level, which can also be called the internal environment of the organization, includes mainly: owners, managers, unions and employees. Transactional Level, which can be called deep environment, represents interaction between the management, owners and other entities outside the organization. These interactions concern the use and allocation of financial, material, human resources and intellectual capital of the organization, (Lance, Butts & Michels, 2006).

2. Methodology

In order to find and quantify the relationships between financial analysis indicators (quantitative) and the values of the organization (qualitative), it is first necessary to quantify these values. The method used in this paper measures the value attitudes of respondents (employees) using ordinal Likert scales. The attitudes were obtained in a specific organization using a standardized questionnaire survey in two years, namely 2020 and 2022. In both years, more than 1,700 respondents across all occupations participated in the survey, making it representative research. The company's key financial indicators were also collected in the same years.

Exploratory factor analysis (EFA) was used to find relationships between the attitudes (company values) found. Due to the small number of items in the scale (3 or 4), the polychoric correlation coefficient was used to measure the relationships and the principal axis method of PA was used to extract the factors, which, as stated, for example, by Soukup (2021), are just suitable for small ordinal scales (with less than 5 scales). In this way, 5 or 6 factors defining the values of the organization from the perspective of its employees were identified. These factors (latent variables) represent the internal states of the company according to Wittgenstein (2017). A model of the inter-internal relationships between these states is then determined by statistically significant correlation values. This model is represented graphically by a diagram. The quality of the model was verified by CFA confirmatory factor analysis using the weighted least squares method (WLSMW), (Rhemtulla et al., 2012).

A standard reliability measure, Cronbach's alpha (α), was used to measure the consistency of the emerging factors and the entire questionnaire. Scale inversion was performed for items that have an orientation opposite to that of the rest of the scale. According to Lance et al. (2006), the α value for a consistent factor or battery of questions (questionnaire) is at least 0.7. This value corresponds to approximately 50% validity of the data.

The quality of the model built with CFA is expressed using the RMSEA (root mean square error of approximation) and Tucker-Lewis index TLI (Xia and Yang, 2019). As stated by Williams and Holahan (1994), the boundary between a good and a bad model is expressed by an error of approximation (RMSEA value) of less than 0.1. The Tucker-Lewis TLI value should be at least 0.9 for a good model.

Gap analysis was used to quantify changes between corporate values between 2020 and 2022. This method, proposed by the American mathematician and economist Igor Ansoff and further developed by, for example, Allen Newell and Herbert A. Simon, is aimed at identifying a shortcoming, gap, or difference between the current state and the expected, desired, or other firm's state (Tontini and Picolo, 2010). In this paper, the gaps (differences) between the perception of firm values in 2020 and 2022 are

analyzed. The aim is to test the hypothesis that improving values of a firm's financial ratios in the post-covariance period (between 2020 and 2022) correlates with improving perceptions of firm values. The structured questionnaire and the developed factor model allow us to identify specifically which internal factors (latent variables) or items (manifest variables of the factor model) have improved and which have remained the same or worsened between 2020 and 2022.

Given the scales used for the items measuring each attitude, the value gaps thus created (between 2020 and 2022) can be measured on scales of -2 to +2 and -3 to +3, respectively. As reported by Rhetmulla et al. (2012), for ordinal scales defined in this way, comparative parametric tests based on the student distribution (Norman, 2010) can already be used to test for changes between the two periods. However, because the use of parametric tests for ordinal scales leads to an underestimation of the test criterion, in line with Tontini and Picolo (2010) and Martin (2008), a significant gap (attitude difference) will only be identified if the p-value (significance) of the test is less than 0.01.

The following discussion will use the DMAIC method Define, Measure, Analyse, Improve, and Control. A structured, systematic, and data-driven approach is used to improve, optimise, and stabilise product and process quality through teamwork. The phases are interconnected, and the output of the previous phase is always the input to the next phase.

3. Results

The results of the survey conducted in the company are shown in the following spider graph, which compares the results of the survey conducted in 2020 and 2022. Each value category was equally represented by five different questions, and the higher the value of the question, the smaller the satisfaction.

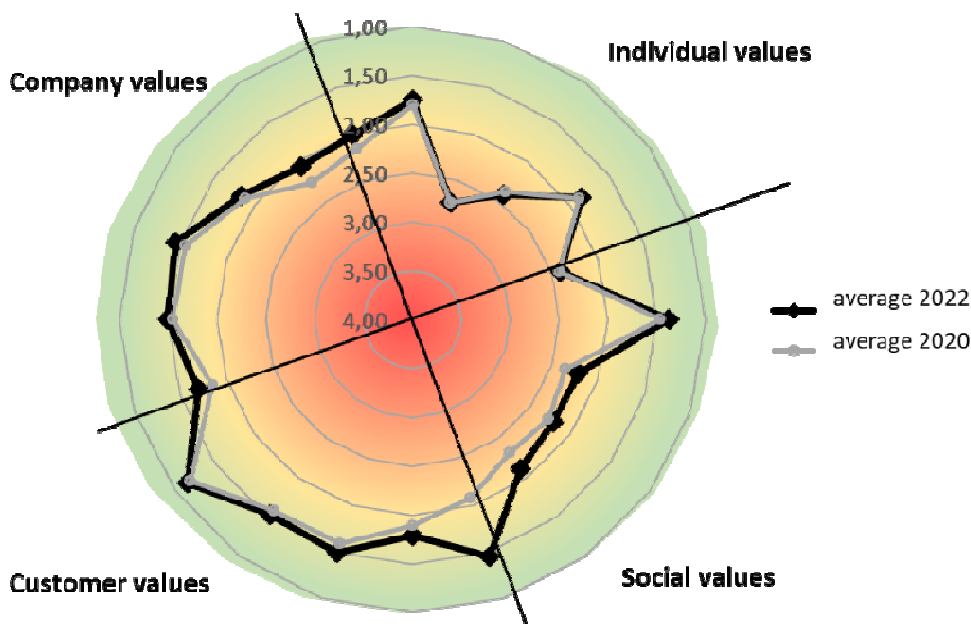


Figure 1. The results of the company surveys in 2020 and 2022
Source: own processing (2023)

The chart shows that there has been an improvement in the company's perception of values (most for social values, least for individual values, where we can find questions related to satisfaction with wage or opportunities for personal development, etc.).

As already mentioned, the aim was to find relationships between attitudes using factor analysis. The result of CFA is shown in Figure 2. The quality of this model is high, due to the values of RMSEA = 0.036 and TLI = 0.99. The model shows five significant factors that determine significant corporate values. On the left side of the figure are the internal factors, and on the right the external factors. A significant correlation between the factors Working Conditions and Company Reputation is also evident.

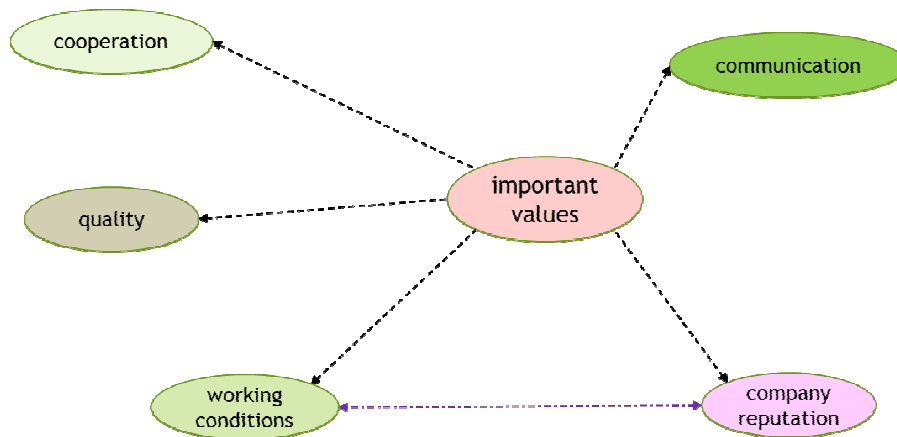


Figure 2. The resulting factor analysis model
Source: own processing (2023)

Table 2 shows the results of the gap analysis between the values of the above factors for the years 2020 and 2022. The gap values and the level of statistical significance are shown using a sign scheme (o = not significant, * = 0.05, ** = 0.01, *** = 0.001).

It is evident that there were positive shifts in perceived values for all factors. For internal factors, this shift is statistically insignificant (negligible), but for external factors it is statistically significant, even at the 0.01 level. The most significant change was observed for the Communication factor. This result is in accordance with the spider graph in Figure 1.

Table 2. Gap analysis results

Factors	gap	significance
Working Conditions	0,03	o
Quality	0,02	o
Cooperation	0,02	o
Communication	0,15	***
Company reputation	0,08	**

Source: own processing (2023)

In this period, a financial analysis of the company was also performed. Financial analysis focusses on evaluating and interpreting a company's financial information and provides business owners, managers, and investors with important information about the financial health, performance, and stability of a company. On the basis of these analyses, it is possible to better understand a company's current situation, identify its strengths and weaknesses, and make strategic decisions to maximise profits and reduce risks.

First, a comparison of financial performance was made during the 2016-2022 reporting period. Input data for the financial analysis were obtained from the company's annual reports. Figure 3 shows the company's financial results for the individual periods. These are earnings before interest and taxes (EBIT) and net income (EAT).

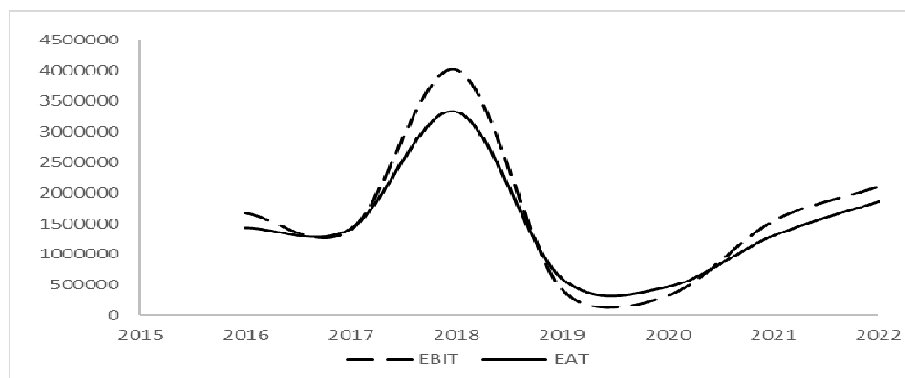


Figure 3. Trends in Economic Activity
Source: own processing (2023)

In 2016, performance was at its highest, followed by a decline in 2017. In the following years, the results fluctuated, with a significant increase in 2018 and the very next year in 2019. In 2020, there was a significant decrease, but in 2021 and 2022 the operating result increased again.

The return on assets is an indicator that reflects the profitability of a company's invested assets. From the above values, we can see that the return on assets ranged between 4.00% and 4.93% during the period under review. It is an important indicator that shows how efficiently the company uses its assets to make profits. Return on Equity is an indicator that expresses the profitability of the company's equity. From the above values, we can see that the return on equity ranged between 4.75% and 5.59% during the period under review. This ratio is important for investors and owners of the company because it shows how efficiently the company uses its equity capital to make profit. In both cases, it can be seen that the trend is downward.

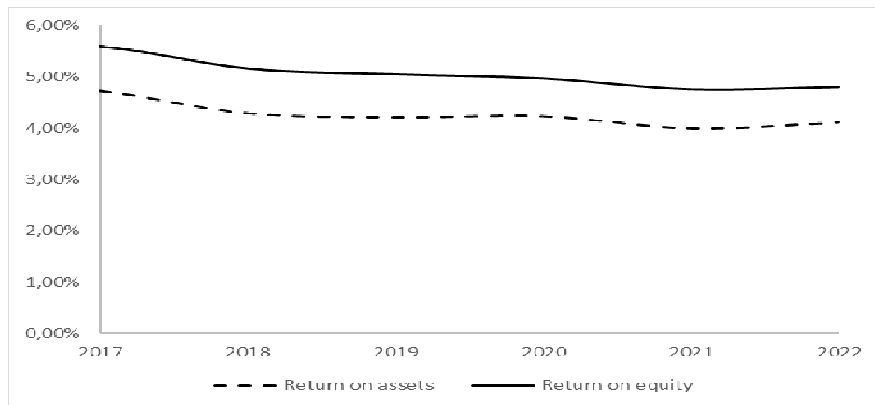


Figure 4. Trends in Economic Activity
Source: own processing (2023)

Generally speaking, it can be said that during the period when the research was conducted within a given organisation, financial indicators improved. This trend can also be observed in other indicators that are not presented here.

4. Discussion

One of the objectives of this paper is to show the interconnection, the dependence of the quality of organisational culture, and organisational performance. To mention the role of subjects, i.e., employees in the process of value creation, including value added, which is positively reflected in the financial indicators of the organization.

Human resource management, organisational culture, and organisational performance are interconnected vessels. Human resources (HR) and human resource management (HRM) at all levels co-create each organization's specific culture. This, influenced by synergistic effects, has an impact on HR and HRM. The two 'connected vessels' co-create the level of performance of the organization. The result then influences the culture and the way HR is managed.

The characteristics of HRM include an emphasis on improving motivation, quality, work life, work engagement, employee relations, performance, etc. The tasks of HRM include optimal use of employees' capabilities, team building, interpersonal relationships, personal and social development of employees, and perhaps also the reputation of the organisation. Specific HR policies include, among others, remuneration, training and development, career development, recruitment, and selection, etc.

From the above-mentioned rather general characteristics, terminology, it is clear that in their subsequent implementation, all those co-shape the culture of the company and consequently its performance is revealed. M.Armstrong (2007) devoted to the influence of HRM on the performance of the organization, authors who define this influence by the imperfect verb is assumed, or associate this influence with causal ambiguity, contingency factors, black box shrouded in mystery, etc. It is pertinent to ask what kinds of organizations are involved and what is the reason they view the influence of HRM on organizational performance in this way.

There are organizations where HR works intuitively, without much administration, and organizational performance is high. Instead, the culture of the organisation is the source of success. Then there are organizations with a developed HR background, much of it is standardized, evaluated, and yet the

organization's performance is poor. The source of failure can be found in top management and HR management at all levels. The third group is organisations where HR is a living organism, part of TOP management, but also of all other levels of management, which complement each other, including the requirement of necessary data, which can interpret and directly and indirectly influence the performance of the organization by its approach. These organizations are closest to a learning organization, consciously working with intellectual capital. Their success is based on quality: TOP management, HR management at all levels, and organizational culture.

That 'assumed' immeasurability and elusiveness of failure and success that can be hidden in, for example, the 'black box' is found in the experience described by (Baron, Armstrong, 2008, p.59) "too often we have been assured that collecting data and creating metrics about people's contribution to the business is too difficult, too costly or too time-consuming".

At the same time, these authors refer to the fact that companies have large amounts of data, "collecting data collected during the hiring process, during the training process, in the performance management process, based on compensation and the opinions of the people employed. In addition, they have access to data from customers, indicators, and financial operations. The problem is not so much in retrieving the data, but in interpreting the results of their analysis.

Today, at the beginning of the 21st century, the link between the culture and the economics of an organization is built physically and mentally by specific employees. In the Introduction the concepts of subject and object were mentioned. The subject is then the human being, the employee. This division is also correct from the point of view of intellectual capital, or human capital. Intellectual capital goes past the utilitarianism mentioned, incorporating Pettigrew's something extra, organizational culture, among other forms of awareness and working with tacit and then explicit knowledge.

Friedman's stakeholder theory is present in Intellectual Capital, as are two important premises for economic life in society derived from Kant's categorical imperative: the responsibility of man for his actions and the dignity of man as an end in himself. Human capital can then be attributed with the aforementioned attributes such as the will, the thought of action, etc. It is human capital, comprising knowledge, skills, abilities, experience, emotional, and action potential, etc., beyond the boundaries of the enterprise, which creates and links the culture and economy of the organization. It is the people, the employees, who, often for selfish reasons, want their work to be measured, analyzed. There is no doubt about the importance of data in this context.

In 2019, the company defined the requirement for the development of a new, different satisfaction questionnaire, the main objective of which was to analyse the understanding and perception of the level of the company's values by its employees. Both the commissioner and the executor of the survey wanted to learn about the employees' views in this area and also wanted to look for and find correlations between specific values, the quality of the organizational culture, the performance of the organization and the work of HR. Everything is summarized through the DMAIC method

In 2020, the survey was conducted using the Multidimensional Analyzis of Ethical Leadership Questionare method (MAELQ), where the selected values (agreed by the client) were divided into four groups of Social Values, Individual Values, Company Values, Consumer Values, which contained specific questions. The number of respondents was over 1700 and surveys were performed in the spring 2020 and 2022.

According to the GAP analysis, the goal was to find gaps that would show potential for improvement. Based on the results obtained, XYZ Company decided to mainly improve the way of leadership, the behaviour of those who hold the positions of direct supervisors, line managers. It expected that the result of the improvement (e.g.: their attitudes, opinions, approaches, responsibilities, ethical practises, etc.) would be reflected in the other areas investigated. The company also decided to raise awareness of the company's values.

In the period between the first and second surveys, there was targeted and long-term training of direct supervisors, line managers. The next step was to replace some of them. By reminding them of the company's values and anchoring them in different contexts of work and activity, the aim was not only to raise awareness but also to make visible the impact on the company's bottom line. According to the GAP analysis (follow-up survey), the areas under review in particular have seen an extremely significant change, which has had a positive impact on the bottom line between 2020 and 2022; see Figure 1,3.

Production and customer audits, interviews with direct supervisors and rank-and-file employees, analyses of HR work and other control organisms drive and control the set changes.

To the question why not only company should consider the link between HRM, the culture of the organization and its financial indicators as very important, one possible answer is offered by (Košturiak, et al., 2010, p. 207) who write what is most important "It is the flow of innovation and improvement that takes place in the background of the production system, it is the flow of people and the acquisition of experience and knowledge in the DNA of the process, it is culture, learning and leadership. Managers who are responsible for developing people and culture." Even if these are the very things that are not visible at first glance. Nevertheless, they are not visible, the results of the analyses indicate a positive change in employee satisfaction and the company's financial indicators.

"In one of them, they said to a group of American soldiers, we are doing an experiment with you, how many pits you dig in a day - dig the pits here, and in the evening a bulldozer will come and cover them up again nicely. They said to the second group: We have such a quiet grove - they even showed them some trees - but because there will be construction here, all these trees will be removed by the bulldozer. We only have 24 hours to replant them, and we need pits. Please dig. The result was that the latter dug two and a half times as many holes as the former, though otherwise they were the same boys." (Šantora, Zajič a Kohák, 2001, p.144).

Conclusion

The aim of this paper is to point out the connection between corporate culture and financial indicators of the company, or to point out that the improvement of corporate culture (represented by employee satisfaction) has a positive impact on the company's financial indicators. Through a questionnaire survey, the weaknesses of the corporate culture (or the different categories of values) were identified. Then, by factor analysis, the values that most affect employees were pointed out. And the measures taken in these areas led to an improvement in the perception of these values and therefore an increase in employee satisfaction. This has undoubtedly had a positive effect on the financial indicators monitored as well, despite the fact that the company was struggling with the reverberations of the covid crisis and dealing with the energy crisis, which affected the company in a very significant way. Although performance was affected by a number of other factors, especially macroeconomic ones, we are not afraid to accept the fact that the increase in employee satisfaction and therefore corporate culture had a significant positive impact on the company's financial indicators.

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Burnout Syndrome: Incidence of Burnout among Employees of Family Businesses

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Abstract

Research background: Burnout syndrome has become a critical issue in various work environments. Employee burnout is not an individual's problem, but an employer's responsibility. Our research focused on whether some groups of employees are more susceptible to burnout than others. Therefore, burnout syndrome was examined among 115 employees of the family businesses. Employee characteristics were as follows: 56 % male; mean age group 41-60 years (43 %); mean length of practice 5-15 years (43 %); and 23 % managers.

Purpose of the article: The paper aims to present how the incidence of burnout syndrome varies depending on the length of the practice of the respondents and their age.

Methods: Data were collected using the questionnaire to determine levels of burnout in March and April 2023. The internal consistency was checked by Cronbach's alpha. The descriptive statistics and the one-way ANOVA were used to examine the burnout of employees and related factors.

Findings & Value added: The factor, which is significantly associated with burnout, is the age of the employees. In the sample, the higher burnout levels were predominant among younger employees in age groups under 40's. Further experiments did not confirm the hypothesis that the length of practice plays a significant role in the burnout level. The insights gained from this study can guide HR teams in implementing targeted strategies to enhance employee well-being and overall organizational health.

Keywords: burnout syndrome, family business, age, well-being, HR strategy

JEL classification: I12, I30, M54, M59

1. Introduction

Employees are the most important resource for the successful functioning of any organization, not excluding public organizations, as they play a key role in achieving performance and maintaining the stability of any organization (Horváthová et al., 2023). Burnout is a syndrome described as a state of exhaustion that may occur in a very wide range of occupational contexts (Maslach, 2016) in which employees become cynical concerning their work and experience decreased professional efficacy (Schaufeli et al., 2017). (Hillert et al., 2020) describes burnout as a state of psychophysical exhaustion, deterioration of relations, and a sense of professional inefficacy and disillusion. Burnout is a psychological response to work stress that is characterized by emotional exhaustion, depersonalization, and reduced feelings of personal accomplishment (Vnukova Sebalo et al., 2023). Burnout is linked to impairments in cognitive functioning and impacts the mental and physical health of employees (Čiganská & Birknerová, 2022). Burnout has a serious socio-economic impact in terms of decreased level of performance, high resignation rate, and premature retirement (Schaufeli et al. 2017). Seluch et al. (2021) have provided workplace factors that contribute to burnout: workload, control, reward, community, fairness, and values. Personality is a major contributor to the ways individuals react to the environment and empirical evidence suggests that certain aspects of personality may affect average stress levels (Čiganská & Birknerová, 2022) and stress-related disorders such as burnout (Luo et al., 2023). A core characteristic and predictor of burnout is high neuroticism (Hillert et al., 2020). The link

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between anxiety and burnout, particularly the dimension of emotional exhaustion, has also been empirically proven by Asi et al. (2021).

Staff burnout is increasingly viewed as a concern in the mental health field (Apostol & Voroneanu, 2021). Burnout is associated with an increased risk of personal problems and also problems in the workplace. A lack of solutions can be caused health problems for many years. That is why many organizations today are also dealing with burnout syndrome to prevent its consequences. Burnout syndrome can apply to any occupation that requires a strong personal commitment to work and where there is an imbalance between demands and opportunities to recover resources (Grebski & Mazur, 2022). Burnout can also be considered a serious career crisis (Schaufeli et al., 2017). Maslach defines burnout as a psychological syndrome that arises as a long-term response to chronic interpersonal stressors at work. In response, it produces overwhelming exhaustion, feelings of cynicism and detachment from work, and a sense of ineffectiveness and lack of accomplishment (Maslach & Leiter, 2016). Burnout particularly affects individuals who entered their working lives with high hopes, ideals, and ego commitment and subsequently experience physical, emotional, and mental exhaustion (Hillert et al., 2020). As noted by Schonfeld & Bianchi (2022) the problem of defining burnout concerns its overlapping effect with other syndromes and disorders, such as depression and anxiety. They have revealed that depression is an important determinant of exhaustion. Cynicism and relationship deterioration have consistently been explained only by organizational context. Fastje et al. (2022) suggest that performance-driven climates are positively related to burnout.

These results highlight the dangers of performance-driven work climates on employee well-being. Untreated burnout leads to a decrease in worker productivity and eventually depression and other psychological problems (Grebski & Mazur, 2022). Managers play an important role in employees' exposure to psychosocial constraints (low decision attitude, low social support, high job demands, or low rewards). Parent-Lamarche & Biron (2022) indicated that the psychosocial safety climate was associated with burnout and was also indirectly associated with lower managerial quality.

As can be seen from the above, burnout syndrome can play an important role in addressing the issue of work wellbeing and performance in all types of companies, family businesses not excluding. According to the authors, best of their knowledge, such research has not yet been conducted in Czech family businesses, so they decided to fill this research gap. Thus, this paper aims to present how the incidence of burnout syndrome varies depending on the age and the length of their practice for Czech family business employees.

2. Methods

The research focused on employee burnout syndrome in the Czech private sector family businesses was conducted in March 2023. The selection was performed as random sampling from a database^{****}. In total 700 organizations across the economic sector and size were contacted. The sample consisted of 115 respondents the attitude questions, and a Likert scale was used. All survey questions utilized a 7-point Likert scale (1-7). Descriptive statistics were used for the following variables: burnout level, gender, age, length of experience, and job position.

The structure of the research is composed of two themed sections. The first section of the research will examine the effect of length of practice on burnout level. The second section deals with the effect of age on the burnout level. To meet the objective of the paper, research questions (Q1-Q2) and hypotheses (H1-H2) were formulated based on the previously mentioned findings. The evaluation of the conducted survey allowed answering them. Statistical significance was analyzed using analysis of variance (one-way ANOVA) as appropriate. There was also used a correlation analysis to examine relationships between the variables stated in the hypotheses. Pearson's correlation coefficient shows the negative relationship between age and level of burnout. A simple regression analysis was performed to show the direct linear relationship between burnout and gender. There was used A box plot in descriptive statistics for graphically demonstrating numerical data through their quartiles. The internal consistency of a set of survey questions was measured by Cronbach's alpha. All analyses were carried out using Microsoft Excel.

The authors wanted to survey employees' level of burnout syndrome which is why the authors, so they used an abbreviated Maslach Syndrome Inventory questionnaire (Maslach, 2016) when they focused on two negatively tuned factors of this questionnaire - emotional exhaustion and depersonalization. They

The database of the organizations was obtained from <https://www.databazefiremcr.cz/>.

used the following fourteen survey questions: Item 1: Work drains me emotionally. Item 2: At the end of the workday, I feel exhausted. Item 3: When I wake up in the morning and think about work problems, I feel tired. Item 4: I feel like I sometimes treat co-workers or clients like they're impersonal. Item 5: Working with people all day is exhausting for me. Item 6: I feel "burned out", and exhausted from my job. Item 7: Since practicing my profession, I have become less sensitive to people. Item 8: I am afraid that the performance of my work is making me emotionally hard. Item 9: My work brings me feelings of futility and dissatisfaction. Item 10: I feel like I'm doing my tasks so hard that it's draining me. Item 11: Today, I don't care what happens to my colleagues or clients. Item 12: Working with people brings a lot of stress to me. Item 13: I feel like I'm at the end of my strength. Item 14: I feel that co-workers or clients attribute some of their problems to me. These questions all use a 7-point Likert scale ranging from 1 Not at all to 7 Very strongly.

3. Results

Cronbach's alpha coefficient was used to measure the internal consistency, or reliability, of a set of survey items. This statistic is used to help determine whether a collection of items consistently measures the same characteristic. Cronbach's alpha quantifies the level of agreement on a standardized 0 to 1 scale. Higher values indicate higher agreement between items. The statistical output is in Table 1.

Table 1. Cronbach's α calculation

Cronbach's α calculation			
k	14	Sum variance item	37.9
k/(k-1)	1.077	Cronbach's α	0.905
Variance total	237	Internal consistency	Excellent

Source: authors (2023)

The overall Cronbach's alpha is .905. It means the internal consistency of a set of survey items is excellent.

The normed score for burnout was defined as no burnout: ≤ 1.75 , low burnout: ranging from 1.76 to 3.5, average burnout: ranging from 3.51 to 5.25, and high level of burnout: ≥ 5.25 .

Table 2. illustrates some of the main characteristics of the descriptive statistics of the sample (N = 115). The mean burnout score of the analyzed population was in the middle of a low level of burnout (2.89). This value starts to be a signal for a threat of burnout. Further analysis of burnout syndrome showed that the median is 2.71 and the value that occurs most frequently in the given statistical set is the modus (1.93). The standard deviation is relatively small (1.10) which means that the elements of the statistical population are mostly similar. The variance as a measure of how far a set of numbers is spread out from their average value is 1.22 for the burnout syndrome.

Table 2. Descriptive statistics of burnout level of the sample

Burnout	
Mean	2,888199
Error avg	0,102909
Median	2,714286
Modus	1,928571
SD	1,103575
Sample variance	1,217878
Sharpness	-0,67836
Skewness	0,419865
Minimum	1,214286
Maximum	5,714286
Sum	332,1429
Number	115

Source: authors (2023)

As the first step, the authors focused on answering research question Q1.

Research question Q1: Does the length of practice affect the degree of burnout?

In the sample of respondents, the experience of 5 to 15 years was most often mentioned

(49 respondents, 43 %), followed by the experience of up to 5 years (31 respondents, 27 %), the experience of 16 to 30 years was almost identical (29 respondents, 25 %) and 5 % of respondents reported more than 30 years of experience. The following hypotheses were defined for answering research question Q1.

H1₀: The length of practice does not affect the level of burnout.

H1₁: The length of practice significantly affects the level of burnout.

In the next step, the hypotheses (H1₀, H1₁) were tested by one-way ANOVA (see Table 3.).

Table 3. Anova: one way: testing the effect of length of practice on burnout

Factor						
Groups	Count	Sum	Mean	Variance		
Till 5 years	31	85.42857	2.75576	1.210127		
5 to 15 years	49	144.0714	2.940233	1.384215		
16 to 30 years	29	87.71429	3.024631	1.168103		
Over 30 years	6	14.92857	2.488095	0.241667		
ANOVA						
Source of variation	SS	df	MS	F	P-value	F crit
Between groups	2.176702	3	0.725567	0.589325	0.62326	2.686384
Within groups	136.6614	111	1.231183			
Total	138.8381	114				

Source: authors (2023)

The F test statistic is.5893 and the corresponding p-value is.6233. Since this p-value is not less than.05, we do not have sufficient evidence to say that the length of practice leads to different mean burnout levels. A one-way ANOVA revealed that the length of practice has no significant impact on burnout in the sample because $F (0.5893) < F \text{ crit } (2.6864)$. The burnout levels are not statistically significantly different. Therefore, the null hypothesis is confirmed and in summary, the above results confirm that the length of practice does not significantly affect burnout.

In the next part of the analysis, the authors focused on the effect of age on the level of burnout syndrome.

Research question Q2: Does the age of employees affect their burnout level?

A closer look at the age of the respondents, it can be seen that the most numerous groups of employees are in the age group of 41 to 60 years (49 respondents, 43 %), employees under 30 years represent 22 % (25 respondents), employees from 31 to 40 years represent 23 % (26 respondents) and employees over 60 are 13 % (15 respondents). The correlation analysis between burnout and the age of respondents (see Table 4.) shows a weak negative correlation (-0.25). Contrary to expectations in the given data sample, employees with older age have lower burnout levels.

Table 4. Correlation between the age of respondents and their burnout level

	Age	Burnout
Age	1	
Burnout	-0,24978	1

Source: authors (2023)

The following hypotheses were defined for answering research question Q2.

H2₀: Age has no impact on burnout syndrome.

H2₁: Age has an impact on burnout syndrome.

The hypotheses (H2₀, H2₁) were tested by one-way ANOVA (see Table 5.).

Table 5. Anova: one-way: testing the effect of age on burnout

Factor						
Groups	Count	Sum	Mean	Variance		
Under 30 years	25	79	3.16	1.152755		
31 to 40 years	26	84.35714	3.244505	1.428642		
41 to 60 years	49	133.2857	2.720117	1.139421		
Over 60 years	15	35.5	2.366667	0.725121		
ANOVA						
Source of variation	SS	df	MS	F	P-value	F crit
Between groups	10.61198	3	3.537326	3.062117	0.031136	2.686384
Within groups	128.2261	111	1.15519			
Total	138.8381	114				

Source: authors (2023)

A one-way ANOVA revealed that age has a significant impact on burnout syndrome in the sample because $F(3.0621) > F_{crit}(2.6864)$. The p-value is 0.0311. Since this p-value is less than 0.05, we have sufficient evidence to say that age leads to different mean burnout levels. This means that there is a statistically significant difference in burnout levels between at least two age groups. This is statistically proven at the chosen 5 % level of significance. Overall, these results indicate that burnout syndrome is predominant among younger employees in this sample of respondents.

Focusing on gender and position in the organization, the statistics look like this: The sample of respondents is considerably unbalanced in the proportion of superiors and subordinates. The sample consisted of 27 managers (23 %) and 88 subordinate staff members (77 %). To focus on gender, the sample of respondents was almost gender balanced, 50 (44 %) of respondents were women and 64 (56 %) from them were men.

4. Discussion

An initial objective of the project was to identify employees' levels of burnout syndrome in private family business companies in the Czech Republic. Concerning the first task, it was found that the mean level of burnout syndrome was low. This low mean level of burnout may be explained by an acceptable workload, reasonable control, sufficient rewards, a pleasant and friendly community, fairness, and higher values of the organization. An alternative explanation for this result is that it is due to an enjoyable working environment, good working conditions, respectable interpersonal relations at the workplace, and interesting, inspiring, and attractive job content, but also by the fact that employees are placed in the right jobs and do the meaningful work they want. The mean burnout level is currently low but there is still a potential threat that it may worsen. A satisfied employee can quickly become dissatisfied with the threat of burnout. Unmonitored and untreated burnout can cause a decrease in employee performance and cause several psychological personal and work issues. The psychosocial safety climate and management quality are key factors for employee well-being. There is no time comparison in monitoring employees' burnout levels. So it is not known whether the burnout level is increasing or decreasing in this group of employees and what the trend is. This may be interesting to observe in the future to have a more complete picture.

Research questions were focused on the impact of age and the impact of length of practice on the burnout level. A one-way ANOVA revealed that the length of practice does not affect the level of burnout. Groups of employees divided according to their length of practice have very similar mean values of burnout level. The situation is different concerning the age of employees. Based on the one-way ANOVA, there was found sufficient evidence to say that the mean burnout level is statistically significantly different between analyzed age groups of employees. A weak negative correlation was found between age and burnout. What is surprising is that the statistic showed that a higher level of burnout was predominant in younger age groups (especially younger employees under forty). Several factors could explain this observation. Firstly, insufficient resistance to stress and workload, less experience among new, young employees, or insufficient training. Secondly, younger employees may feel that their knowledge, skills, abilities, and potential are not being fully used, or on the other hand, they can feel overloaded. Another possible reason can be that they are not easily in the right places. They may feel that they don't have enough opportunities to show what they can do. Or they may feel more in control and may wish to be

more autonomous. They may feel that they do not have opportunities for further development and growth and can be frustrated by this. On the other hand, a higher level of burnout may be related to lower abilities to assert oneself in a team or establish positive relationships in the community. Another possible explanation for this is that they cannot sufficiently separate work life from private life and then constantly solve work problems in private life as well. And this fact can cause more stress for them. The concrete reasons for higher burnout levels among the youngest group of employees still need to be identified in further research. This outcome is contrary to that of Desmette & Villoti (2022), and Hybels et al. (2022) who found the probability of burnout syndrome is higher among older individuals. Hybels et al. (2022) justify the burnout syndrome of older employees by the inability to meet the physical demands of the job (due to older age), high workload, or lack of support in the organization. According to Parker & Tavella (2022), the burnout of older workers can be characterized by high workloads with a lack of challenges at work and fewer growth opportunities. There are also opposing views, Sak and Kolesárová (2012) state that how a person can manage stress and resist burnout does not depend on age. The prominent Czech psychiatrist Honzák states that older employees themselves attribute their higher resistance to burnout syndrome to the "lessons" they have learned through experience (Honzák, 2022). Burnout is a professional's occupational disease that must be recognized early and treated (Parker & Tavella (2022). Burnout is the result of chronic stress in the workplace which has not been dealt with successfully (Vnukova Sebalo et al., 2023).

Conclusion

The purpose of the current study was to determine employees' burnout levels in private family business companies and explore the influence of age and length of practice on burnout.

This study has identified a low mean burnout level. The research has also shown that the length of practice does not have any effect on the burnout level. The next major finding was that age statistically significantly affects the burnout level, especially in younger groups.

Before this study, it was difficult to predict employees' burnout levels in the analyzed company. The contribution of this study has been to determine employees' burnout levels and confirm significant factors influencing burnout. The results gained from this study may be of assistance to the management of the analyzed company to focus on improving the current situation and avoid a potential threat to worsen. It is clear that burnout is a significant problem in mental health, both in its prevalence and its association with a wide range of other problems for individual staff persons, for the organizations that employ them, and likely for the people whom they serve.

A limitation of this study is the small sample size. The study is limited by the lack of information on employees' subjective reasons for their feelings. Since the study was limited to examining burnout in one period, it was not possible to analyze the trend over time. Although the paper is based on a small sample of participants, the findings suggest there is an association between age and burnout and between gender and burnout.

From the results of the research, it is possible to determine the occurrence of burnout syndrome in other categories as well, such as gender and position in the organization. Also, there can be complemented comparison with other research in this area. The research should be repeated to analyze a trend of burnout over time. More broadly, research is also needed to specify employees' subjective reasons for their feelings to avoid further possible worsening. It would be contributing to the next research to investigate if employees with their characteristics and traits are in the right jobs concerning their burnout. A key policy priority should therefore be to plan for the long-term care of employees in the area of burnout and satisfaction.

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Resources

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Employer Competencies Requirements for University-Educated Students: Surveys from 2020 to 2022

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Abstract

Research background: In modern human resource management, there is a growing emphasis on competencies that encompass recruitment, education, and career development. The traditional focus on knowledge, skills, and experience has evolved into a comprehensive approach that evaluates applicants based on their competencies, including the abilities and skills required for specific tasks. The Career Centre at VSB Technical University of Ostrava conducts annual surveys to explore the expectations and possibilities within the university-graduates-employer relationship.

Purpose of the article: This article aims to analyse surveys conducted between 2020 and 2022 to identify emerging trends in employer requirements for graduates.

Methods: The surveys targeted significant employers in the Moravian-Silesian region that employ university-educated professionals. Data collection involved focus groups and semi-structured interviews with HR representatives. The findings were then evaluated by a psychologist.

Findings & Value added: The surveys revealed that employers increasingly prioritise adaptability, rapid onboarding, proactivity in learning, and teamwork. While soft skills are particularly valued in nontechnical fields, graduates in technical disciplines also require them alongside their technical knowledge. Given the rapid advances in science and technology, the ability and willingness to learn new things are deemed crucial competencies. The findings provide a valuable foundation for graduates to focus on developing the competencies desired by employers, enabling their personal growth and employability. Additionally, the results serve as feedback to the university, prompting adjustments in study programmes and additional education to align with the evolving employers' expectations.

Keywords: competencies, graduates, employer requirements

JEL classification: A23, I23, J24, M50

1. Introduction

In the current approach to human resource management, competencies are a key factor on which basic HR processes rely. Competencies can be used to detail job descriptions, establish hiring criteria, recruit candidates, conduct performance evaluations, identify training needs, plan careers, and succession planning (Ali et al., 2021). The concept of competence in the context of HR activities has appeared in the literature since the 1970s, with the meaning of capability. In the past, it was believed that having the right qualifications was sufficient for performing a job. However, over time, this concept was replaced by the broader concept of competence (Karwehl, 2021). In general, competencies can be considered as a set of knowledge, skills, and personal attributes that influence the nature of work. They can be measured against generally accepted standards and can be improved through training and development. In practice, it can be observed that although managers have a clear idea of the competencies an employee should possess for a given position, they are not always able to determine the importance and required level of these competencies (Horváthová et al., 2019).

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Technological development places high demands on companies, requiring them to adapt not only their production processes but also their human resources, which serve as the driving force and competitive advantage of every company, even in the current digital age. The implementation of competence-based policies, programs, and strategies by organizations would facilitate the judicious and optimum utilization of their resources, thereby paving the way for sustainable competitive advantage (Ganie, 2019). Acquiring new technology or new equipment is usually a matter of financial investment, but acquiring new employees with the right competencies or retraining existing employees for new conditions is a highly challenging task with many uncertain variables that can negatively affect the entire process.

For this reason, there is a growing trend not only to emphasize hard skills, i.e., the professional competences acquired through education or work experience but also to give much more emphasis to soft skills, i.e., the individual competences of each person that define their abilities in social and work interactions, as well as their ability to adapt to and understand new conditions.

The aim of this paper is to analyse surveys conducted between 2020 and 2022 that focused on the competences employers require graduates to possess and to identify trends in employers' expectations of students. While schools can teach students the necessary technical competencies, graduates must also have the soft skills to be employable in the labour market. Ideally, a perfect combination of technical and soft competencies is required for a given position (Sujová et al., 2021).

2. Theoretical background

Mirabile (1997, p. 74) defines competency as knowledge, skill, ability, or characteristic associated with high performance on a job, such as problem solving, analytical thinking, or leadership. Some definitions of competence include motives, beliefs, and values. According to Draganidis & Mentzas (2006), competency is a combination of tacit and explicit knowledge, behaviour, and skills that gives someone the potential for effectiveness in task performance. Banfield & Kay (2012) said that a specific competency can also be understood as an underlying characteristic of a person, that is, a trait, a belief, an ability, or an attitude that distinguishes one person from another and explains differences in job performance.

When we talk about the competence of an employee, we mean that he or she has the necessary characteristics to the extent that he or she can handle the tasks assigned. It is assumed that if an employee is competent, he/she performs his/her tasks well or at a higher-than-expected level. To speak of a competent person, three prerequisites must be met. He or she must have the qualities, abilities, knowledge, skills, and experience that he or she needs to behave competently. Additionally, the person must be motivated to use the behaviour and see the purpose of it. Last but not least, there are external conditions that enable this person to use this behaviour (Spillerová et al., 2004, p. 27). The first prerequisite is the most influential; it can be developed in the direction we need. For the second assumption, it is the person's personality traits, such as motives, attitudes, and values, that are very difficult to change.

Both of the first two assumptions are related to the personality of a particular person and complement each other. If someone has the necessary competences but is not motivated to use them, these competences are useless. Conversely, if a person has strong motivation, but does not have the necessary competencies, they will not achieve the desired result. The third assumption is independent of the person but equally important for the most effective use of competences. If a person is competent and has the right motivation to use his/her competence, if external conditions do not allow him/her to do so, he/she will not achieve the desired effect. As Kandula (2015) states, not all qualities and characteristics need to be considered competencies. To qualify a characteristic as a competency, it must lead to effective performance and contribute to job success.

In general, competencies can be divided into professional competencies, which refer to the set of professional requirements needed to perform a job in a given position. They are commonly referred as hard skills. They are measurable or can be verified by a test or examination. They can be broken down according to the field to which they relate or according to the nature of the activity to which they relate. They are the practical skills required for the performance of a particular work activity, but also the theoretical knowledge required for that performance. The next category is general skills, which are not exclusively related to a specific job but are the general requirements needed to perform the job. They are transferable and applicable across disciplines. Digital competences are related to digital literacy. It includes not only competences related to working with, searching, and processing data but also competences related to creating digital content or using digital technologies. However, the last category,

which appears to be increasingly important, is soft competencies. These competencies are not dependent on expertise, they are general competencies needed to perform a job well (Ternikov, 2022, MPSV, 2017).

The fact that a candidate has a particular competence does not mean that he or she is suitable for a particular position or activity. Today, it is necessary for each employee to have multiple competences at different levels. For this reason, competency models are used. For students, competency models can verify the potential to define effective performance. Subsequently, the training content can be adapted to individual development goals (Getha-Taylor et al., 2018). The basis of education, regardless of specialisation, should consist of so-called generic competences, which are interdisciplinary, as opposed to specific competences that are characteristic of individual disciplines (Ferrerias-Garcia et al., 2021).

The basic prerequisite for working with competences is their identification. It is not possible to define the necessary competence without identifying its need and determining the basic characteristics of the activity for which the competence is needed. As stated by Spillerová et al. (2004), the process of identifying competencies has several stages; see Figure 1.

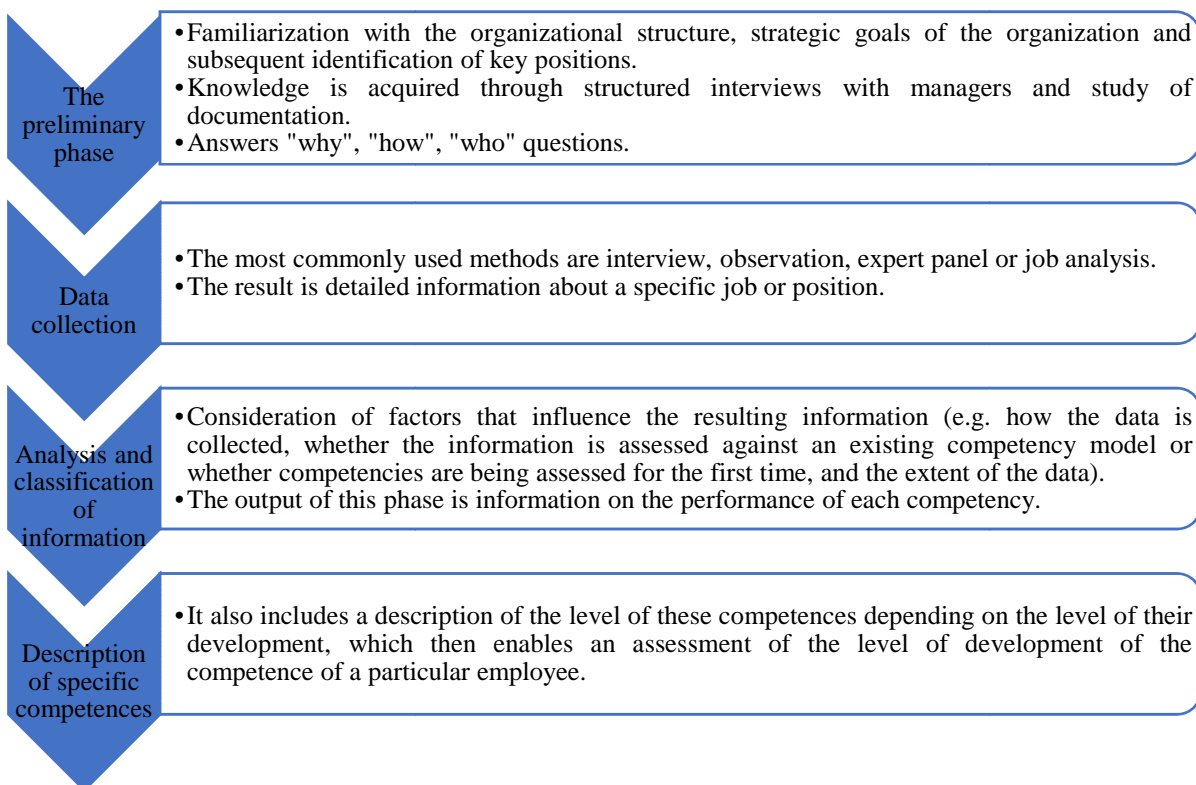


Figure 1. Process of identifying competences

Source: own processing (2023)

2.1 Changes in competency requirements

In the context of today's rapid technological development, it can be stated that competence is not a constant variable. Competences can have a "life cycle", that is, they emerge, develop, and then disappear (Kovács, 2009). At the same time, there is a need for new competences, which are usually related to new trends and developments and are expected. The critical phase for organisations is usually the realisation of the need for a new competence and the necessity for employees to acquire the new competence. This identification often occurs only when the absence of the new competency starts to cause serious problems in organisational processes. For the above reason, organisations should continuously monitor their competences, update them, or identify completely new ones.

Since the beginning of competency research, technological progress and the alteration of competence demands among employees have drastically reshaped the landscape of employment. The handling of complexity and large amounts of information has become essential to stay up with the developments in today's world. Globalised competition has led to an increasingly intense 'War for Talents' under volatile circumstances (Karwel, Kaufeld, 2021).

3. Methods

The research was focused on what competencies organisations will demand for university graduates in the coming years. This information will help both to define and describe the requirements in question and to help students focus on developing these competencies.

3.1 Conducting the focus group method

Given the relatively homogeneous composition of the groups, it was anticipated that the interaction would yield profound insights into the topic at hand. The discussions were skilfully guided and directed by the moderator. Typically, the optimal number of participants for each group ranged from six to eight individuals. Consequently, the interviews were conducted in three separate sessions, allowing the researcher to uncover emerging trends within the topics explored by each focus group while simultaneously satisfying the data saturation requirement inherent in qualitative research.

The primary objective of the focus groups was to effectively deliberate on predetermined topics within a limited time frame. The collected data was analysed with simplified content. Semi-structured interviews and discussions were consistently divided into three to four core segments. The initial segment involved collecting information about the respondents and the companies they represented. Subsequent segments exclusively focused on the employers' expectations of student competencies. Furthermore, additional blocks addressed pertinent issues currently or potentially addressed by the Career Centre.

3.2 Semi-structured individual interviews

The research was conducted through semi-structured individual interviews with representatives of companies in the HR, recruitment, or development sectors. A total of 20 interviews were conducted over two years (June 2021 and May 2022) were conducted, all online via Zoom and MS Teams. All interviews were recorded for further analysis. The data saturation condition set by qualitative research was met. Data were analysed using simplified content analysis. The semi-structured interviews were divided into four basic blocks. In the first part, information about the respondent and the company he/she represents was collected. In the next blocks, questions focused on employers' expectations of students and vice versa, the outlook of the labour market in 5 years, and cooperation with universities.

The analysis was conducted independently by two researchers to increase the validity of the results, and the conclusions below are an intersection of their findings.

4. Results

Based on the results of the first survey conducted in 2020, the competencies most frequently required by graduates by employers can be divided into 3 groups. The first group consists of requirements related to the approach to work and to the company, namely, the desire to work, achieving a certain degree of compatibility of the candidate's personality with the company and the team, and the ability to work in a team. The second group of required competences relates to the approach to work and problem-solving. Employers reported that they value the ability of candidates to analyse a situation, solve new problems, and propose new ways and procedures. The last pair of competencies expected of the candidates included the ability to communicate and present the results and the results of their work. The general consensus was that soft skills were more important than hard, domain-specific knowledge and skills. There was a consensus among employers that language skills were an essential, but still under-represented, competency for graduates.

In 2021, which was influenced by the Covid-19 pandemic, the research was more orientated toward recruitment trends; in any case, here too, employers defined the requirements they had for applicants. The results show that in recruitment they do not only focus on professional knowledge and skills, which is expected to a certain extent for all candidates with comparable education, but they place much more emphasis on the potential of the candidates, which can be described by three basic characteristics based on the research results. It is important that the candidate fits the company culture and shares values similar to those of the company and its current employees. The expected competence is adaptability, that is, the ability and willingness to adapt to new practises and trends. Motivation is a very important aspect that determines whether or not a candidate is hired. The employer is interested in the motivation of the candidate to work for the employer and to do the job, but also in whether he or she is motivated to go above and beyond.

The latest available results are from 2022 when the research focused on what employers' expectations are from the career portfolio offered by the VŠB-TUO Career Centre. This is basically about what

competences graduates will be equipped with. The requirements are very closely linked to the globalisation of the market, so there is a constant need for sufficient language skills among graduates. As in previous surveys, the required competencies were related to the transition from study to work, employers require a proactive approach to work, the ability to adapt to the working regime, and they also expect a certain degree of self-discipline. This requirement is a consequence of the Covid-19 pandemic, where many employers are persisting with the option of working from home, with limited control by a supervisor who has to rely on the self-discipline of his/her subordinates. There is a continuing interest in the ability to keep abreast of current industry trends and the ability to present one's results effectively.

It can be concluded that although individual sub-studies focused on different areas, we can find common features in the results in the required competences. One of the basic requirements of all employers in all surveys was the language skills of graduates. According to the National System of Competences, language competence is classified as a general competence that is not exclusively linked to a specific position; it is a general requirement for the performance of work. They are transferable and applicable across disciplines (MoLSA, 2017). Other required competencies can already be included in the area of soft competencies, which are not dependent on expertise but are general competencies required for good job performance (MoLSA, 2017).

Using the structure of the National Competence Framework, the most commonly required soft competencies can be divided into three areas. The first is personal competences, where employers most often required competences for lifelong learning, i.e. the ability and willingness to accept new information. Next, there are requirements for flexibility in the sense of the ability to think operationally and flexibly and to adapt to new situations and creativity, which is understood as the ability to create, think, see, and do things differently than usual. Another area is interpersonal competences, specifically the competencies to communicate effectively and to cooperate, which employers expressed by requiring the ability to work as a team. A sub-field is performance competencies. Here, the most frequently mentioned competency was the competence to be proactive, i.e., the ability and willingness to engage in activities beyond job duties, requirements, and expectations. Competence for autonomy and, last but not least, competence to plan and organise work were also desirable.

5. Discussion

The findings of our research exhibit comparability with internationally published results, extending beyond the domain of engineering graduates, thereby suggesting an interdisciplinary trend of significance. To illustrate, research conducted in Hungary reveals that graduates with a bachelor's degree in human resource management are expected to possess foreign language skills, teamwork skills, and effective communication abilities in addition to their professional competencies (Bogdány et al., 2023). Similar outcomes are observed in a survey investigating the competencies of human resource professionals in relation to organizational digital transformation. Once again, competences for continuous learning and communication skills are among the main requirements (Van den Berg et al., 2020). However, it is important to acknowledge the limitations of the conducted research. Firstly, the relatively short duration of the study precludes the secure identification of long-term trends in employers' competence requirements for graduates within a span of three years, although its outcomes can be compared with other international studies. Additionally, the sample of company representatives was restricted in both number and focus, primarily comprising companies that employ graduates in technical fields. Future research endeavours can expand the pool of respondents, as well as concentrate on investigating the latest trends in recruitment and selection processes. This may involve exploring aspects such as the digitization of these processes, the utilization of artificial intelligence, and the subsequent impact of these changes on employer demands.

Conclusion

Common characteristics of the competencies required by employers have been identified in various research studies. Regardless of the specific field, language skills and soft skills are consistently in high demand as they transcend expertise and contribute to overall job performance. Soft competencies encompass personal, interpersonal, and performance-related aspects. Employers place significance on attributes such as the ability to learn new information, flexibility, creativity, effective communication, teamwork, a proactive approach, independence, and skills in planning and organizing work.

In light of the rapid development of technology, which impacts the labour market and candidate requirements, it is foreseeable that the demand for hard skills will undergo change, rendering several competencies obsolete. Consequently, applicants and current employees will need to acquire novel

proficiencies. Nevertheless, it can be presumed that within this rapidly evolving landscape, greater emphasis will be placed on soft competencies linked to adaptability and continuous learning. Language skills and digital literacy will extend beyond technical professions, becoming imperative across diverse domains.

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Gamification in Management: Enhancing Engagement, Motivation, and Performance

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Abstract

Research background: In today's competitive business environment, fostering employee engagement, motivation, and performance is crucial. This comprehensive study takes an in-depth look at the role of gamification in management practices, specifically how applying game design elements in non-game contexts can effectively address these challenges.

Purpose of the article: The purpose of the article is to explore how gamification can be effectively used in management to enhance employee engagement, motivation, and performance. It offers a detailed look at the benefits, methods, and potential challenges of applying gamification in a corporate setting. The article aims to serve as a comprehensive guide for organizations considering the implementation of gamification strategies, while also highlighting the need for further research on its long-term effectiveness and ethical implications.

Methods: The study explores multiple gamification strategies, including Points, Badges, and Leaderboards (PBL), narrative contexts, challenges and quests, real-time feedback, social features, and adaptive difficulty levels.

Findings & Value added: Evidence indicates that gamification significantly enhances participation, motivates employees, and fosters skill development. However, the effectiveness of these strategies is contingent upon thoughtful implementation aligned with organizational culture and objectives. Ethical considerations and implementation barriers are discussed to provide a comprehensive view.

Keywords: gamification, management, employee motivation, performance, socio-economic impact

JEL classification: M10, M12, M54

1. Introduction

In today's dynamic and competitive business environment, organizations are constantly seeking innovative approaches to enhance employee motivation and improve performance. One such approach gaining traction is gamification. Gamification involves applying game design principles, mechanics, and elements in non-game contexts, such as management practices (Deterding et al., 2011). This definition contrasts “gamification” against other related concepts via the two dimensions of playing/gaming and parts/whole (figure 1). A well-designed game is a guided missile to the motivational heart of the human psyche. Applying the lessons that games can teach could change your business, the way you learn or teach, even your life (Werbach & Hunter, 2020).

Gamification holds the potential to transform traditional management practices by infusing elements of challenge, achievement, and rewards into various tasks and processes. It can be utilized in areas such as employee training, performance management, goal-setting, and feedback systems (Reeves & Read, 2009). By leveraging game-like features, organizations can enhance employee engagement, improve productivity, and foster a positive work culture.

This section provides an overview of gamification in management and its potential implications for organizational success. The key theories and frameworks underpinning gamification will be explored, along with its relevance in contemporary management practices (Zichermann & Linder, 2013).

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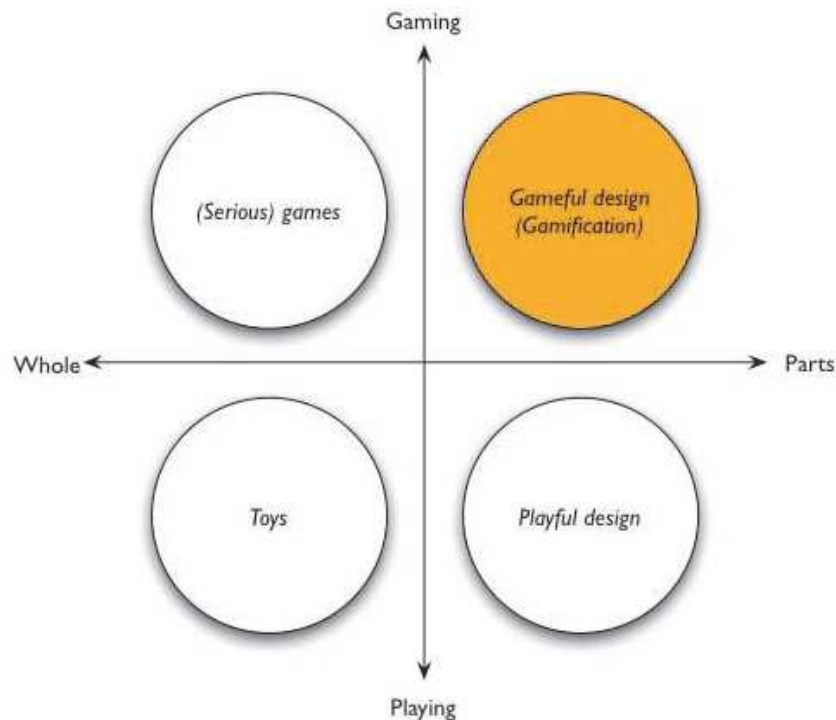


Figure 1. “Gamification” between game and play, whole and parts
 Source: Deterding et al., 2011

2. Methods

Gamification leverages elements from game design to engage users in non-game contexts. It involves applying various strategies and techniques to make activities more enjoyable, rewarding, and meaningful for participants.

2.1 Benefits of Gamification in Management

There are a lot of benefits that come from the results of using gamification in management.

The benefits include enhancing engagement, boosting motivation, improving skills, fostering teamwork, and improving performance.

2.1.1 Enhanced Engagement

One of the primary advantages of gamification in management is its ability to enhance employee engagement. A meta-analysis by Hamari et al. (2014) found that gamified systems yield positive outcomes concerning engagement and attitude towards tasks.

Games have a natural capacity to captivate individuals and create a sense of enjoyment and flow. When applied to work-related tasks and processes, gamification can transform mundane activities into more interactive and enjoyable experiences.

Gamification taps into the psychological aspects that make games engaging, such as rewards, competition, and social interaction. By incorporating these elements, companies can make mundane tasks more engaging, thereby increasing employee involvement and commitment. For example, SAP uses gamification to engage its employees in sustainability efforts, significantly increasing participation rates in sustainable activities (Werbach & Hunter, 2012).

2.1.2 Boosting Motivation and Productivity

Gamification provides a powerful tool to boost employee motivation and productivity. By offering employees choices and control over their tasks, gamification fosters a sense of autonomy and empowerment, which fuels motivation. Through well-designed progression systems, employees can gradually develop their skills and experience a sense of mastery, which further enhances motivation and productivity. Furthermore, gamification can emphasize the purpose and impact of employees' work,

connecting it to larger organizational goals and societal impact. This sense of purpose inspires employees to go above and beyond, resulting in increased productivity.

Self-Determination Theory posits that humans have intrinsic needs for competence, autonomy, and relatedness (Ryan & Deci, 2000). Gamification can cater to these needs by providing autonomy through choices, competence through challenging tasks and feedback, and relatedness through social features. A study by Robson et al. (2015) found that gamified elements like leaderboards and badges significantly increased motivation among sales representatives.



Figure 2. Microsoft's Windows Language Quality Game used to motivate staff to help find glitches before the launch of Windows 7
Source: Zichermann & Linder, 2013

2.1.3 Improved Skill Development

Gamification in management can also facilitate learning and skill development within organizations. By incorporating game-based elements into training programs, employees can engage in interactive simulations and scenarios, allowing for hands-on practice and experiential learning. This approach promotes a safe environment for experimentation, encourages knowledge retention, and facilitates the development of critical skills. Gamified learning experiences can also promote collaboration and knowledge sharing among employees.

Gamification enables skill development through constant feedback and challenge levels. It effectively supports mastery learning (Guskey, 2012), allowing employees to build on existing competencies (Kapp, 2012).

For instance, gamified simulations allow employees to practice their skills in a realistic and risk-free environment. These simulations can recreate challenging scenarios that employees may encounter in their roles, allowing them to develop and refine their skills through hands-on experience. Immediate feedback within these simulations enables employees to learn from their mistakes and iterate on their approaches, enhancing the learning process.

2.1.4 Fostering Teamwork

Fostering teamwork is essential in almost any group setting, whether it's in a professional organization, an academic environment, or even in social activities. Teamwork allows for the blending of various skills, personalities, and insights, which often results in more effective problem-solving and a more productive output.

Fostering teamwork is a continuous process that requires ongoing effort, adaptability, and a willingness to work toward a common goal.

By incorporating leaderboards and team challenges, gamification promotes a healthy sense of competition and collaboration, fostering teamwork and collective problem-solving (Zichermann & Cunningham, 2011).

2.1.5 Improve Performance

Enhanced engagement and motivation often lead to improved performance.

The element of competition introduced through gamification can stimulate employees to push their boundaries, strive for excellence, and continuously improve their performance.

This competitive element can drive higher levels of effort and performance as employees seek recognition and the satisfaction of being at the top of the leaderboard.

Studies have indicated a positive correlation between gamified environments and performance metrics (Sailer et al., 2017). For instance, a case study on Deloitte Leadership Academy revealed that the introduction of gamification resulted in a 37 percent increase in the number of users returning to the platform, thereby improving the skill development essential for performance (Meister, 2013).

2.2 Key strategies

Several key strategies can be employed to realize these goals, each supported by academic research and practical examples.

2.2.1 Points, Badges, and Leaderboards (PBL)

One of the most commonly used gamification methods is the use of Points, Badges, and Leaderboards (PBL). The PBL system is often considered the cornerstone of gamification strategies. Points act as immediate markers of progress and accomplishments, making abstract goals concrete (Deterding et al., 2011). Badges are given as rewards for accomplishing specific challenges or tasks, serving as status symbols and encouraging a sense of ownership. They can also be shared socially, catering to the need for social recognition (Christy & Fox, 2014). Meanwhile, leaderboards create a competitive environment, sparking interest and engagement among employees (Hamari et al., 2014). However, it's important to note that excessive competition may deter collaboration; thus, these elements should be balanced and aligned with organizational objectives.

One of the most well-known examples of Points, Badges, and Leaderboards (PBL) in a corporate setting is the gamification system implemented by Salesforce, a leading Customer Relationship Management (CRM) software provider. Salesforce's platform offers a feature called "Salesforce Trailhead," a learning experience platform that gamifies the process of learning Salesforce.



Figure 3. Fitbit Badges
Source: Werbach & Hunter, 2020

2.2.2 Narrative Context

Another strategy is to provide a narrative context for tasks to make them more meaningful. Games often use story elements to engage players, and the same can be applied to work environments. Adding a narrative can heighten the sense of purpose and make tasks more emotionally engaging (Zichermann & Cunningham, 2011).

Incorporating a narrative into tasks helps infuse a layer of emotional investment, adding a new dimension to otherwise mundane tasks. For example, customer service representatives could be positioned as "heroes" on a mission to solve customer issues, which in turn, increases the perceived importance and engagement of the task at hand.

One widely recognized example of incorporating narrative context in a corporate environment is the approach taken by Deloitte University with their leadership training program called "Greenhouse." Deloitte Greenhouse sessions are designed to break the mold of traditional corporate training, often using stories and narratives to immerse participants in real-world scenarios.

2.2.3 Challenges and Quests

Creating challenges and quests taps into the human need for achievement (Ryan & Deci, 2000).

Quests and challenges can be developed in alignment with key performance indicators (KPIs) and specific business objectives. They break down complex tasks into smaller, more digestible pieces, facilitating step-by-step progression and mastery. Rewards earned from completing challenges can be both intrinsic (sense of achievement) and extrinsic (badges, points), catering to various motivational needs (Kapp, 2012). These elements not only introduce problem-solving aspects to daily tasks but also create a clear path toward mastery, which can lead to enhanced performance.

Microsoft's "Office 365 Champions Program" serves as a notable real-world example of implementing challenges and quests in a corporate setting. This program aims to accelerate the adoption of Office 365 tools within an organization by identifying and empowering internal champions who are enthusiastic about these tools.

2.2.4 Real-Time Feedback

The use of real-time feedback loops ensures that employees can adjust their performance immediately.

The power of real-time feedback is exemplified in the immediate gratification and learning opportunities it provides. An employee doesn't have to wait for an annual review to understand their performance; they can adapt and grow continuously. This instant feedback not only fulfills the psychological need for competence but also enables immediate course correction, thus contributing to skill development and improved performance (Sailer et al., 2017).

One real-world example of the use of Challenges and Quests in a corporate setting is the initiative undertaken by IBM through its "Innov8" platform. Innov8 was initially designed as a business process management (BPM) simulation game, aimed at training employees and other stakeholders in various aspects of business decision-making and strategy.

2.2.5 Social Features

Social features like team-based quests, collaborative challenges, or forums for sharing accomplishments can provide a support system and increase the sense of community. It also enhances the sense of community and relatedness among employees.

This not only promotes cooperative behavior but also fulfills the human need for relatedness and belonging, which is a powerful motivator for engagement (Robson et al., 2015).

A well-known example of the integration of social features in a corporate setting is the use of Yammer, a social networking service used for private communication within organizations. Owned by Microsoft, Yammer functions like a social network for the workplace and is often described as "Facebook for business."

2.2.6 Adaptive Difficulty

In gaming, the level of challenge adapts to the player's skill to maintain engagement. A similar approach can be beneficial in the workplace. Adjusting the level of task difficulty based on an employee's skill level ensures that tasks are neither too easy nor too challenging. Striking this balance sustains engagement and promotes a state of "flow," where employees are fully immersed in the activity at hand. This concept, based on the Flow Theory, has been linked to high levels of performance and job satisfaction (Csikszentmihalyi, 1990).

Duolingo, the language-learning app, offers an excellent example of adaptive difficulty in an educational context, and its principles have been adapted for corporate training programs as well. While Duolingo is not strictly a corporate example, its adaptive difficulty techniques have inspired similar implementations in corporate training and development platforms.

Level	Description	Example
<i>Game interface design patterns</i>	Common, successful interaction design components and design solutions for a known problem in a context, including prototypical implementations	Badge, leaderboard, level
<i>Game design patterns and mechanics</i>	Commonly reoccurring parts of the design of a game that concern gameplay	Time constraint, limited resources, turns
<i>Game design principles and heuristics</i>	Evaluative guidelines to approach a design problem or analyze a given design solution	Enduring play, clear goals, variety of game styles
<i>Game models</i>	Conceptual models of the components of games or game experience	MDA; challenge, fantasy, curiosity; game design atoms; CEGE
<i>Game design methods</i>	Game design-specific practices and processes	Playtesting, playcentric design, value conscious game design

Figure 4. Levels of Game Design Elements
Source: (Deterding et al., 2011).

3. Results

Gamification strategies such as points, badges, leaderboards, and virtual rewards can incentivize desired behaviors, foster healthy competition, and promote continuous improvement (Landers, 2014). It can create a sense of enjoyment, autonomy, and mastery, leading to increased productivity and satisfaction (Huotari & Hamari, 2016).

Moreover, gamification in management has shown potential in enhancing learning and development initiatives. It can provide interactive and immersive experiences, making training programs more engaging and effective (Kapp, 2012). Collaborative gamified platforms can also encourage teamwork, knowledge sharing, and problem-solving among employees (Hamari et al., 2014).

Implementing these methods in a thoughtful and balanced way can help organizations harness the full potential of gamification in enhancing employee engagement, motivation, and performance. However, it is important to note that the effectiveness of these methods can vary depending on the unique needs and dynamics of each organization.

The effectiveness of these methods depends on factors such as the target audience, context, and the specific goals of the gamified experience. Combining several methods can create a rich and engaging experience that caters to different motivations and preferences.

Remember that effective gamification is not a one-size-fits-all approach. The methods you choose should align with your target audience's preferences, the context of the activity, and your specific goals. Regular assessment and adaptation based on participant feedback and behavior are essential for maintaining engagement, motivation, and performance over the long term.

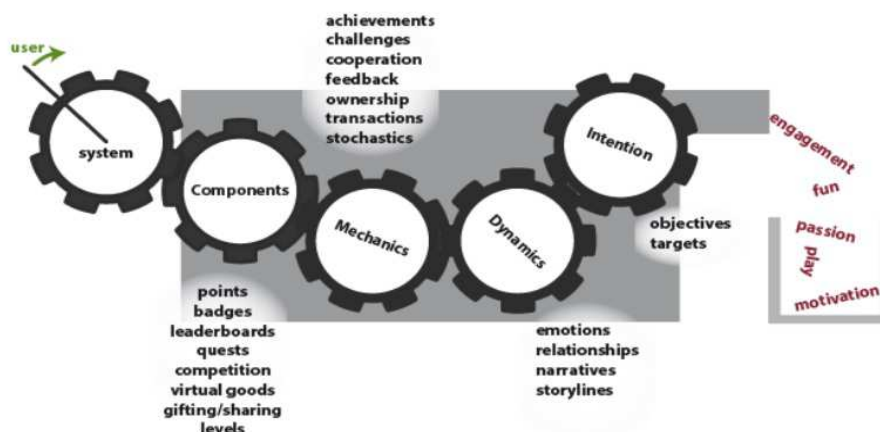


Figure 5. Gamification successful achieved by the key elements join & run in unity in favor of the user
Source: Wood & Reiners, 2015

4. Discussion

While gamification in management offers promising avenues for enhancing employee motivation, engagement, and skill development, its application is not without challenges. Despite its promise, gamification is not without its pitfalls. A misaligned gamification strategy can lead to unethical behaviors and can demotivate employees who are not competitive (Nicholson, 2015). As such, it is crucial to implement gamification in a manner aligned with the organizational culture and goals.

However, it is crucial to acknowledge potential challenges associated with gamification in management. Misalignment between game mechanics and organizational goals, excessive competition, and the risk of short-term motivation without lasting impact are among the potential pitfalls to consider (Zichermann & Cunningham, 2011).

4.1 Ethical Considerations

Previous research indicated that gamification techniques could introduce risks to the business environment, and not only fail to make a positive change, but also raise concerns about ethics, quality of work, and well-being in a workplace (Algashami, 2018).

There is also concern about the ethicality of manipulating employee behavior through game mechanics (Mollick & Rothbard, 2013).

4.2 Implementation Barriers

Implementing gamification strategies effectively requires a deep understanding of organizational culture and employee preferences, making it resource-intensive (Robson et al., 2015).

Conclusion

Gamification in management presents a valuable approach to enhance employee engagement, motivation, and performance. By leveraging game mechanics and design principles, organizations can transform work-related tasks into enjoyable and immersive experiences. The benefits of gamification include increased engagement, boosted motivation, improved productivity, and enhanced learning opportunities.

Gamification offers opportunities for employees to find joy and purpose in their work, while also promoting learning, skill development, and collaboration.

However, organizations must address challenges such as alignment with overall objectives, careful management of competition, and the need for ongoing maintenance and updates. With a thoughtful and strategic approach, gamification has the potential to revolutionize the workplace and drive positive outcomes for both employees and organizations.

This essay argues that gamification has significant potential in enhancing engagement, motivation, and performance within the realm of management. However, the success of such initiatives depends heavily on thoughtful and strategic implementation. Organizations must be vigilant in aligning gamification strategies with their broader goals to harness its full potential.

As gamification in management continues to evolve, further research is needed to explore its long-term effectiveness, ethical implications, and specific applications within diverse organizational contexts.

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Managing the Health Risks of Climate Change is Imperative for Human Health: What Does a Health Provider Need to Know?

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Abstract

Research background: Climate change is considered one of the world's greatest threats, endangering both physical and mental health, while also directly limiting international development. The World Health Organization (WHO) has gone so far as to label it the most significant health challenge of this century. The impacts of climate change are being felt across natural and human systems globally, carrying substantial repercussions for a diverse array of sectors, including agriculture, business, trade, healthcare, and social well-being. However, despite its undeniable importance, there exists a notable dearth of comprehensive studies delving into the knowledge and awareness levels of medical and nursing personnel concerning climate change. This lack of research is impeding the formulation of effective strategies for climate change education and management within the healthcare system.

Purpose of the article: The purpose of the study is to investigate the stance of service providers concerning climate change and its impact on health. The study aims to develop strategies that can enhance staff knowledge and awareness, particularly in health management under conditions related to climate change.

Methods: An observational cross-sectional study was conducted among nurses and physicians working in the departments of emergency rooms and internal medicine departments in various Israeli hospitals. The study will include participants composed of physicians and nurses. Data on participants' perceptions, knowledge, and awareness of climate change and its effects can be collected using an online questionnaire.

Findings & Value added: The health impacts of climate change command increasing policy and public attention as the climate continues to change rapidly. Adaptation is no longer tomorrow's choice, but today's imperative. To effectively adapt to the field of public health, it is crucial to establish multisectoral and multidisciplinary responses that involve close collaboration among individuals, communities, governments, international organizations, and the research community. This collaborative approach is necessary to address and mitigate the adverse health impacts of climate change.

Keywords: climate change, health risks, nurses, public health, physicians

JEL classification: I15, Q58, M1

1. Introduction

Climate change poses a significant challenge to humanity and has profound implications for public health. According to the World Health Organization (WHO), it is even regarded as the greatest health challenge of the current century (Beillouin et al., 2022). This global phenomenon is considered one of the most serious threats, directly endangering both physical and mental health while also imposing limitations on international development (Stephenson et al., 2013). The recent changes in climate patterns are already having a significant impact on natural and human systems worldwide, leading to far-reaching consequences across various sectors such as agriculture, business, and health (Watts et al., 2019). For these reasons, climate change is considered the greatest health threat of the 21st century and beyond (Hubbert et al., 2020).

The climate crisis is one of the most serious threats to public health in the 21st century, and it is projected to worsen in the coming years (Watts et al., 2018). In 2020, global attention was drawn to the coronavirus pandemic and its wide-ranging impact on public health. The corona crisis, along with climate change, provides evidence of the interconnectedness between countries in the realm of public health and the disproportionate harm faced by vulnerable populations, including those with low incomes, minorities,

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women, the elderly, chronically ill individuals, and those who work outdoors in sectors such as infrastructure, construction, and agriculture (Al et Romanello, 2021). There has been an observable increase in the frequency, duration, and intensity of extreme weather events, including heatwaves, storms, floods, droughts, and fires. Additionally, temperatures, sea levels, and air pollution have all seen noticeable increases (Watts et al., 2018; Delmotte-Masson et al.).

Numerous studies have explored the attitudes and awareness of medical and nursing professionals regarding climate change and its impact on human health. In a survey conducted by the American Association of Physicians, which aimed to assess physicians' perceptions of climate change, research findings indicated that climate change is primarily driven by human activities. The majority of respondents reported observing health effects in their patients, particularly noting an increase in the severity of chronic illnesses linked to air pollution. As a result, they emphasized the need for physicians and healthcare organizations to educate the general public and take appropriate action on this issue (Sarfaty et al., 2015).

Another study conducted in the United States examined the knowledge and awareness of climate change among public health nurses and revealed that they perceive significant threats to the human environment. However, they noted a lack of resources, action plans, and strategies to address these threats (Polivka, Chaudry, & Mac Crawford, 2012a). Therefore, it is crucial to assess the knowledge, awareness, and readiness for action among frontline healthcare workers, such as nursing and medical teams in public hospital emergency departments, who are expected to address the growing morbidity and injuries resulting from climate change (La Torre et al., 2020).

1.1 Climate change

Weather and climate exert a substantial influence on life on Earth, playing a vital role in supporting the biosphere and ensuring human well-being (IPCC, 2014). The recent shifts in climate patterns are largely attributed to human activities and their impact on the environment, which has resulted in significant consequences for resources and various sectors globally (Watts et al., 2019).

In 2020, global attention was focused on the coronavirus and its extensive impact on public health. Both the COVID-19 crisis and climate change demonstrate the interconnectedness of countries worldwide regarding public health and the disproportionate impact on vulnerable populations, including those with low incomes, minorities, women, the elderly, the chronically ill, and outdoor workers (e.g., in infrastructure, construction, agriculture) (Romanello et al., 2021).

Climate change is recognized as one of the most serious global threats, endangering the future health of human populations and directly challenging international development (Stephenson et al., 2013). It is considered the greatest health threat of the twenty-first century, causing severe problems in various areas, compromising people's health, and resulting in high mortality rates (Hubbert et al., 2020). The Intergovernmental Panel on Climate Change's fifth report highlights the warming of the Earth in recent decades, increasing temperatures, rising sea levels, escalating air pollution, and changes in the frequency and intensity of extreme events such as droughts, floods, and storms (IPCC, 2014).

1.2 Consequences of climate change on human health

Climate change has various impacts on the health sector, both directly through physiological effects and indirectly by influencing chronic and infectious diseases, as well as mortality and morbidity rates due to external factors (Watts et al., 2019). Climate change, in conjunction with other natural and human-induced stressors, affects human health and disease in multiple ways. It exacerbates existing health threats while also giving rise to new ones. However, not all individuals face an equal level of risk. Factors such as age, economic resources, and geographical location play a crucial role (McDonald, 2020).

Climate change-related health risks encompass various aspects, including physical and mental health. These risks include trauma resulting from extreme weather events, illnesses associated with high temperatures, and compromised water and food safety (Huang et al., 2013). The disruptions caused by climate change have significant health implications, such as increased respiratory and cardiovascular diseases, injuries, and premature deaths linked to extreme weather events. Furthermore, there are changes in the prevalence and geographical distribution of foodborne, waterborne, and other infectious diseases, along with threats to mental health (Cruz et al., 2020). Vector-borne diseases, cardiovascular and respiratory illnesses, and psychosocial health impairments are also among the health impacts related to climate change (McIver et al., 2015). Additionally, there is an expected increase in widespread and dangerous fires following extreme weather events (Beillouin et al., 2022).

1.3 The health system and climate change

Countries need to strengthen their health systems to effectively and promptly respond to the increasing morbidity and mortality caused by climate change, reduce vulnerability to climate-related stresses, and cope with the challenges posed by extreme events that strain the system's infrastructure (WHO, 2015). The role of the health care system in the climate crisis can be understood in four aspects. Firstly, the health care system is a significant contributor to greenhouse gas emissions and should take action to mitigate these emissions (MacNeill, McGain, & Sherman, 2021). Secondly, the system must prepare for a surge in demands for emergency medical services and hospitalization due to extreme events and prolonged periods of heat and drought (WHO, 2015). Thirdly, the health system plays a crucial role in preventing adverse health outcomes, including those related to climate change, by mitigating exposure to extreme climatic conditions, raising awareness among vulnerable populations, addressing health inequities, and promoting healthy behaviors, thereby reducing the vulnerability of at-risk populations (WHO, 2015). Lastly, health systems need to safeguard their infrastructure from the impacts of extreme events, such as power outages during storms, floods, or heatwaves (Negev et al., 2019).

Physicians and healthcare organizations can play an active role in educating patients, the general public, and policymakers about climate change and its impact on human health, as well as helping to mitigate the health harms caused by climate change (Hubbert et al., 2020). Therefore, it is important to integrate the subject of climate change into the curricula of medical, nursing, and public health programs in a structured manner. This integration should provide a comprehensive and interdisciplinary perspective, aiming to cultivate a new generation of healthcare professionals who have a deep understanding of climate change and its multifaceted effects on health (Paz, Negev, Davidovich, 2019).

A climate change strategy or plan refers to a government's policy intentions to undertake a series of actions aimed at reducing greenhouse gas (GHG) emissions and/or adapting to climate change. Currently, there is a lack of collaboration on climate change preparedness among various sectors including health, environment, welfare, education, and homeland security (Negev et al., 2019). Effectively managing climate change presents a significant challenge, thus necessitating the development of a strategy and multidisciplinary interministerial national action plans. Preparedness and adaptation are ongoing processes that require flexibility to incorporate new knowledge and information. Furthermore, these plans must be dynamic and adaptable, considering new information to enhance preparedness (Burke et al., 2015).

2. Methods

An observational cross-sectional study was conducted among medical and nursing staff working in Israeli hospitals, specifically targeting doctors and nurses in emergency and internal medicine departments across various hospitals in the State of Israel.

Regarding the sampling method, this study aimed to include the entire target population rather than drawing from a specific sample. The questionnaire was distributed through various channels, including medical associations such as the emergency medicine association, the internal medicine association, and the nurses' association. Additionally, the questionnaire was shared within WhatsApp and Facebook groups that the researchers and their colleagues were members of. Overall, the study aimed to capture data from a wide range of medical and nursing professionals working in Israeli hospitals, with efforts made to reach out to the target population through multiple channels for questionnaire distribution.

The research instrument used in this study was a validated questionnaire, which included various variables such as knowledge, awareness, willingness to act, and the importance of incorporating the topic of climate change among medical and nursing teams. The questionnaire was adapted from a previous study conducted by Mona Sarfaty and colleagues (Sarfaty et al., 2016). The first part of the questionnaire comprised closed-ended questions related to the participants' general background and their awareness of climate change. For example:

1. Have you ever heard of the terms climate change, global warming, and greenhouse effect?
- Responses: 1 = No, 2 = Somewhat, 3 = Quite a bit, 4 = Very much.
2. Where have you previously encountered the mentioned terms?
- Responses: Participants could choose from the following nominal scale options: Newspapers, television, hospital, books, course of study, Internet.

3. Results

In the initial section of the questionnaire, the medical and nursing staff were presented with several general background questions concerning climate change. One of the questions inquired whether the participants were familiar with the concepts of climate change, global warming, and the greenhouse effect. Approximately 42% of the sample reported a high level of familiarity with the concepts of climate change, global warming, and the greenhouse effect, indicating that they had heard about these concepts extensively. Additionally, around 31% of the sample reported a moderate level of familiarity, suggesting that they had some knowledge about these concepts.

The research findings indicate several key insights. Firstly, the vast majority of the sample (95%) believes that climate change is currently occurring. Furthermore, a high level of confidence (approximately 88% sure-very sure) is expressed in this belief. Regarding the causes of climate change over the past 150 years, approximately 55% of the participants believe that it was entirely caused by human activities, while an additional 23% believe that human activities played a major role in causing climate change. In terms of the state's efforts to mitigate the effects of climate change on human life, a majority of the sample (around 62%) believes that the state should invest extensive efforts, even if it entails significant economic costs.

Lastly, participants were asked about their personal experiences as healthcare professionals regarding the effects of climate change, such as illness, injury, or allergies. Unfortunately, the provided information does not include the diagram illustrating the distribution of their responses. Overall, the research highlights the widespread recognition of climate change among healthcare professionals, a strong belief in the role of human activities in driving climate change, and a call for significant efforts to address its impact on human health.

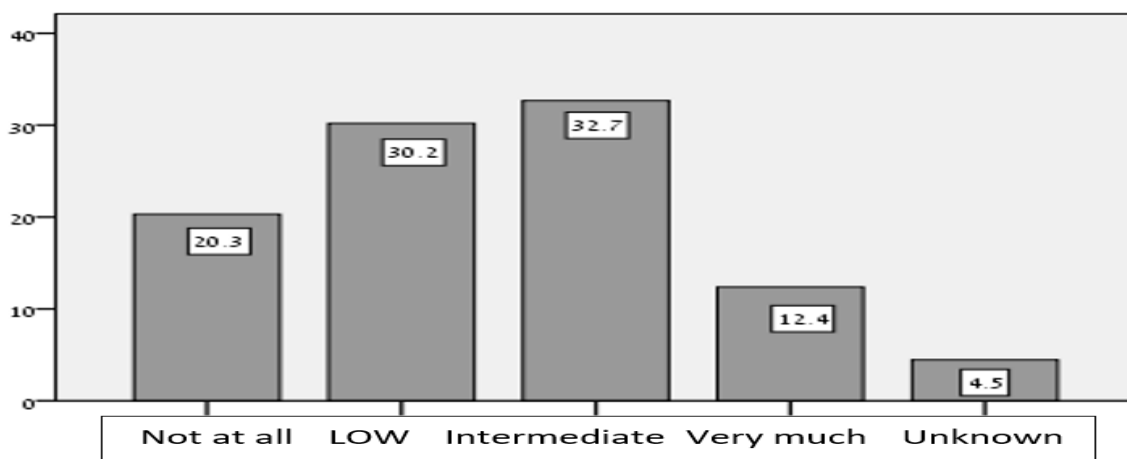


Figure 1. Distribution of personal experience of the effects of climate change

The research indicates that approximately one-third of the sample of health professionals reported experiencing the effects of climate change to a moderate extent, while another third reported experiencing it to a small extent. The data suggests that a significant portion of the participants has observed and personally encountered the impacts of climate change in their professional capacity.

The research findings indicate a significant positive relationship between the level of knowledge on climate change consequences and the willingness to act on the subject. The higher the participants' knowledge on climate change consequences, the greater their willingness to take action. This confirms the second research hypothesis. Furthermore, there is also a significant positive relationship between the level of awareness on climate change consequences and the willingness to act on the issue. Participants with higher awareness levels demonstrate a greater willingness to take action.

4. Discussion

Climate change is widely recognized as a severe global threat that poses risks to both physical and mental health. Despite its coverage in the media and increasing attention in medical and public health research, the level of knowledge and awareness among medical and nursing teams in Israel regarding climate change and its impact on public health has not been adequately investigated. These teams play a

crucial role in preventing harm to public health and treating patients affected by climate change-related conditions. The presented research aimed to assess the knowledge, awareness, and willingness to take action among medical and nursing staff in Israeli hospitals regarding climate change. It also explored their perspectives on the importance of integrating climate change topics into medical and nursing curricula to effectively manage this crisis. By understanding the current state of knowledge and perceptions among healthcare professionals, appropriate measures can be taken to enhance their preparedness and response to the health implications of climate change.

The present study aimed to investigate the level of knowledge and awareness among medical and nursing staff regarding climate change. Additionally, it examined how various background characteristics, such as job characteristics and socio-demographic factors, influenced their understanding of climate change and its consequences. Furthermore, the study explored the significance of incorporating health education into medical and nursing curricula, as perceived by doctors and nurses. The objective was to enhance knowledge, develop effective coping strategies, and foster the assimilation of values that can contribute to improving human health in the face of climate change. Moreover, the study assessed the willingness of medical and nursing teams to take action in response to environmental climate changes.

The findings of our research indicate that medical and nursing staff in Israel recognize the importance of incorporating climate change topics into medical and nursing studies, rating it as medium to high in terms of significance. They also demonstrate a moderate level of willingness to take action on climate change within their professional responsibilities. These findings align with a study conducted among African-American doctors, where a significant majority of participants expressed support for increasing public awareness of climate change and implementing measures to protect individuals from its health effects. The participants emphasized the need for health education, promotion, and effective management of the healthcare system in response to climate change. They also agreed that extensive preparation for climate change should be a top priority for health systems (Sarfaty et al., 2014). These parallel findings highlight the importance of addressing climate change within healthcare professions and integrating it into practice and education.

Climate change is considered a significant and tangible threat to all of humanity. By raising the level of knowledge and awareness among medical and nursing teams who care for patients at risk of being affected by climate-related consequences, we can provide opportunities to create health infrastructures for many patients. Research findings have shown that there is a high level of knowledge and awareness among medical and nursing staff regarding the implications of climate change. On average, participants in the study reported a relatively high level of knowledge on climate change (mean of 9.60 on a scale of 0-12 with a standard deviation of 2.50) and a relatively high level of awareness on the topic (mean of 3.06 on a scale of 1-4 with a standard deviation of 0.96). Furthermore, the research highlighted that the nursing staff had a higher level of knowledge and awareness compared to the medical staff. These findings align with previous studies that examined the knowledge level among public health nurses, where the majority (76%) demonstrated moderate to high knowledge on climate change-related health issues and diseases resulting from these changes (Xiao et al., 2016). Similarly, a study conducted among African American physicians from various hospitals found that they possessed knowledge about the negative health impacts of climate change on the human population and emphasized the need for health systems to prepare and prioritize this issue (Sarfaty et al., 2014). Public health nurses and physicians perceive the environment as threatened and recognize the significant role of nursing and medical units in treating physical and mental effects on numerous patients due to climate change. Therefore, there is a need to increase and enrich knowledge on this subject (Polivka et al., 2012b).

In contrast, these findings contradict previous research conducted in Romania, which examined the knowledge, skills, and practicality of family physicians regarding climate change and its implications. It found that the level of knowledge among physicians was low, possibly due to their focus on various diseases without linking them to climate change, which could be a significant cause for exacerbation and complications of these diseases (Croitoru et al., 2020).

Raising the awareness of the medical and nursing teams on the subject will enable a faster and more accurate diagnosis, as well as the provision of professional treatment to patients when necessary. To achieve this goal, strategies and dedicated training programs must be developed for health system employees. Additionally, staff awareness must be increased by making essential information available regarding personal preparation for climate change, with an emphasis on at-risk populations such as the elderly and patients with underlying illnesses.

The anticipated climate changes necessitate a paradigm shift in the preparedness and response capabilities of government ministries and health organizations to address emergencies. The research findings underscore the crucial role of medical and nursing teams in emphasizing the shared responsibility of various entities, including the Ministry of Health, in effectively managing health risks arising from climate change. These findings align with prior studies conducted among medical and nursing teams. For instance, Huang et al. (2013) conducted a study on heat events resulting from climate change, highlighting the significance of implementing public health adaptation strategies. These strategies encompass a range of actions, such as providing accessible medical advice, improving housing conditions, urban planning, establishing early warning systems, and enhancing the preparedness of the healthcare and social systems to mitigate the consequences of climate change. Similarly, another study emphasized the imperative of developing comprehensive programs aimed at enhancing communication between the health sector and climate-related initiatives (Sheehan et al., 2017). In essence, it is essential for healthcare professionals, government departments, and health organizations to actively engage in educating patients, the general public, and policymakers about the far-reaching effects of climate change on human health (Sarfaty et al., 2015).

In conclusion, these findings suggest that healthcare professionals who encounter patients affected by climate-related events advocate for the inclusion of preparedness protocols within the healthcare system. This includes hospitals, health insurance funds, and health offices. If necessary, internal procedures should be established to guide staff members in their response to emergencies. In cases where specific aspects of dedicated preparation for climatic events are lacking, efforts should be made to address these gaps by developing appropriate protocols. By implementing these measures, healthcare organizations can enhance their readiness to effectively manage the health risks associated with climate change and provide optimal care to those affected.

Conclusion

Climate change poses a significant threat to human health, and its global nature has led to increased attention from multilateral frameworks and international organizations. This study highlights the importance of enhancing knowledge and awareness among medical and nursing teams in Israel regarding climate change and its consequences. The research findings reveal that medical and nursing staff in Israel do not perceive climate change as a major public health threat. Therefore, there is a crucial need to raise awareness and develop preparedness for the climate crisis across all healthcare professions. The study also underscores the importance of implementing intervention plans and strategies to prepare medical and nursing teams for the challenges posed by climate change. Furthermore, integrating education on climate change and its impact on health into medical and nursing curricula is crucial. By addressing these issues, healthcare professionals can better understand the risks associated with climate change and contribute to mitigating its effects on public health.

There is an urgent need to develop educational programs targeting the general public and healthcare professionals on adapting to climate change. Additionally, government ministries should regularly evaluate the preparedness of medical and nursing teams in dealing with natural disasters caused by climate change. This evaluation should encompass factors such as knowledge, awareness, willingness to take action, and availability of necessary equipment for treating individuals affected by extreme weather events like floods and droughts. Moreover, enhancing the teams' readiness to respond can be achieved through four key pillars: increasing knowledge, providing training to the teams, ensuring accessibility of relevant information, and fostering research efforts. By addressing these aspects, we can better equip healthcare professionals to effectively respond to climate-related emergencies and protect the well-being of individuals and communities.

Research Limitations

The conducted research is subject to several limitations. Firstly, the cross-sectional study design used in this research restricts the ability to infer causal relationships. Another limitation pertains to the sampling process. In this study, the approach involved appealing to the entire target population through an electronic questionnaire, which was distributed to various nurses, doctors, and physicians across different hospitals in Israel. This approach introduces the potential for selection bias and restricts the generalizability of the findings to all healthcare professionals in Israel.

Recommendations for Research and Policy:

Several recommendations emerge from this study. Firstly, the development of educational programs is crucial for both the general public and healthcare system personnel to enhance their preparedness for climate change adaptation. Additionally, government ministries should regularly evaluate the competency of medical and nursing teams in addressing climate change-induced natural disasters. This evaluation should encompass factors such as knowledge, awareness, willingness to take action, and the availability of necessary equipment for treating victims of extreme weather events like floods and droughts.

Moreover, enhancing the readiness of these teams to respond effectively rests upon four primary pillars: bolstering knowledge, providing comprehensive training, ensuring the accessibility of information, and fostering research initiatives."

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Unlocking the Potential: A Guide to Managing Employees with Disabilities

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Abstract

This article discusses managing employees with disabilities in the workplace. It highlights the significance of inclusivity, training, flexibility, open communication, and proactive efforts to create an inclusive environment for these employees.

Research Background: Hiring and retaining employees with disabilities boosts productivity, innovation, and performance. Managing this workforce demands a proactive and inclusive approach to overcome barriers and promote equal opportunities in the workplace.

Purpose of the Article: This article offers insights and tips for managing employees with disabilities helping organizations create inclusive, supportive workplaces that foster success and well-being. It is a guide for employers and managers to promote inclusion and empowerment.

Methods: This article reviews literature, best practices, and case studies on managing employees with disabilities. It gathers insights from academic research, industry reports, and professional publications. The methods include examining current strategies used by organizations for a diverse workforce inclusive of those with disabilities.

Findings & Value Added: This article emphasizes the value of inclusivity, training, flexibility, ability-focused approaches, open communication, and proactive inclusion efforts. These strategies boost employee engagement, productivity, and overall organizational success. The article offers practical recommendations to guide organizations in managing workforce diversity, particularly for employees with disabilities.

Keywords: employees with disabilities, workplace inclusion, diversity management accommodations, disability awareness

JEL classification: M5, M21, L1, D4

1. Introduction

The inclusion of employees with disabilities in the workforce has become an increasingly important topic in contemporary society. Organizations are recognizing the value and potential of individuals with disabilities and are striving to create inclusive work environments that support their employment and career development (Keisling et al., 2022). This article examines the management of a population of employees with disabilities, exploring various aspects related to their inclusion and well-being in the workplace.

The background for this is both the academic and social understanding of disability and the demographic background of the developed countries that are undergoing a process of aging and reduction of the workforce (Zhu et al., 2019) and the increasing emphasis on equal opportunities in the workplace, more people with disabilities enter the workforce (Gould, et al., 2020). This is seen as a positive development in creating diverse and inclusive workplaces. Traditionally, diversity management strategies regarding disability have often followed an identity-conscious approach. In this approach, employees with disabilities are labeled as such, and specific management programs, like workplace accommodations, are designed to address their needs. Workplace accommodations are adjustments to the job, work environment, or work processes to reduce physical and social barriers for people with disabilities. Under the identity-conscious approach, employers assume that employees with disabilities face lower organizational status and are victims of discrimination and stigmatization. Consequently, they reactively adopt reasonable accommodations to meet legal requirements and mitigate the perceived inferior status of these employees (Colella and Bruyère, 2011, p. 478).

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However, it is important to note that while the identity-conscious approach has been a common strategy, there is a growing recognition of the need for a more proactive and inclusive approach to diversity management, especially concerning disability. This evolution in thinking acknowledges that people with disabilities should not be seen primarily as victims needing assistance but as valuable contributors to the workforce who can bring unique skills and perspectives. Employers are increasingly shifting towards a broader, identity-blind, and inclusion-focused approach to diversity management. This approach emphasizes creating an inclusive work environment where all employees, regardless of their disability or other diverse characteristics, have equal opportunities, are valued for their contributions, and can thrive without feeling stigmatized or singled out. This shift in perspective recognizes that diversity and inclusion are not just about complying with legal requirements but about harnessing the full potential of all employees, including those with disabilities. Employers are encouraged to move beyond merely accommodating disabilities and instead focus on fostering an inclusive culture that welcomes and supports all employees, irrespective of their backgrounds and abilities. This shift can lead to a more productive, innovative workforce and a stronger, more inclusive organizational culture (Fuchs, 2018).

Historically, workplace accommodation has primarily focused on meeting the needs of people with disabilities (Baldrige & Swift, 2013). While this approach is important for ensuring equal opportunities and full employment for people with disabilities, it tends to overlook the potential effects of accommodation on other important stakeholders, such as coworkers without disabilities (Schur et al., 2014). Scholars and experts advocate transitioning from the identity-conscious approach to a broader identity-blind approach in diversity and inclusion efforts. The identity-blind approach emphasizes creating equal and inclusive environments for all employees, regardless of their diverse characteristics. The identity-blind approach recognizes that workplace accommodation should extend beyond people with disabilities. It should also consider the needs of other groups, such as older workers, pregnant women, employees with religious needs, and those with family responsibilities. These individuals may require accommodations like flexible working schedules and family-friendly programs. One of the challenges highlighted in the passage is the lack of research on the positive effects of workplace accommodation for employees without disabilities. Most studies have focused on the positive effects of people with disabilities or cost-benefit analyses for employers. This gap in knowledge limits the promotion of workplace accommodation in organizations and hinders the realization of the full potential of both employees with and without disabilities (Man, 2020).

The importance of this topic is underscored by several scholarly articles that shed light on different dimensions of managing employees with disabilities. One key aspect of effective management is the provision of accommodation. Schur, Nishii, Adya, Kruse, Bruyère and Blanck (2014), explore the accommodation practices for employees with and without disabilities, highlighting the importance of creating an inclusive and supportive workplace. Accommodations can range from physical modifications to the work environment to flexible work arrangements, assistive technologies, and adjustments in job tasks or schedules. Such accommodations aim to level the playing field and enable employees with disabilities to perform their roles effectively.

In addition to accommodations, promoting inclusivity is crucial in managing a population of employees with disabilities (Fuchs, 2022). Organizations must foster a culture that values diversity, educates employees about disability issues, and encourages respectful and inclusive behavior. By focusing on abilities rather than disabilities, employers can create an environment where individuals with disabilities are valued for their skills, talents, and contributions. This approach not only benefits employees with disabilities but also enhances overall organizational performance and innovation (Gupta et al., 2023).

Another important factor is providing training and resources to managers and supervisors. Managers play a critical role in supporting employees with disabilities, and they need to be equipped with the knowledge and skills to effectively manage this population. Training programs can cover topics such as disability awareness, communication strategies, understanding legal obligations, and best practices for providing reasonable accommodations. By investing in manager training, organizations can create a supportive and inclusive management culture that positively impacts the experiences of employees with disabilities (Keisling et al., 2022).

Open communication is vital in managing a population of employees with disabilities. Employers should create an environment where employees feel comfortable discussing their disability-related needs and concerns. This includes encouraging open dialogue, active listening, and addressing any potential barriers or misconceptions. By fostering a climate of trust and understanding, organizations can ensure

that employees with disabilities have a voice and can actively participate in decision-making processes that affect their work and well-being. In short, managing a population of employees with disabilities requires a comprehensive and inclusive approach. Accommodations, promoting inclusivity, providing training, and encouraging open communication are essential elements in creating an environment where employees with disabilities can thrive. The scholarly articles referenced in this introduction provide valuable insights and research on different aspects of managing employees with disabilities, contributing to our understanding and knowledge in this field. By implementing effective management strategies, organizations can harness the talents and potential of individuals with disabilities and create inclusive workplaces that benefit everyone involved (Ghosh, Liu & Mishra, 2022).

Articles presented here and others in the field contribute valuable empirical research, program evaluations, and employer perspectives. By analyzing and synthesizing information from these sources, researchers can gain deeper insights into effective management strategies and better understand the barriers and opportunities in employing individuals with disabilities. This body of knowledge aids in promoting more inclusive and supportive workplaces for all.

Keisling, Crispin, and Cone's (2022) article evaluates the outcomes of a leadership academy designed to enhance disability services among state employees. It offers insights into the effectiveness of this program and its impact on the management of employees with disabilities. Ghosh, Liu, and Mishra's (2022) article present a cross-organizational review of labor market participation for employees with disabilities in India. It explores challenges and opportunities related to disability employment across various organizations and sectors. Houtenville & Kalargyrou (2012), focusing on the leisure and hospitality industry, this article delves into the viewpoints of employers regarding recruitment practices and challenges in employing individuals with disabilities. While specific to one industry, it sheds light on broader challenges employers face in managing employees with disabilities.

2. Methods

This article employs a comprehensive approach to explore effective strategies for managing employees with disabilities in the workplace. By utilizing these methods, this article aims to provide an overview of the key strategies and practices contributing to successfully managing employees with disabilities. The research draws from various sources to offer valuable insights and actionable recommendations for employers and managers seeking to create inclusive and supportive workplaces. To gather relevant insights, the following methods were utilized:

Literature Review: A thorough review of existing literature was conducted. This included academic research papers, industry reports, and professional publications. The review encompassed various sources to compile an extensive and diverse set of perspectives and findings.

Analysis of Best Practices: This article analyzed best practices in disability management. Insights were drawn from successful strategies implemented by various organizations to effectively manage a diverse workforce, specifically focusing on employees with disabilities.

Case Studies: Real-world case studies were examined to provide practical examples of effective management strategies. These cases shed light on how organizations have successfully promoted inclusion and empowerment among employees with disabilities.

3. Results

The results of several key studies shed light on various aspects of managing employees with disabilities, offering insights into the critical role of employer practices, workplace climate, acceptance, and supportive policies. These findings underscore the need for a holistic and multi-faceted approach to manage the population of employees with disabilities effectively. A positive workplace climate, acceptance, and supportive policies are paramount in creating an inclusive work environment. Moreover, the results highlight the critical role of employer practices, including proactive efforts to foster inclusivity and accommodate the needs of employees with disabilities. Organizations can use these findings to inform their strategies and practices, ultimately creating a supportive and inclusive workplace that enhances the well-being and productivity of all employees, including those with disabilities:

1. Importance of Employer Practices and Workplace Climate (Von Schrader, Malzer & Bruyère, 2014): This study emphasizes the significance of employer practices and workplace climate concerning disability disclosure. The findings reveal that an employer's commitment to fostering a supportive and inclusive work environment plays a pivotal role in employees with disabilities' decisions to disclose their disabilities. A positive workplace climate, characterized by inclusivity and support for reasonable

accommodations, substantially increases the likelihood of disability disclosure. Conversely, a negative or unsupportive work environment acts as a formidable barrier to disclosure, hindering the effective management of employees with disabilities.

2. **Factors Influencing Acceptance (Vornholt et al., 2013):** This study explores the factors influencing the acceptance of people with disabilities in the workplace. The findings reveal a complex interplay of elements that impact acceptance. Positive attitudes and perceptions of disability, a deep understanding of disabilities, previous experience working alongside individuals with disabilities, and supportive organizational policies and practices contribute to higher acceptance levels. Conversely, negative stereotypes, a lack of awareness or understanding, and limited accommodation resources can impede the acceptance and effective management of employees with disabilities.

3. **Individual and Organizational Factors (Vornholt et al., 2018):** This study provides a comprehensive overview of disability and employment, emphasizing key factors for managing employees with disabilities. The results underscore the importance of individual characteristics, such as self-efficacy and coping strategies, in facilitating the successful employment and management of individuals with disabilities. Additionally, organizational factors, including supportive policies, practices, and workplace accommodations, significantly contribute to positive employment outcomes for employees with disabilities.

4. Discussion

The research results presented in the articles mentioned offer a profound understanding of the pivotal factors contributing to successfully managing employees with disabilities. These findings underscore the complexity of effectively managing a diverse workforce that includes individuals with disabilities. Our research findings highlight the multifaceted nature of disability management. Employers and organizations are strongly encouraged to adopt a proactive approach to creating supportive work environments. This approach entails the implementation of inclusive policies and practices, along with active efforts to transform attitudes and foster a culture of acceptance within the workplace.

By addressing both individual and organizational factors, organizations can empower their employees with disabilities to not only succeed but also thrive. This benefits the individuals by providing equal opportunities and support and contributes to the organization's overall success and diversity. These insights serve as a valuable guide for organizations seeking to enhance their disability management strategies and promote truly inclusive workplaces.

The research findings hold profound implications for organizations and employers committed to creating environments where all employees, including those with disabilities, can flourish and contribute their unique talents and perspectives:

1. **Significance of Employer Practices and Workplace Climate:** The study by Von Schrader, Malzer, and Bruyère (2014) underscores the importance of employer practices and workplace climate. It highlights that a positive and inclusive work environment is paramount for employees with disabilities to feel comfortable disclosing their disabilities. When organizations create an atmosphere that values diversity and embraces disability inclusion, they foster trust and enhance the overall management and well-being of their employees with disabilities. This finding calls for proactive efforts from employers to establish inclusive policies, engage in disability awareness training, and develop practices that demonstrate a commitment to inclusion.

2. **Importance of Acceptance and Attitudes:** The research conducted by Vornholt, Uitdewilligen & Nijhuis (2013) and Vornholt, Villotti, Muschalla, Bauer, Colella, Zijlstra & Corbière (2018) further underscores the significance of acceptance and attitudes towards employees with disabilities. Positive attitudes, knowledge about disabilities, and previous experience working with individuals with disabilities contributed to greater acceptance. Employers can be pivotal in promoting understanding and dispelling misconceptions about disabilities within their organizations. By fostering a culture of acceptance and support, employers can create an environment where employees with disabilities feel valued and included.

3. **Individual and Organizational Factors:** The study by Vornholt, Villotti, Muschalla, Bauer, Colella, Zijlstra, and Corbière (2018) emphasizes the role of individual factors, including self-efficacy and coping strategies, in determining the employment outcomes of individuals with disabilities. Organizations can support their employees by providing resources for skill development, self-advocacy training, and career advancement opportunities. Moreover, organizational factors, such as supportive policies, practices, and accommodations, are critical for facilitating the successful integration and management of employees with

disabilities. Clear policies and procedures for disability accommodations should be established to ensure employees have access to the necessary resources and support to excel in their roles.

Conclusion

In conclusion, the research on managing the population of employees with disabilities highlights the significance of creating inclusive and supportive work environments. The results emphasize the importance of employer practices, workplace climate, acceptance, and supportive policies in effectively managing employees with disabilities. To successfully manage employees with disabilities, organizations need to foster a culture that values diversity, promotes inclusivity, and provides appropriate accommodations. Employers should invest in disability awareness programs, training, and resources to enhance understanding and acceptance within the workforce.

Individual characteristics, such as self-efficacy and coping strategies, play a role in the employment outcomes of individuals with disabilities. By providing opportunities for skill development and career advancement, organizations can empower employees with disabilities to reach their full potential. The findings highlight the need for a comprehensive approach that addresses both individual and organizational factors. By implementing inclusive practices, promoting positive attitudes, and offering support, organizations can create an environment where employees with disabilities can thrive and contribute effectively.

Overall, the research underscores the importance of recognizing the abilities and potential of employees with disabilities and integrating them into the workforce with equal opportunities. By embracing diversity and providing the necessary support, organizations can create a more inclusive and equitable work environment for all employees.

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Examining Employee Commitment during Crises

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Abstract

Research background: Having just overcome the coronavirus epidemic, Central and Eastern European's organizations are facing another crisis, the energy crisis resulting from the conflict between Ukraine and Russia. The flood of refugees, dependence on Russian natural gas imports and extreme inflation are all factors of economic and social problems which have a significant impact on the functioning of the organizations. High energy prices, weakening purchasing power of money, wage tension and a sense of insecurity have a significant impact on employees' trust and loyalty to their organization.

Purpose of the article: The aim of the study was to assess the commitment of Hungarian employees to organizations in the light of the crises of recent years.

Methods: For the primary research, we conducted a questionnaire survey among Hungarian SMEs in the spring of 2023. The target group for the survey were actively employed Hungarian employees. We chose the snowball method as the sampling method. Our research followed the logic of deductive research, whereby we formulated two hypotheses based on theory and similar research and tested them using statistical methods.

Findings & Value added: Our research has statistically shown that the more an employee can identify with the problems of the organization, the stronger their commitment to the organization. Furthermore, we found a significant relationship between employee commitment and trust in the organization. In times of crisis, it is even more important for organizations to do all they can to improve employee commitment, which can be helped by communicating with employees, involving them in solving organizational problems and reassuring employees that they can count on the organization's support in all circumstances.

Keywords: organizational commitment, employee trust, crises, small and medium enterprises, Hungary

JEL classification: O12, D81

1. Introduction

An unexpected negative event has an impact on the relationship between the employee and the organization. Organizations' response to an unwanted crisis is limited to internal activities such as prevention and preparedness, recovery from the difficulties and utilization of opportunities, which can be achieved through a supportive environment, effective communication, adequate digital preparedness and commitment. The key to effective crisis management is leadership commitment and appropriate communication. The task of management is to create a sense of security and trust, and to ward off fear and anger (Mohamad et al., 2022). Crisis situations cause mistrust, the relationship between organizations and their employees becomes unbalanced, employees are sensibly affected by the unpredictable situation of their organization and the management's crisis reaction (Chang et al., 2021). At the organizational level in particular, it is the role of HR management to carry out these tasks. HR management is the decision-making and proposing body for all activities that affect employees, thus influencing employee commitment (Al Doghan, 2022). The biggest sufferer of crisis situations is the SME sector, it is still questionable to what extent HR management is able to support SMEs in difficult times, which gives room

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for research to fill the gap. To avoid difficulties and solve existing problems, committed management and employees are needed (Prouska et al., 2023).

In the management theory literature, commitment refers to the employee's attachment and loyalty to the organization and identification with the organisation's values. If the value system of the organization can be matched by the value system of the individuals, the commitment to the organization increases, in the opposite case, if the value system conflicts, then the commitment decreases or becomes completely insignificant (Mangaliso et al., 2021). In fact, organizational commitment is an emotional state that influences an employee to stay or change jobs. This psychological relationship between the organization and the employee has an impact on the effectiveness of the organization and on the performance of employees and their satisfaction with their organization. In addition to the emotional attachment to the organization, commitment also includes the costs of leaving the organization and the ethical aspects of staying with the organization, which affect the intention of employees to leave (Ölçer & Coşkun, 2021). A committed employee is proud to be a part of the organization. The leader's personality and leadership style also contribute significantly to employee commitment. If a manager leads by example and continually encourages their employees, the chances of commitment to the organization increase. Through humane and ethical management, employees are willing to invest more time, energy and money in their work (Cheng et al., 2022). The precise clarification of tasks and performance-related expectations, as well as the reward for a job well done, are factors that increase employee commitment (Ngwama & Ogaga-Oghene, 2022). An employee who is committed to the organization has a good understanding of its operational mechanisms, can identify with the profile of the organization, the decisions of the management and the employees who work in the organization. The chance of commitment can be seen at the very early stage, when joining the organization. The process and depth of the formation of social relations within the organization can also affect the development of emotional and cognitive attachment and loyalty (Yuesti & Adnyana, 2022). Employee commitment also increases organizational commitment. The stable organizational background provided to employees significantly influences their vision of the future. If they feel important and valued, they can identify with the organization's problems, as well as fight with the biggest challenges for the survival of their organization (Maryati & Astuti, 2022). The commitment to the organization is the result of a two-way process, according to which, on the organizational side, it is possible to encourage the employee's productivity, increase his willingness to act, and strengthen his confidence by providing suitable working conditions. Establishing a mutual relationship based on trust is a lengthy and time-consuming task, the result of which is the development of employee creativity and full commitment to the organization. Involving employees in decision-making not only enhances the psychological connection of employees with their organization, but also provides a significant competitive advantage through the sharing of new experiences and ideas (Słupska et al., 2022). Some demographic characteristics, such as educational attainment, age and marital status, are important determinants of employee commitment. Nevertheless, the position in the workplace, the working time and the satisfaction of the basic needs of the employee are important aspects (Hussein et al., 2022). In a recent study, Gašić and Berber (2023) show that flexible working hours have a positive effect on employee commitment and turnover reduction, which is most pronounced among highly skilled employees.

Trust is one of the forces that hold society together. It is a glue between the employee and the organization, enabling the employee to identify with the values of the organization, and facilitating greater participation in solving organizational problems and achieving organizational goals (Jiang et al., 2022). Trust is based on cooperation between the organization and the employee, which is a key factor in increasing efficiency and quality of work and building long-term relationships (Aristana et al., 2021). Commitment, loyalty and trust in the organization contribute significantly to employee satisfaction, which reduces the thought of changing jobs and increases performance and responsibility (Abdelazim Ahmed et al., 2022). Trust is the key to building a stable organization, a bond based on ethical values between management and employees. It is an essential component of the organization to achieve development directions and breaking points (Yuan et al., 2022).

In addition to many other advantages of remote working introduced as a result of the coronavirus epidemic, being away from the organization appeared as a negative consequence, which reduced loyalty to the organization. Nevertheless, in a positive sense, the pandemic may have inspired employees and their organizations to fight the health crisis together. External environmental disruptions affect internal stressors and conflicts, but mutual cooperation and cohesion deepen the sense of commitment to the organization (Mihalache & Mihalache, 2022).

2. Methods

The aim of the present study was to assess the organizational commitment of employees in the Hungarian SME sector in the light of the crises of recent years. In our own research, we followed the logic of deductive research. The theoretical framework was summarized based on the research problem, according to which we also formulated our own hypotheses. An online questionnaire survey was used to conduct the primary research. The sampling method was the snowball sampling, whereby the potential respondent could forward the questionnaire to others.

The data collection was kept confidential by ensuring full anonymity of the potential respondent. The first part of the questionnaire asked for the respondent's demographic information (e.g., gender, age, education, place of residence, marital status). In the second half of the questionnaire, questions were asked about the respondent's organization and their relationship to it. The questionnaire used scale-type questions, where the respondent could rate each statement on a Likert scale from 1 (not at all) to 7 (completely). To check the measurement adequacy of the scales, the Cronbach's alpha reliability index was assessed.

After filtering out the incorrectly completed questionnaires, we managed to collect a total of 206 assessable questionnaires respondents. The sample is not fully representative. The data were statistically analysed. The data were subjected to a normality test. The data collected are from a normal distribution, so parametric statistical calculations were performed to test the hypotheses.

3. Results

H1: The more an employee can identify with the problems of the organization, the more committed is to the organization. We chose as our independent variable how much the individual feels ownership of the organization's problems and assumed that this would change their commitment to the organization. The change in the averages supported this, so we performed an analysis of variance to prove our hypothesis.

Table 1. Descriptive Statistics

	N	Mean
I don't feel that the problems of the organization are mine at all.	55	2.89
I feel that the organization's problems are partly my own.	112	4.34
I can fully identify with the organization's problems.	39	5.85
Total	206	4.24

Source: Own research (2023)

Our data showed a normal distribution, so we could run the test. The homogeneity of variance was impaired ($p=0.012$), so we looked at the results of the Welch test. There was a significant relationship between the two variables ($p=0.000$), so the Games-Howell test was used to test whether the mean differences between the groups were due to chance or were statistically proven.

Table 2. Welch robust test of equality of means

	Statistic ^a	df1	df2	Sig.
Welch	40.386	2	93.191	0.000

a. Asymptotically F distributed.

Source: Own research (2023)

Those who did not feel any ownership of the organization's problems and those who felt some ownership of the organization's problems differed by an average absolute difference of 1.448 mean points in their level of commitment to the organization ($p=0.000$).

The mean absolute difference between those who do not feel any ownership of the organization's problems and those who feel full ownership of the organization's problems was 2.955 ($p=0.000$).

There was a mean absolute difference of 1.507 between those who felt partly ownership of the organization's problems and those who felt fully ownership of the organization's problems ($p=0.000$).

Based on these results, it can be concluded that there is a significant difference between the groups, so our hypothesis is accepted.

Table 3. Games-Howell test for phase-wise comparison among the means

			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Games-Howell	I don't feel that the problems of the organization are mine at all.	I feel that the organization's problems are partly my own.	-1.448*	0.289	0.000	-2.14	-0.76
		I can fully identify with the organization's problems.	-2.955*	0.330	0.000	-3.14	-2.17
	I feel that the organization's problems are partly my own.	I don't feel that the problems of the organization are mine at all.	1.448*	0.289	0.000	0.76	2.14
		I can fully identify with the organization's problems.	-1.507*	0.260	0.000	-2.13	-0.88
	I can fully identify with the organization's problems.	I don't feel that the problems of the organization are mine at all.	2.955*	0.330	0.000	2.17	3.74
		I feel that the organization's problems are partly my own.	1.507*	0.260	0.000	0.88	2.13

Source: Own research (2023)

H2: There is a significant relationship between trust in the organization and organizational commitment.

We chose to trust in the organization as the independent variable. By changing this we made our dependent variable, which was organizational commitment. We started by examining at the averages and found that as trust in the organization increases, and organizational commitment also increases. To prove a significant difference between the groups, we performed an analysis of variance.

Table 4. Descriptive Statistics

	N	Mean
I don't trust my organization.	34	2.91
I trust my organization conditionally.	105	4.89
I trust my organization.	67	6.34
Total	206	5.03

Source: Own research (2023)

Our data showed a normal distribution, so we could run the test. In the test, the homogeneity of variance was impaired ($p=0.002$), so the Welch test showed a significant relationship ($p=0.000$) between the two variables.

Table 5. Welch robust test of equality of means

	Statistic ^a	df1	df2	Sig.
Welch	90.528	2	86.051	0.000
a. Asymptotically F distributed.				

Source: Own research (2023)

Then we examined the differences between the groups. Those who had no trust in their organization and those who had conditional trust in their organization differed in absolute terms by an average of 1.974 mean points ($p=0.000$).

In the case of those who did not trust their organization at all and those who fully trusted their organization, this absolute difference was 3.432 ($p=0.000$).

In absolute terms, 1.458 differences could be detected between the groups where employees conditionally or fully trusted their organization ($p=0.000$). Based on the results, our hypothesis H2 is accepted, with significant differences between the groups.

Table 6. Games-Howell test for phase-wise comparison among the means

			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Games-Howell	I don't trust my organization.	I trust my organization conditionally.	-1.974*	0.280	0.000	-2.65	-1.30
		I trust my organization.	-3.432*	0.271	0.000	-4.09	-2.78
	I trust my organization conditionally.	I don't trust my organization.	1.974*	0.280	0.000	1.30	2.65
		I trust my organization.	-1.458*	0.181	0.000	-1.89	-1.03
	I trust my organization.	I don't trust my organization.	3.432*	0.271	0.000	2.78	4.09
		I trust my organization conditionally.	1.458*	0.181	0.000	1.03	1.89

Source: Own research (2023)

4. Discussion

There is currently a labour shortage in Hungary. It is important for organizations to measure the satisfaction of their employees, to look for the motivational factors that will keep them with the organization in the long term. As a result, turnover decreases and employee satisfaction increases, as demonstrated in the theoretical framework of Krajcsák's (2022) research. Our research was carried out during the crisis of the last few years, which caused an uncertain situation in the labour market. This was the inspiration for our research.

Our hypothesis H1 was that the more an employee can identify with the organization's problems, the more committed is to the organization. This critical period has affected many organizations, just think of the automotive industry. People's jobs have become insecure. Employees who cannot identify with the problems of the organization have low commitment to the organization. In this situation, these employees feel insecure about their jobs or their livelihoods and look for a new organization. Employees who understand the problems of the organization, are committed to the organization in the long term. For them, changing jobs is not the goal, they are trying to understand temporary problems. These employees are

committed to the organization. They are worth paying extra attention to because they drive the organization forward. A common mistake in organizations is not paying enough attention to long-standing employees. The confirmation of our hypothesis H1 can be identified with Lazar et al.'s (2022) international research among logistics companies that achieving employee commitment is the task of the organization. A committed employee treats problems as his own and sees organizational success as his own. It is important that the organization monitors the personal interests and development of each employee, even with regard to age, professional experience and time spent in the organization. We also agree with the findings of Pramudya and Schmuck (2022), who showed in their research in the sector of small and medium-sized family businesses that identification with the organization is associated with deep commitment, which also strengthens staying in the organization.

Our hypothesis H2 show a significant relationship between trust in the organization and organizational commitment. In the theoretical framework of their research, Domokos and Baracska (2022) emphasize the importance of an atmosphere of trust, which is the cornerstone of commitment to the organization, and thus selfless action for the benefit of the organization. People are distrustful at first, and this is also true of the organization. But over time, trust in the organization needs to develop. If this does not happen, organizational commitment will remain low. Pikos (2022) argues in her study, that recent crises have had a profound impact on trust in the organization. The organization must recognise this problem and find a solution. In their research on diversity management, Alshaabani et al. (2022) found that trust is a reciprocal process between the organization and the employees, which is mostly influenced by HR management. Building trust and commitment to an organization is interacting factors, as our research shows. Above all, it is important to communicate honestly and effectively. The best confidence builder is when members of the organization can convince the prospective employee why they should choose the organization. In such a crisis situation, without the presence of trust, the employee will not commit to the organization and will change jobs. This means extra costs for the organization, as it has to find new employees. In their research, Sarihasan et al. (2022) also emphasise the importance of mutual trust, the tendency to be productive, motivated and effective communication within an organization, especially in a negative and unexpected event.

Conclusion

This period of crisis has further highlighted the need for the organization to pay more attention to its employees. High inflation can cause fluctuations in itself, since the catch-up of wages usually lags behind the rate of inflation or follows it only later, and this also makes employees think about their fundamental loyalty.

Our research shows that the problems of the organization need to be communicated clearly and openly to its members. There are difficult times in the life of any organization, and this is natural in a crisis. Employees need to understand what is happening and be reassured that the organization is there for them. If a possible layoff is necessary, this must also be communicated openly and clearly, and the employee must also be helped to find a job. The definition of the problem and the possible solution to it can make the employees committed, as they see the possible vision of the future.

Trust in the organization is low at first but increases over time. In addition to proper communication, trust in the organization is essential. This is a factor that affects organizational commitment. Without trust in the organization, turnover is high, which is basically higher in times of crisis. The organization must give itself to the employee, without which trust cannot be built.

The research revealed that organizational commitment depends on several factors. At the same time, proper communication and the openness of the organization towards the employee can increase organizational commitment. The crisis has highlighted the value of employees and the need to measure their trust in the organization and their ability to become part of the organization, to take ownership of the organization's problems, as these are what determine their long-term commitment.

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Force Field Analysis and Optimization – a Key Success Factor by Managing Changes

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Abstract

Research background: Fast changing business environment forces the enterprises to build an effective change management. Achieving goals and positive effects of changes is full of challenges. Primary, the success by implementation of changes depends on the precise preparation of a change and a favourable background for its realization. That is why an important role plays the analysis and creation of the favourable environment in a company, called a force field.

Purpose of the article: The aim of the paper is to present the proposal of methodology for the force field analysis and its optimization based on analysis of supporting and braking forces towards changes in a company and its application in a process of change management.

Methods: The methodology of the force field analysis represents the procedure and methods by conducting the FFA. The selected statistical and decision-making methods were used to assess the current state of the force field. The proposed methodology was verified by a case study in the chosen enterprise.

Findings & Value added: The contribution of this papers is the proposal of the complex methodology for analysis of the force field. The role of a positive force field within management of changes was underlined and methods for the force field analysis were suggested. The proposals can serve as a guide by preparation of suitable environment for carrying out changes. The results showed the importance of keeping favourable force field by building enterprise agility.

Keywords: force field, optimization, changeability, change management, enterprise agility

JEL classification: M10, O30

1. Introduction

The business success mostly depends on ability to utilize market opportunities. Reactions to changes of environment and customer's requirements demand to have sufficient current information. Substance of change management is planning and realization of changes on the base of continual monitoring the external or internal reasons for change with aim to secure a permanent increase of internal potential in enterprise. Current changing business environment forces the enterprises to be able perform changes anytime. How to successfully achieve change during economic crises is being asked by many organizations (Ashurst & Hodges, 2010). Digital technologies are breaking down industry barriers, destroying long-successful business models making the traditional competitive advantage deteriorate rapidly by (Rometty, 2016; Weill & Woerner, 2015). Change management as a managerial skill, has been marked as a critical competency in executive surveys (McCauley, 2006). The importance of change management in the present pandemic crisis was highlighted by several authors (Fusch et al. 2020; Hartmann & Lussier 2020; Zainol et al. 2021)

The general process for managing the change and types of changes were described by several authors (Fusch et al., 2020; Kotter, 2012; Kubíčková & Rais, 2012; Sujová, 2013). According to Aljohani, (2016), the process of change is driven by strategic considerations that include the need for improving business processes and integrating ways of working. Such considerations result in well-structured change management programs based on the assumption that the management of change would be done with limited interventions that are objective, linearly manageable and measurable in a short period of time.

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Regarding their opinions the process of change management can be divided to four basic phases (Sujová & Rajnoha, 2012):

- Analytical phase: analysis of initial situation of the enterprise (SWOT factors, force field factors) and determination of needed changes.
- Preparation phase: elaboration of project for proposed changes.
- Implementation phase: defrosting, realization of changes and freezing new conditions.
- Control phase: monitoring achieved effects of changes.

Implementation of a successful change program is full of challenges. Achieving goals and positive effects of changes remains complicated. The success factors by leading the changes were examined in several studies (Zainol et al., 2021; Kotter, 2012; Dobrovič & Timková, 2017; Sung & Kim, 2021; Biggane et al., 2017; Walk, 2022). Most of success factors are common and relate to human factor, learning and communication activities during implementing changes.

Force field analysis (FFA) is widely used decision making tool for creating an organization environment prepared for change implementation. It was developed by Kurt Lewin in 1951 (Lewin, 1951). It helps identify the forces working for or against the desired outcome and allows organizations to develop strategies to address those forces. Typical characterization is that it is a method for identification and evaluation of different factors, assigning weights or scores to them, and analysing their perceived impact on the problem respectively desired change (Kumar, 1999, Kankaraš et al., 2020, McNett et al., 2022).

In the force field model, the force presents an influence existing in the firm, which can be categorized to groups as personal, relational, or systemic groups. The example can be traditions, prejudices, preferences which affect behaviour of people and their attitudes to changes. The other factors can be economic indicators, division of competences, personal features of people, emulation between individuals, mutual misunderstanding. All mentioned factors can be driving (supporting) or contradictory (braking) forces in dependence on situation and required change. (Kotter, 2012; Kubíčková & Rais, 2012).

According to Lewin (1951) the stability of systems and events is created on the base of activity of antistanding forces which try to change the status from stability to instability. In the organization exists a dynamic tension between mutually opposed forces keeping the balance (status quo). If nothing is done, the forces evoking and contradictory to changes are equally strong.

It is needed to know what forces affect the process of change in positive way and which in a negative one. Their knowledge and control is a substantial condition by successful realization of changes. If it comes to violation of forces acting for and against the change, it comes to change in direction to expected goals or against the goals. The situation can develop as follows: return to previous status quo or reaching another goal (Oreg & Berson, 2019).

The aim of the paper is to present a proposed methodology for the force field analysis and optimization based on assessment of supporting and braking forces towards changes in a company and its application in a process of change management. The purpose of the methodology proposal is to make the force field analysis understandable, usable and enforceable by managers in companies.

2. Methods

Based on scientific knowledge, the factors of the force field can be identified. Moving or driving forces support the changes have usually an objective character and affect the firm from outside, for example: rising competition, market globalization and new technologies. They can be found also inside the firm, for example advanced and enlightened individuals – experts, managers or other unsatisfied employees. Contradictory forces brake or block the change and have usually a subjective character and originate inside the firm, for example the lack of sources, internal regulations, contractual obligations. These forces can also affect the firm from outside, as a rigid structure of the sector, traditional customer habits and inflexible suppliers. Internal contradictory forces are mostly connected with aversion to changes or the fear from changes which rise from absence of information and experiences.

True equilibrium assumes that no change takes place because there is a perfect balance between the incoming forces. The opposing pressures of the driving and braking forces result in an approximately stable equilibrium, which is a transient equilibrium (Sujova et al, 2018).

Force field analysis according to Jumara (2005) or Lewin (1951) could be understood as 3 steps process. Firstly, it is necessary to unfreeze status-quo. Movement to a new state is the second step. Final step is refreezing of a new change to make it permanent.

Heinert & Galindo-Gonzales (2020) presents 5 steps recommended to conduct FFA, namely:

- focus on considering change and write it into the centre of paper,
- write supporting forces on the left and restraining forces on the right side of the page,
- allocate weight (score) to each force (1 to 5 from the low significance to the highest),
- sum up scores on each side and if supporting forces are outweighing change should be done, if it is vice versa considering steps to shift imbalance,
- to look at whole process holistically: collective forces for change must be under consideration and it is necessary to try minimizing against forces if it is possible, otherwise, if forces are insurmountable the change is not feasible.

Nowadays FFA is considered a powerful method for managing and planning change in organisations, and so for identifying different forces acting on a potential change issue, source, and strength of these impinging influences. In addition, quantitative and qualitative data for computer software could be gained by FFA (Walker, 2023).

Being possible to perform the change, it is needed to achieve the suitable force field where the driving forces are stronger than the restraining forces. It is the essence of the force field optimization. It requires to support positive, moving forces or minimize blocking forces and a new situation must be achieved: blocking forces become weaker and driving forces become stronger. (Kubičková & Rais, 2012; Sujova et al., 2018). The situation in the force field is depicted in figure 1.

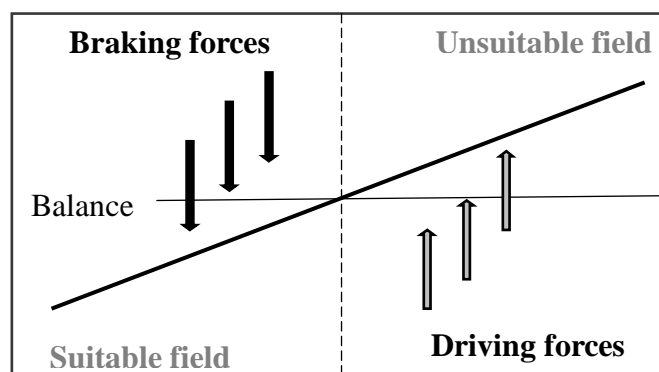


Figure 1. Force Field
Source: own processing (2023)

Description of the process of the force field analysis by several authors was the basis for proposal of the complex methodology for the FFA and its optimization. The designed methodology was verified in the small and medium enterprises. The proposal of the FFA methodology and its verification in the chosen company is presented in the paper.

3. Results

3.1 FFA Methodology Proposal

The methodology of the force field analysis represents the procedure and methods by conducting the FFA. The known information from authors dealing with FFA and its procedure represent only steps that should be done by FFA, the desired – optimal status of the force field by carrying out changes. We haven't found any complex methodology including methods, list of specified factors representing forces or guide how to proceed in FFA.

When drafting the methodology, we took into account the main recommendations of other authors and experiences of companies surveyed in several previous research. The presented proposal of FFA methodology as the result of own research differs from known knowledge:

- it is extended to more steps,
- it contains a guide how to perform each step,
- list of specific forces was created according to literature and surveyed companies,
- the methods were designed to reduce subjectivity in the analysis and at the same time they are understandable, usable and enforceable by managers in companies.

The proposed FFA is depicted in methodology Figure 2.

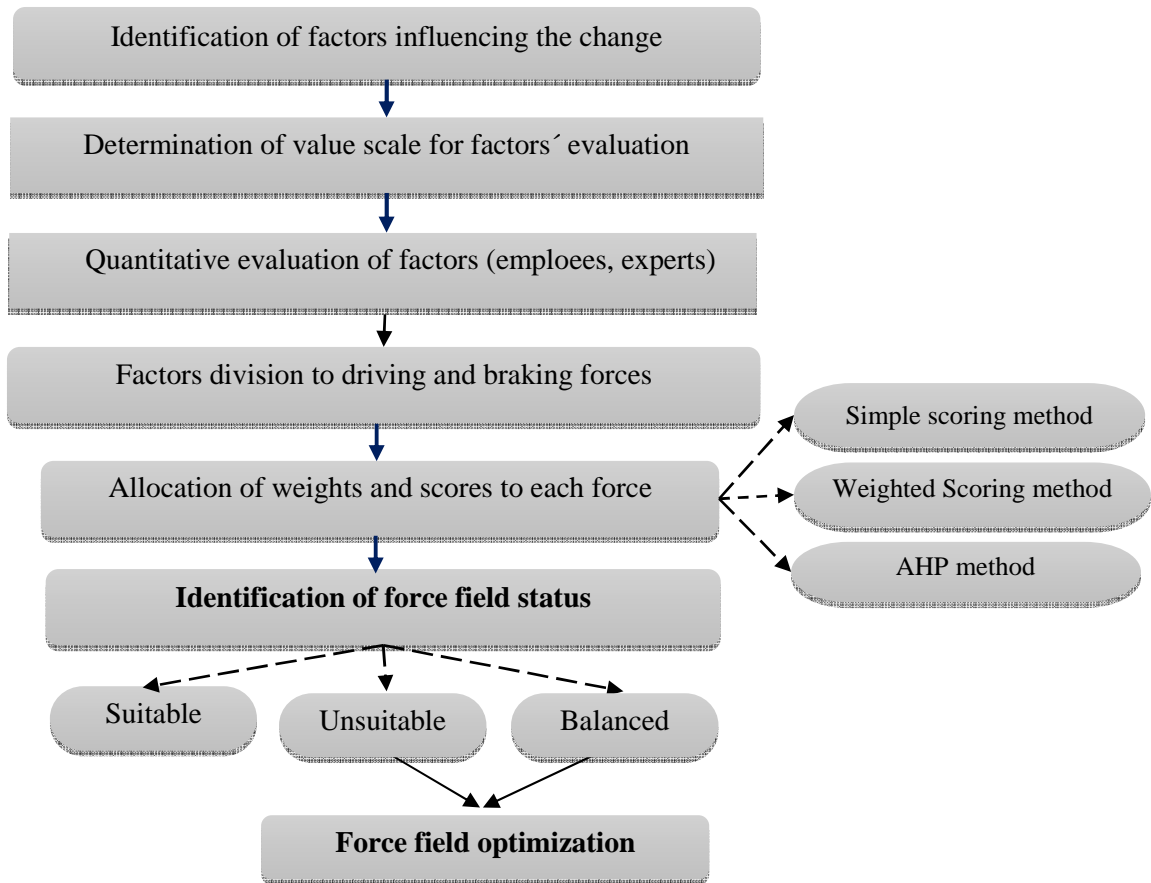


Figure 2. Force Field Analysis Methodology
Source: own processing (2023)

Step 1: Identification of factors influencing the planned change: creating the list of 10 – 20 factors that can have impact on change implementation:

Table 1. List of factors influencing the change implementation

Factor	Factor
Perceiving the importance of change in a company	Importance of further education and learning
Perceiving the changes as necessary and required	Understanding causes and nature of proposed changes
Fear from changes blocks their implementation	Benefits of change in work facilitation
Resistance and negative attitude to changes	Benefits of change in work acceleration
Fear from failure by implementation of changes	Level of informing about the proposed changes
Trust to managers and their ability to make changes	Level of training to changed working conditions
Level of preparing and planning changes	Monitoring effects of changes after implementation
Smooth implementation process by changes	Space for self-development by change implementation
Level of communication of changes with supervisors	Time space to adapt to changes
Opportunity to comment on prepared changes	Lose of the present status

Source: own processing (2023)

Step 2: Determination of value scale for factors' evaluation: the suggested scale to evaluate each identified factor is 1 – 5, where 5 is very good/strong, 4 is good/strong, 3 is neutral, 2 is bad/weak, 1 is very bad/weak.

Step 3: Quantitative evaluation of factors: the factors are evaluated by employees including managers or by experts, if the company enters into cooperation with a consultancy organisation by preparing and implementation of changes. However, our suggestion is to provide the evaluation of factors by 2 groups of people: employees including administrative and operational personnel and managers of the company. The

sample size should be representative and calculated according to formula calculated via <http://www.raosoft.com/samplesize.html> by 95% confidence level and 5% confident interval.

Step 4: Factors division to driving and braking forces: the results of quantitative evaluation of factors will show what factors are driving and what of them are blocking the change. Factors reaching values 5 and 4 are driving forces and factors evaluated by values 2 and 1 are braking forces.

Step 5: Allocation of weights and scores to forces in each group. This step is performed by the same group of people as in the step 3. The methods for this step are suggested as follows:

- *Simple scoring method:* identified forces in each group are evaluated within the scale 1 – 5 where value 1 means minimal significance and value 5 means maximal significance.
- *Weighted scoring method:* each factor within the group of forces is weighted from 0.0 (low) to 1.0 (high importance), while the sum of all weights shall be equal to 1,0 and scored within the scale 1-5. Weights can be assigned by suggestion of experts or managers. To avoid the subjective assignment, the relative frequency of scores by each force can be used.
- *Analytic Hierarchy Process method (AHP):* it is based on pair comparison of the degree of significance of individual factors and it results to ranking the weight of factors in each group of forces.

Step 6: Identification of force field status: summing up scores in each side of forces will show the present state of the force field in the company:

- **Suitable force field:** the sum of scores in the group of driving forces is over the sum in the group of braking forces
- **Balanced force field:** the sum of scores is the same in both groups of forces
- **Unsuitable force field:** the sum of scores in the group of driving forces is lower than the sum in the group of braking forces

Step 7: Force field optimization. This step represents proposals towards creation of favourable force field. The status of unsuitable force field indicates the need of its optimization. The first-rate task of a team managing a change is to minimize the negative attitudes through correct information slicing, education and training providing an increase of knowledge about the importance, goals and effects of changes and acquirement of new skills required after change. The balanced force field needs to be disturbed and driving forces supported.

The readiness of an enterprise to implement change has been identified by Beer in the form of several factors and expressed in a symbolic formula:

$$C = (D \times S \times P) > X \quad (1)$$

where: *C* – change, *D* - dissatisfaction with the current state of affairs, *S* - identifiable and desired target state, *P* - a practical plan to achieve the target state, *X* - cost of making the change.

If any expression in parentheses is close to zero, the change cannot be implemented. The change will only be realistic if the product of the factors in favour of the change exceeds the predicted cost of the change.

3.2 Application of proposed methodology in the company – results

The verification of methodology was provided in the company. The force field analysis was carried out in a manufacturing enterprise of SR, according to size, with a classification of small enterprises with a number of employees of 80. The questionnaire method for data collection was used containing 2 questionnaires. The sample size was 74 employees which is 92 % of all employees including managers in the analyzed company. The sample is representative by 99% confidence level and 3.14% margin error.

The first questionnaire consisted of 15 factors influencing the changes in the company. After evaluation by 5 points value scale, the 6 braking and 9 driving forces were identified. The second questionnaire was aimed at assessing the individual force field factors that block or promote change in the enterprise. The individual factors were rated by a weighted scoring method in order of importance on a scale of 1-5, with 1 being the least important and 5 being the most important. Weights have been assigned according to the relative frequency of median value in scores to avoid additional subjectivity. Results are presented in table 2.

Table 2. Evaluation of the blocking and driving forces in the company

Forces	Score (median)	Weight	Result scoring
Blocking forces			
Distrust of change managers	3	0.162	0.487
The emergence of problems in the implementation of change	3	0.150	0.450
Fear of failure in implementing change	2	0.194	0.388
Loss of status	3	0.181	0.544
Distrust of the unknown	2	0.144	0.288
Doubts about the need for change	2	0.169	0.338
Total	15	1	2.494
Driving forces			
New staff team	3	0.135	0.406
Sufficient staff awareness	4	0.098	0.394
New working technologies and procedures	3	0.127	0.382
Communication with supervisor regarding changes	4	0.107	0.426
Opportunity to comment on planned changes	4	0.101	0.402
Confidence about the need for change	3	0.111	0.333
Room for development during the change implementation	3	0.127	0.382
Training on implementing changes	4	0.095	0.380
Staff remuneration system	4	0.098	0.394
Total	32	1	3.499

Source: own processing (2023)

Presented results in table 2 have shown, that employees respect and adapt to changes, but they also consider changes to be a risk. They are afraid of a position loss or rise of problems by implementation of changes and they distrust to managers of changes. These factors represent a certain attitude of stagnation to changes in the company. Adapting to changes is really demanding not only for workers but also for managers. On the other hand, there was found out that all employees are informed about prepared changes sufficiently and they have possibility to express opinion to changes. Moreover, the employees have possibility to be trained to new changed conditions and they have space for consultation the implementation of changes with superiors and for their own development by change implementation. Every firm wants to have satisfied employees which perform the work the best. Employees are also motivated by suitable remuneration system which presents an advantage by realization of any change, and it also improve attitude to work.

Identification of the force field status: In the analysed company, the driving factors are highly over the braking factors by 17 scores within simple scoring and by 1.01 within weighted scoring. It is a status of a *suitable force field* which enables implementation of changes in the company. The main driving factor is a remuneration system. If the company would create supporting motivation in a form of rewards in connection with implementation of changes, it would improve attitudes to changes by employees who are afraid of changes or don't accept any change in their work and the success by realization of changes would be better. To eliminate forces braking a process of change, the company should minimize an antipathy to changes, fear from changes which are common attitudes of employees or people by changes.

4. Discussion

Ability of changes belongs to contemporary competitive advantages of a company. To perform changes successfully depends on many factors. A specific feature of change management is an awareness of factors which support, and which block realization of a change and they create so called force field in a company. To existence of the force field was pointed to in the work of Lewin (1951) who claim that it is important to have balance between factors of force field for implementation of changes. However, after providing several studies in companies, we found out, that in the process of managing a change it is necessary to create a positive force field. That means, it is needed to reach a status when supporting (driving) forces are stronger than blocking (braking) forces. Only in this environment the changes are feasible.

Models of managing a change according to several authors (Lewin 1951, Jumara, 2005; Kotter 2012) consist of three phases: defrosting, change realization and frosting, where factors of force field play the role. Our findings have shown that a role of force field analysis and utilization of its results can be included in following phases of change management:

- analytic phase: finding out a present status of force field in a company;
- preparation phase: proposals of measures for creation of favourable force field within project of change;
- implementation phase: in the first step “defrosting” the proposed measures are carried out when braking forces became weaker, so that a change can be performed in the next realization step and in the last step “frosting” it is needed to get forces to balance, so that achieved effects of change could be fixed;
- control phase: monitoring balance in a force field and its keeping.

Methodology for the force field analysis and optimization was designed. The existing 3 steps or 5 steps process suggested by Lewin (1951), Jumara (2005), Heinert & Galindo-Gonzales (2020), Walker (2023) was extended to 7 steps and the methods were suggested and described in more detail. The verification of the proposed FFA methodology in the enterprises confirmed its applicability.

In the presented case study, the force field status in the analyzed company is suitable for changes and its optimization is not needed. If the present status of a suitable force field is maintained, the company can be considered to be agile and ready for any change in any time.

Conclusion

The contribution of this papers is the proposal of the complex methodology for analysis of the force field. In works of authors dealing with this issue there is an absence of knowledge, how should be force field analysis carried out and what methods could be used to reduce a subjective approach.

Proposed complex methodology for the force field analysis was implemented in several companies. Results from one chosen company, presented in this paper, have shown the existence of a positive force field in the company for realization of changes. Utilization of the results consists in proposal of actions leading to weaker blocking factors and to stronger driving factors and their integration to phases of change management.

Results achieved by now in the issue of force field analysis within management of change provide a space for further development of knowledge in form of processing a set of measures for the force field optimization. The proposals can serve as a guide by preparation of suitable environment for carrying out changes. The force field analysis can provide insights into the forces influencing the change, it may serve as a complementary tool within a broader framework for measuring and assessing business agility.

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The Administrative Challenge of Managing a Police Station

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Abstract

Research background: Law enforcement has evolved from traditional crime control to broader responsibilities like community policing and crime prevention. Effective execution of these duties relies on police station management practices. With evolving challenges, comprehensive research on police station management is increasingly essential.

Purpose of the article: This study aims to achieve two goals: Firstly, it explores leadership, communication, motivation, and community engagement for better police station management. Secondly, it comprehensively examines police station management in the Israeli West Bank context, potentially impacting global law enforcement discussions. Ultimately, the research aims to improve officer well-being, strengthen community ties, and ensure efficient, unbiased policing services.

Methods: The research is action research within a qualitative method. The data was mainly analyzed thematically.

Findings & Value added: Effective police station management requires consistent leadership, clear expectations, and officer engagement for positive behavior. Proficient management reduces stress, regulates conduct, and boosts officers' well-being and competence. Leadership skills can be proactive or reactive, with proactive approaches involving tailored programs, meaningful participation, and focused routines for better officer engagement. Aligning daily duties with station pace, monitoring, reflection, and positive reinforcement produces superior results compared to reactive strategies.

Keywords: classroom management, discipline management, self regulation, cognitive behavioral intervention, behavior

JEL classification: O03, I01, I03, Z01

1. Introduction

1.1. Police station Leadership

Managing a police station is a multifaceted endeavor that requires adept leadership, streamlined organizational structures, effective communication strategies, and a strong commitment to community engagement (Casey & Mitchell, 2007). Police stations are the cornerstone of public safety and law enforcement within communities. Efficient management practices ensure citizens' well-being and foster positive relationships between law enforcement agencies and the communities they serve (Plank, 2021). Nevertheless, the dynamic and often demanding nature of police work, coupled with the diverse expectations of communities, underscores the necessity of well-informed and adaptable management techniques (Yüksel, 2015).

The existing literature offers insights into various aspects of police station management, ranging from leadership styles and officer motivation to community relations and organizational structure. Scholars have explored the impact of different leadership approaches, such as transactional and transformational leadership, on officer morale, job satisfaction, and overall performance (Noor et al., 2018). Studies have also delved into the influence of communication strategies on internal cohesion and external interactions, focusing on information flow within police departments and interactions with the public (Langbein & Jorstad, 2004).

1.2. Transactional vs. Transformational Leadership

Transactional leadership is a leadership approach that operates on the premise that the relationships between leaders and individuals are primarily driven by instrumental exchanges (Kark et al., 2016).

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According to this perspective, people are motivated to perform tasks by the instrumental rewards they receive from their leaders. In this context, rewarding leadership can be seen as a form of "business" leadership, where the leader assesses the situation and adapts the type of reward based on the situation's specific conditions and nature. The fundamental idea behind rewarding leadership is to establish a clear connection between the effort exerted and the rewards individuals receive. Transactional leaders actively engage in instrumental exchange relationships with their subordinates, strategically negotiating and supplying rewards (Yun et al., 2007).

Transformational leadership is a theory that goes beyond individual self-interests, emphasizing collaboration with teams or followers to recognize necessary changes. This involves creating a guiding vision for the change and using influence and inspiration to execute it. The leader works alongside committed group members, elevating their maturity levels, ideals, and dedication to achieving the shared goals. This approach fosters a shift from personal concerns to a broader focus on collective achievement (Odumeru & Ogbonna, 2013). Transformational leadership is a style that motivates individuals to achieve extraordinary outcomes (Bass, 1999). It empowers employees with job autonomy and decision-making authority, particularly after appropriate training. This engenders a positive shift in both individual attitudes and the overall organization. Transformational leaders typically exhibit four key behaviors, referred to as the four I's: Inspirational motivation, Idealized influence, Intellectual stimulation, and Individualized consideration. According to Bass, a leader's Transformational qualities are primarily measured by their influence on subordinates. Subordinates of formative leaders experience trust, admiration, loyalty, and respect, making them more motivated than initially expected. Bass identified three ways formative leaders shape and motivate subordinates: 1) Enhancing subordinates' awareness of the importance of task outcomes. 2) Persuading subordinates to prioritize the organization or team over personal interests. 3) Addressing higher-order needs of subordinates.

Bass proposed three key components of formative leadership: charisma, intellectual arousal, and consideration toward individuals. Charisma involves arousing intense emotions and fostering identification with the leader through encouragement and developmental experiences. A revised version of the theory introduced an additional behavior known as inspiration or inspirational motivation (Hosna et al., 2021). This component focuses on how leaders convey a compelling vision, utilize symbols to direct subordinates' efforts, and exhibit appropriate behavior to inspire their followers. This amended version of formative leadership theory provides a more detailed understanding of the leadership process, highlighting the importance of inspiring and motivating subordinates through visionary communication and symbol usage.

1.3. The applied goals of the leadership tools in the police station

As a head chief of a police station in the Israeli West Bank, Transactional and Transformational leadership (Adriansyah et al., 2020) can be highly relevant to police station management. Transformational leadership emphasizes the importance of inspiring and motivating individuals to rise to higher levels of values and motivation. Here is how it can apply to police station leadership:

Transformational leaders seek to address higher ideals and moral values, such as justice, equality, and peace. In a complex and sensitive environment like the Israeli West Bank, emphasizing these values can help foster a sense of fairness and create a more harmonious atmosphere within the police station. By consistently promoting these ideals, I can encourage my officers to uphold them in their interactions with the community.

Transformational leaders cultivate trust, admiration, loyalty, and respect among subordinates. These qualities are crucial for effective law enforcement and community engagement. By demonstrating integrity, transparency, and accountability in the leadership actions, the head chief can build trust and loyalty within his team, positively impacting their performance and the public's perception of the police force.

Transformational leaders persuade subordinates to prioritize the organization or the team over personal interests. One of the police station head chief role is to motivate the officers to understand the importance of their duties beyond individual ambitions. By highlighting the significance of maintaining security, promoting public safety, and ensuring justice. The head chief can inspire his team to work collaboratively and focus on the greater good of the community.

Transformational leaders recognize and address the higher-order needs of their subordinates. In a challenging environment like the Israeli West Bank, where officers may face stress and emotional strain, providing support mechanisms, promoting professional development, and creating opportunities for

personal growth are essential. The head chief can foster a more engaged and committed team by caring for his officers' well-being and professional advancement.

The Transformational leadership theory highlights the importance of conveying a vision in a heart-moving manner. The head chief should articulate a clear vision for the police station that aligns with maintaining law and order while ensuring respect for human rights and fostering positive community relationships. By effectively communicating this vision, the head chief can inspire his team and gain their commitment to shared objectives.

2. Methods

This study employs a qualitative research approach to explore the leadership effects on officers' motivation within the context of the Israeli police. The research is conducted as action research, focusing on practical interventions to enhance policing practices. Participants in this study include police officers within the Israeli police. The data was collected through interviews and surveys to explore officers' perceptions, motivating factors, views on their commanders, underlying values, and the correlation between station commanders' leadership values, station core values, and officers' daily task motivation. The data collection instruments were structured interviews and surveys designed for the data collection. The data collection procedure included in-depth interviews to gather rich qualitative data, and surveys were administered to collect quantitative responses. Ethical considerations were upheld, including informed consent and protection of participants' confidentiality. The data analysis includes Thematic Analysis, where the data was primarily analyzed thematically, allowing for a comprehensive exploration of the officers' perceptions and motivations.

The Intervention Study (Upcoming) will be the initial phase of the research, and it will serve as the foundation for an upcoming intervention study that will apply Transformational leadership principles to promote responsible, proud, and community-connected policing. The intervention program will take place within the management of a police station in the Israeli West Bank, focusing on inculcating discipline and appropriate behavior in police officers and the management of police offices.

3. Results

The insights gained from the analysis of the questionnaires can be valuable in shaping the leadership approach and improving the overall effectiveness of the police station. We can see that embracing formative leadership, fostering a values-based culture, building trust with the community, creating a shared vision, and empowering police officers all contribute to the success of the police station. By proactively addressing the insights from the research, we can enhance policeman satisfaction, strengthen community relations, and improve the overall effectiveness of the police force.

Here are some key takeaways and their relevance to your role:

The findings highlight the significant influence of commanders on the motivation of police officers and their connection to the community. As a Transformational leader, the head chief can inspire and motivate his officers by promoting higher values and ideals, such as justice, equality, and peace. Leading by personal example and showing appreciation for their work can positively impact officers morale and commitment to their duties.

Recognizing that police officers who identify with the goals of the police and feel a sense of purpose in their work are more satisfied than the other policeman, the head chief can proactively create a values-based culture within the station. A duty to protect and serve the community can enhance the officers' daily work and overall satisfaction.

Recognizing that police officers who identify with the goals of the police and feel a sense of purpose in their work testify that they are more satisfied than the other policeman, this could suggest that a values-based culture can be created proactively within the station. A duty to protect and serve the community can enhance the officers' daily work and overall satisfaction.

Establishing trust between the police and the community is crucial to effective law enforcement. Community engagement has emerged as a critical dimension of contemporary police station management. Police-community relations significantly influence trust, cooperation, and the perception of legitimacy. By understanding the community's needs and improving communication and training between officers and the public, the head chief can reduce friction and increase appreciation for the police. Researchers have investigated the effects of community policing initiatives, problem-solving approaches, and proactive measures on enhancing community partnerships and reducing crime rates. Additionally, studies have explored the complexities of building bridges with diverse communities, addressing cultural sensitivity,

equity, and social justice concerns. This will lead to a stronger connection between the police and the community they serve.

Developing a clear and shared vision for the police station based on the community's needs and aspirations is essential. By involving the community in the planning process, the head chief can foster a sense of ownership and partnership, leading to greater support and cooperation between the police and the public.

Acknowledging that police officers must feel their work is meaningful and aligned with their abilities, the head chief can seek to match tasks with their skill sets and interests. Empowering officers to take on roles as community leaders and entrepreneurs can enhance their self-image and motivation, leading to increased functional capacity and reduced attrition.

Understanding that some officers may struggle with feelings of low appreciation, creating an environment where open discussions about this concern can occur is essential. By providing support and recognition for efforts, even in challenging situations, the head chief can help improve officer morale and motivation.

4. Discussion

The insights from the analysis of the questionnaires shed light on crucial aspects of police station management, leadership, and their profound impact on police officers and the community they serve - a multifaceted nature of police station management, where leadership, values, community engagement, and officer satisfaction intersect. Moreover, by proactively implementing the insights from this research, police stations can enhance officer satisfaction, strengthen community relations, and ultimately improve the overall effectiveness of law enforcement. These strategies are not only relevant to the Israeli police but also resonate globally, offering valuable guidance for police station management and leadership practices worldwide. This discussion will delve into key takeaways and their implications for shaping effective leadership and improving overall police station effectiveness.

Leadership Approach and Building Trust: The findings emphasize the pivotal role of leadership in motivating police officers and fostering a connection with the community. Transformational leadership, characterized by inspiring and motivating officers through higher values and ideals, such as justice, equality, and peace, emerges as a potent strategy. Police leaders, particularly the head chief, can lead by personal example and demonstrate appreciation for officers' work. This approach positively influences officer morale and commitment to their duties, ultimately enhancing job satisfaction.

Values-Based Culture: The research underscores the significance of creating a culture within the police station. Officers who identify with the overarching goals of the police and find a sense of purpose in their work express higher levels of satisfaction. Proactively instilling a sense of duty to protect and serve the community can profoundly impact officers' daily work experience and overall job satisfaction.

Trust-Building with the Community: Effective law enforcement hinges on establishing trust between the police and the community they serve. Community engagement is pivotal in contemporary police station management, as it significantly influences trust, cooperation, and the perception of legitimacy. By comprehending the community's needs and enhancing communication and training between officers and the public, police leaders can reduce friction and bolster appreciation for law enforcement. Building bridges with diverse communities addressing cultural sensitivity, equity, and social justice concerns further solidifies the connection between the police and the community.

Shared Vision: Developing a clear and shared vision for the police station, one that aligns with the community's needs and aspirations, is essential. By involving the community in the planning process, police leaders can foster a sense of ownership and partnership. This collaborative approach increases support and cooperation between the police and the public, strengthening the station's effectiveness.

Empowerment and Task Alignment: Recognizing that officers must find meaning and alignment with their abilities in their work, police leaders should aim to match tasks with their skill sets and interests. Empowering officers to assume roles as community leaders and entrepreneurs can enhance their self-image and motivation. This empowerment increases functional capacity and reduces attrition rates, contributing to a more effective police force.

Recognition and support: Acknowledging the importance of addressing feelings of low appreciation among officers, police leaders should create an environment conducive to open discussions about this concern. Even in challenging situations, offering support and recognition for officers' efforts plays a critical role in improving morale and motivation within the police force.

Conclusion

From the officers' interviews, it becomes evident that effective police station management is marked by the consistent implementation of leadership procedures and routines that establish clear behavioral expectations for officers. This consistency not only brings about order but also cultivates trust. The active participation of officers in police station processes, integrated as a part of management strategy, plays a pivotal role in shaping positive officer conduct. The interviews underscore the notion that proficient management leads to stress reduction, behavior regulation, and an augmented sense of belonging, competence, and legitimacy among officers. Leadership skills pertinent to police station behavior can be categorized into proactive and reactive skills. Proactive skills encompass the design of programs tailored to offer meaningful officer experiences, enabling their involvement in decision-making processes. By embedding direction and focus into routine activities, officers' persistence in maintaining concentration, attentiveness, and participation in police station endeavors can be amplified. Proactively aligning officers' daily duties with the pace of the police station, incorporating monitoring and reflective procedures to comprehend the underlying reasons behind officer behaviors, and consistently employing positive reinforcements to influence behavior, achievement, engagement, and success are considerably more effective than employing reactive strategies in leadership for behavior management.

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Trends and Digitization of Human Resources Management - New Forms and Models

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Abstract

Research background: To ensure business sustainability and optimize performance capabilities, it is paramount to integrate prevailing trends into human resource management practices. Responding to emerging labor market dynamics has become a continuous mandate for organizations, given the rapid shifts in the business landscape. Consequently, an array of human resource management challenges persists and is expected to endure. The elasticity in demand and the increasingly abstract nature of work are revolutionizing essential managerial roles. The realm of HR management has acquired an unprecedented level of intricacy.

Purpose of the article: The purpose of the paper is to assess the extent of utilization of contemporary patterns within the realm of human resource management, with a specific focus on the phenomenon of digitization. The paper studies interconnections between a cluster of practices referred to as trends in human resource management, the dimensions of the organization, and employee turnover – a pivotal metric for organizational performance.

Methods: To achieve this, a compilation of 10 distinct trends has been identified, encompassing elements such as the integration of social network platforms in HR, job rotation, remote work arrangements including home office and remote working, metamorphic work setups, hybrid work models, and similar factors. These hypotheses are subsequently explored through a sequential exploration of correlations, utilizing Kendall's rank coefficient.

Findings & Value added: While the direct link between HRM trends and turnover remains unverified, the effectiveness of incorporated trends appears to be contingent upon the size of the organization. Within this context, we propose a contemporary array of systemic solutions that address the domains of HR trends and digitization.

Keywords: trends, human resources management, organizations, digitalization

JEL classification: M12, M54

1. Introduction

In general, organizations try to be more competitive and efficient and use modern procedures and technologies in the field of human resources to do so. This includes, for example, the use of human resource management software, process automation, a focus on improving the employee experience and culture, as well as employee development and growth. These trends are increasingly accepted and used in many organizations, but the specific level of use will depend on the specific organization and its goals and priorities.

Tom Marsden, director of professional services at Alexander Mann Solutions, said HR departments really need to add real value to their organisations. In the field of human resources management, the issue of the relationship between human resource management practices, business sustainability and organizational efficiency is a very intensively discussed issue. This trajectory of conversation has spurred a substantial volume of inquiries (Caligiuri et al., 2020; Gigauri, 2020; Meri, 2020), with a prevailing consensus strongly affirming a statistically meaningful positive correlation between existing trends in human resource management practices and operational efficiency.

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Notwithstanding these affirmations, the latent causal link between these practices and efficiency remains shrouded in obscurity. This obscurity underscores the necessity of presenting the tangible benefits stemming from investments in human resource management practices, for any investment decisions made without such presentation would be bereft of solid justification. Moreover, the challenge persists in methodologically quantifying the precise influence of human resource management practices on efficiency.

Individual studies and surveys carried out by different authors from different geographical areas and time periods devoted to the relationship between management, sustainability and performance confirm the existence of this relationship. A significant majority of them proved a positive correlation. Given the established statistical significance of this correlation, it becomes evident that companies are progressively adopting sustainability strategies due to its influence. These strategies are yielding novel outcomes across various facets of organizational performance, thereby culminating in an enhancement of companies' competitive prowess within the market. Deloitte conducted an examination into how the execution of a business sustainability strategy influences the organizational performance of firms (2011, 2012 and 2013).

Currently, human resource management is affected by many impacts and therefore several implications can be drawn. The results of a worldwide survey carried out by Cranet (2022) point to several facts. In the world ranking, key trends for 2020 in the field of human resources management include the so-called well-being (overall physical, mental and social well-being), as evidenced by 80% of the surveyed companies. This is followed by employee compensation (79%) and the third most important trend is: knowledge management, the changing role of HR and ethics. The most significant difference is in the perception of the importance of a multigenerational workforce. At the global level, 74% of respondents consider it important. Global companies are the least prepared for digitization and integration of artificial intelligence and generally for introducing technologies into their teams. The above study identifies significant trends in human resources, making it the largest global study on human resource management, talent management and related topics. The study is based on knowledge obtained on the basis of a survey in which almost 9,000 respondents from 119 countries of the world took part. All the mentioned changes require organizations to identify and implement new strategies for acquiring and developing and rewarding key employees.

1.1 Challenges of HR Managers and Social Media Platforms

Innovations, commonly embodied as emerging technologies or shifts in organizational frameworks, simultaneously bring about alterations in the prerequisites for the labor force. This transformation necessitates workers to cultivate novel and intricate expertise, thereby escalating the requirement for individuals with advanced educational backgrounds. This phenomenon sets off a competition between technology and education, characterizing a scenario wherein advancing technology reshapes the demands on the workforce's demand facet, thereby propelling educational systems to respond by providing more pertinent knowledge to a broader segment of the populace. When technology triumphs, the demand evolves at a swifter pace than the educational environment can adapt to, thereby favoring individuals with higher educational qualifications. This trend has been observable in developed countries since the latter portion of the 20th century. (Amstrong, Taylor, 2015)

Ruparel et al. (2020) examined the influence of online professional social media in human resource management. He mentioned that the Internet has played a reframing role in the lives of individuals. Social media platforms (SMPs) were originally introduced to facilitate the communication of personal and professional interests. SMPs are expansive, dynamic and enable the sharing of several types of content. DeNardis and Hackl (2015 In: Ruparel et al., 2020) conceptualize SMPs as encompassing the following three technological features:

- (a) mediation of the content generated by users;
- (b) interactivity among users and direct contact with online content; and
- (c) interconnection of individuals with other users on the network.

Different SMPs serve different purposes. For example, Facebook is used for social networking, Twitter is used for micro-blogging, YouTube for content sharing and viewing, Snapchat for image sharing, and LinkedIn for professional networking. Among the various PSMs that ease the process of employment, several studies have identified LinkedIn as the most convenient and effective website for employers and job seekers. In fact, LinkedIn (94%) was found to be the best platform among PSMs for

hiring individuals for vacant job roles, followed by Facebook (65%), Twitter (55%), Google Plus (18%), YouTube (15%), and Instagram (13%). In addition, Grissa (2016) and Ruparel et al. (2020) included websites such as Viadeo, Xing, YouPeek, and SkilledAfricans, to conceptualize professional networking sites.

Beyond just tailored advertisements and passive waiting for anonymous applicants, LinkedIn provides a platform that includes a network of "headhunters." This network serves as a mechanism to proactively engage with specific individuals. This employee recruitment approach leverages social connections to entice top-tier candidates through endorsements from their acquaintances and individuals familiar with the prospective employer. (Ďurechová, Glatz, 2019)

Technological progress offers HR specialists who look for "talents" new possibilities. Utilizing fresh and readily accessible applications in the market brings about a transformation in the creativity and approach of HR professionals and managers to their work. The utilization of modern ICT tools for recruiting employees also redefines the essence of their roles. (Štefko et al., 2014) Contemporary employees are expected to achieve exceptional outcomes and excel without being caught off-guard by fundamental tasks like cross-cultural communication, navigating intricate internal IT systems, engaging in tele or video conferences with their globally dispersed teams, and promptly addressing issues online. The forthcoming generation is not only reshaping human resource management practices, but also influencing global values and the very significance of established concepts. (Frejtichová, 2015)

Nazarov et al. (2020) conducted a more detailed analysis of modern trends in working with staff by using digital technologies (Table 1) due to their abilities to improve the efficiency of personnel management.

Table 1. Modern trends in working with staff

HRM trends	The software platform that implements it
Automatically fill in candidate profiles based on their pages in professional networks	LinkedIn
Anonymity in pre-selection	Jobsnap, djinni.co
Use of social networks for selection of candidates	Telegram, Facebook, Twitter
Automation of personnel selection	Applicant Tracking Systems - Jobscan
Automation of recruitment processes – onboarding, adaptation, training, development, internal document flow of the company	ZOHOPeople, BambooHR, HURMA
Forecasting and HR – analytics	
Monitoring the mood of employees	HURMA, eNPS, Gallup Q12
Combination of recruitment and HR processes	
Integration with calendars, meeting management	Google Calendar
Corporate training	
Digitization of recruitment	Skype, Hangouts, Zoom
Skills testing sites	Codility, TESTDOME, Tests4Geeks, PROMETHEUS

Source: Nazarov et al. (2020)

The analysis by Ďurechová and Glatz (2019) delves into the ever-changing dynamics of the labor market, influenced by the pervasive trend of low population growth across the European Union. A dearth of qualified and skilled workers is becoming apparent within our labor market. In the present age, employers are compelled to react proactively and with adaptability to these evolving circumstances. The landscape has evolved beyond mere loyalty, which was traditionally paramount to employers. Instead, employers are now seeking experience and a conscientious work ethic. They are in pursuit of employees who possess specialization and proficiency in their respective domains, coupled with an entrepreneurial mindset and a collaborative inclination. An area of vulnerability for millennials lies in their craving for admiration and recognition, thus magnifying the necessity for employers to manifest appreciation and acknowledge their workforce. Those employers who recognize the irrevocable distinction between tomorrow and yesterday are poised to attain success in the future, given the perpetual transformations in the labor market milieu. In the imminent years, the recruitment of individuals from the resilient middle generation is projected for middle and senior management roles.

1.2 The relationship of psychology and neuroscience with the modern HR management

In the digital information age, big data and artificial intelligence technologies have brought new opportunities for the talent recruitment. Constant updates and iterations, optimization of the organizational structure and more reasonable distribution of talents are key to achieving the new strategic goals of the company. If an organization cannot keep up with the rapid pace of technological development, it will be difficult to reap the benefits of new improvements and technological advances. In practice, problems such as low screening efficiency, insufficient job matching ability and technology drain in the traditional recruitment process are still being addressed. To improve these processes, researchers suggest using data collection to reduce the amount of data that needs to be processed. Data mining uses massive data and various techniques and statistical methods to obtain more useful information. (Khan, 2022)

Agarwal et al. (2021) think that talent management still makes little use of neuroscientific techniques to solve management problems. Although neuroscientists are only beginning to understand how to use neuroscientific findings in the workplace, there is potential to improve management and understanding of individuals through these methods. Neurological studies in the field of HRM are still unclear and further research is required due to the lack of relevant and credible evidence. An in-depth examination of neuroscientific discoveries is needed to address a wide range of human resource and talent management activities. It's evident that current neuroscience is predominantly deployed to substantiate training and developmental methodologies and to shape training approaches. Nonetheless, notable behaviors illuminate the impact of educational and developmental interventions on individuals. Broadly speaking, insights into leadership, team dynamics, and akin facets should encompass neurological underpinnings, empowering leaders with a deeper grasp of the factors influencing employee performance. The quantity of data amassed by businesses is experiencing rapid growth in contemporary times. This expansion outpaces the capacities of conventional HRM systems for processing and dissecting this data. Consequently, this study introduces a salary projection model rooted in neural networks, with the intent to enhance the efficacy of HRM systems driven by advanced AI technologies. The model employs applicant data to prognosticate their potential remuneration. The outcomes can serve as benchmarks for data-driven HRM systems.

1.3 Hybrid work models

As in the case of remote work, the hybrid model is more focused on managing human resources than on the actual performance of tasks. More emphasis is placed on mutual support, trust and reliance on each other, clarifying working relationships and ensuring that everyone is present at work meetings. Results matter more than personal presence. Effective communication is the basis of hybrid work. It is of fundamental importance for achieving success, but at the same time it is considered a high-risk area. If communication is not properly managed, it can lead to insufficient information flow, knowledge gaps, barriers to effective team collaboration, and exclusion of team members who are not present in the office. All group members are responsible for ensuring effective communication. Departments, sections or teams should discuss their priorities together and set clear expectations. (European Labor Authority et al., 2021)

At the same time, the European Labor Authority claims (2021) that they should set aside time for targeted work and agree on when physical presence in the office is necessary and when not. In connection with the COVID-19 pandemic, measures focused on health and safety, but also on the emotional and mental health of employees, have been introduced. It is important for managers to be flexible and have empathetic conversations with individual employees to discuss any adjustments or support they may need for an effective return to work. In the case of remote work or more flexible forms of work organization, it will be more difficult to monitor the performance of employees. Therefore, managers should adapt to evaluate performance based on the results, ability to achieve goals, contributions and contributions of each employee. It is important that managers provide regular feedback to each employee and update work-related goals when necessary.

According to Ngo (2023), there are four most common types that companies use when choosing a hybrid work model. The first type includes a solid hybrid model. It includes certain rules that determine when and how employees can work from home and when they must work in the office. These models are usually schedule-based and can be tailored to the needs of individual teams or departments. Employees adopt a schedule alternating between office-based workdays and remote workdays from home. This arrangement provides employees with a degree of consistency and foresight, which can yield positive outcomes for their productivity. As the second co-author, she introduced a versatile hybrid model that champions flexibility. This model empowers employees with greater freedom and control over their work location and hours. Individuals have the option to work

from home or the office, tailored to their specific needs and preferences. This approach can be adapted to various circumstances, including familial commitments or health constraints. However, the incorporation of flexible hybrid models mandates employees to embrace greater accountability and self-governance. Following this, the primary hybrid model for organizational operations within physical office settings is presented. It allows employees to work from the office, but also from other places, such as cafes or other public spaces. This model allows employees to change their work environment and adapt to their needs and preferences. This model also encourages collaboration and interaction between employees of different departments or teams. As the last model, it introduces the remote hybrid model in the office. This model allows employees to work remotely and access various tools and resources from the office. Employees can work from home or from any place with Internet access and the necessary technology. The model brings flexibility to employees and reduces the costs of renting and maintaining office space.

Boyatzis et al. (2015) offered a comprehensive change model that can better enable sustained behavior change in organizations. To be successful, individuals must genuinely care about making the change, engage in intentional effort to make the change, and be aware of the change and the change process. In this model, change begins with the creation of a personal future vision that provides the impetus for change. A personal vision represents an ideal self, which is then compared to the actual self to identify strengths. The difference between the real self and the ideal self creates a learning agenda and provides motivation for change. The likelihood of successful change increases when individuals embrace a learning-centric outlook, fostering a positive self-belief in their capacity to change and directing their focus toward their envisioned self. Conversely, a performance-oriented approach, emphasizing success, validation, and commendation, triggers feelings of anxiety. The premise is that individuals should experience an inherent motivation to change, propelled by the emotional realm of their mind, rather than feeling compelled to change due to external directives. Additionally, trust and nurturing relationships play pivotal roles in facilitating the change process. Numerous studies have indicated that this approach yields more effective outcomes in behavior change compared to the utilization of conventional educational methods.

Human resource management challenges, especially for enterprises operating across diverse global cultures, pose distinct obstacles. Businesses participating in the global marketplace require a multitude of components, along with the centralization of their operational processes. In the sphere of human resources, enhancing global competitiveness and enabling employees within a globally dispersed framework are of paramount importance. Should success on the global stage be the aspiration, it becomes the duty of every organization, irrespective of its size, to grasp cross-cultural corporate divergences and invest in human resources. The authors expound on human resource management complexities unique to global enterprises. Key considerations encompass HR policies, talent identification and retention, as well as training and development. These endeavors, in turn, bolster employees' capacities for innovation and creativity. Furthermore, the intersections of cultural barriers and work dynamics are frequently observed. Other challenges entail comprehending the intricacies of living and working conditions, conducting remote performance evaluations, and implementing training and managerial growth strategies. (Saranya, Asok, 2019)

2. Methods

The aim of the paper is to evaluate the current trends in the field of human resources management with an emphasis on the phenomenon of digitization and to research relationships between a set of practices called trends in human resource management and the size of the organization and the turnover of employees in the organization. For these purposes, we have identified the following set of trends, namely job rotation, home office, work in a meta version, hybrid work model and remote working.

Two hypotheses were formulated:

- H1: We assume the existence of a statistically significant relationship between the rate of utilization of human resources trends and the size of the organization.
- H2: We assume the existence of a statistically significant connection between the rate of utilization of human resources trends and employee turnover.

The analytical aspect of the research endeavor involved gathering primary data via a well-structured questionnaire. This survey was disseminated among employees spanning various organizations. The

questionnaire encompassed queries posed in a closed-ended format, delving into trends prevailing within human resource management and their impact on enhancing work performance. Topics embraced job rotation, remote work scenarios (home office), engagement in meta versions, and beyond. The questionnaire was generated utilizing the Google Forms platform, remaining accessible online for a span of 2 months, during which a cumulative total of 223 participants contributed to the study.

The research made use of the quantitative methods such as frequency analysis, percentage distribution and correlation analysis. These methods allowed us to identify basic trends in the field of human resources management and their impact on work performance, as well as to determine the most frequently used methods of human resources management. The results were then analyzed and interpreted in order to evaluate the effectiveness of human resources trends and their impact on employee performance quantified through the turnover indicator.

Research hypotheses follow a linear relationship (connection) between pairs of questions with an ordinal character. A Likert scale was used, with 1 indicating a strongly agreeing opinion and 5 strongly disagreeing. Both research hypotheses were evaluated through Kendall's rank correlation coefficient (hereinafter referred to as "Kendall's coefficient") calculated as follows:

$$r_K = \frac{n_c - n_d}{n(n - 1)/2}$$

where: n - number of observations of a pair of variables
 n_c - the number of matching pairs of the pair
 n_d - the number of discordant pairs of the pair

As each of the previously mentioned research hypotheses revolves around questions involving ordinal variables, the selected mathematical-statistical approach falls under the non-parametric methods category. The analysis and subsequent evaluation of these research hypotheses are undertaken using MS Excel and Statistica 13.

3. Results

The initial stage involved identifying trends within HR management and assessing the level of their adoption in correlation with organizational size. Additionally, our objective was to establish whether staff turnover within the organization had witnessed an increase in the past two years subsequent to the revamping of HR practices and the introduction of novel trends. The study cohort encompassed 223 participants, and fundamental particulars pertaining to the surveyed sample are presented in the ensuing section.

In the sample, the highest representation was found among small businesses with a staff size of 10 to 49 employees, accounting for 35.87%. The subsequent significant group comprised medium-sized organizations employing 50 to 249 individuals, constituting 33.18%. Close on the heels were large corporations with a workforce exceeding 250 employees, contributing 25.11% to the sample. The least representation was noted among micro enterprises employing up to 10 personnel, making up a modest 5.84% of the sample. The surveyed organizations predominantly hailed from the private sector, representing 89.69%. Of the complete sample, 60.54% were Slovak organizations, while 77.6% boasted an established human resource management department. An important finding is that up to 70.9% of organizations transformed existing HR practices and introduced new approaches or trends during the pandemic. This result suggests that organizations have been able to adapt to the new challenges and needs of their employees during the pandemic, and that human resource management has become a key factor in this process. Employee turnover over the past 2 years, after the transformation of practices and the introduction of new HRM trends, has significantly increased in the case of 64.13% of organizations. Neutral employee turnover, i.e. termination of employment and contracting of newly hired employees, was recorded in 14.80% of organizations.

As delineated in the methodology section of the document, the research hypotheses trace an ordinal correlation linking the utilization frequency of human resource trends to both the organization's size and the employee turnover subsequent to the restructuring of human resource management practices, serving as a performance indicator.

In the initial hypothesis, we posited the presence of a statistically significant correlation between the frequency of human resource trends' utilization and the organization's dimensions. The outcomes of the correlation analysis are showcased in Table 2.

Table 2. Results of correlation analysis (Kendall's coefficient) - research hypothesis H1

HRM trends	r_K
Talent management	-0.2093*
On-boarding	-0.2022*
Social networking platforms	-0.1502*
Hybrid working model	-0.0572
Work in metaversion	-0.0419
Work from home	-0.2093*
Remote working	-0.2022*
Flexible working hours	-0.0390
Job rotation	-0.0572
Sharing of work	0.0003

* statistically significant at the significance level $\alpha = 5\%$

Source: own work (2023)

The results of the employment of selected trends of human resources from the point of view of the size of the organization can be divided into two groups. The use of HRM trends is not related to the size of the organization, i.e. it is not possible to attribute their greater or lesser use in small (or large) organizations. This group includes Hybrid work model, Work in metaversion, Flexible working hours, Job rotation and Work sharing. However, in the case of 5 trends, the rank correlation proved to be statistically significant. Specifically, these are Talent management, On-boarding, Social networking platforms, Work from home and Remote working. In all cases, this correlation is negative and small, i.e. we observe a slightly higher employment of these 5 human resources trends in larger organizations. Based on the above results, research hypothesis H1 cannot be confirmed. When examining the research hypothesis separately for distinct human resource trends, we were able to affirm the associations.

Furthermore, we examined the connection between the rate of utilization of human resources trends and employee turnover as one of the performance indicators. Employee turnover has increased in the past two years in the case of 64.13% of organizations. We present the results in Table 3.

Table 3. Results of correlation analysis (Kendall's coefficient) - research hypothesis H2

HRM trends	r_K
Talent management	0.0764
On-boarding	0.0327
Social networking platforms	-0.0354
Hybrid working model	0.0168
Work in metaversion	0.0270
Work from home	0.0128
Remote working	0.0376
Flexible working hours	0.0396
Job rotation	0.0837
Sharing of work	0.0524

* statistically significant at the significance level $\alpha = 5\%$

Source: own work (2023)

In none of the 10 scenarios did a statistically significant correlation emerge between the implementation of distinct human resource trends and the evaluation of employee turnover. Based on the correlation analysis outcomes, the affirmation of the second hypothesis cannot be substantiated.

4. Discussion

Human resource management and its trends have a significant impact on work performance and the overall results of the organization. In today's dynamically changing business climate, it is crucial for organizations to adapt to new trends and focus on improving employee engagement and satisfaction. Employees who are engaged tend to perform better and contribute to increased productivity, innovation and lower recruitment and retention costs. Implementation of modern technologies and human resource management systems enable better management, coordination and monitoring of employee performance and human resource management processes in the organization. This could lead to increased efficiency and improved quality of human resource management in the organization. As part of the correlation analysis, we did not confirm the formulated hypotheses regarding the relationship between the rate of use of human resources trends and the size of the organization and employee turnover. Despite this, partial connections were confirmed, that is, trends in human resources that have the potential to be employed independently of the size of the organization and employee turnover. These trends are social network platforms used in the field of HR, remote working, working in meta versions, and talent management.

There are many modern human resource management systems in use today. Renowned studies in the field of HR trends and digitization focus on the following systems (Mitrofanova et al., 2019; Nazarov et al., 2020; Yadav, 2020):

- Cloud Human Resource Management Systems (HRMS) - enable employee management and records in the cloud, allowing access to information from any location and device.
- Knowledge sharing systems - support the sharing of information and knowledge between employees and allow them to easily access information resources.
- Data analysis - modern human resource management systems include data analysis tools that allow employers to analyze and compare various employee data.
- Performance management systems - allow employees and their supervisors to track and evaluate employee performance in real time and assist in setting goals and monitoring their achievement.
- Process automation systems - these systems help employers automate and streamline various processes and tasks, such as time management and employee attendance.
- Mobile applications for human resources management - these applications allow employees and managers to access information about employees and manage the provision of their work using mobile devices.
- Employee Appraisal and Development Systems - these systems assist in the appraisal and development of employees and ensure that employees have opportunities for learning and development.
- Virtual employee tests and games - modern human resource management systems use virtual employee tests and games to increase interest in work and create a positive work atmosphere.

Conclusion

Modern times also bring progress in the field of human resources management. If the organization wants to be successful, it must incorporate new ways, methods, techniques, tools and technologies in the management of human resources. Currently, in an era marked by the effects of the pandemic crisis, the energy crisis and geo-peninsular conflicts, every single area in the company undergoes constant development and is subject to change. The consensus among the authors is that the effectiveness of organizations is substantially influenced by their human resources, which also wield the power to determine success or eventual downfall. Companies are compelled to swiftly pivot towards an innovation-centric approach and refine processes within human resource management. Failing to react with agility and pragmatism can bear catastrophic repercussions. Deliberation is warranted regarding the current relevance of different trends, given that certain trends might not be universally applicable, while simultaneously endorsing and augmenting novel trends. The array of challenges currently confronting businesses must be met head-on in order to survive within the global marketplace. Organizations should embrace a synthesis of both global and local best practices in human resource management. The contribution of the examined study resides in furnishing a substantial framework for juxtaposing human resource management strategies among distinct organizations.

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The Relationship Between Quality of Work Life and Job Satisfaction: Practical Perspectives

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Abstract

Research background: The definition of the quality of work life remains open to interpretation, leading to different research approaches among authors. Despite the lack of a precise definition, it is commonly understood as the employees' perceptions of crucial aspects of their work, such as salary, working conditions, relationships with colleagues, job security, and the equilibrium between work and personal life.

Purpose of the paper: This research primarily aims to explore the correlation between the soft aspects of the quality of work life and job satisfaction. Moreover, it seeks to analyze how the age of employees might influence their perception of individual criteria concerning the quality of work life, and whether such criteria exhibit any connections with the marital status of the participants in the designated sample.

Methods: A total of 139 individuals employed in the automotive industry in the Žilina region participated in the research. The demographic analysis revealed that the majority of respondents were males (88.5%), the most represented age group was between 27-39 years (47.5%), and a considerable percentage (68.4%) of participants were married.

Findings & Value added: The results of the research provided evidence that by increasing employees' salaries and providing benefits, their overall job satisfaction can be positively impacted. Moreover, the study highlighted that employees belonging to different age groups have distinct perceptions of specific elements related to the quality of work life, and interestingly, the family status of employees did not play a role in influencing their perception of these criteria.

Keywords: quality of life, quality of work life, job satisfaction

JEL classification: M12, O15

1. Introduction

Over the past few years, human resources departments have shifted their attention towards prioritizing quality work life and job satisfaction. Their main objective is to ensure employees' satisfaction, engagement, loyalty, and efficiency simultaneously. Achieving this goal demands more than just offering a competitive salary and benefits package.

The quality of work life has been a subject of focus since the latter half of the 20th century. In recent years, there have been notable endeavors to establish standardized procedures and tools for measuring not only the quality of work life but also the quality of work, workplace, and overall employment conditions.

Just like the broader concept of quality of life, a consistent definition for the quality of work life is yet to be established. In academic literature, it is commonly referred to as QWL, and it is also associated with related terms *such as the quality of employment, quality of work, good work, and decent work*.

The authors Boisvert and Morton played a pivotal role in attempting to define QWL in 1977. Boisvert's definition described it as "a collection of favorable consequences arising from an individual's work life, with positive impacts on the individual, organization, and society" (Boisvert, 1977; in Sojka, 2014). In contrast, Morton viewed the quality of work life as incorporating "all imaginable aspects of work ethics and working conditions" (Morton, 1977; in Sojka, 2014). Considerable attention is given to objectively evaluating working conditions, capturing workers' expressions of contentment and

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discontentment, and analyzing social cohesion and stability (Stefana et al., 2021). Throughout the year, several research studies have underscored diverse aspects of QWL - as discussed by Lee (2023), Nauman et al. (2023), and Glaveli et al. (2023) - with a specific focus on the conceptual framework related to fulfilling different needs. Nonetheless, recent trends indicate that the quality of work life is primarily influenced by how employees subjectively assess and perceive their employment within a company. (Stefana et al., 2021).

According to Díaz-Chao et al. (2016), the literature presents two distinct perspectives on the quality of work life. The first perspective is objective and relates to the attributes and features of the working environment, encompassing factors like safety, technology, management systems, organizational processes, and, importantly, salary assessment. The second perspective, on the other hand, is subjective, centering on employees' preferences and their perception of fulfillment.

1.1 Quality of work life criteria

The quality of work life is determined by a range of criteria and characteristics, as acknowledged by numerous authors. To provide an overview of these factors, we present a table (Tab. 1) illustrating the distribution according to several prominent authors and researchers.

Table 1. The quality of work life criteria - an overview according to the authors

Author	Quality of work life criteria
Walton (1980)	<ol style="list-style-type: none"> 1. Adequate and fair remuneration 2. Safe and healthy work conditions 3. An immediate opportunity to use and develop one's skills at work 4. The possibility of continuous growth 5. Social integration in the organization 6. Guarantee of constitutional rights in the organization 7. The relationship between work and life expectancy 8. Social relevance of work life
Muftah & Lafi (2011)	<ol style="list-style-type: none"> 1. Physical factors 2. Psychological factors 3. Social factors
Jay (2014)	<ol style="list-style-type: none"> 1. Hard characteristics (they cannot be influenced - e.g. company loyalty, job content) 2. Soft characteristics (they can be influenced and changed - salary and benefits)
Bashir (2018)	<ol style="list-style-type: none"> 1. Work-life balance 2. Working conditions 3. Salary and benefits 4. Nature of work 5. Social integration and social relations at the workplace 6. Career growth and development

Source: own work according to Sojka (2014)

1.2 The relationship between the quality of work life and job satisfaction

Several research studies have affirmed the existence of a connection between the quality of work life and job satisfaction, examining these variables from different perspectives. Significant contributions in this area were made by Hogenelst et al. (2022), Javanmardnejad et al. (2021), Anita (2021), Fabry et al. (2022), Bogoviz et al. (2022), Glaveli et al. (2023), Kim et al. (2021), and Kortman et al. (2021). Despite the diverse industries in which these studies were conducted, encompassing tourism, automotive, steel, and healthcare sectors, all the mentioned research consistently confirmed a substantial relationship between the quality of work life and job satisfaction. Furthermore, these studies highlighted that an overall positive quality of work life has a direct impact on enhancing employee satisfaction with their work, and both factors are instrumental in achieving high employee productivity.

2. Methods

To facilitate the research, the questionnaire was divided into two distinct parts. The first section focused on gathering demographic and fundamental data about the participants, such as gender, age, marital status, highest education attained, and years of experience. The second part of the questionnaire comprised a set of items dedicated to evaluating both the quality of work life and job satisfaction. This section was carefully crafted by amalgamating and adapting items from established questionnaires, namely Walton's (1980) Quality of Work Life Questionnaire and the Minnesota Satisfaction Questionnaire. (MSQ) (Pio, 2021).

The credibility and consistency of standardized questionnaires are grounded in their validation through previous research. For our research, we opted to include only relevant items from these questionnaires that were best suited for achieving our research objectives.

The questionnaire research employed a variety of mathematical and statistical methods for evaluation. Descriptive statistics such as frequency, minimum, maximum, average, and standard deviation were utilized. Additionally, the reliability of the data obtained from the respondents, considering the variations between them, was assessed using the Standardized Cronbach's alpha method. The calculation of Cronbach's alpha for the entire scale yielded a value of 0.95, signifying sufficient internal consistency of the data and affirming its reliability for further investigation.

The hypotheses were evaluated through two statistical methods: regression analysis was employed to investigate the impact of soft characteristics of the quality of work life on job satisfaction, while a MANOVA test was conducted to assess whether employees' age influenced their perception of individual criteria of the quality of work life and whether these criteria were associated with employees' marital status in the sample.

3. Results

The research sample included 139 employees from the automotive industry in the Žilina Region. Data collection took place between January 2023 and March 2023, using the method of non-random random sampling. Regarding gender, the sample comprised 88.5% men ($N = 123$) and 11.5% women ($N = 16$). The two largest age groups were employees aged 27 to 39 (47.5%, $N = 66$) and employees aged 40 to 50 (24.5%, $N = 34$). Another aspect investigated during the research was the marital status of the respondents. The majority were married - 68.4% ($N = 95$), while 30.2% ($N = 42$) were single employees. In terms of education attained, 43.2% held a secondary school degree ($N = 60$), and 56.8% had completed university education ($N = 79$). Concerning the number of years of service, 61.9% of employees had worked in the companies for an average of 0 to 5 years ($N = 86$).

The Excel program with the XLSTAT add-on and the statistical program STATISTICA were used to test the established hypotheses. Statistical significance was verified for all tests based on the resulting p -value at $\alpha = 0.05$.

3.1 Measuring the quality of work life

Analyzing the average ratings of the respondents across 28 quality of work life items, it was found that the overall perception of work life quality was positive among the employees in the sample, with up to 123 (88.5%) expressing overall satisfaction. Notably, the criteria receiving the highest evaluations were the social relevance of work life ($M = 4.47$), social integration in the organization ($M = 4.35$), and constitutionality ($M = 4.19$). Conversely, the criteria rated with the lowest satisfaction were the relationship between work and total life expectancy ($M = 3.51$) and adequate and fair remuneration ($M = 3.87$).

3.2 Measuring job satisfaction

Based on the responses collected from the individual job satisfaction subscales, we can determine the ones with the highest and lowest average ratings. The aspects of job stability ($M = 4.53$; $SD = 0.58$), working conditions ($M = 4.50$; $SD = 0.67$), and workplace relations ($M = 4.39$; $SD = 0.71$) received the highest ratings. On the other hand, aspects such as material rewards ($M = 3.51$; $SD = 1.01$), recognition ($M = 3.78$; $SD = 0.98$), and career growth ($M = 3.86$; $SD = 0.87$) were rated the lowest. It is worth noting that despite the lower ratings, these subscales were still positively evaluated by the respondents, and the employees expressed satisfaction.

3.3 Hypothesis testing

Based on the defined research goal, three hypotheses were postulated.

H1: There is a statistically significant relationship between the soft characteristics of the quality of work life and the overall job satisfaction of employees.

To examine this hypothesis, we integrated salary and benefits items into the soft characteristics category (according to Sojka's definition from 2014). Additionally, we assessed overall job satisfaction by calculating the average of 11 items defining the respondents' contentment with their job.

Table 2. Descriptive statistics of variables for hypothesis 1

Item	Number (n)	Min.	Max.	Average	STD
Total job satisfaction	139	2	5	4.05	0.50
Soft characteristics of work life quality	139	1	5	3.87	0.77

Source: own processing

At the α (0.05) significance level, we tested the null hypothesis against the alternative hypothesis through regression analysis.

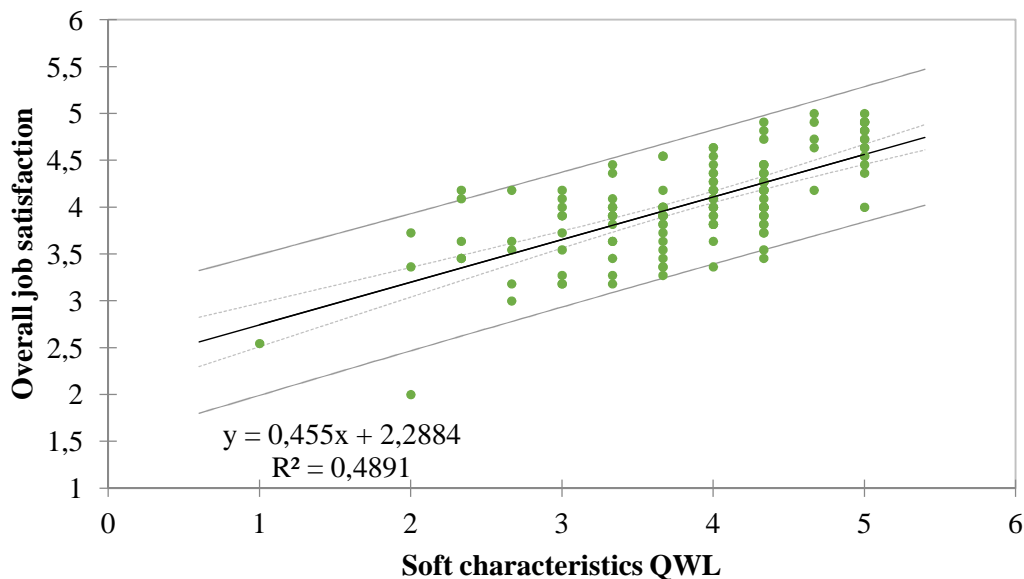


Figure 1. Regression analysis of hypothesis 1

Source: own work

Table 3. Evaluation of regression analysis of hypothesis 1

r	0.6994
R²	0.4891
p - value	1.01E-21
sm. an estimate mistake	0.36

Source: own work

The data presented in Figure 1 indicate that the coefficient of determination (R^2) achieved a value of 0.4891 (48.91%), reflecting a notable closeness between the variables. As per the correlation matrix, the correlation coefficient (r) was determined to be 0.6994, pointing to significant tightness between the variables. Additionally, the positive paired correlation coefficient ($r > 0$) indicates a direct linear relationship between the variables, meaning that higher values of one variable (soft characteristics)

correspond to higher values of the second variable (overall job satisfaction). The p-value calculation demonstrated the statistical dependence between the variables (<0.0001).

The findings indicate a statistically significant relationship between the soft characteristics of the quality of work life and overall job satisfaction among employees in the sample. Improving employees' salaries and benefits is likely to enhance their overall job satisfaction, potentially resulting in increased work efficiency and, importantly, higher company turnover.

H2: There is a statistically significant relationship between the individual criteria of the quality of work life and the age of employees.

To examine the second hypothesis, we utilized the mean value of individual quality of work life criteria items and employees' age demographic data. The corresponding distribution is displayed in Table 4.

Table 4. Descriptive statistics of variables for hypothesis 2

Age category		18 - 26 years	27 - 39 years	40 - 50 years	51 years and more
Number (n)		25	66	34	14
Relative frequency (%)		17.99	47.48	24.46	10.07
Average Value of answers as per individual criteria of work life quality	Salary	3.60	3.78	4.22	3.93
	Working conditions	3.94	3.87	4.21	3.97
	Using own abilities	3.99	3.89	4.27	3.93
	Career growth	3.82	3.77	4.29	4.07
	Social integration	3.56	3.62	4.13	3.98
	Constitutionality	3.97	4.05	4.29	4.07
	A work – life balance	4.10	4.01	4.35	4.00
	Social relevance	4.34	4.49	4.62	4.25

Source: own work

The findings indicate that the age group of 40-50 years (n=34; 24.46%) received the highest ratings across all criteria. To test the hypothesis at the α (0.05) significance level, we employed multivariate analysis of variance (MANOVA), which is well-suited for comparing multivariate sample means. The Wilks criterion, widely utilized in practice, is presented in Table 5.

Table 5. Verification of individual criteria of the quality of work life depending on the age category of employees using the MANOVA test (Wilks' test)

λ	0.742
F	1.681
|F|	1.547
p-value	0.025

Source: own work

Legend: Lambda (λ) = result value of Wilks test; F = the resulting F value of the MANOVA test; |F| = critical value of test criterion F; p- value = resulting p-value

The results presented in Table 5 demonstrate that the Wilks' lambda value of the test (0.742) falls within the specified range of values for the given test (0-1), signifying slight differences in the mean vectors. Additionally, the calculated F value (1.681) exceeds the critical value (1.547), and the resulting p-

value (0.025) is less than the established significance level α (0.05). As a result, we can assert with confidence that a statistically significant relationship exists between the individual criteria of work life quality and employees' age. This indicates that employees from different age categories perceive the individual criteria of work life quality differently. Among the respondents, those aged 40-50 demonstrate the most favorable perception of the quality of work life, achieving the highest evaluations in all areas. The outcomes imply that younger employees tend to assess the quality of work life criteria with a lesser degree of satisfaction when compared to older employees. The most notable variations in evaluations across age categories are evident in salary, social integration, and career growth. Consequently, the findings suggest that the perception of satisfaction with these work life criteria undergoes the most substantial changes as employees' age increases.

H3: There is a statistically significant relationship between individual criteria of the quality of work life and marital status of employees.

For the purpose of testing hypothesis 3, we assessed the responses to the listed items associated with individual criteria of work life quality, in addition to considering the demographic data regarding employees' age. The key distribution is presented in Table 6.

Table 6. Descriptive statistics of variables for hypothesis 3

Marital status		Single	Married
Number (n)		42	95
Relative frequency (%)		30.66	69.34
Average Value of answers as per individual criteria of work life quality	Salary	3.64	3.96
	Working conditions	3.89	4.01
	Using own abilities	3.89	4.05
	Career growth	3.76	4.02
	Social integration	3.58	3.84
	Constitutionality	4.00	4.13
	A work – life balance	4.15	4.09
	Social relevance	4.40	4.49

Source: own processing

Table 6 presents the count of employees as per individual marital statuses (n), their respective percentages (%), and the average scores obtained in individual criteria of work life quality. The results indicate that the "married" marital status category (n=95; 69.34%) received higher ratings in nearly all criteria, except for "work-life relationship" (4.09). To assess the third hypothesis, we utilized the most appropriate method for examining two independent variables (family status) and eight criteria of work life quality (dependent variable). The MANOVA test evaluates the hypothesis of equal mean vectors for different levels of marital status. The widely used Wilks criterion was employed, and the outcomes of the MANOVA test are shown in Table 7.

Table 7. Verification of individual criteria of the quality of work life depending on the marital status of employees using MANOVA test (Wilks' test)

λ	0.903
F	1.711
|F|	2.011
p-value	0.102

Source: own work

Legend: Lambda (λ) = the resulting value of Wilks test; F = the resulting F value of the MANOVA test; |F| = critical value of test criterion F; p-value = resulting p-value

Table 7 results indicate that the Wilkov lambda test (0.903) demonstrates negligible differences in mean vectors, within the permissible range (0-1). Moreover, the calculated F value (1.711) is below the critical value (2.011), and the resulting p-value (0.105) exceeds the predetermined significance level ($\alpha = 0.05$). This suggests that the marital status of employees has no statistically significant association with the individual work-life quality criteria.

4. Discussion

Based on the research conducted, we have arrived at the conclusion that certain criteria hold significant sway over the work-life quality of the respondents in the given sample. These criteria include the social relevance of work life, social integration within the organization, and constitutionality. Conversely, the respondents displayed the lowest satisfaction when it came to criteria concerning the relationship between work and overall life expectancy, as well as adequate and fair remuneration. Regarding job satisfaction, the aspects that stood out with the highest ratings include job stability, working conditions, and workplace relationships. However, material rewards, recognition, and career growth were identified as the aspects that received the worst ratings. The results of hypothesis testing indicate that by increasing employees' salaries and providing benefits, there is a corresponding improvement in their overall job satisfaction. Additionally, the research reveals that employees from different age groups perceive individual work-life quality criteria differently. Notably, respondents aged 40-50 demonstrated the most positive perspective and consistently provided the highest evaluations. Comparatively, younger employees expressed lower levels of satisfaction, particularly in criteria related to salary, social integration, and career growth. These aspects had a significant impact on work-life quality as employees' age increased. Furthermore, the research shows that family status does not influence the perception of individual work-life quality criteria.

Conclusion

The main objective of the presented research was to extend the findings of previous studies in the realms of work-life quality and job satisfaction while exploring the connection between these two variables. Earlier research have already established the existence of this relationship, and among the most significant contributors to this understanding are studies by Kortmann et al. (2021), Belardi et al. (2021), Rai & Verma (2022), Hogenelst et al. (2022), Javanmardnejad et al. (2021), Anita (2021), Fabry et al. (2022), Bogoviz et al. (2022), Glaveli et al. (2023), Kim et al. (2021), and Kortman et al. (2021). Despite conducting research across various industries (tourism, automotive, steel, and healthcare), all the mentioned studies consistently confirmed a positive relationship between work-life quality and job satisfaction. Moreover, they established that overall work-life quality significantly influences employee satisfaction with their work. In light of these findings, we conducted our own sample study to investigate the impact of soft work-life quality characteristics on job satisfaction, as well as the influence of employee age on their perception of individual work-life quality criteria. Additionally, we explored whether the individual work-life quality criteria are related to employees' marital status within the given sample. We can assert that this objective has been successfully achieved, and the paper represents both a theoretical and empirical contribution to this field of knowledge.

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Optimizing Patient Hand-off Safety in Healthcare Management: A Theoretical Exploration of Effective Strategies for Managing Healthcare Workers for Increasing Patient Hand-off Safety

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Abstract

Research background: The integration of lean principles, evidence-based practices, and standardized protocols shows promise in improving healthcare quality and patient safety during care transitions and hand-offs. This approach, including the full Bedside Shift Handoff (BSH), addresses challenges in communication and coordination, leading to smoother transitions across care settings. Effective communication empowers patients, ensuring accurate information transfer and active engagement in their care journey.

Purpose of the article: This article emphasizes the crucial role of patient-centered care and communication in healthcare, particularly during transitions and hand-offs. Patient-centered care empowers individuals to actively participate in their care decisions, leading to improved outcomes. Meaningful discussions during these transitions transform patients from passive recipients to informed decision-makers, enhancing the patient-provider relationship and tailoring treatment strategies.

Methods: This study uses a qualitative literature review to explore hand-off care in healthcare settings a comprehensive search from the last ten years using relevant keywords. Additional articles were found through citation chaining. Selected literature was reviewed, and qualitative thematic analysis identified themes, patterns, and key concepts. Data was continuously compared to refine themes and identify relationships.

Findings & Value Added: This article emphasizes the importance of patient-centered care in healthcare, highlighting its benefits for satisfaction, safety, and empowerment. Combining lean principles, evidence-based practices, standardized protocols, and patient-centered approaches offers a comprehensive strategy for seamless care transitions. The full Bedside Shift Handoff (BSH) enhances communication, empowering patients for smoother transitions. Patient-centered care enables informed decision-making, strengthens relationships, improves care quality, and tailors treatments for better outcomes. The article provides practical implementation strategies, including leadership support, training, technology integration, and continuous education, fostering a patient-centered culture that enhances communication and safety.

Keywords: hospital management, patient-centered care, bedside shift handoff, lean principles in healthcare, evidence-based practices

JEL classification: I10, I12, I18

1. Introduction

Lean management is a comprehensive management system that aims to streamline operations by reducing waste and time-consuming processes, enhancing safety and quality, and lowering costs within the healthcare sector. This approach utilizes various tools, such as Fishbone diagrams and flow charts, alongside operational redesign, to achieve these objectives. Leading health organizations like the National Health Service (NHS) and the Institute for Healthcare Improvement (IHI) have recommended implementing lean concepts in healthcare settings to improve work efficiency (Bertagnolli, 2018).

Lean manufacturing is a production methodology primarily focused on reducing production system times and response times to both suppliers and customers. It is closely tied to the concept of just-in-time manufacturing (JIT), which aims to align production with demand by supplying only ordered goods. It emphasizes efficiency, productivity, continuous improvement, and waste reduction for both producers and

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suppliers of goods. Lean manufacturing builds upon the JIT approach and further emphasizes the elimination of non-value-adding activities to reduce cycle, flow, and throughput times (Abu Bakar et al., 2022). Lean manufacturing is not limited to the manufacturing process alone. It extends to functions outside of production, such as marketing and customer service. Abu Bakar et al., (2022) note that "Lean Manufacturing Design of a Two-Sided Assembly Line Balancing Problem Work Cell,". While JIT manufacturing centers on the efficiency of inventory strategy to eliminate waste and enhance productivity, Lean manufacturing focuses on efficiency within its system setups to reduce cycle, flow, and throughput times, ultimately adding value for customers.

Abu Bakar et al., (2022) suggest that integrating lean management principles into nurse hand-offs holds the potential to create more efficient, safe, and quality-driven transitions of patient care within hospital wards. By standardizing procedures, eliminating non-value-adding activities, and focusing on efficiency and accuracy, healthcare institutions can improve the hand-off process and ultimately enhance patient outcomes. Just as lean principles have transformed various aspects of healthcare, they can play a crucial role in revolutionizing nurse hand-offs for the better.

Patient-centered care is vital for improving patient outcomes and experiences. It tailors healthcare to individual needs, involving patients in decision-making (Ortiz, 2018). Patient-centered care and lean management can be integrated effectively. Aligning operational processes with patient goals, this integration prioritizes patient needs and preferences: 1. Lean's standardization adapts to patients' preferences; 2. Lean eliminates non-essential processes for patient well-being; 3. Lean streamlines administrative processes, reducing wait times; 4. Patient involvement in lean management enhances process improvement; 5. Both emphasize communication, reducing errors in hand-offs; 6. Continuous improvement aligns with patient-centric care; 7. This integration fosters a culture valuing both patients and efficiency.

1.1. Clinical handover

"Clinical handover" is a globally recognized concept that highlights effective communication and information transfer in healthcare settings. It's known by different terms like "handoff," "transition of care," and more. Essential for patient shifts and care stage changes, it involves exchanging patient information and responsibility among healthcare providers (Abraham et al., 2016). This is crucial during transfers between units or shifts, ensuring seamless care continuity. The varied terminology reflects the process's complexity. 'Report' focuses on content exchange, while 'Handoff' implies a shift in care responsibility. Despite the terms used, clinical handovers are vital for patient safety and continuity. They facilitate effective communication among providers and underscore the need for standardized practices for optimal outcomes. Handoffs encompass transferring information, responsibility, and control among care providers. They're a widespread activity with clinical and organizational significance (Abraham et al., 2016). "Ubiquitous" highlights their prevalence among clinicians, bridging patient information exchange at all hospital levels. Designations like 'sign-out' imply temporary delegation of authority during shifts, indicating different responsibilities. For instance, patients can be handed off without formal sign-out, indicating no formal responsibility transfer. Practitioners emphasize knowledge exchange for patient outcomes (Bowersox, 2016). Researchers study ineffective handoffs and their consequences, including adverse events and safety risks (AHRQ, 2014). Handoffs are pivotal for continuity of care (Criscitelli, 2013) and hold clinical and organizational significance (Abraham et al., 2016).

Patient transfers in clinical settings, such as from the Intensive Care Unit (ICU) to the Emergency Department (ED), are common but not without risks. These transitions introduce the potential for errors, miscommunications, and disruptions in patient care. Nurse handoffs, which include shift reports and care transitions, are frequent occurrences in healthcare facilities. High patient turnover rates, often 40% to 70% daily, coupled with approximately 2 million annual transitions in mid-size hospitals, underscore the prevalence of these handoff situations. It is essential to recognize that these transitions involve the transfer of care responsibility, making them a focal point for organizations prioritizing patient safety and care effectiveness, as emphasized by The Joint Commission and the Agency for Healthcare Research and Quality (AHRQ) (AHRQ, 2014; TJC, 2017)

Despite recommendations, substandard hand-offs continue due to unstandardized processes, missing information, and lengthy procedures. This results in negative consequences like delayed care, inadequate treatment, adverse events, longer stays, avoidable readmissions, costs, inefficiency, and patient and caregiver dissatisfaction (Ayaad et al., 2019). A review conducted in 2016 indicated that four main

obstacles to efficient hand-offs are communication difficulties, social environment, language barriers, and physical environment (Colvin et al., 2016).

Medical errors are a grave concern in healthcare, leading to death and injury. Insufficient hand-off communication is a key contributor to patient harm and mortality (NHS, 2016). The Joint Commission highlights inaccurate hand-offs as a factor in patient harm (TJC, 2012). Hospital adverse events affect around 9% of patients, with hand-off failures contributing to 35% of errors (Patel et al., 2015). Medical errors cause up to 98,000 hospital deaths yearly. In 2016, 251,000 preventable deaths resulted from medical errors, ranking it as the third leading US cause of death (Makary & Daniel, 2016). In response to the many patients being harmed and the costs following that, healthcare organizations realized that event reporting and learning from errors would improve the healthcare system and lead to patient safety, i.e., preventing adverse events for patients (Aspden et al., 2014).

Adverse events can lead to great human suffering not only for patients, but also for their relatives and for the healthcare staff. Health organizations are also negatively affected, causing extended hospitalization, disability at release, or both. The financial costs associated with medical errors further underscore the significance of this problem. The estimated costs due to adverse events caused by drugs were \$5.6 million in 1997 (Bates et al., 1997), and by 2010, these costs were estimated to range up to \$19.5 billion annually in the United States (Milliman, 2010). In British hospitals, adverse events led to costs of £290,268 (Vincent et al., 2001). The costs related to adverse events in Swedish hospital care increased from 185.7 million SEK in 1995 (Soop et al., 2009) to over 11 billion SEK in 2013 (SALAR, 2014).

Researchers understand now that the information exchange process during hand-off communication is complex and despite considerable advancements in technology and skillfulness in healthcare, there are multifactorial influences that can impact hand-offs play out (Ernst et al., 2018). There is limited structure of communication, there are multiple communication approaches (Benham-Hutchins & Effken, 2010), a strong time constraints (Trovó et al., 2021), interruptions and distractions during hand-off (Hedberg & Larsson, 2004), lack of hand-off training (Patterson et al., 2004), and bottlenecks in exchanging shifts, leading to an inability to ensure the receiver comprehends (Calleja et al., 2011). Furthermore, patient transfers often become a multifaceted experience as multiple transfers can occur within different settings during a single hospital stay (Bunn, 2007).

1.2. Suggested solutions

In this paper we will claim, that from a theoretical point of view, there is a way to Ward-Management of the healthcare staff's attitude toward patient safety that can be minded safety culture, improving safeties, reduce costs, save time, and improving the patient experience with a better rounding, team assignments, and handoff procedures.

The transfer of patients within the healthcare system should, ideally, entail a fast, secure, convenient, and efficient motion from one level of care or setting to another, providing seamless care and promoting the continuity of care (Naylor, 2000). Various strategies to improve hand-offs are evident in the literature, including: 1. Standardization of Hand-offs: Using standardized protocols enhances communication by ensuring consistent conveyance of crucial information during care transitions. 2. Clinical Training: Equipping healthcare professionals with effective hand-off skills through comprehensive training facilitates smoother transitions and accurate information exchange. 3. Improving Environment: Creating a conducive environment by minimizing interruptions, providing suitable settings, and reducing noise contributes to successful information transfer (Colvin et al., 2016).

Utilizing evidence-based processes and tools is vital for successful hand-offs. Research indicates positive outcomes of evidence-based practices, including: 1. Reduced Hand-off-Related Problems: Evidence-based processes lowered hand-off problems from 25.8% to 7.9% ($P < .05$). 2. Higher Compliance: Incorporating evidence-based tools increased compliance rates from 86% to 96% ($P < .05$). 3. Clear Transition of Responsibility: Evidence-based tools facilitated smoother responsibility transition, reducing misunderstandings. 4. Fewer Interruptions: Evidence-based practices reduced interruptions during hand-offs from 84% to 90% ($P < .05$). 5. Enhanced Satisfaction: Integrating evidence-based approaches improved overall satisfaction from 55% to 70% ($P < .05$) (Colvin et al., 2016).

In the literature, various strategies to enhance hand-offs have been identified. These include: 1. Standardization of Hand-offs: Implementing standardized protocols for hand-offs has shown promise in improving communication. This approach ensures that essential information is consistently conveyed during the transition of care; 2. Clinical Training: Providing comprehensive training to healthcare

professionals on effective hand-off practices can lead to better communication and smoother transitions. Proper training equips them with the skills necessary for accurate information exchange; 3. Improving Environmental Factors: Creating an environment conducive to effective hand-offs is crucial. Factors such as minimizing interruptions, providing suitable physical settings, and reducing noise can contribute to successful information transfer (Colvin et al., 2016).

A study in a pediatric hospital aimed to enhance hand-offs in a post-anesthesia care unit. The intervention involved sending and receiving teams, utilizing standardized tools. Results showed improved information transfer (49% to 83%), higher satisfaction scores (36 to 44), and shorter hand-off duration (4.1 to 3.5 minutes) (Caruso et al., 2015). The study recommended using standardized tools and a team-based approach for more effective OR-to-PACU hand-offs. Another study aimed to establish the role of nurse-led safety debriefing in fostering a culture of safety during obstetric emergencies. The implementation of a standardized protocol and a formal debriefing course for senior nurses resulted in the identification and resolution of improvement ideas and enhanced working processes (Tirelli & Colpa-Lewis, 2017).

Moreover, shifting from a blame-and-shame perspective to a systemic viewpoint when addressing errors has been suggested. Creating a safety culture involves designing systems that prevent, detect, and minimize hazards and errors. This demands significant efforts within the healthcare system (Reason, 2000). Transforming the healthcare staff's perspective and safety practices is essential for a lasting improvement in safety culture (Longo et al., 2005). Therefore, understanding how to foster a culture of safety based on understanding of how accidents and threats to patients arise is crucial for enhancing patient safety (Nordin, 2015).

Priority in healthcare should focus on strengthening information exchange procedures during hand-offs. Despite its challenges and time-consuming nature, Bedside Shift Hand-off (BSH) is increasingly seen as the gold standard and recommended by national patient organizations (AHRQ, 2014). While BSH aims to ensure safe continuity of care by communicating essential patient data, Galatzan and Carrington (2022) emphasize its primary purpose, highlight that when healthcare teams prioritize safety in hand-offs, it can occupy a significant portion of the workday (19.3% to 29%), impacting workload. BSH's benefits include reducing harmful events and enhancing communication (Winebarger, 2022), but its prevalence as a ubiquitous and organizational activity (Abraham et al., 2016) warrants further examination to determine if it's the most effective way to communicate critical patient information and responsibility (Criscitelli, 2013).

1.3. Communication

Communication is crucial for patient safety in healthcare, especially in Clinical Hand-offs (TJC, 2012). Hand-off communication involves conveying patient-specific information between caregivers to ensure continuity of care (Sears et al., 2014). A Joint Commission report revealed that communication failures were a leading cause of sentinel events from 1995 to 2006, and Over 60% of adverse events since 2006 are linked to poor healthcare communication (JCCTH, 2010). The World Health Organization identifies communication failures as a major cause of adverse events (WHO, 2007). TJC's study indicated that 70% of serious medical errors stem from hand-off communication breakdowns. Poor handoff communication results in errors, inconsistent care, and death. Roughly 65% of sentinel events involve communication issues, and more than 80% of healthcare errors stem from communication breakdowns (TJC, 2017). The expanded number of hand-offs communication creates possible problems based on message errors or information deletions during the handoff communication process. In Australia, clinical handover occurs around 7,068,000 times annually. Hand-offs Communication failures are listed among the top factors contributing to sentinel events in Australian public hospitals (ACSQHC, 2010).

Bowersox (2016) stated that Hand-off communication must guarantee the continuity of the patient care, when control of, or responsibility for, the patient passes from one health professional to another, and important information about the patient are exchanged. The World Health Organization claims that an effective clinical handover can reduce the risk of communication failures between healthcare clinicians (WHO, 2007). Swedish healthcare organizations aimed to enhance patient safety by addressing common areas of patient injury like falls, infections, and errors. This systematic approach initiated proactive efforts, emphasizing patient safety culture (SALAR, 2014). The hand off communication between nursing units remains challenging despite global improvement efforts (Colvin et al., 2016).

Clinicians must communicate effectively through clinical hand-offs for safe, quality care delivery. Adequate communication during nurse hand-offs ensures safe and quality patient care (Abraham et al., 2016). There are four common styles of hand-off mentioned in the literature used between nurses which

are verbal hand-off; tape recorded hand-off; bedside hand-off; and written hand-off. Many studies showed the ability of the use of more than one style during the hand-off with use of structured tools (Anderson et al., 2015)

Emphasizing information responsibility in hand-off communication is key. The frequency of data transmission highlights the need for improvement. Crucial patient details must be communicated to ensure confident care transitions. Nurses' perception influences continuity of care; a robust process enhances responsibility perception. Effective hand-offs face challenges, including interpersonal skills and caregiver experience. Clear communication of essentials is vital for receiving nurses' confident care assumption. Nurses' recognition of their role reinforces accountability and patient awareness (TJC, 2012).

Bunn (2007) explores patient transitions from intensive care to hospital wards, focusing on ward nurses' experiences and challenges. Similarly investigates ICU-to-ward transfers, studying patient, family, and provider experiences, communication dynamics, adverse events, and process enhancement opportunities. The blurred boundaries between units create stress for staff and affect patient experiences. Inadequate communication about patient movements complicates bed allocation decisions. Ward nurses are often unprepared for ICU patient admissions, leading to resource challenges and family tension. Delays in transfers stem from staffing shortages, unplanned transfers, and discharge documentation delays. Proactive ward planning is crucial but often lacking due to bed shortages. Bunn (2007) also highlights ICU bed scarcity and the need for efficient utilization. The study further details the current transfer process to the ward, emphasizing protocols, existing transfer documentation, and factors influencing discharge or transfer delays. This definition underscores the specialized nature of intensive care and its focus on managing patients with life-threatening or potentially life-threatening conditions. It emphasizes recovery potential and acceptable quality of life while highlighting the specialized expertise and facilities essential for supporting vital functions. The balance between resource allocation and patient benefit is emphasized (Bunn, 2007).

Communication tools in healthcare primarily focus on defining the content of hand-off communication (Thomas & Donohue-Porter, 2012). This has led to standardization efforts and tools like templates and checklists (Staggers & Blaz, 2013). Structured hand-off procedures are discussed to improve care consistency, patient safety, and standards (Street et al., 2011). Yet, consensus on content and structure standardization remains limited (Staggers & Blaz, 2013).

1.4. BSH

In Galatzan and Carrington's (2022) research, the sample consisted of one nurse giving and one receiving the hand-off (n = 19). 5 bedside and 5 nonbedside hand-offs were audio recorded and analyzed using content analysis. The hand-off overall contained 34.7% of the data, 51.7% of the information, and 13.6% of the knowledge. Compared with the bedside hand-off, the nonbedside hand-off contained a substantially higher percentage of data and less information. The percentage of knowledge communicated in the nonbedside and bedside hand-off was low at 13.6% and 13.7%, respectively. They conclude that the data compared with the knowledge in the hand-off places nurses at greater risk of experiencing cognitive lapses due to cognitive overload. Staggers and Jennings (2009) studied hand-offs in various formats: audio tapes, face-to-face, and BSH, identifying key content themes. They found that 33% involved clarifying details, 30% conveyed factual patient information, 25% included nursing actions and decisions, and 13% focused on teamwork and transition smoothing.

When a nurse understands all aspects of the patient's care, it allows the nurse to care for the patient in a competent manner (Hall, 2005). The goal is that the hand-off communication procedure must complete the following expectations (TJC, 2012): 1. communication between the giver and the receiver must create an opportunity for questioning. 2. up-to-date information, including care, treatment, condition, and changes must be communicated. 3. knowledge exchanged must be confirmed. 4. an opportunity for the receiving health care team member to examine any relevant information. 5. interruptions must be avoided.

AHRQ (2014) introduced a checklist for BSH: 1. Introduce and invite patients and families to participate. 2. Open the electronic medical record in the patient's room. 3. Conduct a verbal report covering the situation, background, assessment, and recommendation. 4. Perform a focused assessment of the patient and room (e.g., wounds, IV sites, catheters). 5. Review tasks to be completed (e.g., labs, tests, medications). 6. Identify patient or family needs or concerns.

Nurse Bedside Shift Report (BSR) or Bedside Shift Hand-off (BSH) is a recognized solution in healthcare for its positive impact on patient satisfaction, nursing quality, and safety (Grimshaw et al., 2016). The literature emphasizes BSH's benefits, including improved communication and fewer adverse

events (Winebarger, 2022). Paredes-Garza et al. (2022) conducted a systematic review focusing on ICU nursing professionals to assess the effects of bedside hand-off on patient safety. Covering 2016-2021, the review included 15 articles, revealing BSH's advantages. It enhanced precision, reduced distractions, prevented information loss, and actively engaged patients in their care. Despite potential concerns, the overall benefits of BSH outweighed the drawbacks. In contrast, traditional hand-offs lack consistency and occur in less ideal settings, hindering patient observation during shifts. Winebarger (2022) contends that BSH aligns with the Institute of Medicine's six Domains of Health Care Quality: 1. Safe: BSH minimizes errors and safety incidents. 2. Effective: BSH enhances staff accountability and information consistency. 3. Patient-centered: BSH engages patients, families, and caregivers. 4. Communication: BSH facilitates communication about relevant matters. 5. Efficient: BSH improves care coordination and comprehension. 6. Equitable: BSH supports consistent communication, benefiting patients less familiar with hospital processes.

Despite BSH's recognized advantages, its consistent adoption remains a challenge. A significant portion (51%) of surveyed hospitals noted frequent omission of vital patient details during BSH. AHRQ (2014) Highlight BSH's benefits for satisfaction, quality, and safety. However, low adoption persists even in recommended hospitals. Interviews with nurses and supervisors unveiled five themes: time constraints, adjusted approach, tailored critical content, discussing content in and out of patient's room. These findings underline BSH's real-world complexity and the problem of implementation. They discovered that nurses and supervisors found bedside hand-offs much more time-consuming due to increased thoughtfulness and interruptions. So, they adopted a modified approach, combining in-room and out-room hand-off portions, ensuring successful critical information transfer. Initial rehearsals were sometimes conducted outside the room. Nurses felt certain topics weren't suitable for patient presence. Discussions varied based on illness severity and incoming nurse's familiarity.

The intervention included the use of cognitive and behavioral tools. The goal was to teach strategies and tools to strengthen and develop self-reflection, self-management, and self-regulation in the first phase.

In recent years, the concept of person-centered care has emerged as an extension of patient-centered care. Rooted in philosophy, the term "person" encompasses distinct human qualities such as rationality, self-consciousness, and free will. This definition grants individuals a unique moral status, both for themselves and in acknowledging others (Stewart, 2001). Patient-centered care has emerged as a shift from the previously dominant biomedical and paternalistic approach in healthcare. Originally defined as "someone who suffers," a patient now refers to an individual receiving medical treatment for an illness. This approach addresses vulnerability and dependence inherent in being a patient. Patient-centered care developed in response to limitations of biomedical traditions, aiming to understand patients beyond a biopsychosocial perspective (Ortiz, 2018). The concept was introduced by Michael and Enid Balint in 1969, emphasizing psychological aspects in medical thinking. In summary, a person-centered approach to care places individuals at the core, considering their context, history, family, strengths, and weaknesses. This approach shifts from viewing patients as passive recipients of healthcare to active participants in their own care and decisions (Håkansson-Eklund et al., 2019).

2. Method

This study employs a qualitative literature review research design to explore and synthesize existing literature on hand-off care in healthcare settings. A comprehensive literature search was established. A systematic investigation was conducted using academic databases within the last ten years (e.g., PubMed, Scopus, Web of Science) with relevant keywords (e.g., "Clinical handover"; "handoff"; "hand-off"; "handover"; "communicat"; "transition of care"; "continuity of care"; "intershift"; "shift reports"; "Bedside Shift Hand-off"; "patient-centered care"). Additional articles were identified through citation chaining, and references in selected papers were examined for further relevant sources.

Data collection and analysis: The identified data literature and articles meeting the inclusion criteria were systematically reviewed, and relevant data were extracted. The collected data includes author(s), year of publication, research objectives, methodologies, key findings, and implications for transferring the patient from one medical team to another and from department to department. Qualitative thematic analysis identified themes, patterns, and key concepts within the selected literature. A coding framework was developed to categorize and code relevant information, facilitating the extraction of meaningful insights. The data was continuously compared and contrasted, refining emerging themes and identifying relationships between studies.

Since this research involves the analysis of existing published literature, ethical approval is not required. However, ethical considerations include proper citation and referencing of all sources to maintain academic integrity.

The synthesized findings were presented in a coherent narrative format, highlighting key themes, trends, and gaps in the literature. This review aims to provide a comprehensive overview of hand-off concepts, their implementation, and their impact on healthcare outcomes.

3. Results

The literature review revealed several key findings and themes regarding hand-off care in healthcare settings. It highlights the critical importance of effective hand-off communication, patient-centered care, and integrating lean principles in healthcare settings to improve patient safety, quality of care, and overall healthcare outcomes. Addressing communication challenges and empowering patients through shared discussions are essential to achieving these goals:

1. Clinical handover, also known as "hand-off" or "transition of care," plays a crucial role in healthcare settings, involving exchanging patient information and responsibility among healthcare providers. During patient transfers between units or shifts, it is essential to ensure seamless care continuity. Despite variations in terminology, clinical handovers are vital for patient safety and require standardized practices.

2. Inefficient hand-off processes can lead to substandard transitions and negative consequences, including delayed care, inadequate treatment, adverse events, longer hospital stays, avoidable readmissions, increased costs, inefficiency, and patient and caregiver dissatisfaction. Communication difficulties, social factors, language barriers, and physical environments contribute to these challenges.

3. Ineffective hand-off communication significantly contributes to patient harm and mortality in healthcare. Adverse events resulting from medical errors can lead to human suffering, extended hospitalization, disability, and financial costs for healthcare organizations.

4. Effective communication is vital for patient safety during hand-offs. Communication failures have been identified as a leading cause of sentinel events and adverse events in healthcare. Various communication approaches, including verbal, written, and bedside hand-offs, are utilized, each with advantages and challenges.

5. BSH is increasingly recognized as a gold standard for hand-off communication. It emphasizes engaging patients in their care, reducing errors, enhancing communication, and improving patient safety. However, its adoption remains a challenge due to time constraints and complexity.

6. Person-centered care, an extension of patient-centered care, places individuals at the core of their care, considering their unique context, history, family, strengths, and vulnerabilities. This approach transforms patients from passive recipients to active participants in their care decisions, leading to better experiences and outcomes.

7. Integrating lean principles, evidence-based practices, and standardized protocols can enhance healthcare quality and patient safety during care transitions and hand-offs. Addressing communication challenges and empowering patients through meaningful discussions are essential components of this approach.

8. Strong leadership and training in lean principles, evidence-based practices, and standardized protocols are necessary to effectively implement enhanced healthcare quality and patient safety during care transitions and hand-offs.

4. Discussion

The literature review findings emphasize the importance of effective hand-off communication, patient-centered care, and integrating lean principles in healthcare settings. The synthesis of findings from the literature review highlights the critical need to prioritize effective hand-off communication, embrace patient-centered and person-centered care approaches, and consider the integration of lean principles in healthcare settings. These strategies have the potential to significantly enhance patient safety, improve healthcare quality, and elevate the overall patient experience. Achieving these goals necessitates a concerted effort from healthcare leadership to foster a culture of effective communication and continuous improvement while actively engaging patients in their care decisions. By doing so, healthcare organizations can move closer to the ideal of providing safe, high-quality, and patient-centered care. These aspects collectively contribute to improving patient safety, enhancing the quality of care, and ultimately optimizing healthcare outcomes.

The review underscores that hand-off communication is a linchpin for patient safety. Suboptimal hand-offs can result in adverse events, medical errors, and patient harm. Clear, standardized communication during care transitions ensures that all healthcare providers accurately convey and understand critical patient information. As the review highlights, the consequences of communication failures during hand-offs are substantial, leading to patient dissatisfaction, inefficiency, increased costs, and even mortality. These findings reinforce the urgency of addressing communication challenges in healthcare settings.

The literature review provides evidence of the benefits of BSH, particularly in terms of patient engagement and safety. BSH actively involves patients in their care and empowers them to participate in decision-making processes. This approach aligns with the principles of person-centered care, which recognizes individuals' unique qualities and preferences. Patients transition from passive care recipients to informed decision-makers, leading to more personalized and satisfactory healthcare experiences. However, adopting BSH remains a complex endeavor, as healthcare providers must balance the time constraints of their daily practice with the benefits of this patient-centered approach. Strategies for the successful implementation of BSH need to be explored further.

Person-centered care emerges as a critical theme in the literature review. This approach recognizes that patients are not merely recipients of medical treatment but individuals with their context, history, and specific needs. By adopting a person-centered perspective, healthcare providers can tailor care to the unique circumstances of each patient, fostering stronger patient-provider relationships. This shift from passive to active roles leads to better care quality and more favorable healthcare outcomes. Person-centered care is not limited to specific healthcare settings but has broader relevance across various industries, highlighting the importance of understanding and responding to customer or patient needs.

The review introduces the integration of lean principles, evidence-based practices, and standardized protocols as a comprehensive strategy for enhancing healthcare quality and patient safety during care transitions and hand-offs. This approach addresses inefficiencies and communication challenges by streamlining processes and focusing on value-added activities. Lean principles promote continuous improvement and the elimination of waste, aligning with patient safety and quality care goals. However, successful implementation requires strong leadership and training to ensure that healthcare professionals understand and apply these principles effectively.

Conclusion - FBSH Management and implementation

Our review underscores patient-centered care and communication's vital role in healthcare. BSH goes beyond enhancing safety; it empowers patients to actively engage in their care decisions. Full BSH discussions transform the patients from passive recipients to informed decision-makers, amplifying their voice, preferences, and needs. A person-centered approach to care places individuals at the core, considering their context, history, family, strengths, and weaknesses. This approach shifts from viewing patients as passive recipients of healthcare to active participants in their own care and decisions. This inclusive approach fosters a stronger patient-provider relationship, enhances care quality, and tailors treatment for better outcomes. While implementing BSH presents challenges, its benefits in patient satisfaction, safety, and empowerment are substantial.

Our findings about customer-centricity in healthcare have broader relevance, highlighting the significance of this approach across industries. Active listening, understanding customer needs, and tailored service are crucial for all service providers. Our perspective underscores patient-centered care's transformative effect, promoting patient involvement in decisions for improved experiences, health outcomes, and compassionate healthcare systems.

In conclusion, the integration of lean principles, evidence-based practices, and standardized protocols holds the potential to greatly enhance healthcare quality and patient safety during care transitions and hand-offs. By addressing communication challenges through a comprehensive approach, such as the full Bedside Shift Handoff (BSH), patients can experience seamless transitions between different levels of care and settings. This approach is rooted in the understanding that effective communication makes patients feel fully engaged in their care journey.

Our review emphasizes the pivotal role of patient-centered care and communication within the healthcare system. Patient-centered care not only enhances safety but also empowers individuals to actively shape their care decisions. Through meaningful discussions, patients transition from passive recipients to well-informed decision-makers, with their preferences and needs given due consideration. Adopting a person-centered approach that encompasses the whole individual – including context, history,

family, strengths, and vulnerabilities – fosters stronger patient-provider relationships. This shift from passivity to active participation results in improved care quality and tailored treatment strategies, ultimately leading to better outcomes.

Although implementing patient-centered care presents challenges, its undeniable benefits in terms of patient satisfaction, safety, and empowerment underscore its importance. Therefore, the synergy of lean principles, evidence-based practices, standardized protocols, and patient-centered approaches stands as a comprehensive strategy to ensure smooth and safe care transitions while prioritizing the well-being and active involvement of patients in their healthcare journey.

To implement enhanced healthcare quality and patient safety during care transitions and hand-offs is not easy. Involving patients in decision-making through shared discussions is much harder for the nurse's daily practice. That's the reason why healthcare management must provide strong leadership for patient-centered care and communicate its value to staff. To train healthcare professionals in lean principles, evidence-based practices, and standardized protocols for transitions, outlining communication processes and roles with a focus on effective communication and full patient engagement. By implementing these strategies, healthcare management can enhance communication, patient engagement, and care transitions, ultimately improving healthcare quality and patient safety.

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Reality Television Programs Impact on Management

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Abstract

Research background: Motivating employees is a critical aspect of increasing productivity and success in the workplace. Recently, organizations have explored innovative approaches to increasing motivation, including the use of reality television programs as a motivational tool. This research area investigates the potential benefits and disadvantages of incorporating reality TV-inspired strategies in the workplace.

Purpose of the article: This article aims to comprehensively analyze the use of reality television programs as a motivational tool in the workplace. It explores the development of reality shows, emphasizing their significance in the world of management and understanding motivation in the workplace, examines the benefits and potential disadvantages, presents case studies and success stories, suggests practical implementation strategies, and critically analyzes existing research findings.

Methods: The article unifies academic literature from various disciplines, including organizational behavior, psychology, and communication studies. It draws on empirical studies, case studies, and theoretical frameworks to provide an all-around perspective. The research findings and critical analysis are based on a systematic review and synthesis of scholarly sources.

Findings and Value Added: Research findings indicate that reality TV-inspired strategies can positively impact employee engagement, teamwork, and personal development. Provide opportunities for employees to challenge themselves, acquire new skills, and raise their confidence. However, organizations must carefully consider potential drawbacks, such as excessive competition and ethical considerations, to ensure a balanced and supportive work environment.

Keywords: motivation, workplace, reality television programs, employee teamwork, personal development

JEL classification: M0, M1, M12, M14, M190

1. Introduction

Motivation plays a critical role in driving employee engagement and productivity in the workplace. Traditional approaches to motivating employees often focus on financial motivations or performance-based rewards (Murray & Ouellette, 2016) However, in recent years, there has been a growing interest in exploring alternative methods, such as reality television programs, as motivational tools in the workplace (Kowalczyk et al., 2018). This article aims to survey the use of reality TV programs as a means of motivation and their potential benefits and downsides (Biressi & Nunn, 2019). By incorporating elements of competition, collaboration, and personal development, reality TV-inspired creativity has the potential to enhance employee motivation, raise creativity, and improve overall organizational performance (Mazzarella, 2017). This article provides an overview of the concept of motivation in the workplace, explores features of reality television programs (Hochschild, 2012), discusses their potential benefits (Lee & Stapleton, 2019), and highlights key considerations for their operation (Davies & Fisher, 2017). By exploring case studies (Ferris et al., 2017) research findings (Nabi & Krcmar, 2017), and practical strategies (Sherry et al., 2006), this article aims to shed light on the effectiveness and implications of using reality TV as a motivational tool in the workplace.

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1.1. A Review: The Meaningful Impact of Reality Television Programs in The World of Management

A review of the various aspects of reality programs provides valuable insights into the elements that make them meaningful in the world of management (Biressi & Nunn, 2019). Reality shows have gained significant popularity over the years and are finding relevance in the field of workplace management (Murray & Ouellette, 2016). One key element that makes reality shows meaningful in the world of management is their ability to simulate real-life situations and challenges (Biressi & Nunn, 2019). Many reality shows are designed to mirror the dynamics of the workplace, such as competition, teamwork, and problem-solving (Lee & Stapleton, 2019). By exposing participants to realistic scenarios, reality shows can provide valuable learning experiences that can be applied to the business environment. (Reeves & Nass, 1996). Moreover, reality shows often emphasize the importance of interpersonal skills and emotional intelligence (Hochschild, 2012).

In the context of management, these skills are crucial for building strong relationships, resolving conflicts, and motivating teams (Lee & Stapleton, 2019). For example, shows like "Survivor" and "The Amazing Race" showcase the significance of effective communication, collaboration, and adaptability in achieving shared goals (Lee & Stapleton, 2019). The lessons resulting from these shows can be applied to improve team dynamics, leadership capabilities, and overall organizational culture (Reeves & Nass, 1996).

Additionally, reality shows provide valuable insights into human behavior and psychology, offering a glimpse into the motivations, ambitions, and reactions of individuals in high-pressure situations (Reeves & Nass, 1996). This understanding can be applied in the workplace to enhance employee engagement, motivation, and performance (Murray & Ouellette, 2016). For instance, shows similar to "Extreme Makeover: Home Edition" demonstrate the power of motivation, insistence, and the impact of supportive environments (Murray & Ouellette, 2016). Managers can draw inspiration from these shows to create motivational programs or initiatives that drive employee productivity and well-being (Reeves & Nass, 1996).

Furthermore, reality shows (like "The Big Brother") often feature diverse participants, representing a range of backgrounds, perspectives, and skills (Stavrova & Siegers, 2014). This diversity highlights the importance of inclusivity and equity in the workplace (Stavrova & Siegers, 2014). It encourages organizations to value and leverage the unique talents and contributions of individuals from different backgrounds, encouraging a culture of diversity and inclusion (Stavrova & Siegers, 2014). By embracing diversity, organizations can attach the collective power of varied perspectives and experiences, leading to innovation and improved decision-making (Stavrova & Siegers, 2014).

In conclusion, a review of the benefits of reality shows reveals several elements that make them meaningful in the world of management (Biressi & Nunn, 2019). The ability to simulate real-life situations, emphasize personal skills and emotional intelligence, provide insights into human behavior, and promote diversity and inclusivity all contribute to the value of reality shows in the workplace (Reeves & Nass, 1996). By leveraging these elements, managers can incorporate aspects of reality shows into their management practices to enhance team dynamics, improve leadership capabilities, and drive organizational success (Lee & Stapleton, 2019).

1.2. Understanding Motivation at the Workplace

Motivation is a complex psychological process that drives personalities to take action, persist in their efforts, and achieve desired outcomes (Hochschild, 2012). In the workplace, motivation plays a crucial role in employee engagement, job fulfillment, and overall performance (Kowalczyk et al., 2018). Traditional theories of motivation, such as Maslow's pyramid of needs and Herzberg's two-factor theory, highlight the importance of meeting employees' basic needs and providing essential motivators for optimal performance (Murray & Ouellette, 2016). However, these theories may not fully capture the dynamics of motivation in modern workplaces. To enhance motivation, organizations need to consider factors such as mastery, purpose, and social connection (Lee & Stapleton, 2019). By understanding the core principles of motivation (Biressi & Nunn, 2019), organizations can design effective strategies to inspire and involve their employees.

1.3. Exploring Reality Television Programs

Reality television programs have gained massive popularity in the entertainment industry (Murray & Ouellette, 2016). These shows typically involve unscripted, real-life situations, competitions, and interpersonal dynamics (Murray & Ouellette, 2016). The unique characteristics of reality TV, such as the element of competition, the development of personal narratives, and the emotional investment of viewers,

make them potentially motivational tools in the workplace (Baruh & Cemalcılar, 2019; Biressi & Nunn, 2019). By incorporating elements such as challenges, teamwork, and personal growth, reality TV-inspired initiatives can create a sense of excitement, engagement, and achievement among employees (Lee & Stapleton, 2019; Mazzarella, 2017). These programs provide opportunities for skill development, learning from failure, and developing collaboration (Kowalczyk et al., 2018; Stavrova & Siegers, 2014). However, it is important to carefully consider the alliance of reality TV elements with organizational values, ethics, and the diverse needs of employees (Davies & Fisher, 2017; Gerbner, 2017).

1.4. The Benefits of Using Reality Television Programs at the Workplace

Employment of reality television programs tactics within workplace area, offers several potential benefits. (Murray & Ouellette, 2016; Lee & Stapleton, 2019) Firstly, these programs can create a competitive environment that stimulates innovation and creativity among employees (Murray & Ouellette, 2016; Lee & Stapleton, 2019). By setting challenges and encouraging healthy competition, organizations can inspire employees to think outside the box, generate novel ideas, and enhance problem-solving skills (Kowalczyk et al., 2018; Stavrova & Siegers, 2014). Secondly, reality TV-inspired enterprises provide opportunities for personal development and growth (Murray & Ouellette, 2016; Lee & Stapleton, 2019). Through challenges, feedback, and mentorship, employees can improve their skills, build confidence, and take on leadership roles (Murray & Ouellette, 2016; Kowalczyk et al., 2018). Thirdly, these programs foster teamwork and collaboration by encouraging employees to work together towards a mutual goal (Murray & Ouellette, 2016; Lee & Stapleton, 2019). By promoting cooperation and communication, organizations can enhance the overall effectiveness of teams and improve outcomes. (Kowalczyk et al., 2018; Stavrova & Siegers, 2014) Lastly, reality TV-inspired initiatives can increase employee engagement and job satisfaction by providing a unique and exciting experience in the workplace (Murray & Ouellette, 2016; Lee & Stapleton, 2019).

2. Methods

The benefits of using reality TV-inspired advantages in the workplace were demonstrated by Methods implied in several case studies and success stories.

One notable example is the research on the effects of reality TV-style competition on teamwork that was undertaken by Chen, Wang and Chang (2020). They used a quantitative strategy and an experimental design with several teams in a genuine business setting. Teams were divided between control and experimental groups, with the latter being exposed to the competition that was modeled after a reality TV show. Surveys and performance measures were used to gather information that was compared between the two groups' collaboration and performance. Although the study shed light on the impact of these contests on partnerships, it's important to recognize the possible limitations of a quasi-experimental design, which could not prove causality with the same certainty as a randomized controlled trial. However, this study added important quantitative data to our knowledge of reality TV-inspired workplace interventions. (Chen et al., 2020).

In a different instance, the impact of reality TV-based games on employee motivation was examined in Johnson and Smith's (2018) study using a quasi-experimental design. Participants in these reality TV-inspired activities were chosen from an organizational environment. Pre- and post-intervention surveys were used to obtain data on motivation levels. Employees took part in games inspired by reality TV as part of the intervention. An investigation of quantitative data was done to look at how motivation levels changed. The findings showed that after the intervention, employee motivation greatly improved. These techniques provided important data on the possibility of treatments motivated by reality television to improve workplace motivation.

In Jaramillo-Sierra and Popa's (2017) research, they explored how reality TV programs may be applied in the workplace as learning settings to improve emotional intelligence. They used a qualitative research methodology for their study, centered on in-depth interviews with employees who had taken part in similar programs inside their companies. They discovered important themes related to the growth of emotional intelligence using thematic analysis. These topics gave insightful information about how reality TV-inspired programming might improve emotional intelligence in a professional setting. Even though the study provided a wealth of qualitative information, it should be highlighted that the absence of experimental manipulation or quantitative evaluation in the research design made it difficult to establish causal links. Nevertheless, this qualitative method helped to grasp the experience aspect of embracing reality TV for professional skill development.

In their case study, Corcoran and Crusco (2015) investigated how reality television may be used to develop leadership skills in a genuine working environment. They used a qualitative study methodology, interviewing participants in leadership training that was influenced by reality TV shows in-depth. Decision-making, communication, and teamwork were among the repeating themes that the researchers discovered through thematic analysis in regard to the development of managerial abilities. Although the participants' experiences were insightfully illuminated by this qualitative approach, there are several major limitations to be aware of, such as the subjectivity of qualitative data and the lack of a control group for comparison. Still, the study provided insightful qualitative information for understanding its influence on leadership development in professional contexts, revealing light on the potential benefits of implementing reality TV-inspired leadership training (Corcoran & Crusco, 2015).

3. Results

Reality television has been employed as a motivating tool in the workplace, and research articles have explored this subject, bringing useful insights into its usefulness and impacts. This section highlights the main research's results while offering a critical evaluation of the subject matter.

1. According to research by Johnson and Smith (2018), employees who took part in competitions based on reality TV revealed greater levels of motivation, excitement, and commitment to their work. These programs' fierce competition generates a sense of excitement and challenge which motivates workers to contribute their best efforts. It is critical to remember that a friendly and collaborative work atmosphere is just as important for fostering employee engagement as competitiveness. Engagement may be increased while creating a supportive and cohesive workplace culture by balancing competitive components with cooperation and shared objectives.

2. Teamwork and cooperation: Strategies influenced by reality television may improve teamwork and cooperation inside enterprises. Incorporating team-based challenges and activities modeled after reality TV formats increased communication, coordination, and collaboration among team members, according to research by Chen et al. (2020). Employee collaboration, utilizing one another's abilities, and performance as a team were promoted by the shared goal and competitive environment.

3. Organizations must take care not to promote a competitive climate that delays collaboration. To prevent the advantages of cooperation from being swamped by individual competitiveness, it is crucial to strike a balance between healthy competition and a supportive team dynamic.

4. Personal Growth and Development: Reality TV-inspired strategies can provide employees with opportunities for personal growth and skill development.

Research conducted by Lee and Jones (2019) revealed that employees who participated in skill-enhancement programs inspired by reality TV formats reported increased self-confidence, improved problem-solving abilities, and a greater sense of achievement. These initiatives allow employees to step out of their comfort zones, acquire new skills, and unlock their potential. However, organizations must ensure that the pursuit of personal growth does not come at the expense of employee well-being. The intense nature of reality TV-inspired challenges may put excessive pressure on employees, leading to stress and burnout. Implementing support mechanisms and prioritizing work-life balance is essential to safeguard employee mental health while promoting personal development. While the research findings generally support the use of reality television programs as a motivational tool in the workplace, it is important to approach the topic critically. Limitations exist, such as the potential for unrealistic expectations, unfair evaluations, and the impact on employee well-being. Organizations must carefully consider these factors and tailor their implementation strategies to moderate potential drawbacks and ethical concerns.

In addition, organizations should provide suitable resources and support to facilitate employee participation and success. This may include training, mentorship, and access to necessary tools or technology. Organizations should also set up a transparent and independent assessment procedure to rate performance and determine winners or rewards. The valuation process will boost confidence and preserve the program's integrity if it is transparent and objective. Tracking the program's development and gathering participant comments are also important. This input may be used to pinpoint problem areas and make changes that are needed to enhance the overall experience. Organizations may effectively employ reality TV-inspired programs to inspire workers, foster cooperation, and encourage positive outcomes at work by implementing these beneficial strategies into reality. (Hirschman & Adcock, 2012)

4. Discussion

The impact of reality TV on workplace dynamics has been thoroughly investigated, and findings have shown a variety of potential effects. We discovered the ways in which reality TV-inspired projects may increase motivation, boost cooperation, and promote personal development among employees by using ideas from a variety of fields, including psychology, sociology, and organizational behavior. The real-world implementation of these strategies has been demonstrated through case studies and success stories from various sectors, highlighting its potency in driving creativity, improving employee happiness, and generating favorable results. We have also covered the methodological approaches, including quantitative and qualitative techniques, utilized to comprehend the impact of reality TV on employee behavior.

This study highlights how essential it is to match company values with reality TV-inspired projects, to maintain open lines of communication, and to provide the tools required to encourage employee engagement. We do, however, recognize that our study has several flaws. Depending on the industry and organizational culture, reality TV's effect on the workplace may differ. To dive into these complexities, further study is required. Moreover, further research is needed to determine the viability of such efforts and their long-term effects, especially in a world where digital connections and distant employment are becoming more common. Investigating possible ethical issues with such systems' implementation, including privacy and fairness, might also be helpful. This may make it easier for businesses to incorporate parts of reality TV into the workplace while maintaining a sense of social responsibility. The current research yet offers a solid basis for comprehending how these tactics might improve workplace dynamics and employee engagement.

In closing, our findings indicate that reality TV-inspired tactics may be successful tools for increasing motivation, cooperation, and employee development in the contemporary workplace when used strategically and in accordance with organizational goals. These observations provide insightful advice for businesses looking for new methods to empower and motivate employees in a continually shifting professional environment.

Conclusion

The use of reality television programs as a motivational tool in the workplace offers both benefits and challenges. Throughout this article, we have explored the concept of incorporating reality TV-inspired elements into the workplace and have examined various aspects, including motivation in the workplace, reality TV programs, benefits, drawbacks, ethical considerations, case studies, practical implementation strategies, and research findings.

The beneficial effects of reality TV-inspired methods on employee engagement, teamwork, and personal development are regularly highlighted by research findings. These tactics can boost employee motivation, encourage friendly rivalry, and encourage teamwork. Case studies of businesses that have successfully implemented initiatives influenced by reality TV show culture show the practical advantages of these tactics for increasing worker productivity, creativity, and leadership development.

Organizations must, however, carefully measure any potential negative effects and moral issues related to the adoption of components from reality TV.

Maintaining trust, morale, and productivity depends on making sure that employees are treated fairly, honestly, and with respect. To address these issues and minimize any harmful effects, transparency, clear guidelines, and continual review are essential.

Organizations wishing to incorporate features from reality TV into their working culture might find advice from practical implementation tactics. Key factors to optimize the advantages and reduce the threats include evaluating organizational preparedness, tailoring techniques to the work setting, offering training and assistance, and creating a positive and supportive atmosphere.

In conclusion, when used intelligently and morally, reality television may be a useful tool for inspiring employees in the workplace. Organizations may tie together the motivating potential and produce favorable results for both their workers and the business as a whole by utilizing the competitive and engaging aspects of reality TV in conjunction with their goals and values.

As a further insight, Organizations should continue to be flexible and focused on the demands and worries of their employees as more research and practical applications are developed. Organizations may develop a workplace culture that encourages motivation, cooperation and personal growth by striking a balance between the excitement and encouragement brought on by reality TV-inspired methods and the welfare and fairness of their workforce.

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Generation Z and Other Employees Chances and Needs for Mutual Benefit in Enterprises

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Abstract

Research Background: The upcoming employees of Generation Z can be a huge enrichment for working processes due their high digital competence., but they show a different view on work-life-balance, working aids, dealing with “old fashioned” work commitments old daily routines. Therefore new working conditions are needed to support all team members. Due to the fact that more than 90% of all entities are SME, the relevance and points of interest for SME are included.

Purpose of the article: Purpose is to identify different approaches between Generation Z and other employees on the work process in SME, and the mutual needs during worklife. These factors are e.g. for Generation Z: Commitment, Authority, Stress (work-life-balance), salary, Technology, or remote work. All solution need also to satisfy long-term or older employees.

Methods: Literature research, including data from 2 surveys of Deloitte (Millennials and Generation Z) and McKinsey (“Time to accelerate” / gender diversity). The survey within Generation Z was done as quantitative survey rolled out as mobile phone application and in total 96 participants complete the survey. Standardized items of expectatitons and personal impressions were evaluated.

Finding and value added: Better understanding of chances and needs for mutual benefit in Enterprises (especially SME). Requirements for onboarding/work/termination. The survey structure enables further surveys in different languages and countries, easily done by own cell phones.

Keywords: generation Z, SME, business processes

JEL classification: J11, J24

1. Introduction

The Generation Z are the upcoming generation of employees, born between 1995 and 2010. Generation Z has grown up in the age of technology and most are "digital natives". Their behavior is shaped by the accelerating development of many areas of life - often positive, as well as by mostly negative stresses (e.g. COVID), with loss of perspectives and fears for the future. Onesto (2022) shows typicals like climate change narrative, economic instability, and injustices and all the consequences of the COVID years.

They are able to be real supporting and valuable team members when it is possible to prepare the propriate working environment and an ongoing commitment. It seems, that members of Generation Z are preferred to be high potentials and possible leaders. But the challenge of leading these employees requires possibly a new behavior and new regulations. Literature research (e.g. Schnitzler (2020), Softgarden (2020) or Steckl (2019) about Generation Z and experiences of different companies, show a massive change in expectations and behavior of this generation. Work life balance and the request towards companies to prepare a proper working environment (part time, open time management, expectations towards colleagues, ...) need new standards from companies.

The needs of this generation are clear different to actual known behaviors, how can companies handle these wide range of culture changes and ensure long time satisfying cooperation. The research is done with a focus on SME, because over 90% of all entities are SME, and these SME are searching for high potential employees and the needs for their integration in the daily business.

1.1 Mental Loads for Generation Z

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The massive accumulation of crisis lead to emotional and physical overloads influences the views of the Generation Z, inherent dangers of general situations influence work and life. The survey of DELOITTE (2021) shows interesting insights in the mental world of Generation Z, see table 1.

Table 1. Mental Loads of Generation Z - Global Millenium and Generation Z Survey

Theme	Consent
Stress and anxiety are dominating the live – have taken time off	35%
Feel stressed all or most of the time	46%
Employer are doing a poor job supporting the mental health of GenZ and they have concerns for future job prospects and future financial situation	40%
Want to work less in the office, remote work can be the future	22%
A job change is welcome within 2 years	53%
Can imagine to stay with a company for at least 5 years	21%

Source: Deloitte (2021)

1.2 Recruiting of Generation Z

Schnitzler (2020) recommend employer branding focused on positioning the company as an attractive employer by communicating the added value of it offers. This includes all target group-specific communication activities aimed at potential employees. The perceived values as well as the interactions in the recruiting process are directly related to the success of recruiting employees.

Wienenergie (2023) shows one of the first reaction in this thematik from a huge energy supplier. Wienenergie is provider of electricity, heat, cooling, natural gas and other required energy derivates and hold a recruiting event, where more than 60 vacant jobs were filled within 15 minutes.

1.3 Onboarding of Generation Z

Schnitzler (2020) recommend employer branding focused on positioning the company as an attractive employer by communicating the added value of it offers. This includes all target group-specific communication activities aimed at potential employees. The perceived values as well as the interactions in the recruiting process are directly related to the success of recruiting employees.

Softgarden (2020) published the study "How do candidates perceive current recruiting processes?" in 2019. There were 6,589 participants with an average age of 35. With 49%, most of the respondents are employed. 16.4% were students, and trainees.

58% said they had abandoned an application in the past although they were interested in the job. Reasons given included: a complicated application procedure, slow response times from companies (interpreted as lack of interest), an unsympathetic behavior from Recruiters or unpleasant job ads. As a reasonable time between the application and an invitation to an interview, 56.7% stated 1 to 2 weeks.

Companies often need more than 4 weeks to respond, which can be problematic, especially for recruiting experts, as they are not on the market for that long. Preferred ways to apply are emails and online forms, which should take no more than 20 minutes to complete. 84.5% of respondents say that what they experience in the application process influences how they view the employer. Key takeaways from the study are that companies should consider the process quality of the application phase as a factor in perceived job attractiveness.

1.4 Employee retention and motivation to stay

The perceptions and attitudes related to the workplace and the factors that influence employee retention differ by generation, age, and gender according Steckl (Steckl Miriam, Simhäuser Ulla, Niederberger Marlen, 2019). Brademann (Brademann I., Poirr R. 2019) reported an online survey completed by 154 bachelor students concluded that Generation Z has a need for affective commitment. Affective commitment is part of the "three-component model" by Meyer and Allen (1990) and describes that employee want to bind themselves affectively to a company (highest form of attachment). For young employees to be effectively committed to a company, various requirements must be met.

The basic requirements are the must-factors, which are essential for building loyalty. These include Personal development, security, salary, transparency, appreciation. Performance factors influence the continuation of a bond: professional identification, harmony, recognition/appreciation, closeness to the manager, meaningful tasks. For companies to differentiate themselves from the competition, the

excitement factors must be fulfilled: Self-determination, caring, tasks clearly structured, tasks varied, tasks challenging, project work, relationship with supervisor, workplace equipment, positive corporate culture, separation of work and private life.

A second survey, Steckl et al. (2019) completed by 383 students in graduating classes in Germany, yielded similar results. Particularly important were Job security, social support, corporate culture, support in the team, pay, recognition of performance, further training, work content, relationship with the boss. The appreciation of one's own ideas and a clear separation of work and private life were also rated as relevant.

To evaluate the different attraction of SME and bigger Corporations, Hermann (2019) shows an online survey with 19.000 participating professionals and managers asked how to assess the competition for qualified professionals from the perspective of SMEs.

The shortage of skilled workers is the biggest challenge SMEs are currently facing. The reasons why candidates apply to smaller companies are: attractive location, meaningful activity (feeling of making a difference) flat hierarchy (individuality). Candidates who do not apply to SMEs give the following reasons: poorer earning opportunities, higher job security and better additional benefits at larger companies. It is important to build a strong employer brand and to communicate one's own strengths to the target candidates.

The location of SMEs is an important aspect when applying and it is important for SMEs to convince skilled workers who lived in the community to come back after their education. To increase regional commitment.

The advantages of SMEs from the perspective of employees are flexible working hours, relaxed working environment, flat hierarchy, meaningful activity, stability, identification potential and a tight-knight relationship between employees.

1.5 Employees Organizational Commitment

The three-component organizational commitment measure to identify ways for managers to drive personal effort. Based on social exchange theory and survey data, an analysis reveals that perceived organizational support (POS) has strong positive effect on affective commitment, no significant effect on normative commitment and a negative effect on continuance commitment. The findings show that only one component of organizational commitment - affective commitment - has a positive direct effect on the surveyed sales people. The study indicates that job satisfaction has positive effects on both affective and normative commitment, but not significant effect on continuance commitment. (Frank Q. Fu; Bolander and Jones (2009) with their application of Meyer and Allens three-component model).

For organizational researchers and managers, the organizational commitment based on the belief that organizations with committed employees achieve superior long-term performance. An example is given for salespeople, which indicate, that the organizational commitment and the job performance is stronger for salespeople than for nonsales employees. Pierce and Dunham's observation that organizational commitment is more important in jobs, that are complex, require adaptability and demand initiatives. The study cites HR Chally that indicates replacement costs of an experienced salesperson with average performance ranges of 40.000 to 60.000 US\$. The report shows also interesting results where salespeople state „lack of attention from upper management“; „management failures“ and so on, but on the other hand, these salesperson had a high level of commitment to the company, which seems strange.

One possible explanation is, that sales people are simply different to traditional employees. They are independent, self-reliant and typically distal from the organization, like boundary spanners (Singh 1993). They also have great autonomy and empowerment. Allen et al (1990) developed a three-component model consisting of affective commitment, continuance commitment and normative commitment. They define affective commitment based on one's values, normative commitment based on obligations and continuance commitment based on calculations of costs and benefits. These components are differentially linked to variables as antecedents and consequents (MEYER et al, 1993). In the following, the model was tested in a variety of empirical settings, e.g. Bentein (2005), Lok Westwood and Crawford (2005).

Conceptual Model and Results

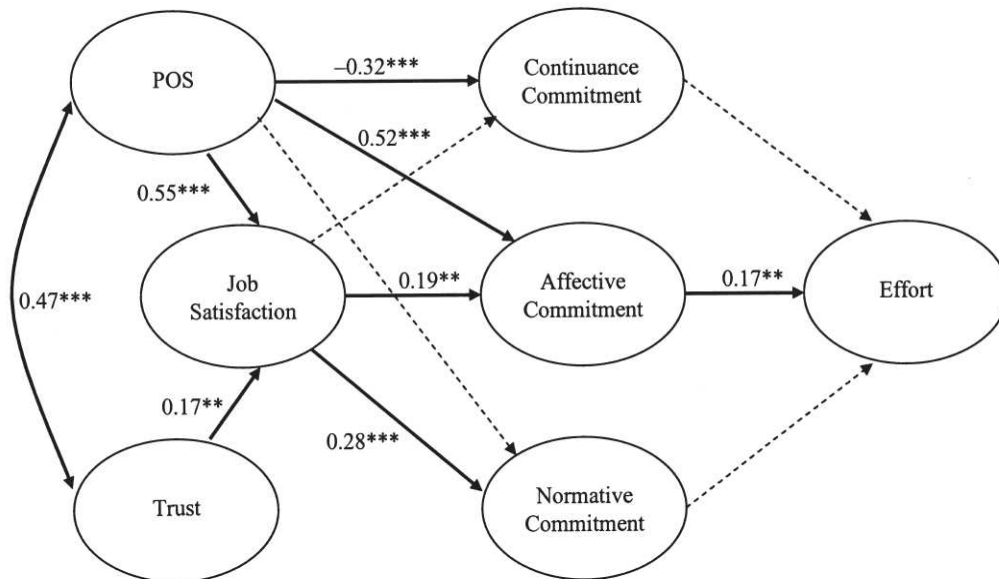


Figure 1. Conceptual Model and Results to reach commitment to remain employed
Source: Frank Q. Fu et al. (2009)

1.6 WERF (2020) Commitments

Roger van der Werf (2020) see the following main commitments in the relationship between company and employees. Affective Commitment against the company includes e.g.:

- how long want an employee to stay
- Identified to companies objectives
- Satisfied with their working environment (equipment, colleagues,...)
- See high value in the work, working as an ambassador for the company

Opposite to Fu et al (2009) define Werf (2020) a calculatorial commitment. The employees in this phase have the feeling, that they must stay in the company, that means the commitment is not on their own accord, it is a must (e.g. wage in other companies is lower, the same job is not available in other companies (or only far away,...)). These employees have inwardly terminated, but stay in the company.

The normative commitment describes the feeling of the employees, that the company want to work with them, and they should stay in the company. If employees are to high normative commitment, employees avoid to leave (to avoid disasters in the company and guilty at themself). As a resumen of this internal conflict decreases the work power of the overall team.

2. Methods

2.1 Literature

Basic Method was the Literature Recherche to the mentioned topics, mainly publications, surveys and high quality scientific literature, but most of the literature is not specific on SME, but several providing literature were found. To sharpen the results and provide data useful for Generation Z and SME, an anonymous survey was done.

- Target Group „Generation Z“, born between 1995 and 2005 and their attitude towards work life

2.2 Survey

The objective of the research, was to find special needs and restrictions for a proper cooperation with Generation Z in daily routines, mainly in SME. The survey was done by mobile phones, sent out to 260 members of Generation Z and 96 answers were generated. The survey includes some demografic questions to gain background informations about the participants. The content related questions were structured as follows: Open questions to generate spontaneous and unbiased answers, e.g. „which aspects are especially important to you in your work life“. Following multiple options are given and the participants had to rate on a 5 point Likert scale.

Further questions include both – closed end questions and text fields to explain the chosen answers.

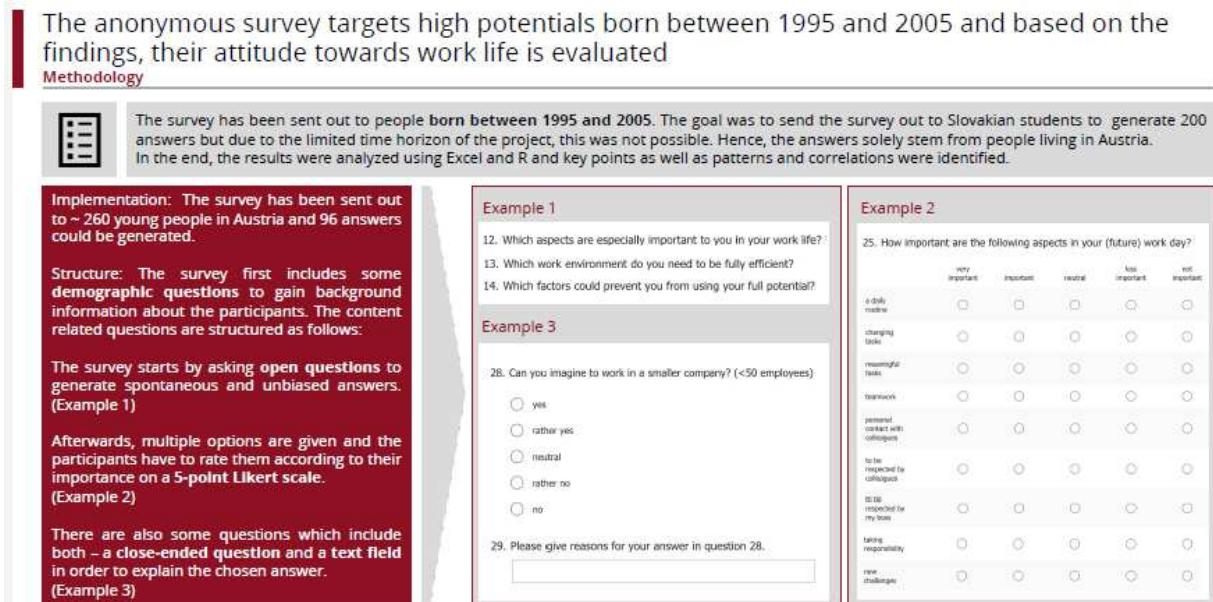


Figure 2. Generation Z Survey – Structured questions
 Source: Ramharter (2022)

2.3 Practical Check

The data of the mentioned survey „Generation Z“ were also compared to other developed documents. First was a company collective document, including organisational handbook for employees, a recruiting handbook for applicants, anonymous interviews about positive and negative influences on the work-flow, and also an interview series with 115 leaders of SME, where trends, needs and values from the managing view were explained.

3. Results

3.1 Generation Z Survey (Generation Z Survey about Work Attitudes)

In 2022 a survey with around 260 asked students, where 96 answered the questionnaire. Main questions and ideas were surveyed. As shown in Figure 4, the main group have finished the bachelor and works for the Maser level, are 19-20 years and working in business and economics.

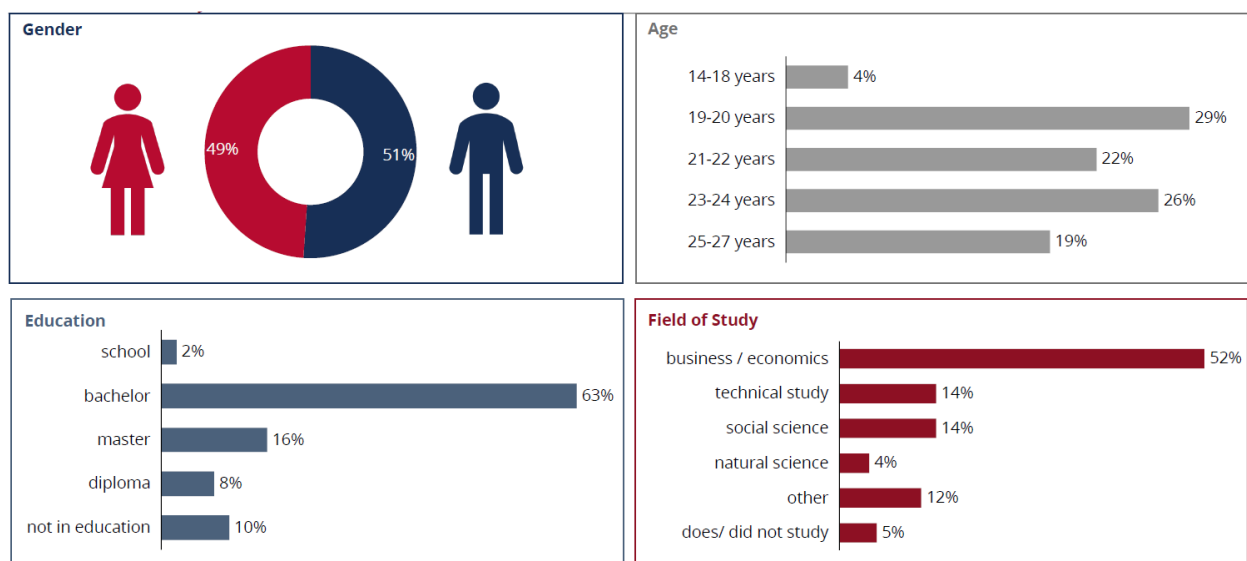


Figure 3. Generation Z Survey – sociological structure
 Source: Ramharter (2022)

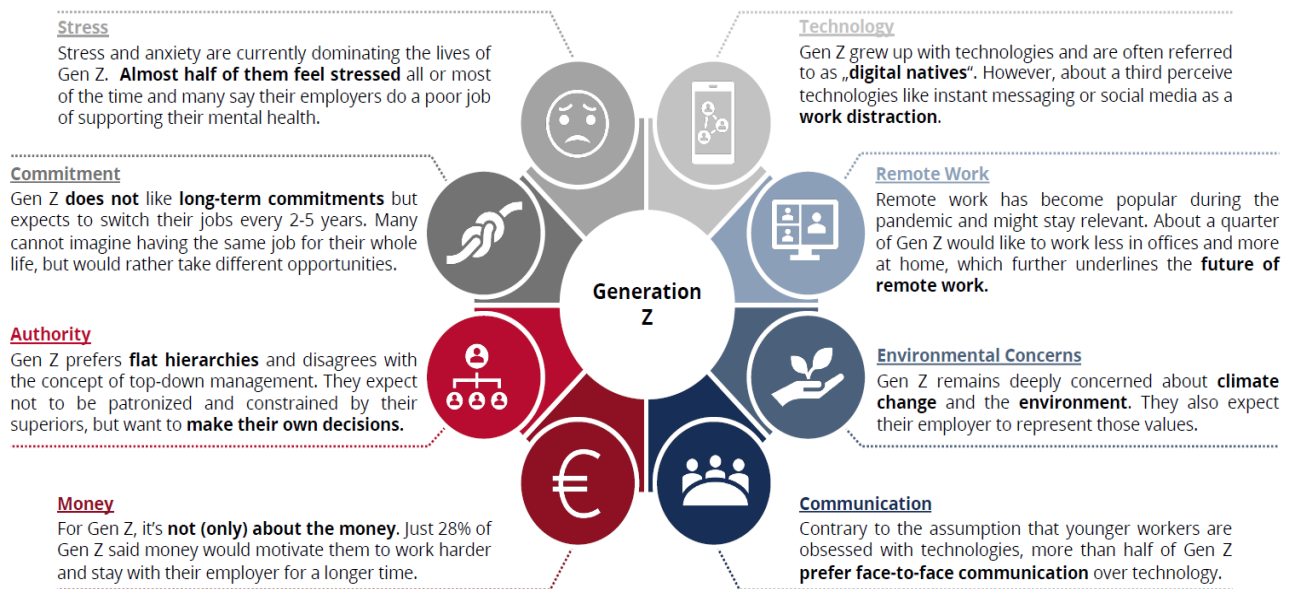


Figure 4. Generation Z Survey – main topics
Source: Deloitte (2021), graphic Ramharter (2022)

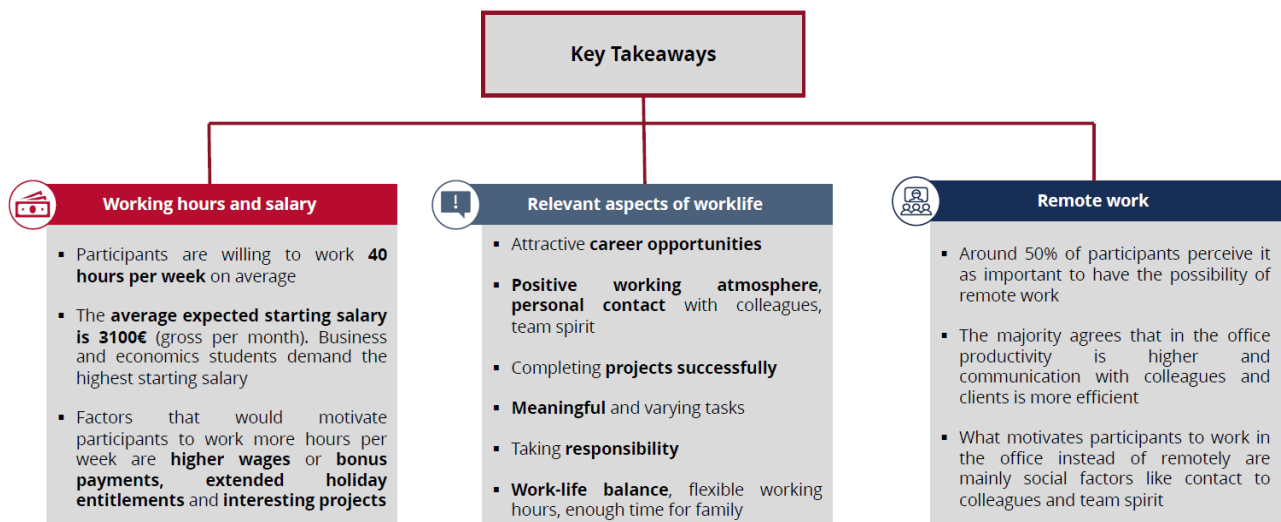


Figure 5 Generation Z Survey – key take aways
Source: Ramharter (2022)

Figure 5 shows, that the Generation Z is willing to work 40 hr/week for an average wage of 3.100, longer working times are possible, depending on extra payments, free time, extended holidays but also to be involved in interesting projects.

Figure 6 shows, that the young professionals can imagine to work in SME, because of flat structures, more responsibility, team spirit (socializing) and a larger pool of tasks – that mean more challenges.

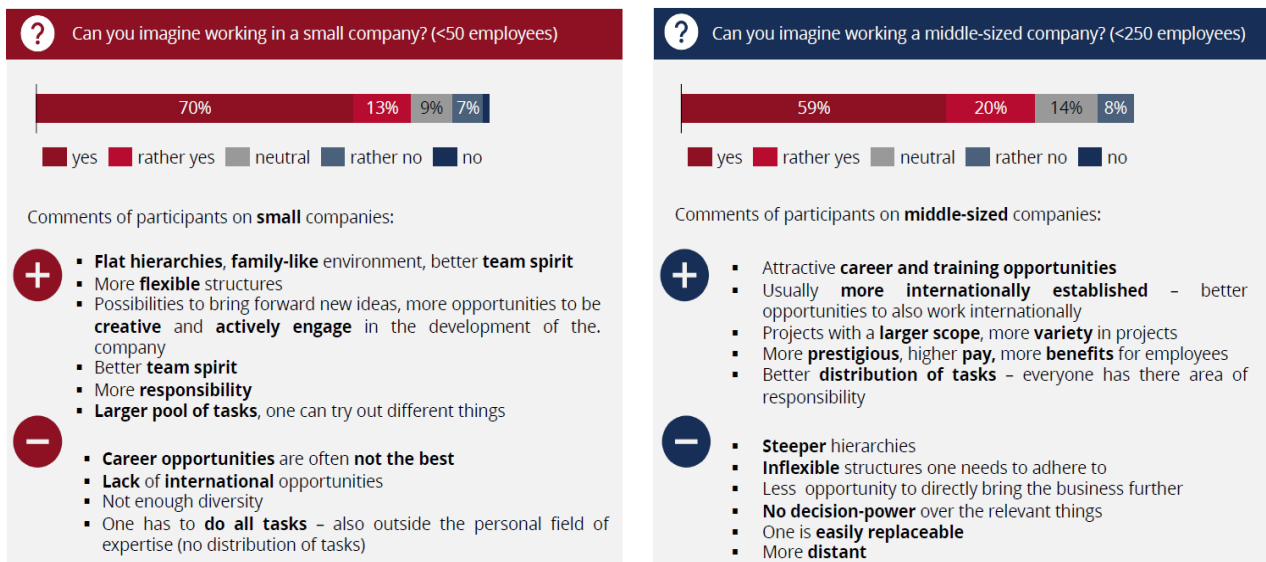


Figure 6. Generation Z Survey - Requirements to work in SME

Source: Ramharter (2022)

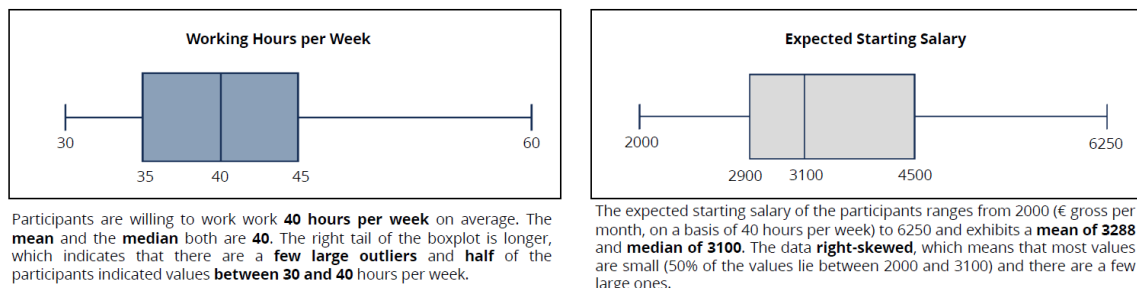


Figure 7. Generation Z Survey – work load - wage

Source: Ramharter (2022)

Figure 8 shows, that the young professionals are willing to work 40 hrs per week, but with an average starting wage of 3.100 (Maximum over 4.000 euro) and with benefits like holidays, free time, but also the work on an interesting project. Preferred is a positive working atmosphere, completing own projects, doing meaningful tasks and taking responsibility, but based on flexible working hours and family time.

4. Discussion

4.1 Generation Z Survey

The findings of the survey (Ramharter 2022) are splitted in some main tasks. Task one are the situation in the Generation Z, where different studies shows intrestingly not only a clear powerful, active and exploring generation, it was also founded a field of uncertainty (better expression maybe insecurity) with a lot of fears and sometimes hopeless visions of the future. But in the data of the surveys of Deloitte (2021), Schnitzler (2021), als well as the publications of Softgarden (2020), Brademann (2019) and Steckl (2019) show also the generation, which is easily unsatisfied, because „the employment process takes to much time“, the employer take to less care to my physical health,....the simple „just do it“ is blocked by fears, uncertainty and to much pressure from an unsafe future.

The requirements during the application process requires an additional presentation of the SME/employer towards Generation Z applicants. Besides classical factors is a declaration of the SME regarding environmental concerns (e.g. climate change; lack of rессources), and a direct communication with the foreseen team-manager regarding the planned work flow responsibilities, tasks, remote work and working communication necessary. Although this generation want to take responsibility is it absolutely necessary to exhort them during the daily working tasks. It is also compulsory, that the processes are digital, requires not to much time, quick response times from the SME and an overall time from fist contact to decision of less than 14 days. By lack of these requirements, above mentioned studies showed

58% of abandoned applications. Some companies react, so was it possible that Wienenergie hires 60 people within 15 minutes (Wienenergie 2023).

To ensure retention and work power of the Generation Z are as a basic “MUST” factors of the employer defined, like personal development, job security, salary, internal transparency and appreciation. For better involvement “PERFORMANCE” factors like harmony, recognition, working close to the manager, meaningful tasks are important. For a long term application “EXCITEMENT” factors like self determination, clear and varying tasks, job challenges, good equipment and a supportive company work style are required.

The basic literature show a high independent of the Generation Z, but at the end of the day, responsibilities should be also taken by the managers or the company. Generation Z expect work-stress and see an employer responsibility to take care about their mental health. Flat hierarchies, less Top-Down leadership, no supervisor patronation and the possibility of own decisions are fundamental basics. Money is only for 28% a motivation to stay longer. Surprisingly causes intensive usage of digital features (e.g. instant messaging, social media) work distraction, mainly when it is not started from the Generation Z, but of anybody else. In general a high performing manager is needed, who supports the Generation Z.

Generation Z expect a high wage and have a view of 2-5 years to the next work switch. It is expectable, that a longer binding can base on a normative (or calculatorial) commitment due to the high starting wage, compared with all the advantages of a wellknown working environment and colleagues. With respect to the generally surveyed concerns (e.g. climate change), means the switch of the work also a new risk.

The survey done with 96 members of the Generation Z, shows high interest in work, high interest in interesting projects and change of daily tasks, 40 hr worktime only against high payment, but preferred free time for work life balance. This free time has a higher value than the finalization of required tasks.

Based on the experiences during pandemic Covid (2021, 2022), the approach to work and free time is much more in an area of “it is my right to work at home”, “....to make a break”, and the company has to equalize the challenges. It is of course good, when employees claim their rights, but it is not acceptable when their behavior is critical for work-flows and maybe important tasks get lost. On the other hand is a complete monthly payment on time a must from the employees view. It is not interesting where the money comes from, it is their right to get the full check on time.

For SME with more sensitive and creative projects (like engineering, plant development, ...) is this an important challenge. When it is not possible to create a steadily income by prefabricated products, missing engineering or work tasks may delay incoming payments up in critical hights. But most of the employees see no connection between their work and the income of the company regarding their payroll.

This approach show the thinking of the Generation Z, that they expect binding promises, but on the other hand is it a must, but the company has to understand, that the project is not ready or main tasks are open. The binding character of their own work is often missing, or in better words not so important like the personal needs.

The comparison between SME and Mid Size companies shows from the view of all participants of the survey, that in small companies more different work exists, the team better cooperate and a better working situation due flat hirachies, family like organization, creative engagement, responsibility and more tasks are given. Concerns are in the themes of Career pools, international working, diversity and fears about to much responsibility because of working on all tasks as maybe only one.

4.2 Onboarding, retention and termination

Task two of the findings lightens the emotional and social commitments which are necessary for a succesful long term relationship between the company and the high sofisticated Generation Z. Based on the idea of the commitment to the company or structures of the company, the results of the publications of (Fu et al, Bolander et al (2009) and Werf (2020)) shows that emotional support (the emotional attachment to the organization) increases the affective commitment very strong, is not driving the normative comittment and downgrad a little the continuance comittment.

The situation of the Generation Z is not so easy as it seems. Future fears (often diffuse), high requirements towards companies, possible employers, work life balance and more, makes it for the Generation Z not easy to find (and stay in) an appropriate work place. They providing high demands against the company, the field of work, work time and more and it is difficult for elder people to organize the appropriate job interview and onboarding process – sometimes it is „to much paperworks“, or the process is to complicated, to slow, the benefits are to less and much more. The perceived organizatorial support must

be controlled to reach and increase the affective commitment for a long work time together, keeping the normative commitment down (avoid negative feelings and obligations), (Schlotter, Hubert 2020).

Interesting is, that the termination of employment by the Generation Z does not necessarily means a complete separation from the company. These people are only changing without long lasting judgement. It is more interesting, or more abroad or with more diversity, but the intention is is not to harm anyone.

Best way to accept a termination is to see it as a “new” contact on the market, but with an enormous advantage, that the former employee knows all strengths, weaknesses, opportunities and threats of the company. Instead of an enemy, the former employee is a new networking partner – exchange contacts, project possibilities and can improve the standing on the market. Although is it possible, that this networking partner come back as a high value employee or partner. This approach may be difficult for elder people, but from the view of Generation Z, may the personal advantage lead back to former companies without any regrets.

4.3 Stay, perform and betterment

Base on their personal abilities and the results of the survey, Generation Z is looking for a challenging work, with high responsibility and interest to support the companies as much as possible. But always based on support from main colleagues or chiefs and with preferred free time for additional efforts instead of money.

It seems that Generation Z see huge possibilities fails to recognize the difference between the real and virtual world or maybe clearer: they see their own needs as much more important, than the companies requirement. The clear connection between income of the company and ability to pay all employees is seen, but the personal needs and wishes give them more value as to ensure the companies income. This seems understandable, since it is very difficult to recognize these differences with little life experience.

High salary demands on the one hand and only limited willingness for corresponding work input and commitment on the other hand show this also. The expected income is not connected to an valuable output.

Since Generation Z has good access to the digital issues, but not so strong views in the working worlds world, a high quality leadership is required. This could be done, for example, through support/coaches who create personal access to these "Generation Z employees" in the company - or through other forms of collaboration in the company.

Possible forms are e.g. no employment relationship, but contracts for work (may lead to easier termination), Amoebing (small groups, free for own decisions, need high appreciated team leaders, who are accepted by the Generation Z) or simply clearer rules for responsibility and bindingness.

The impression is, that a frame is needed, where Generation Z members knows the rules, are able to handle these rules and willing to cooperate with high appreciated colleagues.

Conclusion

The inclusion of Generation Z in existing companies, will require the adaption of the know processes of requirement and affective commitment. Especially onboarding and daily routines must be adapted for Generation Z needs and supported by an accepted team leader, but only on demand of the employee.

The Generation Z intend to stay in the company when it is interesting or brand new, but to stay longer for boring and repeatedly work is less in the scope. In this case personal needs of the Generation Z will be higher valued, then the daily work. This is normal, but Generation Z will even support their personal work life balance, if projects become critical. Depending on the workflows an equalization between existing team-members and the needs and behavior of new employees will be needed and must be guided by high accepted team leaders.

It also seems essential to provide Generation Z with suitable access companies work and needs. This includes, above all, answering the question "What is my concrete contribution to the good of the company"? As long as the company (teamleader) can transfer an interesting philosophy in a good team surrounded by clear and flexible work milestones, the benefit created by such teams will increase the company values.

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Contexts of Hospital Management, Quality of Care Provided and Impacts of Nosocomial Diseases

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Abstract

Research background: To discover why known practices in the management of health care facilities have not been implemented successfully in the proper time after specific new knowledge is gained is the main context of the research. Elucidating the gap between the quality of care provided and possible quality improvements stemming from existing knowledge is the key which might lead to higher quality of care provided and significant cost savings in the health care system.

Purpose of the article: Hospitals are, in many cases, large companies whose management significantly impacts the quality of provided care. Management and management systems play a crucial role in selecting the areas for improvement and are also a fundamental source of disparity in the results achieved. Individual hospitals implement measures with dissimilar content and results in the field of quality. These measures are a combination of human behavior and processes and depend on quality leadership in the organization.

Methods: Through a literature review and in-depth interviews with representatives of hospitals, as well as quantitative analysis, the primary foci were identified.

Findings & Value added: There is an unexpected finding that significant discrepancy in quality awareness between reality and reporting within individual hospitals, as well as across hospitals. The increased transparency and efficacy, particularly in nosocomial disease detection where the reality shows 3,98 times higher than officially reported results, can improve patient care and significantly contribute to transforming the healthcare industry toward delivering higher patient value. It is desirable to verify how targeted interventions might lead to significant quality improvements and economic advantages, which deserves a closer examination in future research.

Keywords: management, quality, healthcare, hospitals

JEL classification: M12, P46

1. Introduction

History documents many cases when specific new knowledge was not implemented successfully in the proper time after it was gained. One example is the discovery made by Dr. Ignac Filip Semmelweis (1818-1865). He was a doctor and scientist working in a hospital and discovered in 1844 how to decrease the number of fatal cases in young mothers due to puerperal fever caused by infections. He repeatedly proved that hygiene significantly improves health results. However, it took three decades for his contribution to be recognized, and professionals started to change their behavior to improve healthcare results. Healthcare today is of much higher quality, and figures such as mortality and life expectancy prove this.

Nevertheless, there is still much room for improvement in implementing new knowledge to achieve better results and improve patient care. Healthcare management is responsible for deciding how new knowledge in the clinical area can be implemented faster to improve outcomes. Much more scientific work beyond this paper is needed to provide further evidence and arguments to win over decision-makers and stakeholders for faster implementation of changes that positively impact added value for patients, efficiency for healthcare providers, and overall quality improvements in public health.

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1.1 Background Information

In most cases, hospitals, as leading healthcare providers, are large enterprises, and their management fundamentally influences the quality and safety of the healthcare provided. Patient safety combines human behavior with processes and relies on organizational leadership (Jarrett et al., 2017). When comparing the quality of care between individual hospitals, the most significant sources of heterogeneity are the managerial measures and organizational settings in individual hospitals. (Manhal et al., 2018). Management systems and organizational culture play a vital role in selecting critical areas for improvement (McChrystal et al., 2015). These settings are also a fundamental source of differences in the level and quality of care management that teams achieve in their hospitals. Initiatives aimed at increasing added value for patients in practice are gaining importance (Zanotto et al., 2021), and when measuring the quality of care, a comprehensive view of the patient (Peasgood et al., 2021), who is the primary customer of the health care delivery system, is increasingly taken into account. Many publications are also devoted to the essential role of modern information technologies, which significantly influence the strategy of organizations (Menz et al., 2021). Modern technologies and systems to support clinical decision-making can significantly affect the acceleration and accuracy of diagnostic processes and potentially reduce error rates in diagnosis and treatments. Technologies that promise to improve quality and safety include telehealth, mobile health and clinical decision support. Clinical decision support holds significant promise in improving care quality and safety (Ricciardi, 2021). For example, applications based on artificial intelligence have demonstrated significant potential to reduce the error rate of decision-making and increase the efficiency of care. In many cases, professionals need to be made aware of potential improvements in their work and seldom are able to recognize and admit mistakes in their efforts. The theory of heuristics and biases described by Daniel Kahneman is applicable and used also in medical diagnosis (Kahnemann, 2011). To this end, the use of modern information technologies in healthcare is a growing trend. It enables complex and consistent processing of information, which directly affects the efficacy and quality of healthcare services, as well as safety during diagnosis and treatment (Zijian et al., 2020). The timeliness and accuracy of diagnostics play an important role in transferring responsibility for corrective measures to smaller operational teams, which, in a complex and dynamic environment, is essential support that allows organizations to improve performance (D'Innocenzo, 2015).

1.2 The Research Topic

The main research topic is to investigate if the structural setup in hospitals is effectively organized and can positively contribute to improving quality outcomes. The perspective of quality, value provided for patients, and the focus on hospital healthcare providers' efficacy are within the scope of the research. Quality is less costly when there are more accurate diagnoses, fewer treatment errors, lower complication rates, faster recovery, less invasive treatment, and minimized need for treatment (Porter et al., 2006). Complication rates listed by Michael Porter are directly linked to patient safety as one of the leading outcome indicators reflecting the value for patients. This indicator can be precisely measured in the number of nosocomial diseases, or healthcare-associated infections (HAIs), to evaluate process outcomes. Indicators such as length of stay and infections are still the most frequent measures considered in the literature (Zanotto et al., 2021). Healthcare-associated infections occur in Europe at a significant number of 3.8 million infections annually and cause up to 80,000 deaths yearly (Suetens et al., 2018). In the Czech Republic, these data are not sufficiently documented, although the professional public emphasizes the seriousness of this issue. The link between the structure set up in hospitals in the Czech Republic and quality outcomes measured by HAIs represents the main content of this research paper.

1.3 The Theoretical Framework

The outcomes in terms of the quality of care provided can be structured and evaluated within the Donabedian quality framework (Donabedian, 2002). This approach is based on three pillars: structure, processes, and outcomes. Structure includes all factors that affect the care delivery context. Processes represent how care is delivered from the clinical perspective, and outcomes contain all effects of health care on patients or populations. Based on the literature review, this model has been adopted in many healthcare areas but has not yet been specifically validated in the area of structural setup concerning improving patient safety and HAIs, which positively impacts value creation in healthcare from the patient perspective. The structural setup represents a wide range of areas that must be considered, e.g., the

legislative framework, organization from the point of view of personnel capacity and organizational structure, information systems and technologies, material equipment, management approaches, motivation schemes for employees, supporting tools and technologies to improve diagnostics and analytical capabilities as well as training and education of individuals and teams. Many other efficient practices can be suggested to improve the sustainability of healthcare organizations: improvements in management practices, leadership practices, manager selection, the engagement of clinicians in the management, the promotion of organizational culture and management style, the promotion of virtual health communication, environmental supply chain management, rational resource consumption, and waste management (Mostepaniuk et al., 2023).

There is an enormous scope of potential structural components which effect the outcome, but only two areas were defined and investigated in the structural area for this research paper to evaluate if potential improvements exist to narrow the gap between what is done and what can be achieved. The Donabedian quality framework was adopted for this research.

Table 1. Adaptation of Donabedian quality framework

1. Structure	2. Processes	3. Outcomes
1.2. Legislative framework 1.3. Management approaches 1.4. Organization 1.5. Information systems 1.6. Material equipment 1.7. Task alignment 1.8. Motivation schemes 1.9. Training and education	2.1. Pneumonia (PN) 2.2. Urinary tract infection (UTI) 2.3. Surgical site infection (SSI) 2.4. Bloodstream infection (BSI) 2.5. Gastrointestinal infection (GI)	3.1. Number of HAIs

Source: author (2023)

As documented in the literature, data and their transparency to measure results and timely detection of opportunities that can be proactively and systematically addressed are the fundamental factors which have gained more importance in the last years for improving quality management in healthcare organizations.

2. Research Methods

The selected structural components are analyzed and interpreted in this research separately. As the structural component can be extensive based on qualitative interviews and recommended WHO standards to improve quality and safety, only two structural areas 1.5. and 1.7. included in Table 1 were identified and researched. Various methods were utilized to answer the research questions. The overview of the structural areas, leading research questions, methods, and information about the data sample are listed in the Table 2.

Table 2. Research Questions and Methods

Structural Area 1.5. Information Systems - Accuracy of measurement and transparency of reporting and documentation related to patient safety measured by HAIs		
Question	Methods	Sample
How accurately does the reporting reflect the occurrence of hospital infections?	The research statistically analyzes and compares the mandatory evidence and reporting of hospital-acquired infections done by hospitals with evidence gained through an automatic search engine algorithm based on internationally standardized medical criteria for identifying HAIs. As the software base algorithm uses artificial intelligence to evaluate structured and unstructured data, the verification of the algorithm was proven, and professionals in individual hospitals confirmed proposals of the software. The software, clinical decision support tool (CDST) system, parameterization resulted in a high level of sensitivity (80%) and specificity (99%) in infection detection.	The historical data sample from 5 hospitals, with 2 500 beds in total and 52 812 hospitalizations, was analyzed, and the reported incidence of infections in total and categories based on medical content was compared with the result achieved with the infection detection software.

Structural Area 1.7. Task Alignment - Prioritization of infection prevention in the context of economic value considered in the cooperation with suppliers across hospital stakeholders		
Question	Methods	Sample
How relevant is infection prevention in considering the economic advantage for individual hospital stakeholders in selecting individual suppliers of materials and services?	Quantitative research was performed among workers in hospitals. Data were collected through telephone interviews (CATI) between March-June 2023. The research method within the subject was used. The question was directed only to the respondents who consider the economic benefit important. They were asked in which area they consider economic value most relevant to select suppliers of materials and services. In the predefined areas, the relevance of economic advantage was evaluated on a scale from 1, "definitely do not consider this to be economically advantageous", to 5, "definitely consider this to be economically advantageous". Only responses rating 5 on the scale were included in the percentage evaluation.	The total sample size was n=145, where the number of representatives from executive management = 50, hygienists = 14, head physicians = 41 and main nurses = 40. The sample set was obtained through quota selection according to a predetermined structure.

Source: author (2023)

3. Results

For a better overview, the results comparing manual / mandatory reporting with reporting supported by clinical decision tools supporting infection detection are displayed in Table 3.

Table 3. Comparison of HAIs officially reported and identified with CDST system.

Infection category	Incidence identified by CDST SW / AI Tool	Manually identified and reported incidence	Total number of hospitalizations
PN: Pneumonia	0,72 %	0,16 %	52 812
UTI: Urinary tract infection	0,83 %	0,25 %	
SSI: Surgical site infection	1,07 %	0,20 %	
BSI: Bloodstream infection	0,24 %	0,14 %	
GI: Gastrointestinal infection	0,44 %	0,08 %	
Percentage of Identified Patients	3,30 %	0,83 %	

Source: Processing of the author and the company HARTMANN-Rico a.s. (2022/2023)

The software tool reports significantly higher results, as much as 3,98 times higher, in comparison to manual detection. Higher results are also reported in individual clinical areas relevant to clinicians. However, this detailed division was not the primary focus of this research and is only displayed in the table overview.

The results which documented stakeholder alignment in the hospitals are displayed in Table 4.

Table 4. Task alignment within the organization across stakeholders

	Executive management	Hygienist	Head of department	Head Nurse
Help reduce the risk of healthcare associated infections	74 %	79 %		78 %
Time-saving products for staff				63 %
Quality products reducing the frequency of material replacement/consumption	72 %	79 %	71 %	78 %
Reduce staff effort, thus reducing the occurrence of health problems. problems				55 %
Products are demanded by patients, sell well				
Comprehensive solutions that reduce costs in the long term	60 %	71 %	59 %	45 %
Products which are easy to handle and apply		36 %	100 %	63 %

Products that simplify the work of healthcare professionals		50 %	0 %	65 %
Products that enhance personnel safety	54 %	64 %	56 %	78 %
Products/services enabling more efficient waste management	52 %		49 %	53 %
Products and advice to give the nurse a greater sense of confidence in patient care	48 %			38 %
Products/services to help set up prev. measures and standards of care. care standards	48 %	36 %		35 %
Products and services that help train staff faster		29 %	44 %	40 %
Advice and services to make the use of operating theatres more efficient	50 %		44 %	50 %
Advice to help streamline cost allocation	40 %		49 %	

Source: Assignment of the author and the company HARTMANN-Rico a.s., processing by the Focus agency (2023)

The highest alignment and economic relevance of the infection prevention topic for hospital stakeholders concerning suppliers selected to deliver and support parts of the structural setup are reported by hygienists 79%, followed by head nurses 78% and hospital executive management 74%.

4. Discussion

In the context of the enormous complexity of the healthcare system, which generates a massive volume of data, the proper interpretation and clinical diagnostics based on this data in real time are hardly possible. This might often lead to healthcare professionals using only some available data and preferring to rely more on their experience in their diagnostic and treatment conclusions. These errors in judgment could lead to avoidable mistakes. Instead, healthcare professionals should merge their own experiences with the complex healthcare data related to individual patients. As documented by the survey, identifying infections that happen during the treatment and which must be reported during the treatment process or based on after-action data analysis from patient documentation, the difference between the number that were reported and the actual number of occurrences is significant. The research uncovered the unsatisfactory quality of the identification level during the care process. The reported number of occurrences was 3,98 times lower on average than the reality based on data interpretation using the clinical decision support tool (CDST) with an algorithm dedicated to infection detection. It is evident that paying attention in a structural setting to how data analysis is supported in hospitals might lead to much better quality results in the future. Quality management depends on data that can document the status and progress not only at the level of the overall hospital organization but also at the level of individual hospital teams. Specifically, designed and trained data models in dedicated software applications can contribute significantly to transparency and the speed at which results can be improved.

Each tool requires motivation for its usage, and each innovation needs the right motivation to be applied. Handling the quality of patient care and economy while at the same time ensuring professionals' engagement is a central leadership task. For top healthcare managers to lead the pursuit of increased sustainability in healthcare, there is a need to balance the quality of patient care, economy, and professionals' engagement (Bååthe et al., 2023). The research confirms this precondition and proves that there is a high level of interest in these tools being implemented in hospitals. Hospitals do not develop the systems independently, and the research proves that topics around patient safety and infection prevention, resonate across hospital stakeholders. As stakeholders have shown willingness to cooperate with potential suppliers helping them deal with infection prevention, this shows interest to be at a decisive level. The proven alignment level here indicates a high probability that the changes can be implemented with positive results and lead to significant value generated for patients.

Conclusion

The answers to both researched questions confirm the topic's relevance to healthcare providers and the potential to reach better results by improving structural setup, specifically related to quality improvements in infection prevention. Due to the enormous complexity and volume of data, it is hardly possible to transfer data into relevant information that might be used by clinicians in time of diagnostics and choice of treatment. Improving the structural setup in measurement accuracy and transparency of reporting and documentation related to patient safety measured by HAIs increases the chance for proper identification and diagnostics. Modern technologies offer the potential to reduce limitations in working with big data, support the innovation process, and speed up the implementation measures. The

implementation of measures in the structural area is relevant across stakeholders which is the precondition to introducing these innovations in daily practice.

Continuing the research would be vital to demonstrate how the gap in infection prevention can be narrowed. The need to understand that the working environment with all stakeholders' behaviors and attitudes toward the implementation poses a crucial effect on success (Rawshdeh et al., 2022). Data transparency and the desire by stakeholders to improve are only the preconditions for the factual improvement in the quality of care and value generated for patients. The success of healthcare innovation projects depends on effective management and alignment with the healthcare quality context (Tonjang et al., 2022). It is highly relevant to conduct a practical experiment and management intervention in the structural area of the hospitals to support behavioral changes in the process area. These changes will be necessary to achieve real and sustainable results, such as cost savings related to hospital infection management and improvements in quality by identifying and implementing the right measures resulting in a higher value generated for patients.

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Personality Traits and Interpersonal Orientation of High-level Managers - Preliminary Findings

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Abstract

Research background: Personality plays a significant role in explaining and understanding the innovative behaviour of individuals in the workplace. Interpersonal behaviour is the basis of social interactions and therefore, in the context of managers' performance. The expression of dominance or affiliation in the context of interpersonal behaviour is dynamic and is partly influenced by personality traits and partly contingent on situational factors.

Purpose of the article: The purpose of this article is to compare personality traits and interpersonal orientation with respect to the performance of high-level manager's work.

Methods: The research population consisted of 193 respondents (38.9% female) aged between 24 and 62 years ($M = 41.86$; $SD = 9.42$). Data collection was conducted by administering the methodologies to high-level female managers as part of a comprehensive test set. Personality traits were measured by the Dark Triad Questionnaire, which measures levels of Machiavellianism, narcissism and psychopathy (Cronbach's $\alpha = 0.816$). Interpersonal orientation was measured by the Fundamental Interpersonal Relations Orientation (FIRO) questionnaire, which consists of 54 items that saturate six scales. The Interpersonal Questionnaire (IPQ) contains 72 items where respondents answer on a five-point scale.

Findings & Value added: Interpersonal orientation and its mean values showed that managers scored lowest in expected and expressed affection, and scored highest in expressed control. Finally, in the interpersonal qualities, managers had the lowest mean scores in the aloof trait and the highest mean scores in the warm, extraverted, and assertive traits. The psychological constructs under research have been a long-standing interest of several studies.

Keywords: personality, personality traits, interpersonal orientation, high-level manager

JEL classification: Z0, Z00

1. Introduction

Personality can be defined as a particular entity (structure or mechanism) that underlies behaviour and is the cause of a particular type of behaviour (Bergner 2020). The best known and most commonly used definition of personality, is that of Allport (1961), who states that personality is a dynamic organization in the psycho-physical system of an individual that determines behaviours and thoughts characteristic for that individual. Funder (2016) points out that personality is characterized by the patterns of thought, emotion and behaviour of an individual along with the psychological mechanisms, hidden or not, that lie behind these patterns. The name of the "Dark Triad" model of personality is related to the personality traits that make up the personality model. The individual personality traits (Machiavellianism, psychopathy, narcissism) can be viewed through the lens of the negative traits associated with them. Jones and Paulhus (2011b) report that the personality traits empirically overlap in the Dark Triad, and each predicts self-promotion, emotional coldness, and aggressiveness. The common core of each personality traits is associated with individuals being indifferent to the harm they inflict on others in pursuit of their own goals. All of the Dark Triad personality traits include selfishness, emotional coldness, and manipulation (Furtner, Maran, and Rauthmann 2017).

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Interpersonal theory of personality discusses traits that are a mix of two important dimensions of interpersonal meaning, namely power (dominance) and warmth (caring). Given interpersonal theory, virtually every social interaction requires specification of the relationship between the above dimensions. From this perspective, interpersonal dispositions or traits can be defined as differences in preferred or characteristic levels of the dimensions of dominance and warmth in social interactions. Interpersonal theory is represented by a circle that is divided by two axes, one axis representing dominance and the other warmth (Wiggins, Trapnel, 2006). The circular arrangement represents 12 interpersonal styles, which include the dimensions of dominance and warmth in varying proportions. The interpersonal styles include: assertive, dominant, manipulative, cold hearted, aloof, introverted, timid, deferent, agreeable, nurturant, warm, and extraverted.

According to Anwar et al. (2019), personality plays a significant role in explaining and understanding the innovative behaviour of individuals at the workplace, which is an important part of managerial performance. If a manager is perceived by others as the top of the hierarchical structure, then they will be able to achieve the status of leadership personality through quality leadership. The Dark Triad personality model is associated with the prediction of traits that are associated with the performance of the managerial position. Babiak, Neumann, and Hare (2010) found that managers with psychopathic traits occupy high-level executive positions and concluded that they will continue to rise higher. Judge, Piccolo, and Kosalka (2009) point out that narcissism and Machiavellianism predict a desire for formal authority and leadership positions, which means that all three personality traits predict charismatic leadership and the successful use of influence tactics to achieve goals.

Interpersonal behaviour is the basis of social interactions and is therefore an important element of effective relational functioning in an organisation in the context of the management. The expression of dominance or affiliation in the context of interpersonal behaviour is dynamic and is partly influenced by personality traits and partly contingent on situational factors, namely the behaviour of the interacting partner (Ianiro, Kauffeld, 2014). Managers who use an effective people management style correspond with a healthy and supportive work environment, which they thus promote (Malik, et al., 2016). Positive interpersonal manifestations of managers towards employees can ensure the success of the entire organization. It is imperative that managers have their followers and this leads to the effective achievement of organisational goals that promote a healthy and lasting relationship with all stakeholders (Abdullahi, Anarfo, & Anyigba, 2020).

The theory of interpersonal orientation consists of three interpersonal needs (inclusion needs, control needs and affection needs) which were assessed by Macronsson and Semple (2001) in the context of personality traits of Machiavellianism based on the research conducted. They found that individuals with low levels of inclusion, control and affection, demonstrated defensively low personal behaviours and for this reason, high levels in the Machiavellianism scale can be expected. Individuals who behave rationally exhibit moderate levels of inclusion, control and openness and for this reason can be expected to score low on the Machiavellianism scale. Research results have shown a relationship between low or high scores on the dimensions of inclusion, control and affection, and high scores on the Machiavellianism scale. Conversely, moderate scores on the dimensions of inclusion, control, and affection were associated with low scores on the Machiavellianism scale. The Dark Triad is also related to counterproductive work behaviours within the organization that negatively impact interpersonal relationships among employees.

The aim of this paper is to compare the personality traits and interpersonal orientation with respect to the performance of the profession of a high-level manager.

2. Methods

2.1 Research sample

The research sample consisted of 193 respondents (61.1% male and 38.9% female) ranging in age from 24 to 62 years ($M = 41.86$; $SD = 9.42$). The research respondents were high-level managers from the Slovak Republic.

2.2 Measures

Data collection was conducted by administering the methodologies to high-level female managers and executives as part of a comprehensive test set.

Personality traits were measured by the Dark Triad Questionnaire (Jones, Paulhus 2014), where each personality trait was measured by 10 items (Machiavellianism, narcissism, and psychopathy) (Cronbach's

$\alpha = .816$). These traits characterise people based on the extent to which they are manipulative and merciless, through which they achieve their own benefit regardless of the consequences for other people (Číbková & Jakubek, 2014; Heretik, Fronc, & Šrol, 2018). Respondents answered each item on a five-point scale, where 1 indicates strong disagreement - 5 indicates strong agreement.

The FIRO-B questionnaire (Schutz, 1967) is a standardized questionnaire in our country and is used worldwide in personality psychology in the selection of individuals. Fundamental Interpersonal Relations Orientation (FIRO) can be translated as interpersonal relationship theory, which was proposed by William C. Shutz (1958). FIRO-B has been designed to predict interactions between two people (Macrosson, Semple, 2001). FIRO-B has three dimensions of interpersonal behaviour - inclusion, control, and affection. The questionnaire consists of 54 items that saturate six scales (inclusion-expressed, inclusion-wanted, affection-expressed, affection-wanted, control-expressed, control-wanted). Respondents answer on a six-point scale (1 - usually, 6 - never; 1 - most people - 6 - no one). Interpersonal orientation is determined by the relationship between expressed (e) and wanted (w) behaviours. The greater the difference between e and w, the higher the likelihood of the existence of internal conflicts and frustration in the researched area. We also report the overall internal consistency of the questionnaire (Cronbach's $\alpha = 0.861$), but note that the appropriate measure of homogeneity for this questionnaire is the coefficient of reproducibility, as the scale is a composite of Guttman scales (Schutz, 1967).

The Interpersonal Questionnaire (IPQ) (Trapnell, Broughton, 2006) provides efficient and reliable markers of twelve locations around the perimeter of a circular model of interpersonal qualities. This circular model summarizes "interpersonal" dispositions, that is, dispositions that involve interaction between persons (e.g., assertiveness involves social interaction, whereas timidity does not). Interpersonal theory (e.g., Wiggins, Trapnell, & Trapnell, 1996) interprets these traits as different mixes of the two main dimensions of the interpersonal meaning of power (e.g., status, dominance) and warmth (e.g., alliance, caring). The IPQ defines twelve interpersonal styles representing different mixes of these two dimensions: assertive, dominant, manipulative, cold hearted, aloof, introverted, timid, deferent, agreeable, nurturant, warm, and extraverted. For example, the trait "manipulative" defines a dyadic orientation of moderate dominance and very low warmth. The remaining IPQ traits can be understood in a similar way.

The IPQ questionnaire contains 72 items where respondents answer on a five-point Likert-type scale where 1 = strongly disagree - 5 = strongly agree. Each of the 12 scales is saturated with six items. We report the reliability of each scale for our research population: assertive (Cronbach's $\alpha = 0.828$), dominant (Cronbach's $\alpha = 0.623$), manipulative (Cronbach's $\alpha = 0.756$), cold hearted (Cronbach's $\alpha = 0.725$), aloof (Cronbach's $\alpha = 0.743$), introverted (Cronbach's $\alpha = 0.788$), timid (Cronbach's $\alpha = 0.791$), deferent (Cronbach's $\alpha = 0.688$), agreeable (Cronbach's $\alpha = 0.593$), nurturant (Cronbach's $\alpha = 0.745$), warm (Cronbach's $\alpha = 0.764$), and extraverted (Cronbach's $\alpha = 0.784$).

3. Results

The research data were processed in JASP 0.14.1.0. Descriptive statistics were used in the statistical analyses.

Table 1. Comparison of personality traits and interpersonal orientation in high-level managers

	Min	Max	Mean	SD	Skewness ^a	Kurtosis ^b	SW ^c	p
Dark Triad								
Machiavellianism	11	38	26.31	5.28	-0.204	-0.317	0.989	0.193
narcissism	15	46	29.24	5.41	0.074	0.175	0.993	0.493
psychopathy	10	30	18.36	4.41	0.411	0.352	0.968	< 0.01
Fundamental Interpersonal Relations Orientation FIRO-B								
Firo Ie	1	9	5.50	1.48	0.197	-0.055	0.944	< 0.01
Firo Iw	0	9	5.20	2.11	-0.088	-0.657	0.949	< 0.01
Firo Ae	0	7	2.54	1.58	0.997	0.623	0.867	< 0.01
Firo Aw	0	5	1.60	1.07	1.608	2.441	0.747	< 0.01
Firo Ce	0	9	6.84	2.26	-0.981	0.065	0.859	< 0.01
Firo Cw	1	9	3.40	1.90	0.431	-0.451	0.924	< 0.01

Interpersonal Questionnaire (IPQ-R)									
Assertiveness	6	30	18.82	4.70	-0.297	-0.194	0.984	0.041	
Dominance	10	28	17.59	3.73	0.140	-0.565	0.981	0.013	
Manipulation	6	24	13.41	4.39	0.174	-0.664	0.974	0.002	
Cold-heartedness	6	29	13.38	4.07	0.578	0.677	0.971	0.001	
Aloofness	6	21	11.03	3.32	0.633	0.004	0.954	< 0.01	
Introversion	6	25	12.61	3.88	0.613	0.370	0.964	< 0.01	
Timidity	7	27	14.59	4.17	0.720	0.151	0.952	< 0.01	
Deference	7	26	15.74	4.09	0.133	-0.307	0.987	0.085	
Agreeability	11	30	21.38	3.85	0.028	-0.122	0.985	0.056	
Nurturance	9	30	19.63	3.63	0.044	0.250	0.989	0.194	
Warmth	11	30	22.81	3.44	-0.327	0.522	0.979	0.007	
Extraversion	8	29	19.83	4.24	-0.280	-0.200	0.986	0.057	

a = standard error skewness = 0.180; b = standard error kurtosis = 0.357, SW = Shapiro - Wilk testing criteria, c = df = 183

Source: own elaboration

The normality of the distribution was checked by graphical exploration (Q-Q, histogram) and by using the Shapiro - Wilk normality test. On the basis of graphical exploration, kurtosis and skewness, the variables under study can be considered as approximately normally distributed. According to the SW normality test, normality was not maintained for some variables. Nevertheless, we treat the variables as normally distributed because these tests are influenced by the research sample size and the other parameters of the normality check of the variables were correct. For the FIRO-B questionnaire, we did not expect a normal distribution because of the way the results were scored.

The Interpersonal Orientation (FIRO-B) and its mean values showed that managers scored lowest in expected affection (M = 1.60; SD = 1.07) and expressed affection (M = 2.54; SD = 1.58), and scored highest in expressed control (M = 6.84; SD = 2.26).

Finally, on the interpersonal qualities (IPQ), managers had the lowest mean scores on the traits of aloofness (M = 11.03; SD = 3.32) and introversion (M = 12.61; SD = 3.88), and the highest mean scores on the traits of warmth (M = 22.81; SD = 3.44), extraversion (M = 19.83; SD = 4.24), and assertiveness (M = 18.82; SD = 4.70).

There is a weak positive relationship between Machiavellianism and control expressed ($r = 0.228$; $p < 0.01$). There is no relationship between Machiavellianism and control expected ($p > 0.05$). A negative weak significant relationship exists between Machiavellianism and expected affection ($r = -0.236$; $p < 0.05$) - the higher the level of Machiavellianism, the less expected affection the respondent indicates. There was no relationship between expressed affection and Machiavellianism.

4. Discussion

Based on the results of the correlation analyses, it was found that there is no relationship between inclusion and Machiavellianism, also between Machiavellianism and expected control and between expressed affection and Machiavellianism. Previous research by Macronsson and Semple (2001) confirmed the association between low levels of inclusion, control and affection. These interpersonal needs are related to defensive impersonal behaviour and based on this, the authors expected individuals to also possess high levels of Machiavellianism. The research conducted is inconsistent with our results and has not been explicitly confirmed.

Conversely, a weak positive relationship exists between Machiavellianism and expressed control, and a negative weak significant relationship exists between Machiavellianism and expected affection. That is, the higher the respondent's level of Machiavellianism, the less expected affection they indicate. Machiavellianism, according to Wu and Le Breton (2011), is associated with disregard for morality and the use of dishonesty to maintain power. That is, the confirmation of a positive relationship between Machiavellianism and expressed control is related to the maintenance of power, and conversely, the weak negative relationship between Machiavellianism and expected control is consistent with the assumption of Macronsson and Semple (2011), who point to individuals with low levels of Machiavellianism and, conversely, moderate to high levels of inclusion and control. Explicit assessment of individual personality

traits from the Dark Triad model and interpersonal needs, to the best of our knowledge, has not been carried out on a sample of high-level managers, which may provide a stimulus for extension and new insights for further research.

High-level managers scored lowest on expected and expressed affection, and scored highest on expressed control with respect to the interpersonal personality model. Finally, on the interpersonal qualities (IPQ), managers had the lowest mean scores on the trait of aloofness and introversion. This finding is not surprising and also from the perspective of Moss, Ritosso, and Ngu (2006), introverts have a lower need to be appreciated, they have less aspiration to gain in executive motivation such as career advancement, managerial position. They scored highest mean scores on traits of warmth, extraversion, and assertiveness.

Conclusion

The individual personality traits can be considered as an important prerequisite for the performance of a challenging position as a high-level manager. The research results confirmed the importance of using methodologies focusing on personality traits in the selection of high-level managers. Based on the assessment of personality traits and interpersonal orientation of high-level managers, it is possible to set up potential opportunities for future education, or individual coaching, which will enable them to reflect their individual needs.

The psychological constructs under research have been a long-standing interest of several studies, and it would be inspirational to continue future research to assess the personality traits of the Dark Triad in an extended sample of high-level managers and to assess their applied conflict resolution strategies from the point of view of their employees. Comparison of Slovak high-level managers with managers in other countries could provide another stimulus for future research.

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Training and Performance in the Outsourcing Industry

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Abstract

Research background: Looking at the overall business landscape, regardless of the industry, all companies have a form to train new employees, or even more tenured staff, to keep them up to date with the rapidly changing business standards. These activities have a clear objective of improving behaviors, increasing or adjusting results, and upgrading certain practices. Thus, they all share the same expectation of a better performance, ideally also a higher level of motivation and belonging, and lastly a financial benefit for the company.

Purpose of the article: This paper is focused on the practices and implications of training activities within an organization that is part of the outsourcing industry. The objective is to verify the hypothesis that behavioral interventions such as training exercises determine a higher level of professional outcomes, which translates into higher labor productivity at the company level.

Methods: The research was conducted across Europe and targeted audiences in the US. The sample size for the research adds up to 136 respondents, across the mentioned countries. The research was based on a questionnaire with a set of 20 questions related to the research hypothesis.

Findings & Value added: The main conclusion of this research is that training programs are perceived by employees as elements that determine productivity growth both directly and indirectly, by improving motivation, skills, and capabilities. The novelty element is the confirmation of this relationship by observing an industry little explored from this perspective, namely that of outsourcing.

Keywords: outsourcing, training, labor productivity

JEL classification: M53, M54

1. Introduction

The outsourcing concept defines the act of externalizing certain areas, functions, and processes of a company to a third-party service provider. The continuous training of employees is a necessity in the outsourcing industry, which requires cooperation between geographically and culturally dispersed teams and organizations. “Learning and Development”, typically referred to as the training of any large outsourcing service provider has a higher and more structured maturity when it comes to developing skills and capabilities. The reason for such an observation resides in the operating model itself, as the clients surrender their operations and services to a third party which is contractually obligated to maintain a certain level of productivity, accuracy and results, which in most cases has a direct link to the skills of the employees. In the outsourcing industry, training is a key player throughout the employee lifecycle and for the comfort of the served customers. Kirkpatrick (1959) builds the framework for evaluating learning, education, and training programs. This framework consists of four levels:

- “Reaction: assessing what the trainees thought of the particular programme, usually by use of a questionnaire (Level 1)
- Learning: measuring the learning principles, facts, skills, and attitudes which were specified as training objectives and absorbed by delegates (Level 2)
- Behavior: measuring aspects of job performance, which change because of learning and are related to the training objectives (Level 3)
- Results: relating the results of the training programme to organizational objectives and other criteria of effectiveness, e.g. increased productivity (Level 4)”

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The model announces a straightforward, quite simple evaluation method in terms of understanding the basic concepts. Measuring the four levels in practice involves a certain level of subjectivity, the most common techniques used being the feedback forms, such as surveys, pre- and post-training intervention, or interviews following a common standardized approach.

Numerous articles validate the positive impact of training on the profitability and competitiveness of the organization, beyond the risks that such an investment in human capital implies. Kurosawa (2001) uses the data collected through a survey administered to the employees of 44 organizations to prove the positive correlation between formal training and business growth. Ng (2005) collected primary data through a survey on the incidence of training among enterprise workers and on the individual earnings and found a generally weak effect of training on employee earnings in China (Shanghai and Guangdong). Bartel (2002) makes a synthesis of the reference literature regarding the return on investment in training, showing that some of these studies are based on data from the companies' internal studies. The same author shows that American companies measure the impact of training on the four previously mentioned levels. The author suggests that an ideal case study would take the form of a field experiment in which the sample would be divided into two groups: one for training and one for control. This method was used by De Grip and Sauermann (2012) on an in-house call center of a telecommunications service provider organization to measure the effect of training on productivity. They show that the training participants experience an increase in productivity and the training generates a positive externality on the performance of teammates who do not participate in the training. Aguinis and Kraiger (2009) performs a synthesis of the reference literature since 2000 regarding the positive effects of training and development on all stakeholders. Hara (2014) studies the impact of training on the productivity of workers with a flexible work regime and of regular workers. To study the changes in work skills and productivity, self-evaluation results from the survey implemented were used on the target group. The results confirm an increase in productivity for both regular and non-regular workers. Using the example of a multinational company in the IT industry, the study of Chatterjee (2017) demonstrates that the investment in human capital embodied in training in the direction of improving technological skills and knowledge of the business field increases profitability. Yanez-Araque, Hernandez-Perlines and Moreno-Garcia (2017) approach the relationship between training and performance from a more different perspective than the studies cited so far: that of the theory of dynamic capabilities. From their perspective, training acts on performance through absorptive and innovative capacities. Arwab et al. (2022) developed a questionnaire on the influence of training on performance, for which they received 397 responses from employees of travel agencies from Delhi, India. Through a relatively complex methodology, they demonstrate the positive impact of training on performance, mediated by employee engagement. Thakkar and Narayanswamy (2022) collected data by interviewing 510 employees of three organizations in the jewelry industry through a 25-question questionnaire on training and productivity, confirming once more the positive impact of training. Pedrini and Capiello (2022), demonstrated using data from 2008 to 2010 that training flow and training stock had a positive impact on labor productivity in the utilities sector. Kucharčíková et al. (2023) used a questionnaire survey to collect primary data from the managers of 113 IT companies in Slovakia regarding how the impact of investment in human capital on performance is perceived. They conclude that "the investment in education and development of employees was identified to be the most frequently performed form of investment in human capital" and that this investment increases the performance of employees.

The methods by which the relationship between training and performance is studied in the reference literature are varied from the perspective of the method of data collection (primary or secondary data), the analysis techniques and the indicators used to measure performance. The research methods used in this work are presented in the second part. In the third and fourth parts, the results of the research are presented and discussed. The last part is dedicated to the conclusions.

2. Methods

The present research was conducted across Europe and targeted audience in the US. The sample size for the research adds up to 136 respondents, across the mentioned countries, all working in the same big outsourcing company. The current research is part of a larger study, based on a questionnaire with 35 questions, which aimed to discover the impact of training on performance, on the factors that affect the retention rate and on professional growth. Of the 35 questions, the questions strictly related to productivity and the factors that influence it were selected and analyzed. The result was a questionnaire of 20 questions, structured in three categories: a set of questions regarding the personal characteristics of

employees (educational level, work and training experiences, gender, age), a category of questions regarding the factors affecting individual performance impacted by training programs and a last category related to employees' perception of the influence of training on productivity. The actual questionnaire was released between February 2022 and March 2022. Answering options ranged from yes / no radio buttons, selecting from multiple choices and Likert scale. Regarding the productivity aspect of the research, the measures proposed in the Likert scale options, have been selected with the guidance of a quality black belt specialist, for defining most common grounds of measuring similar factors of contractual expectations. Training programs were split into two categories: technical and behavioral programs. The survey was announced and explained when launching from top management to all employees and it was anonymous, volunteer base (not a mandate). All answers are set forth from a personal perception of the respondents, as is the case of any questionnaire-based research. The anonymity allowed the respondents to express their views in a most genuine manner, which brings authenticity, relevance and reliability to the data collected. The Cronbach Alpha's was applied to all the Likert scales used in the questionnaire to test the reliability of these scales. The Cronbach Alpha's coefficients are > 0.700 which indicate a very good consistency for these items.

3. Results

The proposed research is tackling the ecosystem of a corporate from the outsourcing sector, so that the results presented below are related to this industry. The structure of the sample is presented synthetically in the following table:

Table 1. Sample Description

Variables		Absolute frequencies	Relative frequencies (%)
Current age	18 -24 years old	9	6.6
	25-34 years old	60	44.1
	35-44 years old	42	30.9
	45-54 years old	17	12.5
	55-64 years old	8	5.9
Current education level	Highschool graduate	12	8.8
	Bachelor	58	42.6
	Master	65	47.8
	Ph.D.	1	0.7
Personal gender details	woman	81	59.6
	man	48	35.3
	prefer not to say	7	5.1
Tenure in the current company	less than 3 years	60	44.1
	3-5 years	35	25.7
	6-10 years	23	16.9
	11-14 years	16	11.8
	> 15 years	2	1.5
Current band level	AA- Agents	45	33.1
	B1- Team Leaders	31	22.8
	B2- Group Leaders	27	19.9
	B3- Deputy Managers	13	9.6
	C1- Managers	10	7.4
	C2- Sr. Managers	8	5.9
	D1 – Associate VP	1	0.75
	D2- General Manager	1	0.75
Role status	Individual contributor	95	69.9
	People manager	41	30.1

Source: authors (2022)

The average age of the respondents is 36 years old, resulting in a better representation of the group of 25–34-year-olds (44%), followed by the 35-44-year-olds (31%). Women are also better represented in the sample (60%), with only 35% being men according to gender declaration. Regarding the education level, 48% have a master's degree and 43 % a bachelor's degree, and a small percentage only have a high school

graduate diploma or a Ph.D. degree. The best represented segment in the company regarding tenure is the group that has worked for less than 3 years (44%) for said company, followed by the group having been employed for 3-5 years (26%), 6-10 years (17%) and 11-14 years (12%). The sampling structure in regard to the current band level of respondents indicates most of them being on the level AA (31%), B1 (23%), B2 (20%) and the remaining 25% on all the rest. The role status splits the respondents in individual contributors (70%) and people managers (30%).

Regarding the training hours per month on average, the distribution of the respondents is: < 1 h/month (36%), up to 2h/month (34%), up to 4 h/month (17%), > 6h/month (13%), as is shown in the following figure:

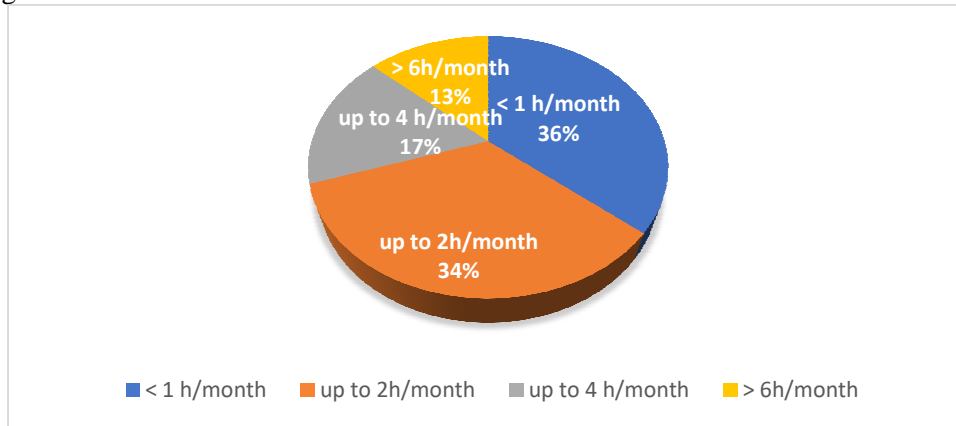


Figure 1. Training hours per month

Source: own processing (2022)

Regarding the elements most impacted by attending a training program, measured on a Likert scale from strongly disagree (1) to strongly agree (5), the results are presented as follows:

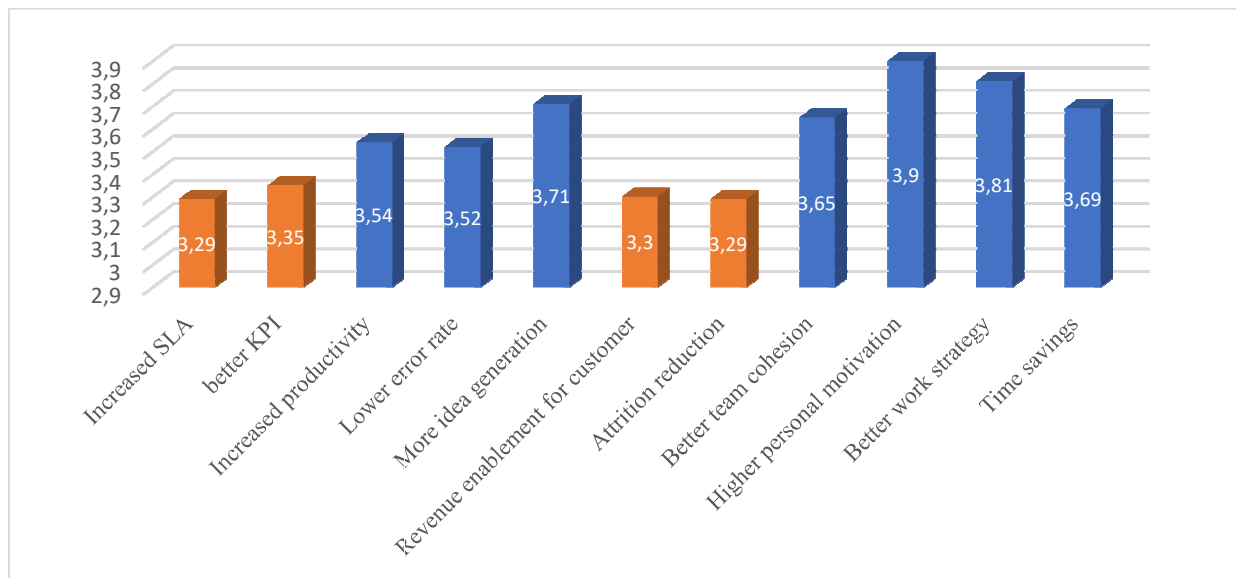


Figure 2. Elements most impacted by attending a training program

Source: own processing (2022)

It can be concluded that there are some neutral opinions regarding the elements which are most impacted by attending training programs such as Increased SLA (service level agreements), Better KPI (key performance indicators), Revenue enablement for customer and Attrition reduction. The respondents agree that the impact was positive in regard to the following elements: Increased productivity, Lower error rate, More idea generation, Better team cohesion, Higher personal motivation, Better work strategy, Time savings, Team management.

A percentage of 79% consider that the technical training programs help to improve the analytic skills and 76% feel that the behavioral training programs help to improve their capabilities.

Table 2. The impact of the training programs

Do you feel the technical training programs helped you improve your analytic skills?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	107	78.7	78.7	78.7
	No	29	21.3	21.3	100
	Total	136	100	100	
Do you feel the behavioral training programs helped you improve your capabilities?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	103	75.7	75.7	75.7
	No	33	24.3	24.3	100
	Total	136	100	100	

Source: authors (2022)

Regarding the skillsets that was applied and improved after attending the excel or google sheets training, the respondents confirm improving all of the mentioned skills, the average score being around 3.7, as it is reflected by the figure 3:

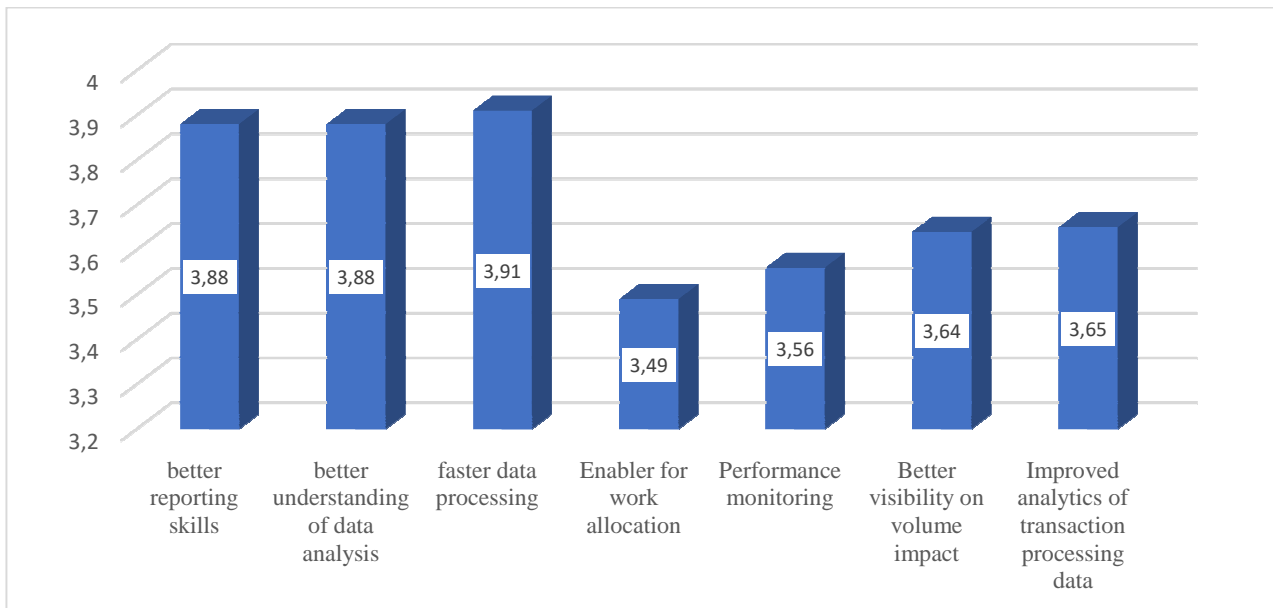


Figure 3. The skillsets improved post attending the excel or google sheets training

Source: own processing (2022)

For the skillsets that was improved by attending the presentation skills/ slide design training, the data from figure 4 indicates the agreement with all referenced elements in the question, with better scores for Better data visualization (3.87) and clearer data communication (3.82).

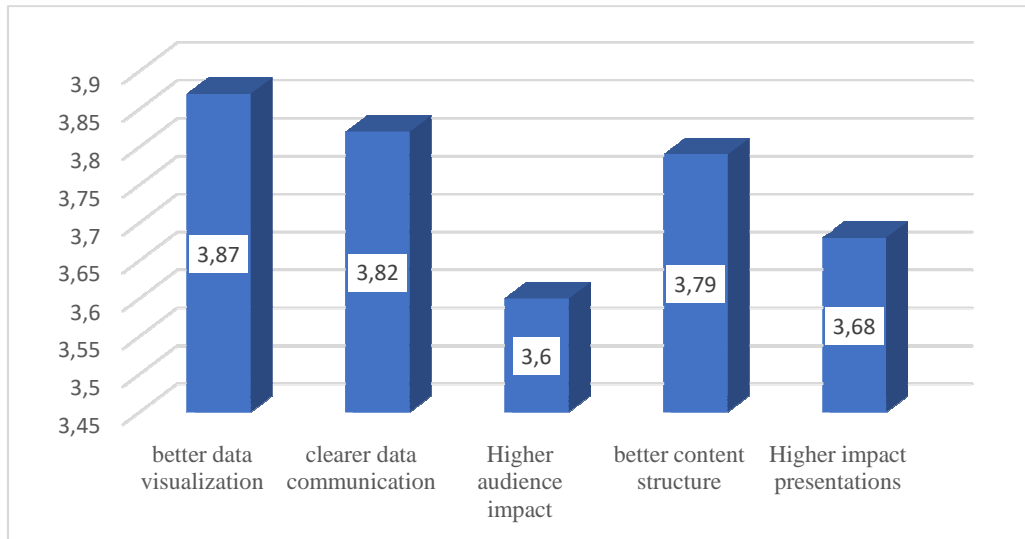


Figure 4. The skillsets improved post attending the presentation skills/ slide design training
Source: own processing (2022)

Respondents agree that all skillsets applied and improved by attending the behavioral topics, the average score being around 3.8.

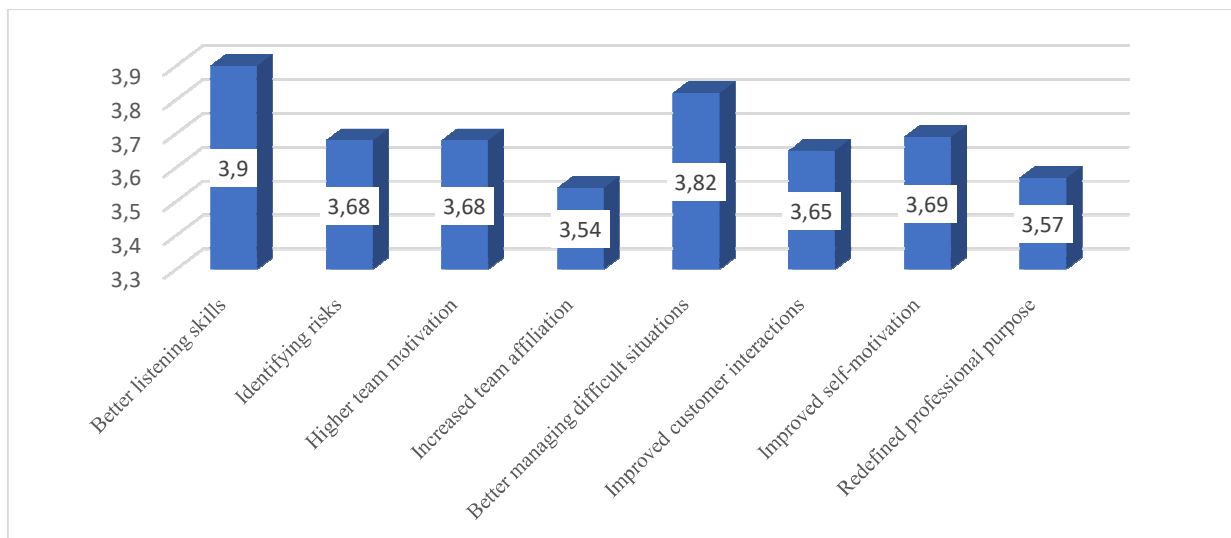


Figure 5. The skillsets improved after attending the behavioral topics training
Source: own processing (2022)

The hierarchy of the *most impacted areas* after attending the training programs, measured on a Likert scale, is as follows, based on the received answers:

1. Improved data reporting (4.64),
2. Increased opportunity to move within the organization (4.33),
3. Higher motivation (4.02),
4. Better communication (4.01),
5. Effective activity planning (3.93),
6. Improved leadership skills (3.88) and
7. Clearer strategy in setting goals (3.15).

The majority of the respondents have the opinion that the training programs had a significant impact on their work, and job efficiency and performance, causing an increase in individual productivity, as can be seen in table 3.

Table 3. The impact of the training programs on work, job efficiency, job performance and productivity growth

Do you feel that the any of the training programs that you have attended so far, have had a significant impact on any of your work related areas?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	66.9	66.9	66.9
	No	45	33.1	33.1	100
	Total	136	100	100	
Do you personally feel that attending any of the training programs helped - in any way - increase your productivity?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	92	67.6	67.6	67.6
	No	44	32.4	32.4	100
	Total	136	100	100	
Do you personally feel that the training programs have had an impact in your overall job efficiency?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	93	68.4	68.4	68.4
	No	43	31.6	31.6	100
	Total	136	100	100	
Do you personally feel that the training programs have had an impact in your overall job performance?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	90	66.2	66.2	66.2
	No	46	33.8	33.8	100
	Total	136	100	100	

Source: authors (2022)

The most impacted professional factor after attending the training programs are presented in figure 4 below:

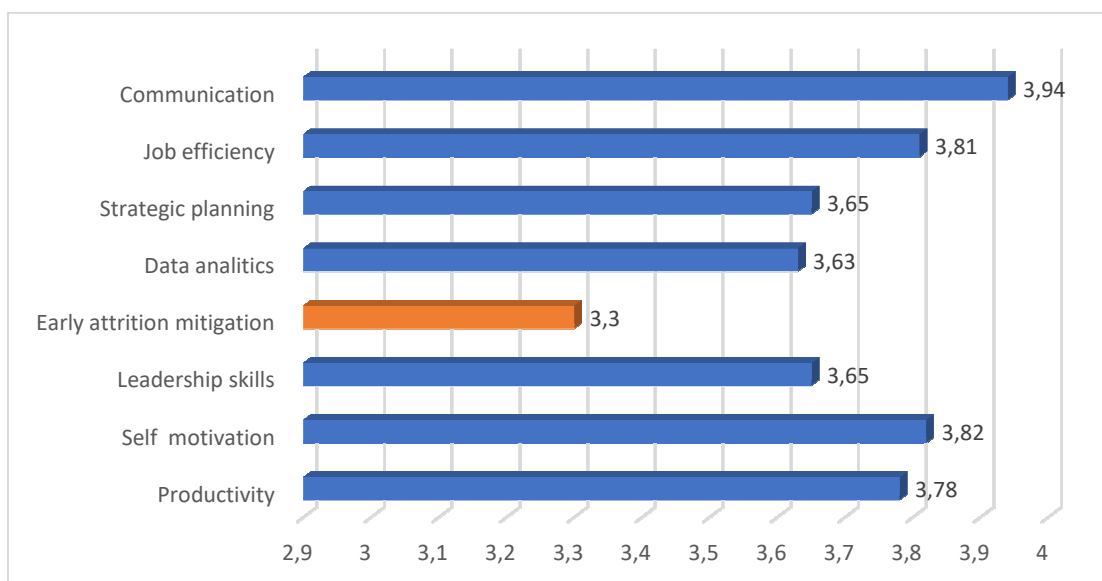


Figure 6. The most impacted professional factor after attending the training programs
Source: own processing (2022)

Communication, self-motivation, and job efficiency are in the first three places, closely followed by productivity.

Regarding the experience acquired after attending the training programs that helped the employees to improve their performance at work, the majority agree and strongly agree (about 67%), 26% are neutral and only 7.4% disagree and strongly disagree with this aspect.

4. Discussions

The previously presented results reveal that the training is perceived by the employees as having a positive impact on most of the components of their work. The degree of agreement regarding the impact of the training is slightly higher (3.72) for the technical training than for the behavioral topics (3.69). It is interesting to note that, although over 75% of the respondents believe that the training improves their analytical skills and capabilities, only about 68% consider that it increases their productivity. This difference suggests that either part of the employees is not aware of the relationship between skills and productivity, or they do not implement the new skills/improvements acquired through training in their work, which refers to the principal-agent model. Any organization that strives to quantify productivity decides to monitor success and performance via multiple means of metrics. In the outsourcing industry such metrics are most often the SLA (custom made basis client needs) and KPI (a complementary measure to the SLA, consisting in measurable strategic goals), as factors of success. The results of the questionnaire show a rather neutral position of the employees participating in the training in relation to these two elements. In the context where the majority states that training increases work performance, a possible explanation could be that SLA and KPI are elements already fixed in the past, while training is perceived as an action with future impact. Another explanation could be that the employees aim to improve their skills through training, rather than to reach the KPIs set by the contract.

Conclusions

The main conclusion of this research is that training programs are perceived by employees as elements that determine productivity growth both directly and indirectly, by improving motivation and skills. This confirms the findings of other authors, mentioned in the reference literature, such as De Grip and Sauermann (2012) and Chatterjee (2017). The novelty element is the confirmation of the relationship by observing an industry little explored from this perspective, namely that of outsourcing, through the processing of primary data collected through a questionnaire.

Since the study refers to the perception of employees, their subjectivity represents the first limit of the research. In addition, this study can be extended by applying statistical models such as correlation analysis and factor analysis, which could highlight new information. Another element to be considered in the future for similar studies is that a larger and more diverse population may bring additional discussion points, or more data for statistical analysis.

Resources

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Exploring Perceptions of Talent Management in Relation to Generational Diversity of Employees in the Context of Sustainability in a Healthcare Facility in the Slovak Republic

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Abstract

Research background: Talent management represents systematic processes in the management of employees who represent exceptional added value for the organization from the point of view of high potential in the future or for the fulfillment of exceptional critical tasks. It is an ongoing and mainly strategic process. A well-set talent acquisition program and systematic work with them brings the organization (among other things economic growth in the form of high-quality and positive results, a goodwill etc.) The generations of employees who currently work on the labor market can be recognized according to criteria (e.g., demographic data, life experiences, sociology, a set of beliefs, attitudes and everything that shaped them during their life and what makes them characteristic). Their differences can be a source of creative power and a source of opportunity.

Purpose of the article: The aim of this paper is to explore differences in perceptions of talent management with respect to generational diversity.

Methods: The questionnaire focused on the issue and was conducted in a hospital that provides inpatient health care, including inpatient emergency services in 9 inpatient wards and 5 specialized ICU wards, where 15 specialized outpatient clinics are also included. The results from the questionnaire survey were evaluated by higher statistical methods (Shapiro-Wilkov normality test, ANOVA test a Kruskal-Wallisov test) using SPSS 22 software. The research sample consisted of 82 respondents out of 120, which is 68.33% success rate.

Findings & Value added: Based on the findings, the research results will benefit the work in a healthcare facility and will also help in setting processes when working with employees.

Keywords: talent management, talented employees, phases of talent management, organization, generation X, generation Y, generation Z, generational differences

JEL classification: J24, M12

1. Introduction

Talent management is one of the ways to improve employee performance and by being future-oriented, it helps organizations to harness the current potential of talented employees to improve future job performance. Pasko et al., (2021) says that Sustainability reporting has become an increasingly common practice among companies around the globe as around 90% of the world's 250 largest companies from Fortune 500 prepare and publish its sustainability reporting.

Creating the conditions for the development and realization of such employees can have an impact on the growth of positive economic result of the whole organization. Talented employees are a long-term asset to the organization and therefore development activities for them should signal that the organization is interested in employing them for the long term. Al Ariss et al., (2014) also demonstrated that talent management is important for at least two primary goals: (i) ensuring that organizations can effectively acquire and retain the best talents, and (ii) retaining these talents for a longer period.

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1.1 Talent management

Recently, interest in Talent management in the national context has increased significantly to more fully comprehend the complexities of managing talent in today's globalized world, where organizations are not only competing with each other, but governments and their societies have also joined the talent race' (Khilji & Schuler, 2017, p. 400). Talent management is a broad issue with many definitions. It represents the systematic attracting, identifying, developing, using, maintaining and deploying those employees who represent an extraordinary value for the organization, whether it is their high potential in the future or because they fulfill critical tasks in corporate activities or processes (Ali Taha - Sirková 2012). According to Menity group (2013), talent management is a complex system of activities and processes, the main goal of which is to find new opportunities for the growth of the organization, while talents and innovations are considered the key to growth. The purpose of talent management is to build and subsequently maintain a strong competitive advantage of the organization. Especially after the crisis, organizations began to deal more intensively with people with the ability to look at problems from a different perspective. People with the courage to change things, with vision, able to anticipate and create new concepts. Many successful organizations attach a high priority to talent management and thoroughly deal with the processes themselves, such as e.g. identification of employees with high potential, development of their career, retention or use of their skills. Most booming businesses recognized years ago that the most efficient practices of talent management are directly associated with the organizations culture and strategy (Gamama et al., 2018). According to the opinions voiced by Sparrow et al. (2015) and Graeme et al. (2016), talent is to be perceived through four "perspectives" as human capital that is embodied in the individual's capability to categorize, a productive economic value, social capital, political capital and cultural capital. A talent management program should be fully integrated with other business processes. In order to achieve the expected results of talent management, it is necessary to ensure a continuous cycle of "talent improvement", which includes attracting talents, inspiring them, motivating them, managing them, developing them and rewarding them appropriately. Organizations that do not change their approach to talent management may lose their greatest asset – people (Menity group 2013).

1.2 Generational differences

Organizations that know and can leverage the strengths of each generation, know how to effectively resolve conflicts within generations, tend to keep their employees both productive and motivated, even in the face of economic and societal changes that affect the organization (Bentley university 2017). The interaction between older and younger generations often leads to situations where generational differences are clear but unknown and therefore instinctively negative biases are attributed to them, due to a lack of understanding. Adaptation is the biggest challenge that members of different generations have to face in a multigenerational work environment (Deal, 2007). As research from the Society for Human Resource Management shows, organizations with an effective collaborative multigenerational workforce have a definite strategic advantage (Birkman 2016). There are several benefits that organizations gain when a multigenerational workforce works together. A positive inclusive work culture can lead to business success by increasing recruitment, retention and profitability.

Different sources and authors report different divisions and types of generations, as well as different time horizons. For the purpose of our work, we have chosen the following breakdown of generations as shown in Table 1.

Table 1 Breakdown of generations

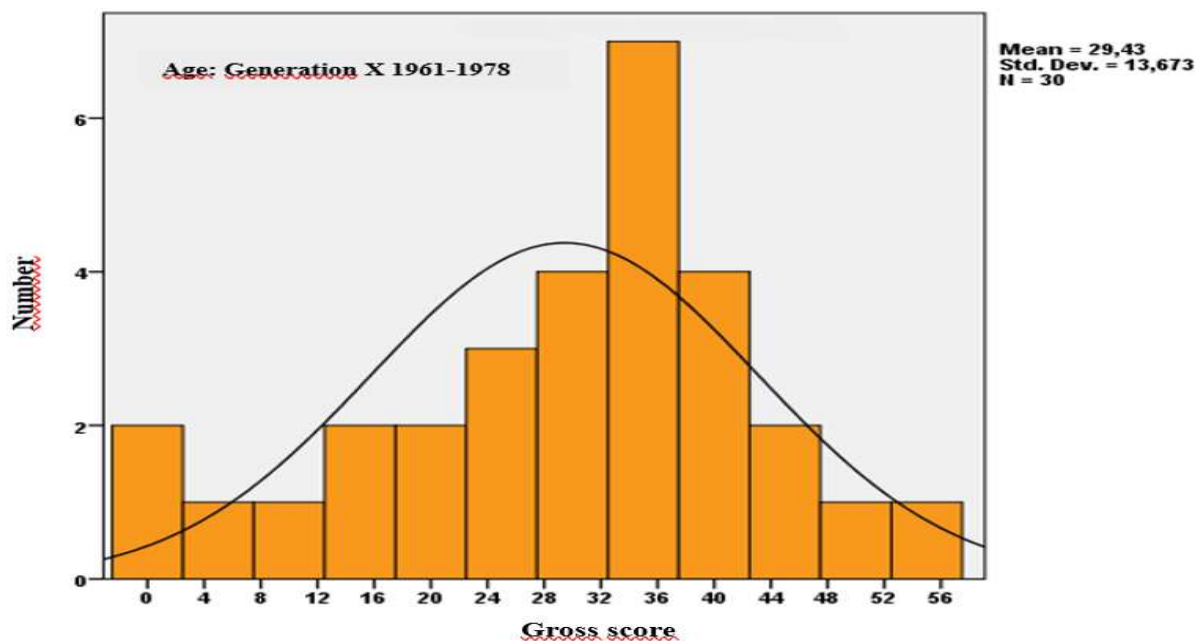
Name of generation	Time horizon of birth
Traditionalists	before 1945
Babyboomers	1946-1964
Generation X	1965-1979
Generation Y	1980-1994
Generation Z	1995-2009
Generation α	2010-present

Source: elaborated according to Kelly (2014) and McCrindle, Wolfinger (2011)

2 Methodology for exploring perceptions of talent management in the context of generational diversity

The aim of this paper is to explore differences in perceptions of talent management with respect to generational diversity. The questionnaire focused on the issue and was conducted in a hospital that provides inpatient health care, including inpatient emergency services in 9 inpatient wards and 5 specialized ICU wards, where 15 specialized outpatient clinics are also included. In 2020, the hospital was awarded the "Best General Hospital in Slovakia" award. The results from the questionnaire survey were evaluated by higher statistical methods using SPSS 22 software.

The research sample consisted of 82 respondents out of 120, which is 68.33% success rate. Graph 1 shows the respondents by generation. The largest group in the sample in terms of generation was Generation Y respondents, and they constituted 52.4% of the sample. In contrast, the least numerous group was Generation Z respondents, and they accounted for only 11% of the sample (Stolárová 2022).



Graph 1. Generation breakdown - Generation
Source: Own elaboration

Survey respondents were asked to indicate their level of agreement on each question in the questionnaire. A Likert scale (a) - (e) was used to express the level of agreement, the individual parameters being as follows: a) definitely yes, b) rather yes, c) don't know, d) rather no, e) definitely no. For statistical analysis, given the stated hypotheses and the nature of the data, the Shapiro-Wilk normality test, ANOVA test and Kruskal-Wallis test were used. Statistical analysis was performed using SPSS 22 software.

3 Results and evaluation of hypotheses

Hypothesis 1 We hypothesize that there is a statistically significant difference in the degree of positive perceptions of talent management in an organization with respect to generation. The overall raw score for perceptions of talent management in the organization was obtained by summing the scores from questions 5, 6, 7, 8, 9, 11, 12, 14, 15, 16, 17, 18, 19, and 20. We scored individual responses as follows: Definitely no = 0 points, Rather no = 1 point, Don't know = 2 points, Rather yes = 3 points, and Definitely yes = 4 points.

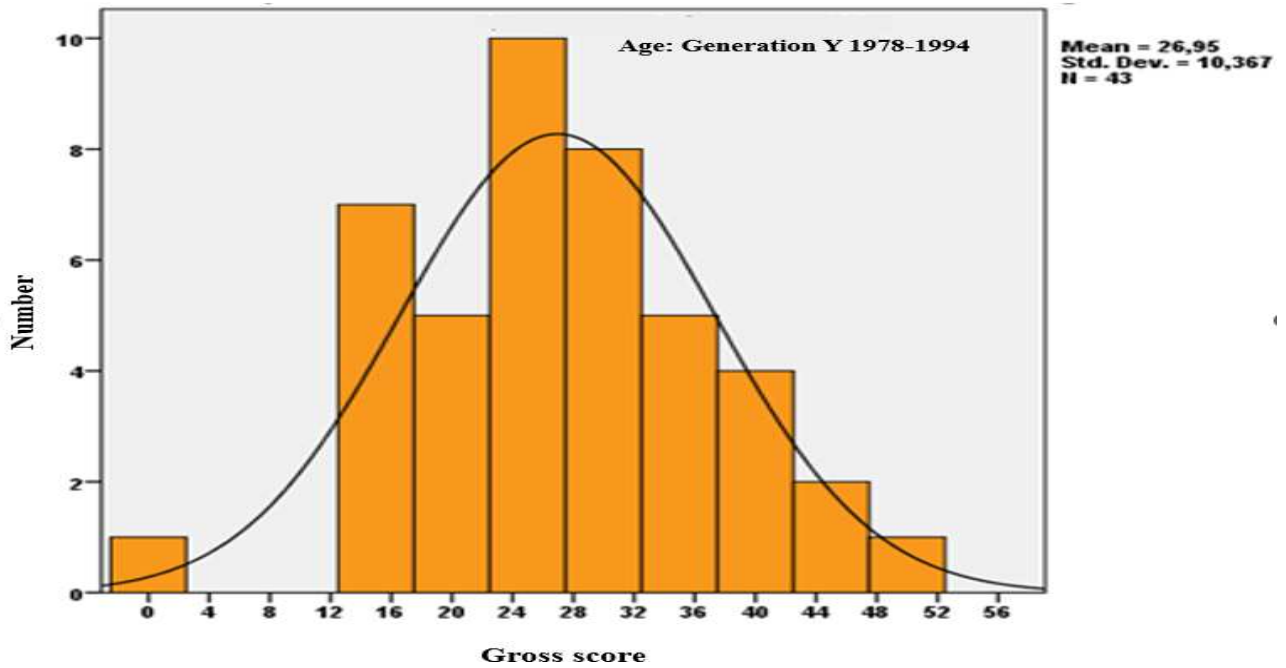


Chart 1. Level of positive perception of talent management in Generation X organisation
Source: Own elaboration

Thus, the total score could take values ranging from 0 - Maximum negative perception of talent management in the organization to 56 - Maximum positive perception of talent management in the organization.

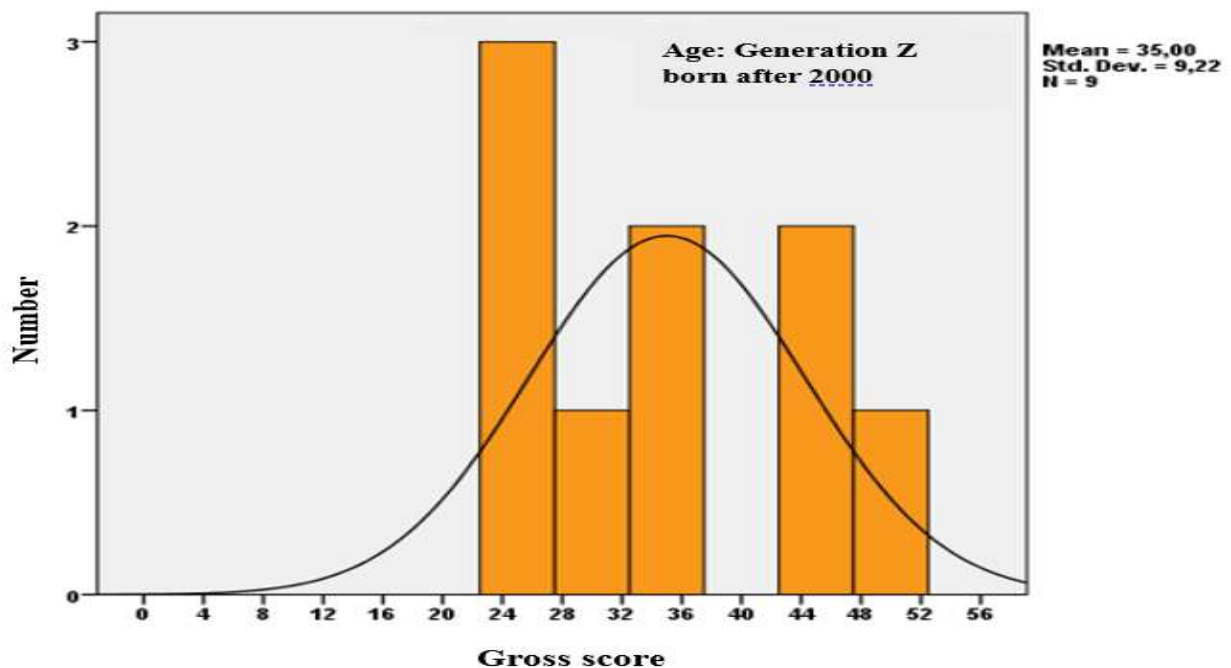


Chart 2. Level of positive perception of talent management in Generation Y organization
Source: Own elaboration

Based on the results, we can observe that the mean raw score of the degree of positive perception of talent management in the organization was on a scale of 0 - maximum negative perception to 56 - maximum positive perception, for Generation X respondents at 29.43 points, for Generation Y respondents at 26.95 points and for Generation Z respondents at 35 points.

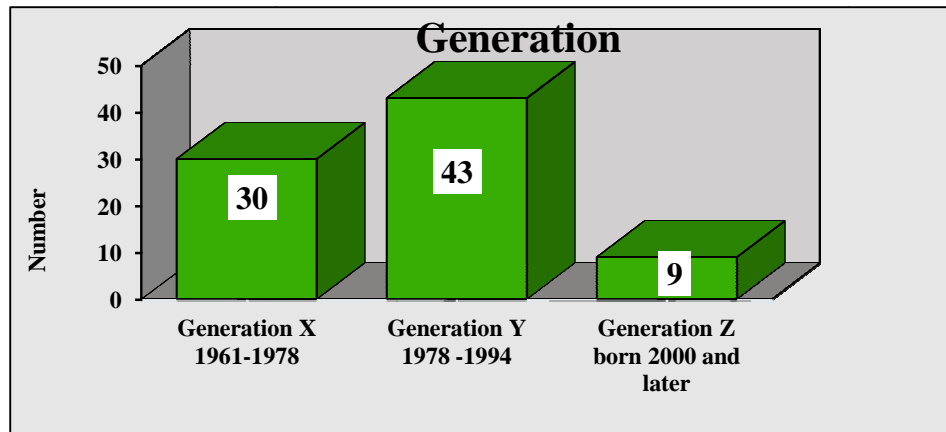


Chart 3. Level of positive perception of TM in Generation Z
Source: Own elaboration

To gain insight into the normality or non-normality of the data distribution, necessary for subsequent testing of hypothesis 1 and based on the sample size, we used the Shapiro-Wilk normality test.

Table 2 Shapiro-Wilk normality test

Generation	Shapiro-Wilk		
	Statistic	df	Sig.
Generation X 1961-1978	,967	30	,469
Generation Y 1978-1994	,981	43	,670
Generation Z born. after 2000	,909	9	,309

Source: Own elaboration

Since we found in the normality test reported in Table 2 that the data have a normal distribution, we use parametric tests to test Hypothesis 1.

For hypothesis 1, we sought to determine whether there is a statistically significant difference in the degree of positive perceptions of talent management in an organization with respect to generation. To analyze the hypothesis, we used parametric ANOVA test after considering the tests of normality of data distribution and nature of variables.

Table 3 ANOVA - degree of positive perception of talent management in the organization

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	504,348	2	252,174	1,877	,160

Source: Own elaboration

For the ANOVA test, we look at the Sig column. If there is a value less than 0.05, there is a statistically significant difference between at least two groups. In our case, there is 0.16 and that means there is no statistically significant difference between any two groups.

Based on the results of the one-way ANOVA test presented in Table 3, we can conclude that there is no statistically significant difference between any two generations in the degree of positive perception of talent management in the organization.

Hypothesis 1 was not confirmed.

Hypothesis 2 We hypothesize that there is a statistically significant difference in the perception of an organization's ability to retain talent with respect to generation.

In descriptive statistics for each hypothesis, it is necessary to make such a basic sketch of the variables involved in the hypothesis.

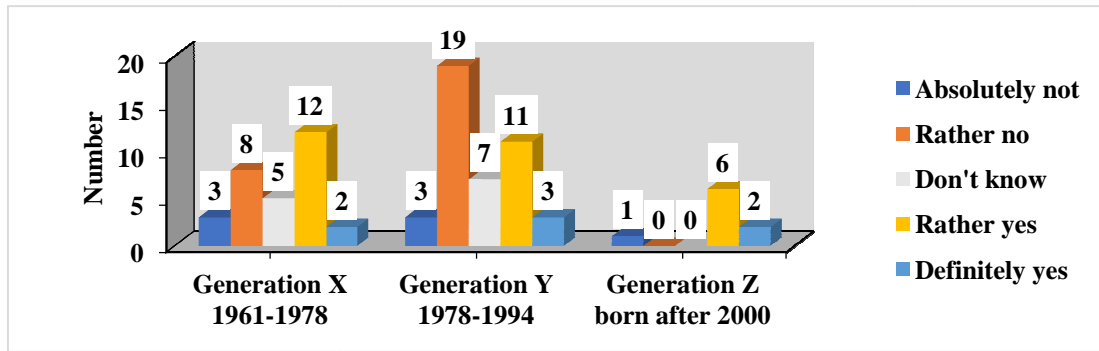


Chart 4. Perceptions of the organization's ability to retain talent in Generation X, Y, Z
Source: Own elaboration

Based on the above results, in terms of perceptions of the organization's ability to retain talent, most Generation X respondents tended to agree with the organization's ability to retain talent and accounted for 40% of their group, most Generation Y respondents tended to disagree with the organization's ability to retain talent and accounted for 44.2% of their group, and most Generation Z respondents tended to agree with the organization's ability to retain talent and accounted for 66.7% of their group.

Based on the nature of the variables, we will use non-parametric tests to test hypothesis.

For hypothesis 2, we sought to determine if there is a statistically significant difference in perceptions of an organization's ability to retain talent with respect to generation. To analyze the hypothesis, after taking into account the nature of the variables, we used the non-parametric Kruskal-Wallis test.

Table 4 Mean Rank Generation X, Y, Z

Generation	N	Mean Rank
Generation X 1961-1978	30	42,42
Generation Y 1978-1994	43	37,27
Generation Z born after 2000	9	58,67
Total	82	

Source: Own elaboration

Table 5 Kruskal-Wallis test

	Perception of the organization's ability to retain talent
Chi-square	6,638
df	2
Asymp. Sig.	,036

Source: Own elaboration

Based on the results of the Kruskal-Wallis test, we can conclude that there is a statistically significant difference in the perception of an organization's ability to retain talent, at least between the two groups with respect to generation.

We now compare the pairs of groups separately and use the non-parametric Mann-Whitney U-test to do this.

Table 6 Perception of the organization's ability to retain the talents in Generation X, Y

Generation	N	Mean Rank
Generation X 1961-1978	30	39,80
Generation Y 1978-1994	43	35,05
Total	73	

Source: Own elaboration

When interpreting the Mann-Whitney U-test, we proceed by looking at the value in the Asymp Sig.(2-tailed). If the value there is less than 0.05 then we know that there is a statistically significant difference between the groups. We then need to figure out what direction that difference is, that is, which group is how different from the other. To do this we use the table on the left, where Mean Rank is like the average for non-parametric tests.

Table 7 Mann-Whitney U-Test

	Perception of ability of the organization to retain talent
Mann-Whitney U	561,000
Wilcoxon W	1507,000
Z	-,986
Asymp. Sig. (2-tailed)	,324

Source: Own elaboration

And so, we can see which number is larger and therefore that group scores statistically significantly more than the other group. In our case, we find that the value of Asymp Sig.(2-tailed) is less than 0.05 and hence there is a statistically significant difference between generations X and Z.

Table 8 Perceptions of the organization's ability to retain talent in Generation X, Z

Generation	N	Mean Rank
Generation X 1961-1978	30	18,12
Generation Z born. after 2000	9	26,28
Total	39	

Source: Own elaboration

In Table 8, the mean rank is higher for Generation Z and thus we know that this Generation Z is statistically significantly more confident in the organization's ability to retain talent than Generation X. We evaluate the other comparisons analogously.

Table 9 Mann-Whitney U-test

	Perception of ability of the organization to retain talent
Mann-Whitney U	78,500
Wilcoxon W	543,500
Z	-1,997
Asymp. Sig. (2-tailed)	,046

Source: Own elaboration

Table 10 Perceptions of the organization's ability to retain talent in Generation Y, Z

Generation	N	Mean Rank
Generation Y 1978-1994	43	24,22
Generation Z born. after 2000	9	37,39
Total	52	

Source: Own elaboration

Based on the results, we can conclude that there is a statistically significant difference between the generations in their perception of the organization's ability to retain talent, such that Generation Z respondents are statistically significantly more confident in the organization's ability to retain talent than both Generation X respondents and Generation Y respondents.

Table 11 Mann Whitney U-test

	Perception of ability of the organization to retain talent
Mann-Whitney U	95,500
Wilcoxon W	1041,500
Z	-2,481
Asymp. Sig. (2-tailed)	,013

Source: Own elaboration

There is no statistically significant difference between Generation X and Generation Y in their perception of an organization's ability to retain talent.

Hypothesis 2 was confirmed.

4. Discussion

By comparing the results of the questionnaire, we concluded that different generations perceive the talented employee differently. While the representatives of Generation X think of talent as a team player, for millennials talent is an employee successful in his/her position and for representatives of Generation Z it is an exceptionally talented person. At the same time, it can be stated that representatives of all generations consistently perceive that they use the acquired knowledge and skills for their career advancement. However, not all of them agree that talented people are offered space for career and personal growth by the organization. While representatives of Generation X perceive this rather negatively, the other two generations see it positively. Generation Y believes that the organization does not focus enough on talent, does not have a well-developed talent management programme, and is more inclined towards the lack of regular performance appraisals, but on the other hand is inclined to say that the performance appraisal process is effective and the findings of the performance appraisal are used to plan further development. It is also worth noting the leaning towards a negative perception of the organization's ability to retain talent. Generation X agrees with conducting regular performance appraisals, but on the other hand they lean towards the statement that the performance appraisal process is not effective and most of them could not answer the question whether the conclusions of performance appraisals are used to plan further development. Generation X agrees with conducting regular performance reviews, but on the other hand is inclined to say that the performance review process is not effective and most of them could not answer the question whether the findings of the performance review are used to plan further development. The issue of talent retention and employer attractiveness was affirmed by both Generation X and Z in agreement.

Conclusion

The goal of talent retention is to ensure the stability of workers in the organization and create an ideal environment for people to stay in the organization, it is important that the organization actually creates this environment. The overall stability is influenced by the reputation of the organization, the selection and placement of employees, the style and level of leadership, the opportunities for education and, of course, recognition, appreciation and remuneration. Our research showed that the organization should focus on a deeper understanding of what talented employees of individual generations imagine under an ideal environment. All businesses must be able to anticipate and seize new opportunities before their competitors (Sareen & Mishra, 2016). The placement of the best employees in the best positions is part of talent management (Devine, 2008).

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Formation of Approaches to Information and Intellectual Resources Management in Enterprises Innovative Activities

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Abstract

Research background: The problem of assessing enterprises' innovative capacity in order to determine capital investment patterns presupposes the assessment of company resource potential and innovative capabilities, which reflect, on the one hand, the efficiency of resource potential utilization and, on the other hand, is an indicator of the management system effectiveness.

Purpose of the article: The purpose of the study is to form approaches to assessing the impact of the effectiveness of innovation management and the use of intangible resources of an enterprise, including information and intellectual resources, on the overall growth rate of an enterprise's capital.

Methods: By means of correlation modeling, the data of enterprises in Ukraine for the period of 2017-2021 were analyzed, and a model of dependence of economic entities' sustainable development indicators on the existing assets structure and the level of investment in enterprise intangible assets (resources).

Findings & Value added: The established approach will help to determine the principles of managing enterprise intangible resources, which influence the growth of the enterprise's total capital and the formation of its market value for all types of innovative changes.

Keywords: innovations, innovatively active enterprises, capital investments, intangible assets, intangible resources

JEL classification: C51, M21, O30, O32

1. Introduction

The transition of world economic systems to the stage of the information development paradigm is characterized by the innovative process determinability to ensure competitiveness at both macro and micro levels. Under the conditions of the economic systems transformation towards digitalization of the entire economic cycle, the priority in the process of enterprise activity has shifted from tangible to intangible factors of production. According to the World Economic Forum (WEF 2023), the countries leading the ranking in terms of the national economies' competitiveness are also the leaders in terms of the volume of innovative activity and the level of innovation capacity.

The crisis phenomena of 2008-2009 (global financial crisis) and 2019-2020 (the economic crisis caused by the COVID-19 pandemic) clearly extend the dynamics of changes in gross domestic product (GDP) growth of the world's leading economies (Fig.1). Thus in 2020, the EU saw a 5.6% decline in GDP, compared to 4.3% in 2009. At the same time, growth of 5.4% in 2021 was higher than in 2010, and in 2022, there was a further increase of 3.5%. Such a recovery, according to the authors, is caused by the

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high level of innovativeness of the leading economic systems, which are capable of accelerated additional gross product generation due to the application of modern technologies and optimal asset capitalization.

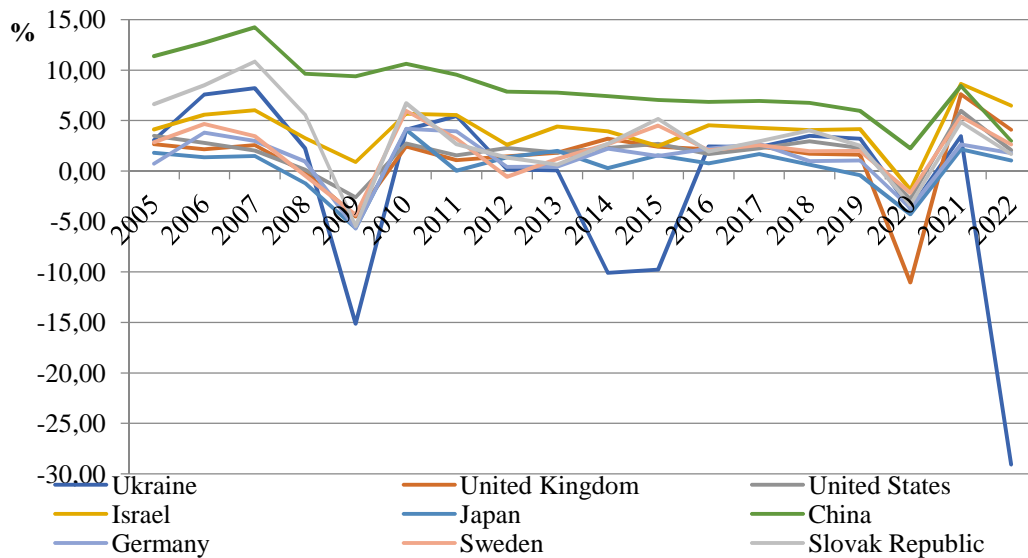


Figure 1. Real GDP of Change, 2005-2022 (% change compared with the previous year)
 Source: own processing based on the database of Eurostat Statistics Explained (2023) and Global Innovation Index (2022)

It should be stated that the presence of intangible resources in the asset structure at the micro level becomes a determining factor in the companies' market value growth and their competitive advantage formation. This is particularly true for their intellectual and information component being the main outcome and generator of innovations. Therefore, it is the increase in the efficiency of cost utilization for innovation activity that should be given considerable attention both at the macro- and micro-level.

The Fourth Industrial Revolution, better known as "Industry 4.0", has taken its name from a 2011 initiative launched by German businessmen, politicians, and academicians who defined it as a means of increasing the German manufacturing industry competitiveness via the increased integration of "cyber-physical systems" (or KPS) into the manufacturing processes (Schwab, 2016). It is hard to disagree with his assertion that the changes being witnessed in the global economy are more than just efficiency gains. They reflect the transformation of the entire modern economy organization paradigm.

It is capital investments in innovative technologies traditionally associated with Industry 4.0, such as additive manufacturing, artificial intelligence, large databases, cloud technologies, and the Internet of Things (Ibarra et al., 2018, Dalenogare et al., 2018, Bai et al. 2020), that can provide for the increase in competitiveness and the sustainable development of both the economies as a whole at the country level and sustainable business growth at the level of individual companies (Müller et al., 2021).

1.1 Innovative Activity as a Driving Factor in the World's Leading Economies Development

The acceleration of scientific and technological progress and the introduction of the latest manufacturing technologies determine the competitive position of any country in the world. Modern economic theory requires a study of the changes that occur under the influence of ever-increasing intensity and expanding the scope of information interactions of all elements of an economy. In this regard, business processes, both at the global and enterprise level, are being reconsidered. This is the fundamental basis for building an effective management system in general and, in particular, the innovation process management system (Piątkowski, 2020, Trinugroho, Law et al., 2021).

The intensification of national economies' economic competitiveness can be traced by analyzing the correlation between changes in GDP and research and development (R&D) expenditures (Kiselakova, Sofrankova et al., 2020).

The growing role of intellectual activity and intangible assets in the countries' economic development is confirmed by the spread of government strategies aimed at strengthening the knowledge triangle, the "angles" of which represent scientific research, business innovation, and entrepreneurial activity.

As can be seen from Fig.2, the countries leading in the competitiveness ranking make significant expenditures on innovative activities, which ensures their innovative vector of development.

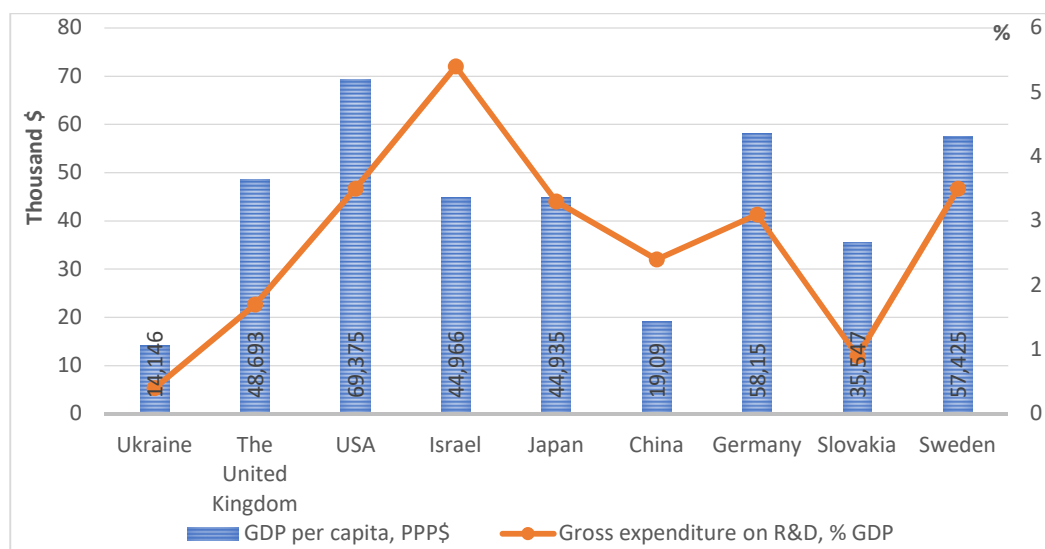


Figure 2. Correlation between the level of R&D spending and the countries' GDP as of 2022
Source: own processing based on the database of the Global Innovation Index, WIPO2022

Moreover, the leading countries of the world emphasize the importance of business innovation and company investments in research. At the institutional level, R&D funds are directed to the private sector instead of funding public research. Business innovations are also supported directly and indirectly, which directly affects the development of territories (Yermachenko, et al., 2023).

Under the conditions of reduced growth rates of the economies of most European countries caused by the general crisis of recent years, the conditions for achieving sustainability at the level of individual companies are based on understanding the importance of an optimal combination of the four main directions of sustainable development (Huttmanova, Valentiny, 2019). Among them - are economic, social, ecological, and institutional development. It is the intangible resources created in the economic system that are the drivers of the development of all other systems.

Economic and social development, both at the level of individual companies and at the level of national economies, should be stimulated by the institutional environment of countries. Ensuring and preserving the quality of the environment is a prerequisite for sustainable development within the Industry 4.0 concept (Huttmanova, Novotny & Valentiny, 2019).

The priority direction of policymaking among the leading countries of the world is an investment in human resources and the development of skills necessary to support innovation. This is exactly the direction in which Ukraine and Slovakia tend to develop their national economies' innovativeness.

1.2 Intangible Assets as the Innovation Development Product and the Driver

The innovative activity itself is a source of generating the enterprise's intangible resources, which are capitalized in certain types of intangible assets or cannot be recognized as assets, but increase the enterprise's market value. It should be noted that during the Fourth Industrial Revolution, within the framework of the concept of Industry 4.0, the importance of innovative resources, namely: the latest technologies and developments, intellectual property, brands, software, databases, organizational improvements, the experience of innovative implementations as well as enterprise human capital development due to the improvement of employees professional skills, experienced an increase.

According to the data provided by the Ponemon Institute report (Aon-Ponemon-2022), among 32 companies with the highest capitalization (according to the S&P 500 index), a steady dynamics can be seen towards the overrun of the intangible assets value and growth rate over tangible assets. In 2018, the intangible component of these companies' market value totaled 84%.

According to Brand Finance's research, in 2021, on average, the global enterprise's value is provided by intangible resources by 54% (in the most technological and intellectual industries – by 65-85%). Of

these resources, 43% are formed by the value of intangible resources which are not recognized as assets under International Financial Reporting Standards. Only 4% are reported as intangible assets, 7% are recorded as goodwill (Global Intangible Finance Tracker, 2021).

Research (Brown, Gregory, and Wunsch-Vincent, 2022) states that global intangible assets in 2021 are estimated at \$74 trillion, having increased by more than 25% since 2019 and compared to approximately \$6 trillion in 1996.

Thus, enterprise intangible resources should be part of any integral indicator measuring the success of corporate and national innovation economies and their innovative business capacity.

In order to get a general idea of the concept of the formation of unified approaches to the effective management of the processes of innovation activity, the goal was set in the study: to assess the impact of indicators characterizing the formation of intangible resources on the growth of total capital and the market value of the business for innovatively active enterprises.

2. Methods

The modern stage of scientific content development for "innovatics" as a science of innovative development and innovative activity of the subjects at different grouping levels is characterized by further clarification, distribution, and delimitation of its categorical apparatus. In the introduction to the innovation activity categorical morphology, the definition of enterprise innovative ability is explained by the approach, which emphasizes that the mere presence of high innovative potential does not guarantee its effective application in the process of innovation activity. Therefore, the innovative capacity indicator should be decomposed into static (sustainable) and dynamic components.

The first component includes the resource potential of innovation activity (R_i), formed in the previous business processes of the enterprise. In a general form, it can be represented by formula (1)

$$R_i = (\sum a_{1i} * WRpi + \sum a_{2i} * WRei) + (\sum b_{1i} * MRpi + \sum b_{2i} * MPei) + (\sum c_{1i} * FRpi + \sum c_{2i} * FRei) + (\sum d_{1i} * InRpi + \sum d_{2i} * InRei) \quad (1)$$

In which:

a_{1i}, \dots, d_{1i} represent weighing coefficients of influence of the i -type resource availability level for each component;

a_{2i}, \dots, d_{2i} are weighing coefficients of influence of the i -type resource utilization efficiency level for each component;

n is the number of model indicators;

$\sum WPri, \sum MRpi, \sum FRp, \dots, \sum InRpi$ represents the sum of attributes characterizing the availability of labor, material, financial as well as information, and intellectual innovation resources, respectively;

$\sum WRei, \sum MRei, \sum FRei, \dots, \sum InRei$ is the sum of attributes characterizing the efficiency of using labor, material, financial, and information-intellectual innovation resources, respectively.

The second component includes the group of indicators which, being based on the existing potential, enable its effective use in future periods. The tuple of such indicators forms the innovative business opportunities of the enterprise. The study refers to the enterprise innovative business opportunities (IP) in the context of assessing the definition of the enterprises' innovative capacity as the ability of the enterprise management system to effectively use the innovative potential for the commercialization of both individual innovative projects and for the implementation of the overall innovative transformation process, which determines the way of enterprise development. This approach is represented by a certain tuple of dependence (2).

$$IP = \{\varepsilon FP, \varphi ROL, \omega IRR\} \quad (2)$$

in which:

FP is the generalizing indicator of the financial state as of the date of the innovation project implementation;

ROL represents the degree of operating leverage, which characterizes the assets structure formed in the previous period;

IRR is the internal rate of return (profitability), which characterizes the efficiency of using enterprise assets.

$\varepsilon, \varphi, \omega$, - coefficients of significance correction.

It should be noted that innovative business opportunities are formed not only within the innovation activity cost management system but also in general by the enterprise operational management system in all its subsystems.

The innovation activity process is characterized by a continuous diffusion process of information flow exchange between the enterprise and the external environment. The application of the provisions of

the research information paradigm implies the definition of information resource as one of the main types that characterize the effectiveness of the enterprise innovation activity process.

Intangible resources as products of innovation activity affect both the resource potential (increase the efficiency of all resource types application) and its innovative capabilities. Thus, it seems significant to study the impact of intangible resources formed in the process of innovative activity on the indicative growth of an enterprise's total capital, which is the basis for assessing the enterprise's market value.

The authors adhere to the approach, according to which not only capitalized tangible and intangible assets but also intellectual resources are formed in the course of the enterprise's innovative activity. Namely, for example, experience after implementing innovations or skills to process information flows, or databases, which can be used in the next business cycles, etc, are formed.

In the course of the study, a hypothesis was formed about a certain dependence of the total capital growth (TE) indicator on the tuple, which contains the share of the volume of investment from the enterprise income, to be directed at innovative transformations (Inv), the level of intangible innovation assets in the total value of enterprise assets (IntangA) and intangible resource (IntangR), which forms itself as a result of innovative activity, but cannot be fully estimated (or identified) in accounting and financial statements.

$$TE = \{Inv, IntangA, IntangR\} \quad (3)$$

The selection of the indicator of the total capital growth rate as a functional variable, which characterizes the enterprise development, is stipulated by its economic significance. It consists in understanding the combination of the enterprise's capital components. It is determined by the authorized capital, all types of additional capital, including direct investments aimed at innovative transformations, and the indicator of "residual profit." If the first two components are clearly estimated in the financial statements (enterprise balance sheet), the latter is formed as the balance sheet profit reduced by the "cost of capital investments in innovation activity". It is proposed to refer to the cost of capital investments as the number of capital investments multiplied by the profitability of an individual business entity. This approach, in its essence, implies the adjustment of the available profit by the number of chances lost by the enterprise under the influence of "refusal" to invest in other types of innovation projects.

The first two factor variables of the tuple (3) can be obtained by calculation based on data contained in financial and statistical reports of enterprises.

The third-factor variable (IntangR) is proposed to be estimated using the rate of change in the degree of operating leverage (ROL), which was formed in the previous period and characterizes the ratio of marginal income and net profit. Since this indicator reflects the "speed" of the enterprise's profits (losses) increase, in case of changes in the company activity volume, it can be used as a characteristic of mutual consistency of all management subsystems functioning, including production, marketing, logistics, sales, etc.

To identify the statistically significant presence of connection, closeness, and direction of interrelations between the functional and the factor variables, the study used the multiple regression analysis model. In such models, determined by a clear interpretation of the parameters, the most widely used linear function, where the parameters with factor variables ($X_1=Inv$, $X_2=IntangA$, $X_3=ROL$) will characterize the mean change in the effective feature ($U=TE$) with the change in the relevant factor with the conservative value of other factors fixed at the mean level.

3. Results

In order to confirm the significance of the selected factor variables for the resulting functional variable – enterprise's capital growth rate, we analyzed and included in the regression model the data on the activities of 20 Ukrainian enterprises in the field of machine building, which are comparable in terms of the activity volume and the size of the assets. The choice of this industry is conditioned by its high level of innovativeness in the Ukrainian economy, as well as by the possibility of distinguishing the influence of the intangible assets formation and the level of innovative activity development on the investment attractiveness of the enterprise. The sources of information for the analysis were annual financial statements and management reports for 2017-2021 published on the official websites of the enterprises. The basic information on the performance indicators of the enterprises selected as the objects of the study is presented in Table 1. Data processing by means of the tabular processor MS Excel, (Fig. 3). Since the study was based on the enterprises' activity in the pre-war years, it is considered inexpedient to apply the

obtained regression equation for forecasting under the conditions of crisis in the Ukrainian economy caused by the aggression of the Russian Federation against Ukraine. But the obtained results can be used for analytical purposes and general trend identification. The findings of the conducted correlation analysis revealed that the factor variables included in the model explain the influence of the functional variable Y (capital growth rate) on the overall indicator only by 19% (R-square=0.19). This indicates the presence of a number of other factors affecting the rate of income growth. This clearly proves the need to take into account the model, which can be used to predict the growth rate of the total capital of an individual enterprise, both the available part of the innovative resource and the material component (formula 1), and it is also necessary to take into account indicators of the level of economic security of the enterprise (Labunska S., Karashevski R. et al. (2019)).

Table 1. Performance indicators of enterprises that were used to build a model of multiple correlation dependence

Y	X1	X2	X3	Y	X1	X2	X3	Y	X1	X2	X3	Y	X1	X2	X3
15,03	0,00	6,27	0,02	10,62	6,92	1,13	0,76	60,96	19,99	0,61	0,04	20,42	3,10	5,23	3,21
-7,29	0,00	4,14	0,18	1,46	9,41	1,35	0,82	-7,83	0,00	0,98	0,05	19,13	4,08	1,00	3,34
20,51	11,92	7,15	0,34	13,16	3,85	5,09	1,03	88,78	3,32	1,40	0,03	15,68	0,00	0,80	3,37
-54,08	0,00	3,82	0,55	4,29	9,72	12,03	0,82	-8,50	4,90	1,22	0,47	14,81	2,48	0,55	2,61
-14,97	8,79	2,67	0,35	0,59	19,39	12,13	0,74	-18,52	5,26	1,47	0,01	-40,31	0,00	0,00	0,27
23,52	0,00	2,03	3,45	1,98	17,19	6,57	0,67	6,14	6,01	0,26	0,79	-47,73	0,00	0,00	0,28
-11,34	0,00	4,68	1,19	2,63	14,41	4,03	0,50	44,96	8,03	16,10	0,49	0,43	0,00	1,94	0,25
35,21	0,00	3,23	1,12	7,12	19,54	9,94	0,15	2,51	8,76	1,16	0,00	-57,47	0,00	1,70	0,29
82,46	0,32	23,86	0,90	-16,76	0,00	0,09	0,28	4,58	18,33	2,42	0,86	80,98	2,60	3,35	0,00
59,06	0,13	17,42	0,45	38,85	7,81	0,13	0,42	-3,81	1,41	3,18	0,01	-24,08	0,00	0,11	0,06
10,58	3,67	22,33	0,28	-57,06	0,00	0,03	0,37	88,48	2,82	8,94	0,00	-69,72	0,00	0,28	0,05
-42,74	0,00	3,39	0,00	31,48	18,85	0,02	0,25	47,14	4,53	3,97	0,00	-79,35	0,00	0,38	0,03
43,17	2,99	2,61	0,00	35,27	5,40	14,52	0,00	-69,56	0,00	1,06	0,00	3,03	4,02	0,00	0,16
-9,52	8,79	2,14	0,00	7,05	0,00	7,19	0,00	-15,61	0,00	2,67	0,00	-12,18	9,21	0,00	0,19
4,67	7,00	1,69	0,00	-1,11	0,00	11,28	0,00	-47,61	0,00	1,13	0,00	-0,15	9,38	4,43	0,21
36,68	6,26	1,20	0,09	-10,45	4,01	18,51	0,00	-28,46	0,00	0,80	0,00	0,65	5,23	1,66	0,21
-41,37	0,00	0,71	0,07	13,65	2,15	7,24	0,00	-69,05	0,11	8,25	0,00	-30,73	4,87	5,27	0,08
13,39	3,92	0,50	0,05	59,90	1,82	2,50	0,00	-1,06	4,68	3,40	0,01	6,02	3,61	4,92	0,10
63,31	0,00	12,98	0,15	3,99	1,71	1,00	0,04	3,27	3,25	3,40	0,06	-11,83	0,00	5,80	0,09
25,32	3,37	1,60	0,22	-4,01	2,80	1,24	0,02	4,75	3,44	5,80	0,14	55,78	0,00	8,41	3,63
10,92	5,57	2,42	0,27	2,99	7,42	1,41	0,00	17,91	2,12	3,09	0,19				
3,09	7,81	3,46	1,00	-23,32	12,43	0,46	0,00	0,11	3,87	3,70	0,05				

Source: own processing based on data posted on the official websites of enterprises

<i>Regression statistics</i>		<i>Dispersion analysis</i>						
		<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>		
R	0,44	Regression	3	20794,515	6931,51	6,55	0,000501	
R-square	0,19	Residual	82	86734,395	1057,74			
Normalized R-square	0,16	Total	85	107528,91				
		<i>Standard</i>						
		<i>Coefficients</i>	<i>error</i>	<i>t-statistics</i>	<i>P-value</i>	<i>bottom 95%</i>	<i>top 95%</i>	
Standard error	32,52	Y	-16,17	5,83	-2,77	0,0069	-27,76	-4,57
		X 1	1,34	0,67	2,00	0,0492	0,01	2,67
		X 2	2,35	0,69	3,40	0,0010	0,98	3,73
Observations	86	X 3	8,63	4,23	2,04	0,0445	0,22	17,04

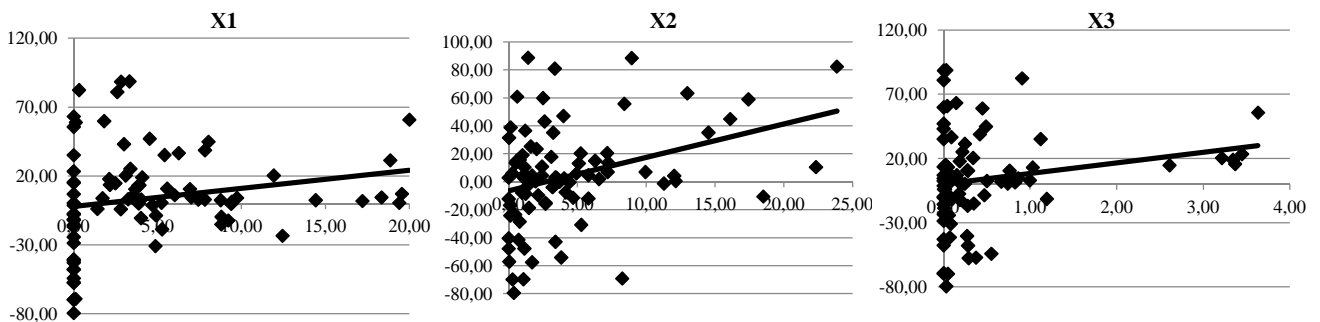


Figure 3. Results of regression statistics
Source: Labunska, Yermachenko, Sidak (2023)

At that, the total value of the regression model statistical significance is $0.0005 < 0.05$. This provided that the confidence interval is chosen at the level of 95%, indicates a statistically significant correlation between the factor variables input into the model and the response variable.

When analyzing each factor variable, it was revealed that all variables X1, X2, and X3 (level of operating leverage, total investment in % of return, and the share of intangible assets in the total assets of the enterprise, respectively) demonstrate statistical significance. Indicator X3 (the level of intangible assets in the assets of the enterprise) has a statistical significance in the model that reflects the growth rate of the capital of the enterprise and provides a significant increase in the functional variable. This is explained by two main reasons. Firstly, the impact on the overall level of profitability of innovative transformations that took place at the enterprises under study in accordance with the concept of Industry 4.0. Secondly, such results do not take into account the assessment of intangible resources in full according to financial and statistical reporting since it includes only their capitalized part.

The analysis of R&D expenditures in the economies of Ukraine and Slovakia over the past twenty years (Fig. 4) confirms the need to pay significant attention to the formation of an innovative product during the implementation of innovative activities.

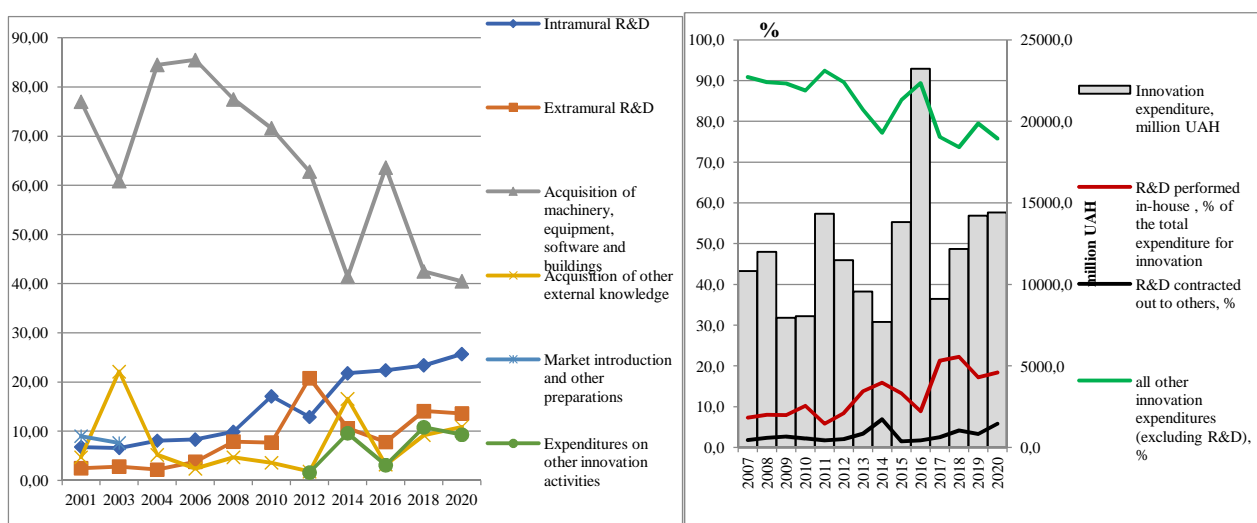


Figure 4. Expenditures on R&D in Slovakia (left hand) and Ukraine (right hand)
 Source: own processing based on the database Statistical Office of the Slovak Republic & of the State Statistics Service of Ukraine (2023)

Not all R&D expenditures lead to the creation of an innovative product and are capitalized in the company's assets. Most of them are aimed at the formation of intangible resources, which are drivers of increasing the competitiveness of the enterprise and the growth of its market value (Fig.5).

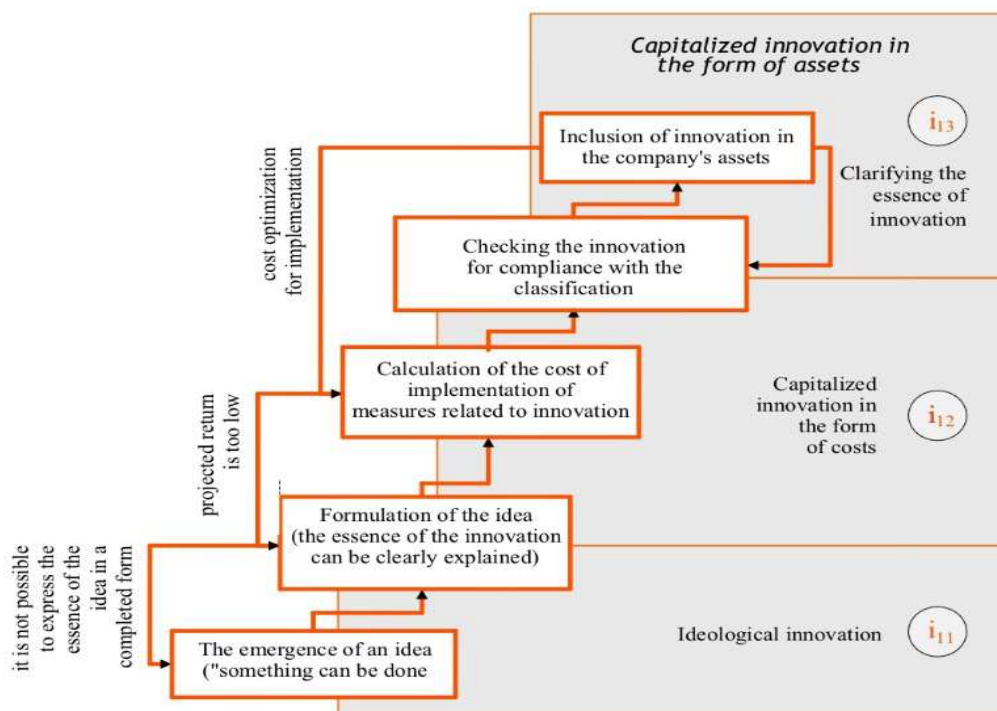


Figure 5. Principles of costs identification and assessment in the innovative activity process in order to exercise managerial influence
Source: Labunska, Yermachenko, Sidak (2023)

In order to exercise managerial influence on the effectuation of innovative activity in order to improve its efficiency, it is proposed to distinguish the types of innovation by the stage of capitalization (parameter xIn) as follows:

- i_{11} represents ideational innovation in the form of an informational intangible component, which can be more accurately expressed through the use of the enterprise's intellectual capital with the availability of intellectual potential and resources for its implementation. Intangibility consists of the fact that the idea cannot be sold yet and does not have an unambiguous cost estimation – specialists only possess the primary information that enables them to assume the possibility of the emergence of innovation in a certain sphere of enterprise activity. At this stage, it is even impossible to predict its success or failure;

- i_{12} is attributed to the costs structure – the enterprise considers that the idea, already expressed in the form of a new approach, product, development, method, etc., should be attempted to be implemented and calculates its cost price;

- i_{13} stands for the capitalized innovation in the form of assets – the costs incurred at the previous stage generated profit (income) to the enterprise or increased the value of other assets. The innovation has been successfully implemented and is now part of the enterprise's assets (tangible or intangible) and can be recorded as an accounting object.

If a company generates innovations independently, they traditionally go through one to three stages. From Fig. 5 it can be seen that the enterprise can abandon the innovation in the second stage if its implementation proves to be economically unfeasible. The process of identifying a new innovation with a certain type of asset is not so critical if the decision to enlist it on the enterprise balance sheet is unambiguous and depends to a greater extent on the convenience of accounting. In practice, it is possible to assume a variant when the innovation is implemented and generates income but is not identified as a separate type of asset. Then the costs of its implementation are distributed among other items, and formally it does not seem to exist, being between stages I and II.

The main task of the enterprise during the innovation processes implementation is the selection of the innovation type and the innovation projects portfolio formation for each individual innovation type, which can be introduced based on the assessment and analysis of:

- directions aims and indicators of innovative activity efficiency, based on the analysis of external factors (competitive environment, availability of established innovative ideas (according to the author's

definition: "ideational innovations," i.e., innovations that have not reached the stage of innovative products (goods)), innovative products available on the market) and general aims of the enterprise's business activity within the period;

- the level of enterprise innovative capacity, which was formed in the previous period;

- maximum intended cost volume based on the distribution of the costs in the overall subject-oriented cost management system.

Fulfillment of the set tasks is ensured through the application of the indicator set selection grid, which characterizes the fulfillment of management functions aimed at transferring the relevant characteristics of the innovative activity system into a new state based on the results of innovation implementation (4).

$$U^x \{ \tilde{\eta}0: (K0, E0, A0, \Omega0) \} \rightarrow P1 \rightarrow \{ \tilde{\eta}1: (K1, E1, A1, \Omega1) \}, \quad (4)$$

Where:

U- represents a set of functional stress from the enterprise subject-oriented management systems aimed at a set of objects. This determines the dynamic response and transfer of objects to a new state at the end of the period;

P1-is grid of parameters selection characterizing the new state of the enterprise;

$\tilde{\eta}0, \tilde{\eta}1$ - refers to characteristics reflecting the set of states of the subject-oriented managerial impact plane at the beginning and the end of the period;

K0,1- shows indicators of the subject-oriented plane, which can be unambiguously reasonably estimated based on the enterprise reporting data, the systematization of which is carried out by processing the results of an expert analysis conducted by a group of experienced specialists at the beginning and end of the period, respectively;

A0, A1- are indicators of the subject-oriented plane, which can be unambiguously reasonably estimated based on the enterprise reporting data and selected based on normalized (formalized according to the methodology) selection at the beginning and the end of the period, respectively;

E0,1- show indicators containing verbal characteristics of the system state and can be included in the plane of study, based on the use of fuzzy logic methods, at the beginning and the end of the period, respectively;

$\Omega0,1$ - are the level of influence random, unpredictable factors may have on external and internal environment threats at the beginning and the end of the period, respectively.

Therefore, the formation of approaches to innovative activity management should contain a set of purposeful actions that improve the enterprise's financial and economic condition, determined by the growth of its total capital (with the account taken of the "cost" of its application in the innovative activity process) and leads to internally generated goodwill accumulation.

4. Discussion

The funding results of the regression analysis indicate the need to expand the array of indicators that determine the impact of intangible assets on the growth rate of the total capital of the enterprise. This justifies the need to calculate the internally generated goodwill, which reflects the presence of a generated but not identified information resource.

Medved, Peštović, Saković (2023) prove the significant impact of investments in intangible assets on the business results (profitability) of companies. We agree with the general concept of research and believe that the profitability indicator fully reflects the results of innovative activity aimed at increasing the intangible resources in the total asset structure, as it does not determine the growth of the company's market value.

Research conducted by Mir, Seboui (2006) revealed a positive correlation between the variance in the evaluation of assets recognized in accounting and the company market value as well as earnings management indicators. In our opinion, the correlation between the operating leverage degree and enterprise income adequately explains the maturity degree of the enterprise management system as a whole. The operating leverage degree is considerably affected by the enterprise cost structure; the absolute majority of enterprises under scrutiny are characterized by the dominance of variable costs; according to the data obtained from management reports, only 13.58% of enterprises have a share under 75% of variable costs in the sales cost structure.

With regard to the resulting indicator that affects the overall estimation of the enterprise market value, the growth rate of total capital, which is estimated based on the data of financial statements, was chosen for the study. Certainly, it is impossible not to agree with the approach which presupposes the expansion of such "accounting" estimation. In our opinion, it should be expanded by combining the value of enterprise intellectual capital formed on the basis of the outcomes of innovative activity

(Serpeninova, Lehenchuk, et al 2022). Therefore, Kucera and Dvorakova (2023) draw attention to the existence of a link between the main determinants of intellectual capital, namely human capital, structural capital, and relational capital, and the overall level of capital reported in financial statements.

At the level of individual companies, the choice of latent factors determining the efficiency of innovative activity aimed at producing intangible assets may vary depending on the specifics of the enterprise's activity. For the post-war recovery of the Ukrainian economy, the issues of strategic restructuring of high-tech industries, namely machine-building, information technology, electric power, and the service sector (including hospitality), towards the increase of intangible assets value in the total structure of assets will gain relevance.

Conclusion

The development of approaches to enterprise innovative activity management should be based on the mutual coordination of the functional influence of all management subsystems and be based on a predetermined level of enterprise innovative capacity, which combines the components of innovation potential and innovative business opportunities.

The result of innovative activity is the formation of not only assets, being both tangible and intangible components but also information and intellectual resource, which is not identified in financial and statistical reporting. The process of innovative transformations affects the experience of the enterprise in the completion of innovative implementations and the increase in the value of information and intellectual resource as well as the labor resources in the potential of the enterprise. In fact, clarification of approaches to the evaluation and identification of intangible resources being an object of managerial influence is required. To clarify the definition of objectivity of the managerial influence direction, it is proposed to scrutinize the innovative activity process from the position of differentiation of results by stages of capitalization.

Organization of effective, innovative activity management requires consideration from a holistic perspective, which presupposes;

- firstly, formation of approaches to innovative activity, with respect to the findings of the enterprise's accumulated experience and its innovative capacity, established in previous periods;
- secondly, aligning the aims of the innovative activity management system with the production, financial, management, marketing, logistics, and sales subsystems;
- thirdly, combining the direction of functional influence by the enterprise's innovative activity management system and the economic security system towards the formation of favorable conditions both in the external and internal environment to enable business activity implementation through proactive strategy implementation.

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Online Management Tools as Research Tools of Managerial Actions Aimed at Artificial Management Implementation. Results of the Research

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Abstract

Research background: Research on Artificial Intelligence (AI) in management slowly appears as a challenge for the future. AI in management seems to exceed any other technological breakthrough that humanity has ever seen and human-machine teaming (HMT) seems to be a promising paradigm to approach future situations in which humans and autonomous systems closely collaborate. After the first age of robotics in mechanical processes and manufacturing rapid development of computer science and Internet has given opportunities to replace team managers with robots.

Purpose of the article: The purpose of this paper is to present results of the research of teamwork during which members were working together with online management tools in the platform of TransistorsHead.com on the given project. The online tools played also a role of research tools in order to record 10 managerial actions taken in that project. The results of the research show how it is possible to track, record and use human managerial actions to implement an artificial manager in a team.

Methods: In the research a long-term, non-participating observation was used. The observation tool a few weeks and the managerial actions were being recorded by online management tools.

Findings & Value added: The papers presents results of research which is a part of a solution of the main scientific problem which has to be solved in a way to artificial management. This scientific problem is what human team managers really do in their teamwork and in cooperation with their team members. All traditional research methods such as questionnaires and interviews give quite poor results. The non-participating, long-term observation of the teamwork together with online tools provide true knowledge which can be used in artificial management.

Keywords: online management tools, research tools, artificial intelligence, artificial management

JEL classification: M12

1. Introduction

Artificial intelligence (AI) can augment human intelligence in teamwork, however, there is still not clear how to implement artificial management (Flak & Pyszka, 2022). Research on AI shows that it could augment human teams in important ways in enhancing team coordination, enhancing knowledge sharing and learning, supporting decision making, as well as evaluation and team performance (Khakurel & Blomqvist, 2022). Additionally, the use of transformer-based language models in artificial intelligence (AI) has increased adoption in various industries and led to significant productivity advancements in business operations (Bouschery, Blazevic & Piller, 2023).

This is said that artificial intelligence has emerged as a promising and increasingly available technology for managerial decision-making. With the adoption of AI-enabled software, organizations can leverage various benefits of the technology, but they also have to consider the intended and unintended consequences of using the technology for managerial roles (Leyer & Schneider, 2021).

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Regarding outcomes, teams perform equally as well under both types of management, with trends toward even superior performance from the AI-managed teams. Furthermore, team members perceive the interventions from both the AI and human manager as equally relevant (Gyory, et al, 2021). Some research on mixed human–robot teams show that comprise both robots and humans has expanded attracting the attention of researchers from different disciplines (Wolf & Stock-Homburg, 2022).

There are many more lacks of knowledge regarding the characteristics of human-AI teams, including a lack of understanding of how certain human-human teaming concepts may or may not apply to human-AI teams and how this composition affects team performance (McNeese, et al, 2021).

This would be the real accomplishment of the Drucker’s words that in the future “computers” will not only make decisions but they will do much more (Drucker, 1967). Looking for an answer if it is possible to replace human team managers with robots, it leads to a strong need of establishing some patterns of team manager work (Halliday & Stacey, 2009). It is claimed that a subject of team management has always come to a simple question: what makes a team manager? (Sinar & Paese, 2016).

This implies the scientific problem, how to record managerial actions in order to know what the manager does and to emulate him. Because the managers use all the time some managerial tools (Rusthollkarhu, et al, 2022), the next is the research question: are the research tools are useful in recording managerial actions?

The purpose of this paper is to present the use of online management tools as research tools to implement artificial managers in place of human managers. The research method was a long-term observation conducted on the basis of a methodology for studying organizational reality, called the system of organizational terms. Participants in the study were 3rd year management students of Jan Kochanowski University of Kielce. Research tools were online management tools implemented in TransistorsHead.com platform (<http://transistorshead.com/>).

Section 2 presents the research method, consisting of the assumptions of the system of organizational terms on how to represent the work of a manager in the form of processes and resources, which create managerial actions that should be recorded to implement artificial managers. This section also briefly presents the design of online management tools. Section 3 shows the results of a study that used online management tools as research tools. Section 4 discusses the results in comparison with traditional approaches to representing managerial work based on managerial skills and managerial roles. Section 5 presents conclusions and further research plans for the implementation of artificial management.

2. Methods

The method used in the research consisted of two parts. The first part is a methodological concept of studying phenomena in organizational environment, which allow us to design online management tools and use them as research tools in many experiments in the field of team management automation. The second part of the method are online management tools which record managerial actions of a manager and team members.

The system of organizational terms is a methodological concept which consists of ontological and epistemological aspects designed for research team management aimed at artificial management. The philosophical foundation of the system of organizational terms is based on Wittgenstein’s philosophy, his theory of facts (the only beings in the world) and “states of facts”. According to this approach the organizational reality can be represented by events and things. Specifically, as shown in Figure 1, each event and thing have the label $n.m$, in which n and m represent a number and a version of a thing, respectively. Event 1.1 causes thing 1.1, which in turn releases event 2.1 that creates thing 2.1. Thing 1.1 simultaneously starts event 3.1 which creates thing 3.1. Then, thing 3.1 generates a new version of the first event, i.e. event 1.2. In such a way, a new version of the first thing (1.1) is created and it is called thing 1.2. Every event and thing is an organizational term, although the things are called primal organizational terms and the events are called derivative organizational terms. The way of labelling comes from the answer to a simple question: what would exist when a team manager stops doing anything? The answer is: things would exist as they are more stable and coherent over time comparing to events.

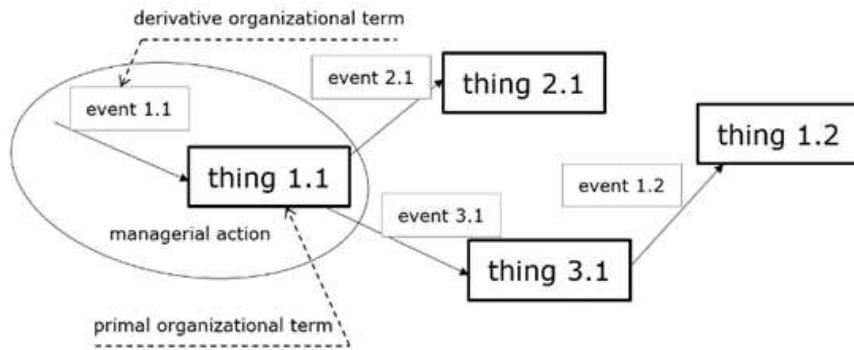


Figure 1. Fundamental structure of organizational reality based on occurring facts
Source: Flak (2018)

Things (primal organizational terms) in the organizational reality represent resources (Crick & Crick, 2023). Events (derivative organizational terms) in the organizational reality represent processes (Sliž, 2022). By the same token, the system of organizational terms combines the resource approach and the process approach in the management science in a way that team management processes effect in team’s resources. Therefore the managerial actions is defined as a real activity, which a manager does in order to play a managerial role when he has a certain managerial skill (Yang, Flak, & Grzegorzek, 2018), the managerial action structure consist of, e.g. event 1.1 and thing 1.1. This is shown in Figure 2.

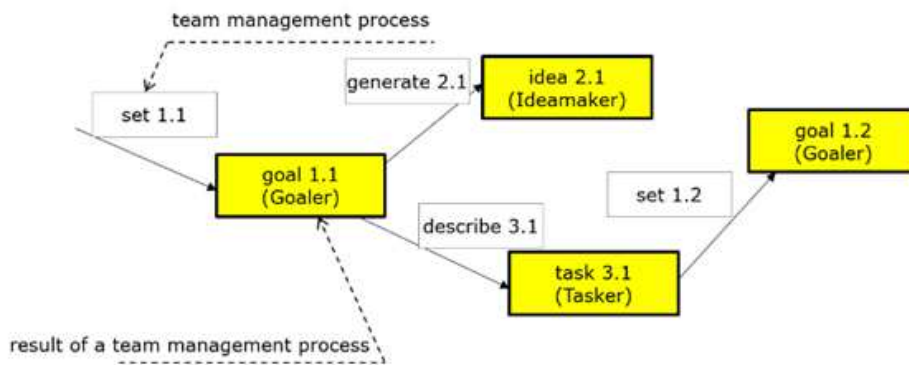


Figure 2. The example of creating resources by processes in team management
Source: Flak & Pyszka (2022)

Despite the fact that on the abstract level this approach is quite clear and easy to understand, a real problem concerns a method of measuring certain organizational terms. It is quite obvious that data which describe organizational terms should be recorded in a way, which allows to represent a team manager unambiguously without any doubts or subjective conclusions. This problem can be described by two questions: (1) which organizational terms could we measure and (2) how to do it? The project of the system of organizational terms includes answers to both questions.

Firstly, it is possible to measure only things as effects of processes (Flak, 2023). Even when we try to measure a process, its parameters must concern a state of the world before and after when this process happens. This means that the parameters concern some kind of a resource which is being changed during this process. In team management this issue looks as it follows.

As it is shown in Figure 2, when a team manager sets a goal (a team management process represented by Event 1.1 – setting 1.1), it is possible to measure features of goal 1.1. If later (e.g. after describing a task – describing 1.1 and task 1.1) this team manager does the next setting of the same goal, he launches the next team management process. Then the features of this team management process are changed and represent the second version of this team management process (setting 1.2 and goal 1.2). The difference between features of goal 1.2 and goal 1.1. let do reasoning on the team management process which happened in this period of time. Such an approach to ontology of team management lets represent all such processes by standardized features vectors with data grouped in content, time and psychosocial domains.

Secondly, if it is only possible to measure things (e.g. goal 1.1), there should be a special research tool which could let record the parameters of goal 1.1 keeping to the rule of minimum influence on a team

manager. The solution is a research tool built-in a management tool, which a team manager uses during day-to-day work. In other words, when a manager does something (e.g. set a goal) with a certain tool, this tool should record the parameters of the goal during the managerial work (e.g. before and after setting).

In order to verify the assumptions of the system of organizational terms described above the innovative online management tools were designed and implemented in TransistorsHead.com research platform. This approach partly based on a well-known method of time and motion study in management science. The author conducted several experiments on recording managerial actions based on this approach, showing the potential of this concept in team management automation.

To begin with, there are some assumptions. First, the functioning of an organization manifests itself in solving organizational problems. Second, one of the most important ways to solve organizing problems is to use instruments, called managerial tools (Flak, 2018). The managerial tool is, so to speak, detached from the person of the manager, his predisposition and ability to use management techniques and methods. A managerial tool is an algorithmized and certain way of performing a management function, which is possible for any manager (Flak, 2013).

Using a managerial tool, a manager can use various techniques, that is, purposeful and rational, theory-based ways of doing the work efficiently and effectively (Chopraa & Gopal, 2011). Taking into account the meaning of the phrase “Managing is about getting things done”, one can conclude that the concept of behavioral unit provides an opportunity to take an analytical approach to the management process and separate the various elements of the process. Each managerial tool is there for the manager to take just one “behavioral unit” (Hatfield & Weider-Hatfield, 1978).

Namely, there is a close relationship between the behavioral unit and the process and resource approach in an organization. R. Cooper and S. Fox call the combination of these two approaches the instrumental action approach (in the original “instrumental action” – author’s note) (Cooper & Fox, 1990). In the literature you can find the view that processes in the organization can be indirectly identified by recording the social processes that take place in the organization as a community. By recording individuals of behavior (managerial actions) we can tell a lot about the functioning of any organization.

So what characteristics should a managerial tool have? There are several (Glykas, 2011):

- fulfilling the function of an instrument during the implementation of processes in the organization,
- dividing the process into small fragments (according to the concept of “unit of behavior”),
- the effect of using the tool is to create an object that is a consequence of the process or serves to document it in the form of information (this object in the accepted theory of facts is a thing, and the language of management science is a "resource" - author's note),
- the possibility to make a record of the organization's resources as a result of the processes taking place in it,
- the ability to analyze the information recorded in the management tool on the connection of processes and resources with each other,
- regulation of processes and resources from the point of view of optimal functioning of the organization,
- determining the effects of the implemented processes and the characteristics of the resources necessary to carry them out.

Managerial tools also meet assumptions such as (Flak, 2013):

- it is possible to construct managerial tools used in many management techniques in many management areas,
- tools monitor the work of the manager and employees,
- tools provide automatic analysis of data on user behavior.

In order to these assumptions of the system of organizational terms described above the innovative online management tools were designed and implemented. They are in TransistorsHead.com research platform which is a knowledge management system used to team management. In the Figure 3 there is a dashboard of TransistorsHead.com. Types of managerial actions recorded by this system means as it follows: 1 - set goals (GOALS), 2 - describe tasks (TASKS), 3 - generate ideas (IDEAS), 4 - specify ideas (SPECIFICATIONS), 5 - create options (OPTIONS), 6 - choose options (DECISIONS), 7 - check motivation (MOTIVATION), 8 - solve conflicts (CONFLICTS), 9 - prepare meetings (MEETINGS), 10 - explain problems (PROBLEMS). The dashboard of the online management tools are presented in Figure 3. The online management tools were used in the experiment which results are presented in Section 3.

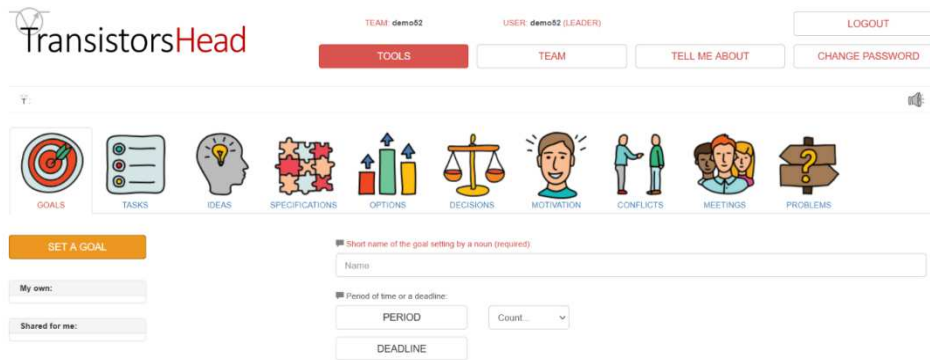


Figure 3. The dashboard of online management tools
Source: Flak (2023)

3. Results

The long-term observation was conducted from December 14, 2022 to January 14, 2023 among the students of management faculty of Jan Kochanowski University of Kielce, Poland. The study involved 26 participants in 5 groups - four groups had 5 participants, and one group had 6 participants. Participants in the long-term observation were given the task of preparing documentation of the program project on the YT channel in the Talent Show format. The task of the participants was as follows: formulate an organizing problem and solve this problem - propose a detailed format for the program and preparations for its implementation. The result of the study participants' work was a pdf document containing a detailed description of the solution to the organizing problem, consisting of the following elements. Participant used the online management tools implemented in the TransistorsHead.com platform, including 10 online management tools, as it is shown in Figure 3 and described in the Section 2.

Table 1 presents a total time of use the online management tools by participant in one of the group. For example, a team manager used a tool for setting goals (type 1) for 3382 seconds throughout the study. Since the managerial tools were shared, some team members were even more active in using certain tools than their manager himself. This can be read by the time of use of each tool. The tool usage time is equal to the duration of a given managerial action taken by a manager or team member.

Table 2, on the other hand, contains the number of uses of each tool by individual team members. For example, the goal-setting tool (type 1) was used by the team manager 70 times. This does not mean that the manager produced 70 different goals. It's simply that many times he went back to the tool and worked on existing or new goals..

Table 1. Duration of a given managerial action taken by individual team members

User of online management tools	Type of managerial actions									
	1	2	3	4	5	6	7	8	9	10
team manager	3382	4481	2270	662	1057	1502	2161	825	4832	5758
team member 1	4553	4224	2210	155	587	122	1138	918	5108	6241
team member 2	3691	376	2061	1588	2784	127	784	523	4292	5249
team member 3	3662	2751	2854	6078	1836	22	2679	1228	2233	1479
team member 4	5768	2599	2186	3435	1515	1073	918	984	2679	4405

Source: own elaboration

Table 2. Number of managerial actions taken by individual team members

User of online management tools	Type of managerial actions									
	1	2	3	4	5	6	7	8	9	10
team manager	70	242	121	97	141	121	170	132	229	61
team member 1	86	164	163	64	87	50	78	93	172	109
team member 2	17	39	114	155	92	21	46	105	120	62
team member 3	28	39	99	43	46	7	133	23	78	10
team member 4	35	81	83	106	64	29	54	48	77	40

Source: own elaboration

Figures 4, 5, 6, 7, 8 show different trajectory of 10 managerial actions, recorded by 10 managerial tools in TransistorsHead.com in team work period. What is interesting, all team members had different trajectory of their managerial actions even than they were working on the same projects in the same group. This shows that the system of organizational terms together with TransistorsHead.com can be used in building knowledge on a succession of managerial actions done one after another by a team manager. Numbers in types of managerial actions mean: 0 – no managerial action, 1 – set goals, 2 – describe tasks, 3 – generating ideas, 4 – specifying ideas, 5 – creating option s, 6 – choosing options, 7 – checking motivation, 8 – solving conflicts, 9 – preparing meetings, 10 – explaining problems.

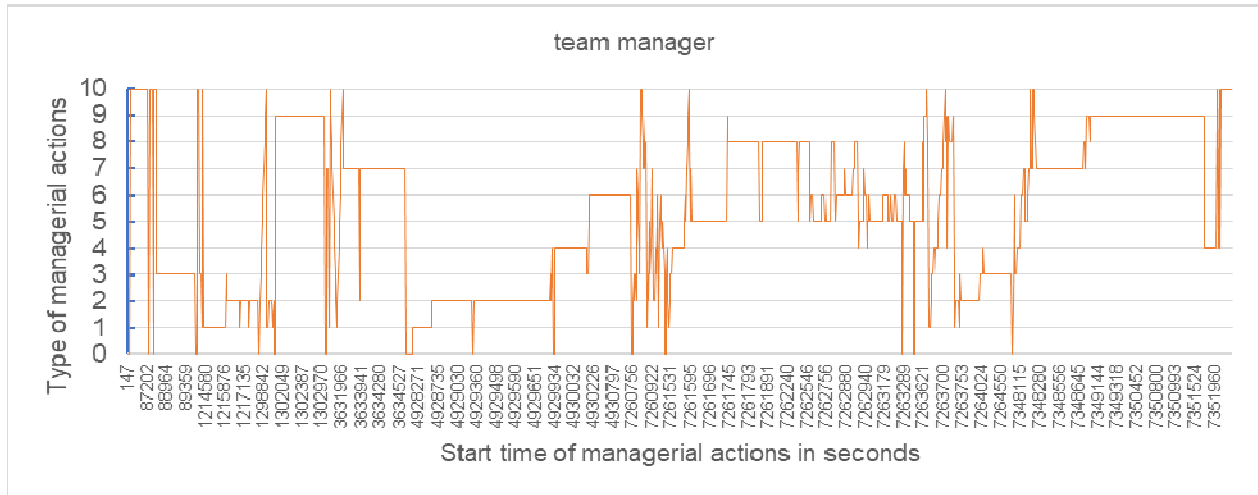


Figure 4. Trajectory of 10 managerial actions taken by a team manager
Source: own elaboration

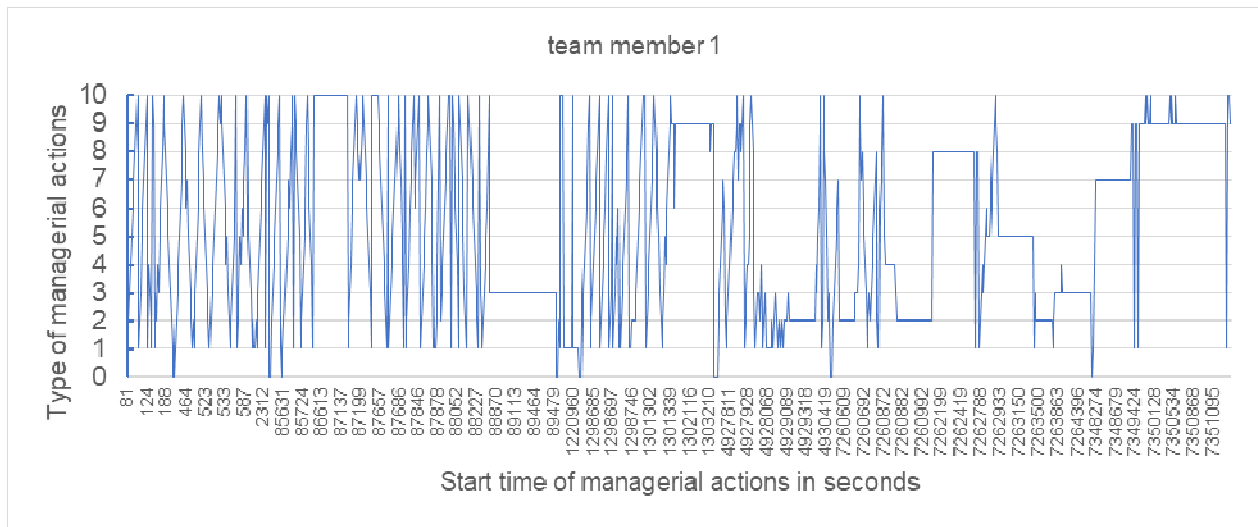


Figure 5. Trajectory of 10 managerial actions taken by a team member 1
Source: own elaboration

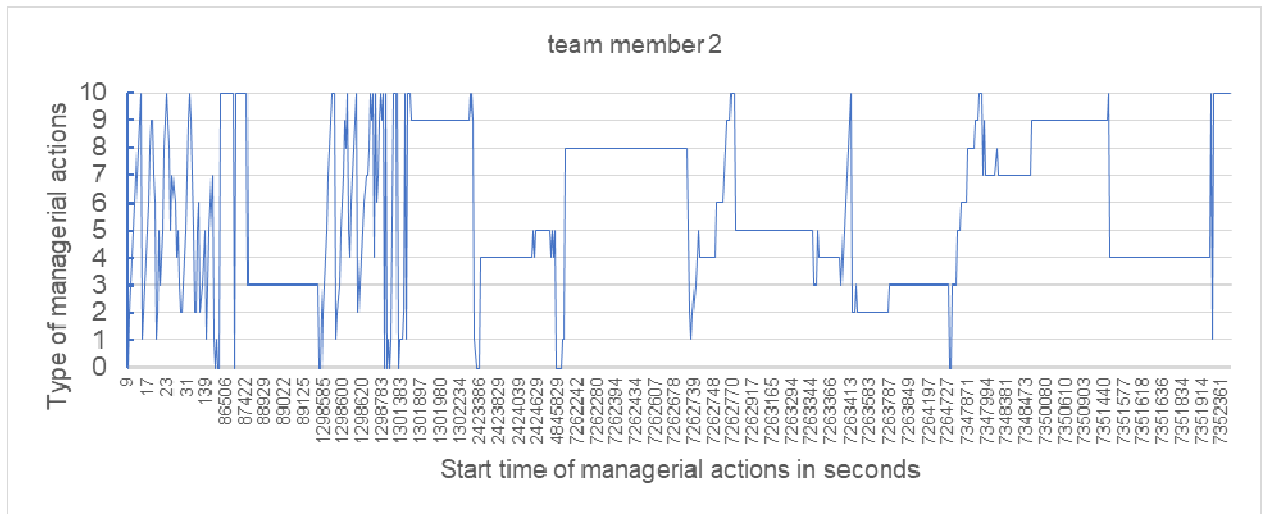


Figure 6. Trajectory of 10 managerial actions taken by a team member 2
Source: own elaboration



Figure 7. Trajectory of 10 managerial actions taken by a team member 3
Source: own elaboration

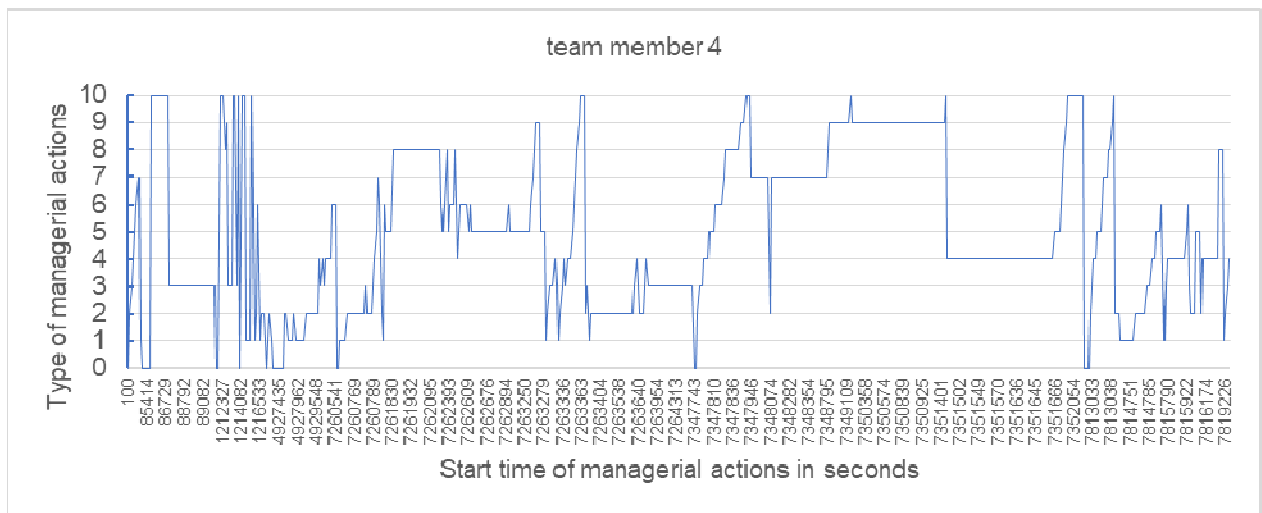


Figure 8. Trajectory of 10 managerial actions taken by a team member 4
Source: own elaboration

4. Discussion

The view of manager's work has been changed over one hundred years. Until the moment when AI emerged from laboratories to the real world creating AI processes matched to the capabilities of human process management (Gyory, et al, 2022), nobody cared if the representation of manager's work. At the beginning of scientific management, the picture of a manager in an organization was defined by his classical functions, such as a reflective planner, an organizer, a leader and a controller (Fayol, 1916). Later a view of a nature of a manager has been dominated by two approaches.

Firstly, in 1964 Koontz and O'Donnel launched a discussion on the meaning of managerial skills (Koontz & O'Donnel, 1964). In 1974 Katz proposed an approach in which managerial skills represented managerial work. The managerial skill was defined as an ability to work effectively as a team manager and to build cooperative effort within the team which the manager leads (Katz, 1974). The dominating typology of managerial skills divides skills into 3 groups: technical, interpersonal and conceptual skills. Technical skills were regarded as most important for supervisors, interpersonal skills for middle managers, and conceptual skills for executives (Kaiser, et al, 2011). One of the latest typologies of managerial skills of managers contains such needed skills as critical thinking, problem solving, an ability to organize data, conceptual thinking, evaluating ideas, persuasive skills etc. (Ullah, Burhan & Shabbir, 2014).

Secondly, in 1980 Mintzberg concluded that the manager's work can be described in terms of 10 roles within interpersonal, informational and decisional areas which were common to the work of all types managers. Managerial roles are defined as areas of job activities which are undertaken by a manager (Mintzberg, 1980). Mintzberg introduced to the management science a typology of managerial roles which contains such roles: a figurehead, a leader, a liaison, a monitor, a disseminator, a spokesman, an entrepreneur, a disturbance handler, a resource allocator, a negotiator (Mintzberg, 1980). Other researchers of team management proposed other divisions of roles, such as a leader, a peer, a conflict solver, an information sender, a decision maker, a resources allocator, an entrepreneur, a technician or an explorer, an organizer, a controller, an adviser (McCan & Margerison, 1989).

Managerial skills and managerial roles have influenced scientists and practitioners so much, that most of research on managerial work was designed as a research either on managerial skills or managerial roles. In the recent years, when intelligent systems are increasingly entering the workplace, gradually moving away from technologies supporting work processes to artificially intelligent (AI) agents becoming team members, there is a need of deep understanding of managerial work (Ulfert, 2021).

These traditional terms still do not recognize what really a team manager makes (Sinar & Paese, 2016) so that it is not possible to recognize team managerial action patterns in (1) a time domain, and (2) a content domain. The answer to this question seems to be hidden in the relation between managerial roles and managerial skills, because it is said, in order for a manager to play managerial roles, they should have some managerial skills (Flak, 2023). It results in understanding playing managerial roles within their managerial skills by day-today activities of managers effects in the managerial actions, which these managers make. Therefore, recording managerial actions on the foundation of the system of organizational terms and the online management tools is so important.

A potential of this research methodology were checked and proved in many previous observations conducted by the author of this project in the last few years, shown in Table 3.

Table 1. Potential of online management tools as research tools verified in research projects

Aim of the research	Main conclusions
Linguistic analysis of team management processes	Managers did not follow the instructions of the project and they planned different actions than they were assumed to accomplish (Alnajjar, Flak, 2016).
Using pattern recognition in team management processes	It is possible to assess similarities of managers actions by pattern recognition methods (Yang, Flak, Grzegorzec, 2018).
Teamwork research based on using online management tools.	Online management tools can be used as research tools and record managerial actions. Then it is possible to draw a trajectory of managerial actions (Flak, 2018).
Teamwork research based on using online management tools.	Online management tools can be used as research tools and record managerial actions. Then it is possible to draw a trajectory of managerial actions (Flak, 2018).
Assessment of using the system of organizational terms in team effectiveness	It is possible to estimate efficiency of team management using TransistorsHead.com as research tools (Flak, 2020).

Recording managerial actions in order to imitate a human manager by an artificial manager.	Literature review and own empirical research show the new organizational reality with hybrid virtual teams, consisting of humans as well as artificial agents. In this organizational reality management tasks, or even a leader's role, would be taken over by artificial intelligence (Flak & Pyszka, 2022).
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Source: own elaboration

Firstly, it is possible to record managerial actions by online management tools (Flak, 2018b; Yang, Flak & Grzegorzec, 2018; Flak, 2018). Secondly, gathered data enables concluding trajectories of managerial actions and repeat them by algorithms (Flak & Pyszka, 2022). Therefore this is a first step implement real artificial management in organizations.

Conclusion

The purpose of this paper was to present the use of online management tools as research tools to implement artificial managers in place of human managers. The construction of managerial tools in the system of organizational terms is also based on the assumption that there is a close relationship between the concept attributed to a given phenomenon in organizational reality and the magnitude that the measuring tool (which is also a managerial tool) measures. The managerial tool collects information about the actions taken by the manager or other participants in the organization with the *ceteris paribus* principle (Flak, 2018).

As it was presented in Section 3, the managerial tool measures about where and when the tool was used, who used it and what resources were produced in the subsequent steps of using the tool and how the process for which the tool was used was carried out. These parameters are necessary to distinguish patterns of behaviour which could be used to implement an artificial manager (Cao, et al, 2021).

The current technological revolution is demanding a rapid pace of change to companies and has increased the attention to the role of teams in fostering innovation adoption. It is supposed that there could be two directions of an evolution from human virtual teams to artificial virtual teams supported by artificial intelligence. The first, vertical direction of evolution is a change from virtual teams with a manager to self-managed virtual teams. The second, horizontal direction of evolution could be a change from totally human virtual teams to totally artificial virtual teams (Flak & Pyszka, 2022). Both directions are the fields of the future research.

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Assessment of Assertive Behavior in Managers' Communication Techniques

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Abstract

Research background: The problem of assertiveness in managers' communication is the foundation of the theoretical framework we have addressed. The tactic of assertiveness involves practicing clear, calm, unaffected, and decisive responses to unwarranted or unacceptable requests, without feeling guilty. Assertiveness facilitates interpersonal communication and reduces manipulation.

Purpose of the article: The aim of article was to enhance understanding of assertiveness issues within various communication techniques used by managers. We specified the mutual differences and connections of the examined problems through selected questionnaires. When examining issue, we took into account the respondents' age, years of work experience, type of organization they belong to, type of research and suggested methods of assertive behavior that the respondents should implement.

Methods: A questionnaire was used to collect data, which examined assertive behavior, emotions, manipulation and aggression in managers. We used descriptive statistics to describe the studied set and mathematical statistics, where we analyzed the obtained data more deeply, looking for mutual differences and connections between selected properties of the statistical set, based on which we drew conclusions. Three hypotheses were formulated based on data from the questionnaire survey and statistically tested.

Findings & Value added: The results showed that respondents from the public sector have better skills in asserting their own rights and higher levels of assertiveness compared to respondents from the private sector. At the same time, correlations between the age of respondents and selected assertiveness factors in communication were demonstrated, specifically in the factors of defending one's own rights, skill in asserting one's rights, and violating the rights of others. Similarly, correlations between the number of years of work experience and selected assertiveness factors in utilizing communication techniques were confirmed, particularly in the factors of assertiveness, emotions, manipulation, and aggression.

Keywords: assertiveness, communication, aggression, emotions, manipulation

JEL classification: D12, E71

1. Introduction

The term assertiveness refers to a communication style that encompasses both communication skills and personal stability. Assertiveness is the art of standing up for oneself without suppressing or limiting the rights and needs of others. An assertive person must make decisions for themselves and be able to take responsibility for their choices. According to Praško (2012), assertiveness aids in collaboration with others. Being assertive means asserting one's rights without demeaning others.

People often avoid personal contact because in modern society, it is faster and, in most cases, easier to deal with everything using technology. They often hide their true intentions behind false pretenses, resorting to various intrigues to manipulate the other party and ultimately leading to nothing but disputes. Assertive techniques are increasingly being used for more effective conflict resolution, primarily focused on finding compromises that satisfy all parties involved.

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Bishop (2000) states that assertiveness is the ability to express oneself without manipulating others or resorting to passive or aggressive behavior. It emphasizes listening and responding to the partner's needs without neglecting one's own interests or compromising one's principles. Consideration is given to the ability to express one's needs, opinions, or feelings with the assurance of not being controlled, exploited, or coerced into denying one's intentions.

1.1 Theoretical background to neuromarketing

Assertiveness skills and techniques that can be learned and applied in various communication situations are categorized in various professional literature. Before we delve into the literature overview of assertiveness skills, it is important to emphasize the concept of assertive persistence. It forms the basis of all skills and denotes resilience, steadfastness, resistance to pressure, and standing firm (Sutton, 2021).

Assertiveness is an important communication tool that helps eliminate conflicts, build trust, and improve relationships and effectiveness in the workplace. Numerous studies on assertiveness show that there are many ways to learn to be more assertive.

Chakraborty (2009) discusses in a case study that organizations worldwide struggle to maintain their competitive advantages due to intense competition, global economic uncertainties, and other related issues. Therefore, it is essential for decision-making employees to ensure that stakeholders are reassured about the sustainability despite all obstacles, requiring an assertive approach in life rather than aggressiveness. There are instances where individuals tend to interchangeably use assertive and aggressive behavior without realizing the gap between them. Assertive behavior within and outside an organization not only helps employee growth but also provides a plan for advancing in the ranks. The study highlights the importance of assertiveness at both the individual and organizational levels and underscores the significance of assertive behavior across different levels of the organization.

This is supported by the study of Elang and Srinivas (2022), which states that elements of organizational climate need to be incorporated into human resource policies for success and alignment with the professionalism ethics of the organization. Seyyed et al. (2020) emphasized that a thorough and comprehensive communication process, both top-down and bottom-up, with a systematic plan for implementing the flow of information, would help align the information parallel to the needs of each department in the organization.

Tripathy (2018) states that assertive communication is the ability to speak and communicate in a manner that considers and respects the rights and opinions of others while also standing up for one's own rights, needs, and personal boundaries. Assertive communication skills create opportunities for open discussions with diverse views, needs, and possibilities within an organization, which need to be respectfully listened to and considered to achieve mutually beneficial problem-solving. It can strengthen relationships, reduce stress from conflicts, and provide social support in challenging times.

Sriyanto et al. (2022) also explored assertiveness in their study, focusing on the state in which an individual is assertive. It requires individuals to be honest with themselves when expressing their feelings and work with arguments that should be proportionate and non-manipulative, avoiding favoring or harming others. Assertiveness is beneficial for bridging an individual and their environment to facilitate effective interaction. Through assertiveness, individuals can respect themselves and others, be self-confident, and develop self-control. In the case of managers being assertive, they can share what they want and think with others while still preserving and respecting others. The findings of this study differ from several previous studies claiming that assertive behavior does not influence an individual's communication skills. The study argues that communication skills, particularly in business, are influenced not only by aspects of social skills. Young individuals who are still in their developmental stage are still in the process of achieving assertiveness. It is important for them to understand the significant impact of assertive knowledge on communication skills. Assertiveness is influenced by several factors, including gender, age, and education. Communication in business is a crucial factor for business success. Through effective communication, traders can better sell their products and avoid any misunderstandings between two parties. In this state, communication is inseparable from negotiation. Effective and assertive communication is the result of good negotiation.

Syla (2022) believes that effective communication is vital in business, whether you are an employer or an employee. It helps establish connections with colleagues, effectively convey information, and promote a positive culture and innovation. Communication style refers to how we interact with others, including our words, actions, or reactions towards others. And assertive communication is the most effective style as it allows expressing one's needs while considering the needs of the other person.

2. Methods

The main goal of the research was to enrich the understanding of assertiveness issues within the communication techniques of managers. We specified the mutual differences and correlations of the researched topic. The results of the respondents' answers were processed using IBM SPSS Statistics 21 software, and these results were presented in the form of tables. The research was conducted through questionnaires, with the aim of verifying the established hypotheses.

Hypothesis 1: We assume the existence of statistically significant differences in assertiveness in the communication of traders according to the type of organization.

Hypothesis 2: We assume the existence of statistically significant correlations between assertiveness in the communication of traders and their age.

Hypothesis 3: We assume the existence of statistically significant correlations between assertiveness in the communication of traders and the number of years worked.

Out of a total of 101 respondents who participated in the research, 63 were women (62.4%) and 38 were men (37.6%). Regarding the demographic question about the type of organization, 71 (70%) respondents were from the private sector, and 30 (30%) respondents were from the public sector. In terms of respondents' age, the majority were in the age range of 18 years - 16 respondents (15.8%), 20 and 21 years - 14 respondents each (13.9%), and 19 years - 11 respondents (10.9%). The purpose of the last demographic question was to determine the number of years worked in the organization by individual respondents. The highest number of respondents had worked in the organization for one year, specifically 30 respondents, which is 29.7% of the total number of respondents. Another 25 respondents (24.8%) had worked in the organization for two years, and 12 respondents (11.9%) for three years.

The first questionnaire we used for the research was the Assertiveness Map questionnaire. It is a questionnaire aimed at measuring the level of assertiveness of the respondents, which we adopted from Medzihorský's book (1991). The questionnaire consists of a total of 32 questions and assesses respondents' attitudes towards certain life situations. Each respondent assigns a level of agreement on a scale from 0 to 4 to each item. The questions are generally divided into three areas:

Area (questions 1-11) - situations related to defending one's own rights.

Area (questions 12-27) - situations related to the skill of asserting one's rights.

Area (questions 28-32) - situations related to violating the rights of others.

The questionnaire expresses the overall perception of the respondent's own level of assertive skills. Evaluation: 0 = never, 1 = rarely, 2 = occasionally, 3 = usually, 4 = almost always, always. The resulting degree of assertiveness problems is assessed - low, moderate, and significant. Each answer indicates a problem with asserting one's own opinion in that particular area.

Another tool used was the A-E-M-A questionnaire. In the paper, we address the issue of assertive behavior in business among managers. For data collection, we used a questionnaire based on the knowledge from Lahner's book (2009). This questionnaire contains items that focus on the assertive behavior of managers, as well as their expression of emotions, and whether managers use manipulation or aggression in their assertive behavior. The questionnaire items were divided to cover each area under investigation, with each area containing 10 items. For each item in each area, respondents selected their level of agreement on a scale of 1 = never, almost never, 2 = sometimes, 3 = often, 4 = almost always, always. We will briefly describe the individual dimensions of the questionnaire based on the information contained in the questionnaire manual. The areas of the questionnaire are:

Assertiveness - The essence of assertive behavior is gaining and maintaining healthy self-confidence. Such behavior is characterized by respecting the rights of each individual as well as the rights of others. An assertive person demonstrates self-assured body language and clear expression of their needs, provided they also recognize the needs of others. When we possess assertive behavior, we have the ability to control our own behavior and maintain self-esteem even in situations where we feel anxious or when we perceive that we are losing control of the situation.

Emotions - The prerequisite for assertive behavior is that individuals can acquire abilities and techniques that allow them to overcome the influence of emotions. This enables them to effectively express their interests, feelings, and needs. Assertive behavior allows us to control our own behavior and maintain self-esteem even in situations where we feel anxious or when we perceive that we are losing control of the situation.

Manipulative behavior - This is the opposite of assertive behavior and is related to personality type. We can encounter individuals who use manipulation based on feigned helplessness, while others choose manipulation based on aggression. It is important to recognize manipulative behavior and stop it when identified. This is not a simple process, as manipulation disrupts the symmetry of relationships, limiting

the possibilities for agreement and creative cooperation. When this form of behavior becomes common in workplace communication, it blocks the space for the development of teamwork, interpersonal relationships, and overall corporate strategy. Manipulation can occur in verbal and nonverbal forms, using conscious and unconscious practices.

Aggression - Aggressive behavior, the ability to act aggressively, is often found in individuals who exhibit a high level of aggression. It is a behavior by which individuals often mask their insecurity in a given situation or fear of the outcome or fear of an unfamiliar environment. Aggression is most commonly accompanied by expressions of anger and hostility, but it does not necessarily have to be so.

3. Results

In this section, we present the results based on which we analyzed the hypotheses we formulated, which interpret assertiveness in the communication of managers.

H1: We assume that there are statistically significant differences in selected factors of assertiveness in the communication of respondents according to the type of organization.

The differences we found relate to the type of organization in which the respondents work, specifically the sector in which the organization operates. Using t-tests, we examined the statistical significance among respondents who work as employees in either the private or public sector in terms of assertiveness in communication. Our findings are presented in the following Table 1.

Table 1. Differences in selected factors of assertiveness in respondents' communication within the type of organization

	Organization	Mean Difference	Standard deviation	Test criterion	Sig.
Defending one's own rights	Private	1,8412	,63147	- 1,126	,263
	Public	1,9970	,64481		
Skill of asserting one's rights	Private	1,9859	,68402	- 1,930	,058
	Public	2,2604	,63950		
Violating the rights of others	Private	1,8028	,75175	-,508	,613
	Public	1,8933	,95950		
Assertiveness	Private	2,3127	,50396	- 2,346	,021
	Public	2,5733	,52518		
Emotions	Private	2,5000	,59976	- 1,294	,201
	Public	2,6533	,51911		
Manipulative behavior	Private	2,3310	,55847	- 1,104	,272
	Public	2,4667	,57795		
Aggression	Private	2,3634	,56169	- 1,147	,254
	Public	2,5133	,68518		

Source: own processing

Through the table, we can see that statistical significance is evident within the public sector, specifically within two factors - the skill of asserting one's rights and the assertiveness factor. Employees in the public sector exhibit a more pronounced skill in asserting their rights compared to employees in the private sector, and their level of assertiveness is also higher than that of employees in the private sector.

The skill of asserting one's rights factor suggests that employees in the public sector are usually more capable of initiating a conversation with anyone compared to employees in the private sector. Employees in the public sector are typically better at pointing out someone who has treated them unfairly or wronged them compared to employees in the private sector. Respondents working in the public sector are generally more open in expressing their feelings compared to respondents working in the private sector.

Within the assertiveness factor, employees working in the public sector are usually more able to genuinely praise their colleagues, acquaintances, and friends, unlike respondents working in the private sector. Respondents from the public sector typically prefer emotions not to be part of the discussion, unlike respondents from the private sector. Employees employed in the public sector are usually more capable of communicating in a more cautious and controlled manner than employees employed in the private sector.

Hypothesis 1 was confirmed as we found statistically significant differences in assertiveness in the communication of managers according to the type of organization.

H2: We assume that there are mutual statistically significant correlations with age within selected factors of assertiveness in the communication of respondents.

In our research, we analyzed the mutual correlations between selected factors of assertiveness in the communication of respondents and their age using the Pearson correlation coefficient. In the following Table 2, we can observe statistically significant correlations between selected factors of assertiveness in communication and the age of respondents.

Table 2. Correlations with respondents' age and selected factors of assertiveness in respondents' communication

		Defending one's own rights	Skill of asserting one's rights	Violating the rights of others
Age	Correlation Coefficient	,252*	,306**	,200*
	Sig. (2-Tailed)	,011	,002	,045
	N	101	101	101

** p<0,01 * p <0,05

Source: own processing

We observed statistically significant correlations in the factors of defending one's rights, skill in asserting one's rights, and infringing on the rights of others. The higher the age of the respondents, the higher the statistical significance in these aforementioned factors.

As respondents' age increases, their defense of their own rights becomes stronger. Respondents with higher age usually hesitate more when returning faulty or unsatisfactory goods to the store. They tend to make purchases they originally did not want simply because it is difficult for them to reject the salesperson's offer. With higher age, respondents are more likely to alert someone who cuts in line.

With higher age comes greater skill in asserting one's rights. Respondents with higher age typically have difficulties criticizing their colleagues, acquaintances, and friends. They often try to avoid certain people or situations out of fear of potential difficulties. Respondents with higher age are more prone to using uncontrolled or inappropriate expressions in moments of anger. They also tend to be more critical of others' opinions and ideas and tend to raise their voices to coerce others into doing what they want.

Hypothesis 2 was confirmed as we assumed statistically significant correlations in selected factors of assertiveness in the communication of respondents with their age.

H3: We assume that there are statistically significant correlations in the number of years worked by respondents within selected factors of assertiveness in communication.

In the following Table 3, we examined the correlations between selected factors and the number of years worked by respondents.

Table 3. Correlations with the number of years of work and selected factors of assertiveness in respondents' communication

		Assertiveness	Emotions	Manipulative behavior	Aggression
Number of years of service	Correlation Coefficient	-,230*	-,351**	-,289*	-,254
	Sig. (2-Tailed)	,020	,000	,003	,010
	N	101	101	101	101

** p<0,01 * p <0,05

Source: own processing

In the hypothesis, we assumed statistically significant correlations in selected factors of assertiveness in communication among respondents based on the number of years worked. According to Table 3, we can see that we observed statistical significance only within the A-E-M-A questionnaire. In terms of the assertiveness factor, we found that respondents with more years of work experience less frequently refuse requests for help or services that are problematic or disadvantageous to them. The more years they have worked, the less they mind being observed by someone while working.

The more years of work experience respondents have, the less they try to create an impression and influence others. Respondents with more years of work experience initiate contact with other people less frequently.

Regarding manipulation, respondents with more years of work experience less frequently question the good qualities, abilities, and personalities of others. They criticize and judge them and speak about them with disdain. The more years of work experience they have, the less frequently they express demands, give instructions, and coerce others to act, often leaving it until the last moment.

In terms of aggressiveness, respondents with more years of work experience have fewer tendencies towards explosiveness. These respondents less frequently get angry when they don't receive recognition for their good work.

Hypothesis 3 was confirmed as we found statistically significant correlations in selected factors of assertiveness in the communication of respondents based on the number of years worked.

4. Discussion

To date, a number of studies have been conducted on the topic of communication. These studies have predominantly focused on managerial skills within marketing communication in companies.

Luzio-Lockett (1995) stated that assertiveness is behavior that involves two-way communication and clear expression of one's desires, while interacting with others without denying their rights. Stubbs (1985) explained that assertiveness is behavior that expresses an individual's rights while respecting the feelings and rights of others. Rathus and Nevid (1986), on the other hand, stated that assertive behavior is behavior that expresses genuine feelings, balances rights, and demonstrates social skills. Caputo (1984) argued that assertiveness encompasses five fundamental individual rights: the right to be respected, the right to feel and express emotions, the right to make mistakes, the right to say no, and the right to ask questions. Phau and Sari (2004) explained that assertive behavior does not involve violent acts in defense of rights. Interesting findings were presented in a study by Thangala and Shama (2023), which empirically analyzed the relationship between dimensions of assertive behavior and organizational climate among employees in a multinational company. The study aimed to determine the potential effects of assertive behavior on organizational climate. This study found that members of the organization were still hesitant to express their desires. The results of the study revealed that respondents in the company were still reserved and reluctant to speak the truth or express themselves to others. It was found that employee well-being was not taken seriously, and communication problems and unbalanced flow of information to other departments occurred. However, this study found that despite a high level of organizational climate, assertive behavior,

through dimensions such as the right to be respected, the right to feel and express emotions, the right to make mistakes, the right to say no, and ultimately the right to ask questions, was at a moderate level.

Assertiveness is beneficial for individuals and society as a whole. Its implementation is recommended in many areas. Applying assertiveness in one's behavior allows for much better results in work tasks. The application of assertiveness is possible in various fields. Utilizing assertiveness can be advantageous in fulfilling work obligations within a company. Assertive behavior would greatly facilitate the work of employees in unpleasant situations and lead to achieving the desired outcome that would satisfy both parties.

Due to the increasingly competitive environment, it is essential for a company to establish itself in the market. The most crucial aspect is to orient the entire company's activities towards customers since they are the ones who determine the success of the business. Assertive behavior towards customers can result in better relationships, leading to customer loyalty and loyalty to the company. Nowadays, customers attach increasing importance to the quality of services provided. They demand greater attention, appropriate and suitable approaches in dealing and communication, whether it is services provided by travel agencies, retail stores, or insurance agencies, among others. It is important for representatives of different workplaces to possess the ability to communicate effectively with the other party and thus achieve the desired goals.

When considering the course of our research, it is necessary to mention that the research proceeded without complications. When contemplating further research on assertiveness that could take place in the future, it would be beneficial to create video recordings that would allow for a more detailed analysis of how respondents communicate in the work environment. It should be noted that it is highly probable that we would encounter nervousness and the fact that respondents may not feel comfortable participating in such research. However, we believe that conducting such research, for example, during an assertiveness training course, where video recordings serve as feedback for the respondents or course participants, would be highly beneficial and useful. Respondents would witness firsthand how they communicate and to what extent they acquire assertive behavior.

It is crucial to focus not only on assertiveness but also on general communication among respondents. Based on our experience, we have determined that work activities in various fields, whether it is business or management, are highly demanding and often underestimated by some individuals. From the perspective of respondents' answers, it would be appropriate to introduce more assertiveness courses within training programs. This would enable individuals to effectively interact with any type of client, even with uncooperative ones, which presents a challenging situation for most individuals.

Being assertive means having the ability to convey one's message confidently and self-assuredly without being aggressive. For a business owner, it is important to be assertive in order to effectively express their thoughts, feelings, and direction. Increasing their assertiveness will undoubtedly help both the business owner and their company on the path to success.

Conclusion

Communicating and acting assertively is an interpersonal skill that helps people maintain healthy relationships, resolve interpersonal conflicts, and prevent the suppression of their own needs. Assertiveness can be understood as a relational style that walks the middle path between passive and aggressive behavior. The result of acquiring this ability is a communication style that individuals use to confidently, openly, and positively express their needs.

The main objective of this contribution was to focus on the issue of assertiveness in the communication techniques of respondents based on theoretical foundations from domestic and foreign literature. The research aimed to investigate the level of assertiveness among respondents through the analysis and interpretation of a questionnaire survey. The collected data were processed using IBM SPSS Statistics 21 and presented in the form of tables.

Through the questionnaire, which provided statistically significant data on assertiveness in the communication of respondents, we examined mutual differences within the sector where the respondent works. Furthermore, we explored the mutual relationships based on the respondent's age and years of experience. We brought new enriching information and data to the field of studying assertiveness in communication techniques of respondents.

The limits of our research were mainly the smaller sample size and occasional sampling method. This study may serve as a prerequisite for further investigation of the relationships between socio-demographic characteristics and factors of assertive behavior in communication techniques.

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Innovation in Leadership: Towards CSR and the Creation of Shared Value in a Humanistic Management Perspective

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Abstract

Research background: Based on the continuous environmental changes that companies must face and the crisis of the shareholder capitalism, the framework of our research concerns the need to innovate the traditional approach to leadership, inspired by the scientific management paradigm, to move towards a humanistic management approach.

Purpose of the article: The paper aims to propose a reflection on the need for a paradigm shift in corporate leadership, starting from the need to integrate the perspective of CSR with that of shared value. Pursuing the goal of shared value goes beyond the traditional corporate purpose oriented towards maximizing shareholder value and reflects the humanistic management approach, centered on an anthropocentric vision of leadership.

Methods: Starting from the observation of the significant changes in the environmental and competitive contexts of recent years and the emerging affirmation of the stakeholder capitalism paradigm, the study analyses, through a conceptual approach, the evolutionary path of the leadership approach necessary to face the challenges of change.

Findings & Value added: The study highlights how the shared value perspective can represent an objective capable of inspiring the behavior of leaders in pursuing CSR from a humanistic management perspective. The practical implications are multiple and of enormous impact on the economy and society. In fact, if companies convincingly adopted the humanistic management perspective in leadership activity and pursued CSR strategies to create shared value, the crisis of the current model of capitalism could be neutralized and the well-being of society and the environment would increase. The originality and added value of the contribution lies in proposing the necessary connection between CSR, the leaders as strategic actors of change and the shared value, as a goal to be pursued in the perspective of a humanistic management.

Keywords: humanistic management, CSR, shared value, leadership

JEL classification: J24, M00, M12

1. Introduction

Market globalization, the advent of the digital revolution, and the increasingly frequent and surprising changes in the environment are all contributing to making competitive scenarios very complex, particularly for businesses, accentuating their intensity and augmenting the risks. For years now, the only real certainty that entrepreneurs and managers can count on in the process of governing enterprises and organizations is that change is a constant. Changes have affected consumer needs, market actors, institutional rules, and the macroenvironmental conditions on all levels political, economic, social, technological, environmental, and legal. To deal with these continual and not always foreseeable changes, organizations must turn to new resources and dynamic competences if they are to adapt and pivot by adjusting their set of strategic capabilities necessary for combining and exploiting their internal and external resources to their best advantage. One competence that has taken on paramount importance is the leadership capability of key enterprise actors, i.e., proprietors, managers, entrepreneurs (Hamel, 2008). Leadership is manifested in a series of activities geared toward governance of all types of organizations, both large and medium-small size,

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whether for-profit or not. In the context of modern businesses, corporate leadership represents a strategic function which, more than any other, is repeatedly put to the test by the incessant changes to external contexts and to organizational dynamics; thus, it requires regular updating and adjustment. The profound changes of recent years have fueled an important debate that has compared two models of capitalism: a) the shareholder-oriented model of capitalism, which assumes that the purpose of companies is primarily that of maximizing profits and market value of companies (Friedman's (1971) traditional view) and b) the model of stakeholder capitalism, according to which the purpose of companies must take into account not only the economic and financial aspects, but also the social and environmental ones useful for satisfying the expectations of stakeholders, according to the view of Freeman's (1984). The debate on the company's goals has highlighted how the vision of the company as a subject oriented towards maximizing profit or market value is inadequate to deal with the current needs of people and consumers, forcing a rethinking of the mission and purpose of the firm recognizing its social nature (Jordi, 2010). As highlighted by Brosh (2023), the debate on the purpose of the company, in addition to indicating the purpose as "the reason for being", focuses on the identification of the purpose as an objective beyond maximization, up to the concept of pro-social contribution, in which the corporate purpose is defined as "a statement of a company's moral response to its broadly responsibilities, not an amoral plan for exploiting commercial opportunity" (Bartlett and Ghoshal (1994, p. 88). To govern the company according to the new paradigms oriented to the common good (Hollensbe et al. 2014), the traditional approach to management and leadership needs to be innovated, overcoming the classic instrumentation of scientific management, which is not always attentive to the needs and well-being of stakeholders conceived primarily as people. This signifies that the diverse competences, approaches, and values of the organizational actors in leadership roles must be updated. It follows, then, that the questions to be raised and addressed are: RQ1 *To what managerial paradigms should today's and tomorrow's leaders look for inspiration?* RQ2 *Which aspects of leadership must be innovated?* In the paper, some preliminary conceptual considerations are proposed to try to answer these important and broad research questions.

2. Methodology

Starting from the observation of the significant changes in the environmental and competitive contexts of recent years and the emerging affirmation of the stakeholder capitalism paradigm, the study analyses, through a conceptual approach, the evolutionary path of the leadership styles necessary to face the challenges of change. Path that takes place in parallel with the need to review the company's strategic goals, which must go beyond the classic paradigm of maximizing shareholder value and arrive at a company oriented towards creating value for and with all stakeholders, from a shared value perspective. (see the conceptual scheme below, in Fig. 1)

The conceptual path uses the main bibliographic sources representative of the various theoretical constructs proposes a logical path of holistic analysis useful for connecting concepts often treated separately. It starts from the synthetic analysis of the academic debate concerning the evolution of the capitalism model and the goals of the enterprise and consequently regarding the transition from the paradigm of scientific management to that of humanistic management. The leadership activity is crucial to make this paradigmatic evolution concrete and effective in the life of companies and therefore we will try to shed light on what changes need to be made to leadership styles, going beyond the classic dichotomy between transactional and transnational leadership, to research of a humanistic leadership or a leadership for the new purposes of the companies.

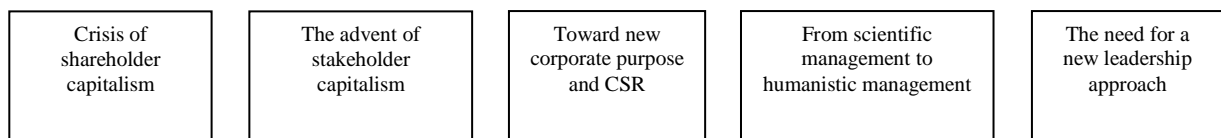


Figure 1. An illustrative concept scheme of the logical path followed in the study

Source: our elaboration

The conceptual approach adopted is inspired by the discussion within the progressive transition from shareholder capitalism to stakeholder capitalism, by the emergent paradigm of *humanistic management* (Melè, 2003; Spitzsch, 2011; Pirson, 2017; Laszlo, 2019; Anadol & Behery, 2020; Koon, 2021), by the

wise company model (Nonaka & Takeuchi, 2021), and by the concept of *shared value* (Porter & Kramer, 2006; 2011). Although these scholars start from different viewpoints, their stances converge on the importance of facing the new challenges arising from changes in capitalism by modifying the underlying principles and methodologies of managerial leadership and work. The starting point is acknowledging that enterprises are following a new objective, one that is no longer limited to the pursuit of maximizing profit for the owners but is focused on creating and co-creating sustainable value for and with all the stakeholders (Sulkowski et al., 2018); such an organization is attentive to social issues, acting from a community-focused enterprise perspective. This approach is not new; in the Fifties it was enacted in Italy by the exemplary industrial experience of the Olivetti company. By its modernity, we can consider it the standard-bearer for the concrete application of a humanistic vision of organizational management. Today we find the humanistic approach to socially responsible business in Brunello Cucinelli, an enlightened entrepreneur capable of exercising humanistic entrepreneurial leadership in the luxury clothing business (La Rocca, 2014).

3. Towards new corporate purpose to create shared value in the perspective of Company Stakeholder Responsibility (CSR)

In reference to the leader of a modern organization a preliminary question to be raised is: “*to what end should a manager or an entrepreneur undertake guidance and governance activities?*”. The setting of strategic goals is, indeed, crucial for every leader of any organization, distribution company, or enterprise that must assess the end goals of his/her behavior and management activities. In fact, the ultimate objectives represent the criteria that guide the choices and actions of strategic and operational governance; they are a crucial aspect of organizational life, especially when the organization aims to carry out actions inspired by the principles of economic rationality. When speaking of the purpose of the company, it must be kept in mind that it can imply an objective perspective, in the sense that it refers to the purposes of the company considered as a system and as a result of the choices of the governing body, or a subjective perspective, in which it would be preferable to speak of the ends of the subjects, of the stakeholders, rather than corporate ends. In the first case, the primary purpose of the enterprise-system is the survival of the system itself, which is achieved thanks to the company's ability to know how to continuously adapt to changing environmental needs and which translates into the pursuit of a minimum profit level that allows achievement of long-term economic equilibrium. If we assume a subjective perspective, however, the aims are those expressed by the relevant stakeholders, who can be majority and minority owners, managers, or other subjects with the power to influence corporate strategies, such as banks, workers, suppliers, etc. In small businesses, the role of small entrepreneurs is relevant, as they play the dual role of owners and subjects of the strategic and operational governance of businesses. Based on the subjective perspective, therefore, the purposes may vary according to the dominant subjects in corporate governance. The goals of maximizing profits, maximizing shareholder value, and controlling are the preferred goals of majority shareholders; maximizing dividends and shareholder value are the preferred goals of minority shareholders; dimensional development is a privileged objective of the managers of companies where there is a strong separation between ownership and government and where dimensional development also implies greater power and prestige for managers; social success and self-realization represent the aims of many small entrepreneurs, in search of a psychological income, prestige and esteem from the local community of reference; the stability of the employment relationship, adequate pay, working hours, safety, career and welfare conditions may represent the expectations of the workers; environmental protection and the creation of social value can be objectives of the communities where the company is located.

In the more recent debate, the discussion of the goals of the firm has polarized, linking itself to two different views of capitalism: Friedman's (1971) traditional view of shareholder capitalism and Freeman's (1984) more modern view of stakeholder capitalism. The two models underlie two different approaches to management and leadership. We therefore wonder “Do the organizational goals to be pursued by contemporary management leadership stem from the traditional vision of capitalism, i.e., maximizing profits and value for shareholders, or should the needs of all stakeholders be considered, and should those goals include socially responsible behavior (CSR) aimed at creating shared value? The concept of corporate social responsibility must be considered as a responsibility of the company towards the stakeholders (Company Stakeholder Responsibility), a concept that goes beyond the traditional idea of Corporate Social Responsibility, which legitimizes the idea of considering business a fact separate from ethics, while in reality in the stakeholders' vision of capitalism it must be incorporated. (Freeman and

Velamuri, 2021). After all, in the context of stakeholder capitalism, the firm aims to create value for and with the stakeholders by adopting a responsible approach, in which business is not separated from ethics. A serious CSR cannot ignore the ethical perspective of corporate strategies, referring to business ethics. A perspective that recognizes how the standards of ethical behavior in business are not very different from the ethical standards and norms of the larger society and culture in which a company operates. Thompson et al. (2016). CSR strategies must be inspired by the principles of business ethics not only to respect ethical standards, but also to avoid incurring the visible costs, internal administrative costs and other intangible and less visible costs generated by the lack of ethics in corporate behavior. The management objective becomes the maximization of the well-being of the stakeholders in the long term (Rusconi, 2007), a condition which should allow to satisfy both the strictly economic expectations and those of a better quality of life of all the stakeholders, including the shareholders and the owners majority shareholder, whose economic return on capital is closely correlated to the company's positive social performance. Empirical research has supported the positive outlook of CSR, highlighting that on financial markets, socially responsible actions increase a firm's reputation and builds trust, strengthening its organizational capital and its competitive capabilities. The underpinning of a balanced response to the interests of the various social entities, which have a relationship with the company influence it to a certain degree, is the stakeholder theory. (Freeman, 1984) According to this theory, the social actors who contribute to varying degrees to the creation of wealth – such as, employees, suppliers, clients, institutions, and the community – must be listened to and kept in consideration in the sharing of value. The concept has evolved from the traditional vision of *shareholder value* to the modern concept of *shared value* and, in this process the confines of the organization have been redrawn, no longer circumscribed to the ownership of capital alone, but expanded to include stakeholders involved in relationships that influence the firm in various ways. From this new perspective, the organizational goal is amplified, and it incorporates not only the needs of the owner(s) but also the expectations of the other stakeholders. Thus, this approach is tied to an innovative, *multistakeholder governance* model with a broader scope. In it, the social actors can participate in the decision-making process, thanks to the redefinition of the firm's social contract with the various stakeholders; it is assumed that benefits will be generated for and with all the stakeholders that invest specifically in the organization. In the past, incentivizing mechanisms utilized by managers have frequently failed, as they were based primarily on the principal-agent model that had originally been designed to maximize shareholder value. Similarly to stock options, these mechanisms often fell short; not only did they fail to maximize value for stockholders, but they often enabled managers to engage in opportunistic and manipulative behaviors that were detrimental to the firm itself and its shareholders.

4. CSR for creating shared value

In the present paper, CSR is considered the standard-bearer of a new way of doing business and of operating in market economy contexts to neutralize any negative effects, integrating business and ethics.

While the economic importance of corporate action is found on the ability to create value, the social relevance is linked to the repercussions (impact) that the company has exercises in the social context in terms of employment and corporate welfare, investments, value proposals capable of generating differential benefits to the market, of participation in life of the community, also through social marketing initiatives, of polluting effects on the environment and distribution of value among the various stakeholders. Various factors are increasing the interest and attention to CSR. First, media and public opinion show increasing disapproval and impatience with the emergence of socially deplorable conduct and at least questionable by many organizations, qualified for this by Gallino (2005) as "enterprises irresponsible", subjects who, beyond the elementary legal obligations, believe they "should not respond to any public and private authority, nor to public opinion regarding the consequences in the economic, social and environmental fields of its activities". The scholar points out how business who act irresponsibly generate high social costs, such as those involved in corporate scandals, in large escapes, in the dismissal of hundreds of workers via text messages, in the practice of salary levels and working conditions often at the limit of decency, increasing their insecurity and in some cases informality, associated with the lack of legal guarantees, in building and relocating chemical plants unsafe in developing countries, in making highly polluting productions without any environmental remediation action, in making products (for example motor vehicles) incorporating defects projects known to the manufacturer that are dangerous for users, or in carrying out relocations sudden production abroad (favored by the liberalization of the circulation of capital and foreign direct investments (FDI) with mass layoffs, without any scruple towards the communities originally hosting the production sites. (Pencarelli, 2020) Attention to responsible

companies towards their stakeholders and the need of correctness and transparency regarding the activities carried out by companies therefore grows in parallel with the occurrence of irresponsibility phenomena, but is also linked to other important factors of changes in the environmental context that are soliciting new positions from the side of public opinion, of governmental and supranational institutions and that push companies to do so fraught with problems previously considered to be the exclusive competence of the state and civil society. (Collis et al., 2012)

On the side of the demand for goods and services, the phenomenon of critical, or responsible, consumption, in which consumer buyers guide the choices of purchase and consumption based on criteria that consider the socio-environmental commitment of companies, favoring goods and services deemed consistent with environmentally conscious consumer behavior and human rights, or boycotting brands deemed guilty of inattentive behavior to socio-environmental issues. In essence, attitudes towards the demand for "other consumption" are affirming or "anti-consumption", both declinable from a domestic perspective or international. On the consumption front, the growing willingness of consumers to pay should also be noted a premium price for the purchase of products made by companies that declare themselves oriented towards the CSR, certifying their conduct through various forms of certification and socio-environmental communication. Civil society and communities are increasingly attentive to respect for human and workers' rights, as well as ecological and environmental issues. In Western countries we are also witnessing the progressive dismantling of the welfare state induced by the public finance crisis, so that the expectations of corporate welfare initiatives, through which companies make available to employees and collaborators, resources and services aimed at improving their well-being. The main forms in which corporate welfare is expressed concern the provision of benefits (supplementary mutuels, cars company, health insurance, etc.), the activation of measures aimed at reconciling work and family (horizontal and vertical part time, nursery schools and company canteens,), the stipulation of agreements with suppliers to ensure more advantageous prices for employees, the implementation of initiatives aimed to protect and enhance diversity in the company, referring to gender, ethnicity and the presence of people disabled. A further driving force behind the attention to responsible conduct from part of the companies must then be identified in the affirmation of the phenomenon of so-called ethical finance, however which in the financial markets are spreading operators (funds) who invest financial resources in companies which are characterized by their social and environmental commitment, excluding them from allocation projects of savings companies not in line with behaviors judged socially and environmentally acceptable.

Also for these reasons, the CSR approach is one which should guide future-oriented wise leaders in their strategic actions, inspiring them to incorporate economic, social, and environmental aspects while embracing profound innovations in managerial culture and in their vision of the firm's goals. Their objectives cannot be limited to maximizing profits or stock value that would only benefit the majority shareholders in the short term, but leadership must look towards creating shared value among all the different stakeholders who contribute to generating wealth in both the present and the future. Sharing value with stakeholders implies that wealth generated by the firm will be divided among workers and managers (in the form of monetary and non-monetary remuneration, quality of work, and organizational welfare), clients (generating customer satisfaction by improving the benefits-to-sacrifices ratio of the socio-environmental value proposition), suppliers (guaranteeing sure and fair compensation for what is supplied), the collective community (increasing well-being and quality of life), the State (ensuring payment of taxes), and owners (guaranteeing adequate remuneration for risk capital invested, either through capital gains or through dividends. All actions must be conducted without harming the environment and in line with the tenets of sustainability; to do otherwise not only can organizations bring about negative consequences for the ecosystem, but they also risk compromising their own competitive and financial performance. (Perrini, 2018; Pencarelli, 2020)

Hence, it becomes paramount to adopt a long-term view that will allow the organization to incorporate an environmental dimension in its resources and competences and to act fairly and inclusively towards the various components of society, including future generations. This evolutionary path will be more rapid and effective if aware leadership plays a crucial role in defining socially responsible and sustainable strategies. Such leaders must learn to recruit, train, guide, and motivate the organization's human resources by innovating the management systems and nudging company action and behaviors towards the new paradigms of creation and dissemination of value. It will require courageous leaders who can propose new visions and new cultural models and who are able to navigate change by finding appropriate resources and allies through effective policies, communication tools, and

engagement. Leaders who pivot towards sustainability and CSR must necessarily be aware that (their) organizations, which pursue strategies aimed at creating shared value, can improve long-term performance and, at the same time, to rescue an ailing, crisis-riddled capitalism by transforming it into an economic system that is sustainable environmentally, socially, and financially. The study of Bosh and Badia (2013) state that according the literature on the empirical evidence on the effects of CSR on corporate financial performance (CFP), three conclusions arise: 1) the relationship between CSR and CFP has evolved from a nil or low correlation to a positive correlation; 2) CSR positively impacts on CFP in the long run; 3) CSR creates value mainly when it is focused on primary stakeholders, but it has an insurance effect when it has a wider orientation. There will be a trade-off between the long- and the short-term views. The former aims to generate lasting competitive advantage and strengthen the social legitimation of the firm while safeguarding natural capital and the need for lasting returns. According to this perspective, CSR represents an investment for the generation of lasting value shared between the various stakeholders of the company, also contributing to the value for shareholders by reducing the political and social risk of corporate strategies. The short-term view, especially in organizations governed by institutional investors that typify the new financial capitalism, is commonly adopted when market and capital pressures push managers to opt for a short-term solution that will yield immediate profitability. Ultimately, innovative leaders who take the long view in responding to current changes must be capable of embracing a new organizational purpose in the “creation of shared value” as so effectively coined by Porter and Kramer (2006, 2011). The two scholars argue that shared value goes beyond social responsibility, philanthropy, or even, sustainability; it represents a new way for businesses to achieve profits and good competitive and social performance, on the assumption that *what’s good for society is good for business*. Bosh Badia et al. (2013) highlights that according the two Authors, CSR “becomes a source of opportunity, innovation, and competitive advantage. The basis of this statement is the distinction between *responsive CSR* and *strategic CSR*. The former is addressed to returning profits to society. The latter is addressed to identifying societal problems that the corporation can contribute to solve, and, as a consequence, create value simultaneously for society and shareholders”. Porter and Kramer hold that such a perspective can significantly contribute to the transformation of the managerial mindset. The vision of this approach is to recognize that *societal needs, not just conventional economic needs, define markets*. (Bosh and Badia, 2013)

In fact, when creating shared value is a core element of an organization’s strategic goals then it is possible to also incorporate financial and competitive objectives to be pursued through the resources and competences unique to the organization, while keeping in mind the need to create social value and safeguard the environment. In sum, the idea put forth by Porter and Kramer (2011) is a far-reaching and revolutionary vision that calls for a radical rethinking of business and the economy as a whole; it offers a multi-value perspective to leaders present and future that can legitimate and reinforce the role of organizations in society, without diminishing the conventional goals of survival and self-generation of the organization as an autonomous system distinct from its subjects. §§§§§§§§§§

More importantly, we must recognize that the conventional concept of the organization or firm as an institution guided by solely by economic principles, which assume that people behave according to egoistic maximizing logics and are capable of rational choices from a series of alternatives, can gradually be overcome. Moreover, corporate governance can no longer follow the principles of *scientific management*, born out of a traditional economic vision, especially given the numerous cases where organizations have failed on multiple levels to create wellbeing for people, organizations, and society. New outlooks are needed, such as those of *humanistic management* (Pirson, 2017 ff.9), of emotional organizations (Pilotti, 2019), and of wise companies (Nonaka and Takeuchi, 2021).

In sum, there is a need to engage in a new narrative for people, organizations, and markets that can move beyond the mechanistic idea of enterprise and beyond the taylorist-fordist principles of scientific management where managers seek to maximize efficiency by planning the work assigned to workers who are expected to obey and perform, machine-like, for monetary compensation. In an era of recurring changes and crises, we must move decisively towards a humanistic leadership approach that prioritizes the dignity and wellbeing of individuals and society (the common good), fosters cooperation among workers and the development of human virtues, spirit of initiative, and learning processes of people inside the organizations. Such an approach sees the organization as a community, rather than simply a set of contracts and just a profit-making mechanism. (Melè, 2003)

5. Leadership in the new context: from *Scientific Management* to *Humanistic Management*

If we agree that the first step to be taken in innovating leadership consists in establishing new strategic orientations for organizations, ones that consider stakeholders' expectations and assign to company leaders the task of aiming to create shared value and common good – based on the principles of humanistic management – then it becomes apparent that the primary strategic goal of organizations must include the principles of CSR and sustainability in the company vision, mission, and culture; ultimately, this should be the guiding force underlying all managerial processes, starting from leadership itself. The generally accepted definition of leadership refers to the guidance carried out by one or more individuals vis-à-vis other individuals or groups of persons and co-workers for the purpose of achieving the company's goals. Therefore, this leadership role must, first, be carried out by the primary stakeholders, i.e., the majority shareholders or principals. (Clarkson, 1996) They, along with the other stakeholders, must define and formulate the foundational goals of organization that have at the core of the organizational strategies and processes, the creation of shared value. Thus, the role of leadership can be actively fulfilled within an organization by those who have the power to do so, by virtue of their role (formal leadership), but also by those who have the opportunity and the ability to guide a group of people towards the achievement of a goal, by virtue of their recognized authority (informal leadership). (Johnson et al. 2017)

As Mintzberg (2017, pp. 15-16) observes, rather than following the tendency of distinguishing leaders from managers by seeing the former as those who do the right things and face change and seeing the latter as those who fix things and face complexities, it is important to see managers of all levels as potential leaders and to consider leadership “a particularly efficacious form of managerial governance”. This is why leadership should be considered widespread throughout an organization, found in every decision-making context where people are working towards achieving company goals, and succinctly expressed, in the words of Bill Gore, founder of W.L. Gore & Associates, as “no bosses, but many leaders”. Cardona et al (2019) refer to the concept of shared leadership, because in this new and ever-changing world, companies need not only heads, but hearts, not only leaders surrounded by followers, but leaders surrounded by leaders, capable of exercising a Purpose-driven leadership, living examples, building trust around shared goals, and overcoming power-based hierarchical approaches. The purpose-driven leadership focuses not so much on what or how to act in organizations, but on why to do it, relying on each leader's ability to discover personal purposes, help others find their personal purpose and connect people to organizational goals stimulating a sense of common purpose, like in top performing sport teams. Therefore, innovation in leadership must be seen as closely tied to innovation in management, suggesting a substantial change and departure from the traditional way of working (as conceived by Taylor and Weber) and of envisioning organizational approaches to achieving company goals (Hamel, 2008). In the humanistic management view, persons who care about their own and others' wellbeing, and who subscribe to the logic of generating shared value, would not hesitate to take on the challenges of the huge global crises that humanity is facing, such as climate change, social inequity, and poverty. (Pirson, 2017, p. 76) Leadership is one of the main activities that can result from a different vision of human nature. Humanistic leadership becomes responsible for guaranteeing the basic tenets of human dignity to workers and for enhancing organizations' capacity to allow their various stakeholders to thrive and reach the highest levels of wellbeing. According to Pirson (2017), the foundational pillars of human dignity consist of the pursuit to acquire the necessary resources for survival and procreation and the desire to defend oneself, which explain human nature from an economic standpoint. To these, one must add – in the humanistic logic – the pursuit of long-lasting and mutually helpful relationships with others and the desire to understand, seek, and share a sense of the world that surrounds us. All these components must be balanced for people to lead a life of dignity and freedom, which represents the primary objective towards which humanistic leadership, based on practical wisdom, must orient its behavior if it is to create wellbeing for people, organizations, and society.

In sum, the humanistic approach, in line with Freeman (1984), pushes leaders towards multiple objectives and a plurality of stakeholders, instead of limiting themselves to the single objective of maximizing value for stockholders. In essence, as Peter Drucker would say, it is human beings who can imagine and “make” the future; this is made possible by their ability to go beyond the narrow interests of firms by putting into practice a practical wisdom based on the tacit knowledge that “puts people in a position to express prudent judgement and carry out actions based on the current situation and guided by values and morals” (Nonaka, Takeuchi, 2021, p. 58) and continually innovating. In light of all these considerations, it is evident that there is a convergence of views presented by the new approaches to the

study of organizational management to leave behind the rigid and partly obsolete paradigms of scientific management and move towards a humanistic approach to management and leadership, as outlined in Pirson's *Humanistic Management* and espoused by his followers and echoed in the recent contributions of other scholars, e.g. on the wise company, which will be discussed in the next section.

6. Beyond the dichotomy between transactional and transformational leadership

According to Pirson (2017, p. 90), in the economic view in which the firm is seen as a bundle of interconnected contracts, leadership activity is manifested in a continual process of negotiation(s) that typifies the so-called transactional type of leadership activities conducted by a leader who can negotiate and maximize organizational efficiency in the context of a hierarchical line of command. This form of leadership is based on the classic carrot and stick approach; it is predominantly focused on the efficient achievement of goals while paying very little attention to people and ethical or moral conduct. On the contrary, in the humanistic view, leadership finds greater resonance in what Bass and Avolio (1993) identify as transformational leadership. Leaders of this type are anchored to solid moral values and are an inspiration for their followers and colleagues; they are intellectually stimulating and can help people to become emotionally engaged in the achievement of organizational goals. This form of leadership is charismatic and is typical of entrepreneurs who are the founders and managers of small- and medium-sized enterprises, particularly if they follow the principles of *Humanae Entrepreneurship*. (Botti, Parente, and Vesce, 2020) In this case, leadership is manifested in responsible activities, and a good leader stands out because his/her actions are oriented towards human wellbeing; their goal is to seek a balance by striving for, defending, relating to, and looking for the meaning that can guarantee human dignity. In real-life organizational and environmental contexts, leadership activities fall somewhere between the two poles of these perspectives. Leadership involved in the day-to-day management of a firm adopts contingent and flexible situational approaches that depend on the leader's own personality, on the characteristics of his/her followers, on the tasks required, and/or on the governance issues to be addressed. A model that can be qualified as contingent and which, in our opinion, fully reflects the requirements of humanistic management, is Daniel Goleman's 'emotional' style of leadership, which systematizes and expands on the seminal work by Salovey and Mayer (1990). He holds that, for effective leadership to take place, managers must listen to and understand the emotions of their co-workers to generate empathy and harmony within the organization. Leaders must have emotional intelligence, possess an awareness of self and others, and be capable of managing themselves and others by adopting different styles of leadership depending on the various contingencies present (1) Visionary; 2) Coaching; 3) Affiliative; 4) Democratic; 5) Pacesetter; 6. Coercive). Goleman identifies anthropocentric leadership models suitable for governing emotional organizations; in such scenarios *Emotional Management* (Pilotti, 2019) represents a daily challenge for managers who embrace participatory and collaborative (Angelini et. al, 2020) leadership styles. Anthropocentric approaches to leadership are pursued by managers who keep in mind that, aside from their position of authority, they are first and foremost, human beings; they avoid excessively assertive behaviors of the executive chain of command, and they prefer management styles that are more horizontally oriented, more focused on the whole project rather than on the individual task. Such leaders' approaches are akin to a cultural revolution deriving from innovation in leadership, at both top and middle management levels; it is characterized by the ability to listen to and interact with people which, in turn, facilitates the emergence of new ideas, critical thinking, inclusion, common goals, team spirit, and equal opportunity. In sum, this type of organizational leadership can put people first, in their entirety and in all their relational, communicative, personal, and interpersonal complexity (Pilotti, 2019, p. 175). This type of people-centered leadership should not be mythicized because, in real life, there is no such thing as the "perfect" company leader, one who can perfectly utilize and balance emotional intelligence *and* rational thinking in decision-making processes. Furthermore, according to Angelini et al. (2019, p. 31), effective leadership cannot stand alone, without the whole set of collaborators' competences and their willingness to collaborate. In these scholars' view, good leadership is a *servant leadership* (Eva et al. 2019), in which the competences required of the manager are the ability to listen, to empathize, to create a climate of trust, to persuade, to engage in forward-looking and systemic thinking; good leaders must promote people's wellbeing and foster an awareness of their strengths and weaknesses, and they must also have an aptitude for stewardship, putting themselves *at the service* of the organization in order to strive for a greater objective where the organization becomes a vehicle for introducing learning and change into society (Senge, 1992, p. 399). Humanistic leadership is not only open to collaboration within the organization, but also to inter-organizational cooperation; its members are activators and facilitators of collaborative

entrepreneurship building and acting within networks that are based on mutual trust and long-term commitment. (Rocha, Miles, 2009) This perspective can be found in the study of Sulkowski et al. (2018) when they underline that “businesses play a fundamental role in "shaking up" stakeholders. Shaking up stakeholders means acting proactively initiate cooperation with the people affected by a company to alter awareness, behavior and networks in order to catalyze change in society and in the market to reward co-created innovations in key company operations that improve social and environmental impacts”. The challenge for humanistic leadership is to address the corporate strategies as the empowering agents to interact with stakeholders for the co-creation of sustainable shared value.

7. The need for new performance assessment tools in leadership innovation

Ultimately, innovative leadership cannot eschew adopting new tools that go beyond the mere control of collaborators and subordinates; these tools involve coaching practices that act on people’s competences as well as on their long-term commitment/engagement, thus creating a culture and value system based on dialogue, collaboration, and innovation. Equally necessary are new methods for assessing companies’ and people’s performance; such tools must be in line with the objectives of creating shared value according to the stakeholder theory of humanistic management and must necessarily balance short term and long term needs in an ambidextrous strategic and organizational perspective.

As concerns performance assessment of firms, multidimensional mapping can track the traditional conventional goals such as competitiveness and balance sheet bottom line figures but can (and should) also include environmental considerations and stakeholder needs, as well as aspects like learning and innovation. This type of map would provide a systemic view of the firm, in both short-term and long-term outlooks. Every organization, whose leaders intend to pursue strategies capable of creating lasting value for their clients, for the majority shareholders, and for the other stakeholders in an environmentally sustainable way, must also avail itself of a balanced and holistic assessment tool that can describe and measure critical success factors, both concomitant with and subsequent to managerial actions, and that can also be used for forecasting. For leaders who are inspired by people-centered visions, such a map should also be able to provide information that is compatible with their need for flexibility and creativity in decision-making processes in organizational contexts affected by instability, uncertainty, and complexity such as we are currently experiencing. Another concern and functional requirement for these maps is that they keep management highly motivated to continue to work for the wellbeing of principals, clients, employees, suppliers, local communities and institutions, by generating and distributing shared value for all stakeholders through socially responsible and eco-sustainable behaviors. In short, profitability must dovetail with a humanistic vision of the firm. (Spitzech, 2011)

Similarly, and in line with the objectives of organizations attuned to the new paradigms of value creation so, too, must the assessment of managers undergo innovation. Management performance assessment processes and tools must be more able to consider people’s needs and stakeholders’ new expectations. While the Taylorist practices of scientific management had evaluated employees and provided incentives based on their level of productivity (of which *Management by Objectives* (MBO) became the icon), the Nineties ushered in the first changes to assessment processes; self-evaluation was introduced for employees, and especially, for high level managers. This practice increased the motivation and engagement of people whose importance for the success of firms was gradually given greater weight and recognition, e.g. by acknowledging personnel as “human capital”. (Angelini et al., 2019, p. 104) According to these scholars, the current evaluation and skills assessment process must be speeded up and should be based on continual and mutual feedback between leaders and followers, thus promoting a more rapid and effective alignment of strategic objectives and organizational behaviors. The setting of goals and objectives no longer follows the traditional top down method but is shared, through proposed goals set by (non-management level) employees, following a bottom up approach, in a climate of high engagement and widespread trust. However, in contemporary capitalism, not only does the *how* change, but the object of the assessment – the *what* – also changes. According to the 2020 *Osservatorio Ambrosetti* report on governance in Italian firms, high and middle level managers in listed companies are more and more frequently evaluated according to increasingly important criteria such as sustainability; new evaluation metrics are being adopted to reflect how well the firm performs in terms of environmental issues, workplace safety, equal opportunity, customer satisfaction, the *Down Jones Sustainability Index*, and training of human resources. Moreover, evaluation parameters are differentiated according to the timeline of reference, balancing short- and long-term criteria. In our view, this is a good sign that Italian leadership has been inspired by the principles of humanistic management and of wise companies; it sends a signal of

hope for the future of Italian companies and, indeed, society. Nevertheless, in the era of globalization one cannot overlook the fact that for there to be widespread acceptance and adoption of the vision by organizations and managers, new rules and regulations need to be issued by international institutions, and future managers and stakeholders must also cultivate a new culture. As suggested by De Los Reyes and Scholz (2019), to make the vision of creating shared value more effective, it must be integrated with a broader model for management and employees to take on responsibility not only for the legal norms but also for the social norms emerging within communities, provided they are also in line with the higher norms concerning human dignity and human rights, for example. This approach was recently adopted (August 2019) by 181 American CEOs at the Business Roundtable on CSR; on that occasion they issued a joint declaration on organization goals that was inspired by the idea of sharing value with all stakeholders. We are aware that the concept of "shared value" presents areas of uncertainty and vagueness and presents important discrepancies in the way it is defined and operationalized. (Dembek, et al., 2016) In fact, there can be numerous and different metrics to measure the ability of a company to obtain shared value, paying attention simultaneously and in a balanced way to the threefold economic, social and environmental dimensions. There are also aspects of conceptual overlap with the themes of CSR and sustainability, although Porter and Kramer (2011) have clarified that taking the perspective of shared value means placing the ability to generate profits and create value for society and the planet. They argue that "Shared value is neither CSR nor sustainability because in contrast to these concepts it creates social benefits through business model (not through additional non-core business activities)". Despite the conceptual uncertainties, we are convinced that shared value should be considered as the goal of the action of modern leaders and the landing of corporate social responsibility strategies.

According to this perspective, an organization must be capable of rediscovering a sense of community, under a type of leadership that Mintzberg (2009) coined "Community-ship". Such a leadership recognizes the importance of involving all components of the organization in the process of governance and finds its inspiration in a strong and motivated culture based on respect. The community-centered firm knows how to adopt a form of governance in which the decision-makers are agents of change who recognize that most of that change will be carried out by others. (Ferri and Esposito, 2020) In the aim of fostering the necessary cultural innovation, a crucial role must also be played by the community of scholars and management docents who will be educating our leaders and citizens of the future. (Giudici et al. 2020).

8. Some inconclusive notes

To answer the research questions of this study, we have developed a conceptual path which, starting from the observation of the crisis of the shareholder capitalism model and from the need to orient the production system towards stakeholder capitalism, we have highlighted the need to review the purpose of companies and the traditional managerial principles inspired by scientific management. Based on these evolutionary tendencies, the affirmation of the principles of a new approach to management was highlighted. The new managerial approach should be less anchored to the principles of Tayloristic efficiency and more attentive to the needs of people, to the human dignity of all internal and external stakeholders to the enterprise. The principles of humanistic management represent the guidelines from which to start for the exercise of new forms of leadership today and in the future (RQ1). This means abandoning the idea of considering people as resources to maximize profits or the shareholder value of companies, instead embracing the idea that people are at the heart of any business project, to be treated with respect for their human dignity and to be considered as actors essentials with which leaders can create shared value.

The application of the principles of humanistic management requires a significant change in the traditional ways of conceiving leadership. We need to overcome the classic dichotomy between transactional and transformational leadership, both models inspired by the hierarchical principles of solitary leaders. Therefore, to the RQ2 "which aspects of leadership need to be innovated?" one can answer that a shared humanistic, situational leadership is needed, capable of involving the other people of the company in the pursuit of a common purpose, a broad purpose where business principles are merged with ethical ones to govern companies responsible towards the stakeholders for which and with which companies want to co-create shared value.

This urges scholars and managers to reflect more on the new ways of measuring manager performance, modifying the metrics to be adopted which inevitably can no longer be limited to reporting only economic and financial results, but must also evaluate the impact on social value and environmental

aspects of the company's actions for the generation of well-being for the stakeholders, according to the paradigm of Corporate Social Responsibility, better conceived as Corporate Stakeholder Responsibility. The authors are aware that the subject matter is and will be the subject of further debates, due to the completion of the transition from shareholder capitalism to stakeholder capitalism and the affirmation of a new managerial culture and new approaches to leadership, necessary to guarantee that businesses become active agents in building a better world.

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Factors of Success in Managerial Work: Current View of Slovak Managers

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Abstract

Research background: In the current competitive business environment, quality leadership is a key factor for the success of an organization. Managers are responsible for resource management, strategy formulation, and goal achievement. Their ability to effectively lead teams and make decisions is critical for the survival and growth of the organization in the face of competition. Additionally, a severe shortage of talented workforce and sustainability poses another challenge for a good manager.

Purpose of the article: This article aims to analyze the current opinions of Slovak managers regarding selected success factors in managerial work. Theoretical foundations provide various perspectives and processing of success factors.

Methods: The article emphasizes the current opinions of 156 Slovak managers. The results show that managers know the importance of personality in managerial work. However, the conclusion highlights extensive questions for further research, including the assessment of managers' soft skills, discrimination against young or older managers and employees, as well as other differences that may not reflect the current state and needs of companies, managers, employees, and society despite being sufficiently processed at a theoretical level.

Findings & Value added: Regardless of the quantitative research results, effectively leading, adapting to changes, and managing resources is critical for achieving organizational goals and maintaining a competitive advantage. Moreover, it is a complex area of research that creates a crossroads between fast and slow gain and short-term or long-term sustainability through talented employees, managers, and their willingness to contribute to the positive development of the organization.

Keywords: management, leadership, success of managers

JEL classification: M00, M5

1. Introduction

The task of managers is primarily to organize groups of people to collaborate productively on known and clear goals (Gilmour, Dixon 2007). According to the Cambridge Business English Dictionary (2011), a factor is one of the many things that affect or influence a situation. Factors are influences, circumstances, or realities that contribute to the outcome. Ianucci et al. (2009) addressed the topic of success among facility managers and property administrators. When asked what they considered a success, their answers varied. Some managers mentioned achieving client satisfaction as success, while others considered maintaining low costs or securing financial resources for investors as success. Two categories of theories are relevant in choosing a managerial career:

- Biological theories that consider these differences as innate,
- Social theories consider them socially determined and variable (Malach-Pines, Kaspi-Baruch 2008).
The contribution highlights the most discussed managerial success factors, which do not encompass all.

1.1 Literature review

The paper focuses on these success factors, and some of them are applied in the results section.

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The factor of managerial success: Gender

Certain factors differentiate women and men in the workplace. Gender-cultural differences in work are often unnoticed, despite being an everyday part of it. Men and women approach practically every aspect of business differently.

Melero (2004) stated that women managers tend to be more participative and democratic in their approach, while male managers are more directive and autocratic. Female managers are more successful in "transformational" styles that require interpersonal interactions and mentoring. For this reason, they become a managerial or role model for lower-level employees. Males were more successful in the "default management" category and the "carefree negligence" style, which men characterize as managers having a greater tendency to delegate and being less active in supervising employees.

Shambaugh (2012) clarified the differences between women and men in business leadership positions today. She claims that both women and men in managerial positions are at the same level regarding strategic thinking in business. Managers focus on one task in the business and postpone other tasks until the prioritized one is perfectly mastered. In contrast to male managers, female managers can focus on fulfilling multiple tasks in the organization simultaneously. Men are more task-oriented, while women focus on affiliation and inclusion in the workplace. Experienced managers, whether male or female, show no differences in leading employees.

However, specific differences have been found in decision-making styles between men and women in business leadership positions (Aboyasin, Alnsor 2012). An interesting perspective is presented by Luis (2023), who states that it is essential to distinguish between female leadership and female ownership. He found that when women manage companies with no female owners, they exhibit higher average labor productivity. However, if women are among the owners and a woman is a top manager, their productivity is lower than in other companies. He argues that men-owned companies belong to a corporate culture dominated by men and would only choose a female manager if she is more competent than potential male candidates (Tremmel, Wahl 2023).

The factor of managerial success: Age

Karsh and Templin (2013) explain the influence of age or the generation individuals were born into as a factor influencing managerial work. It primarily involves different management styles that are conditioned by life in four distinct generations:

- Veteran/Traditionalist Generation (born between 1928 and 1945) - Traditionalists, as managers, are very disciplined and expect discipline from employees in lower positions. Managers of this generation are loyal to the company, conservative, and prioritize company rules over their own. If they treat employees respectfully, they expect respect and esteem in return.
- Baby Boomer Generation (born between 1946 and 1964) - Managers of this generation are characterized by their knowledge and experience, which they are willing to share with employees. They demand high effort from subordinates in task completion. They have no problem collaborating or competing depending on the company's situation and surroundings.
- Generation X (born between 1965 and 1980) - Managers of this generation primarily make decisions based on their judgment regarding how to proceed and what to do for the company's benefit. They do not require assistance from others and are self-reliant. They prefer practical thinking and decision-making over theoretical approaches but utilize their creativity in their work.
- Generation Y/Millennials (born between 1981 and 2000) - Millennial managers associate work with fun, are optimistic, and aspire to change management within the company and the world. They are energetic and revolutionary, prefer a fast pace, and promote collaboration in the workplace. They follow their dreams and allow more room for their own creativity and innovative thinking (Roestenburg, 2021).

Bae and Choi (2022) highlight the issue of age discrimination among employees and find that younger workers tend to discriminate more against older colleagues. The age of managers may be related to their experiences, which can influence their success. In practice, it is important to ensure that age considerations for managers are made for proper placement and determining the required courses. Efforts should be made to reduce age discrimination tendencies in the workplace (Becker, 2022).

The factor of managerial success: Culture and Nationality

Cultural factors that influence the behavior and management of managers at work. Culture can be defined as a social phenomenon because we share it with people who live or have lived in the same social environment. It represents specific unwritten rules that we should adhere to. We must adopt culture; we are not born with it (Hofstede et al., 2010).

Cultural factors that influence managers can be summarized into five fundamental cultural dimensions derived from the integration of existing models:

- Power distribution - hierarchical or egalitarian.
- Social relationships - individualistic or collectivistic.
- Environmental relationships - oriented towards control or harmony.
- Time and space orientation - monochronic or polychronic.
- Uncertainty and social control - based on rules or relationships (Steers et al., 2016).

From a national and cultural perspective, we can distinguish Asian, European, and American management. Asian management is called Eastern management, while American and European management is called Western management.

Differences in organizational culture tend to be more disruptive than differences in national and professional cultures, which are most relevant for creating alliance values (Sirmon, Lane 2004). Shane et al. (1995) point out that the more uncertainty a society avoids, the more people prefer working according to norms, rules, and procedures. The further a society is from power; the more people prefer to focus on gaining support from those in authority rather than taking alternative steps for innovation, rather than building broad-based support among organization members for new ideas. The more collectivist a society is, the more people prefer champions to seek cross-functional support for innovative efforts.

The factor of managerial success: Personality

A manager's success in a business is influenced not only by demographic factors, which we discussed in the previous chapter, but primarily by psychological factors, such as the manager's personality, traits, and other associated characteristics (Frankovsky et al., 2009). Personality is how a person forms and adapts to the constantly changing internal and external environment. The main functions of personality include feeling, thinking, perception, and their integration into specific behaviors (Fountoulakis, 2014). Mastering demanding and diverse tasks in the work environment places great demands on the personality of coaches and managers. Personality is an essential determinant of the entire organization as it influences individuals' behavior and work commitment.

According to Caruso and Salovey (2019), an emotionally intelligent manager can read the emotions and feelings of their subordinates, sense their moods, and use them as motivation for the team. The primary emotional skills of an ideal and successful manager are:

Predicting future emotions: The manager can anticipate their own emotions and the emotions of others in the group, even when they are not stable, and adjust them to planning and analysis.

Managing emotions: The manager can convert emotions into practical action and behavior, balancing the heart (emotions) and the mind (thoughts).

Managing anger at work: The manager can separate the emotion from the reaction without ignoring it, ensuring that anger does not affect their or others' behavior.

Managing groups: Managers understand that emotions are data, so they do not avoid feelings and integrate them into their thoughts, using them as inspiration.

A manager's success can be achieved through their personality and ability to motivate their employees. According to Singh (2018), the main tools used by managers to motivate their teams are ranked from the most essential elements for employees to the least important:

- Approval, praise, and recognition.
- Trust, respect, and high expectations.
- Expressing and receiving loyalty.
- Removing organizational obstacles that hinder the performance of the group and individuals.
- Enriching work, good communication, financial incentives, and rewards.

Hiriyappa (2011) defines job rewards as tangible outcomes of positive value provided by an organization to individuals or groups.

Organizations realize that to compete in a demanding and rapidly changing global environment, they increasingly need to rely on the ability and engagement of their human resources in terms of operational efficiency, product innovation, service quality, and, ultimately, strategic success. The results indicate that employees who are satisfied with the personality of their managers show positive reactions to the company they work for and higher job satisfaction (Abedi et al., 2016; Boswell et al., 2006).

Employees are also confronted with many job opportunities and promotions, leading many organizations to engage in a talent war. In today's world, a manager can be successful even if they possess different skills and qualities than their successful colleagues. We recommend literature on the personality, temperament, and character of managers such as Zhou et al. (2023), Borgholthaus et al. (2023), Lacam, Salvevat (2023), Štefko, Birknerová, Zbihlejšová (2023).

2. Methods

For statistical analysis, data were collected using a questionnaire inspired by Mahlamäki, Rintamäki, and Rajah (2018). Slovak managers were asked 51 questions grouped into eight sections. After providing information on gender, age, and managerial experience, managers answered questions regarding the influence of 5 factors (personality, emotional intelligence, social intelligence, education, and experience) on their performance. Managers also had the opportunity to write their factors of success. Subsequently, they responded to statements related to self-assessment of success and leadership. The last 30 statements assessed the role of personality and motivation in work performance. The questionnaire items were rated on a scale with the following responses: 1 - completely disagree, 2 - rather disagree, 3 - neither agree nor disagree, 4 - rather agree, 5 - completely agree.

The sample selection was conducted through purposive sampling, where the questionnaires were distributed to Slovak managers in various positions. The research sample consisted of 156 managers, of which 81 (51.92%) were women, and 75 (48.08%) were men. The age of respondents ranges from 24 to 51 years, with an average age of 33.46 years in the research sample. The minimum managerial experience is one year, while the maximum is 21 years. The average length of experience is 9.12 years.

The study aims to verify the significance of individual success factors for managers and the relationships between selected variables at the descriptive and inductive statistical levels (correlations). Two research problems are formulated as questions:

Q1: Is there a statistically significant relationship between the age of managers and the assessment of the importance of individual success factors?

Q2: Is there a statistically significant relationship between the use of a democratic management style by managers and self-assessment of success for the company?

3. Results

The post presents five main factors of success. Descriptive statistics of the observed factors are displayed in Table 1.

Table 1. Descriptive statistics

	Min	Max	Mean	SD.
Personality	1	5	4,34	,652
Emotional intelligence	1	5	4,06	,814
Social intelligence	1	5	4,01	1,297
Education	1	5	3,77	,788
Experience	1	5	3,67	1,021

Source: own processing

Based on the average value, managers consider Personality as the key factor, followed by Emotional and Social Intelligence. They give less importance to Education and Experience. Managers' Personality is considered the dominant factor of success, as it influences behavior, decision-making, delegation, and all activities directly related to the success of the manager and the organization. Some research studies explore the personality traits of managers along with emotional and social intelligence, which, in our case, confirms that these three factors received the highest average scores as assessed by the managers. However, we must consider the country's economic status, cultural conditions, requirements, and goals of the organization, which

may lead managers to have a different perspective on key factors in their specific context. This viewpoint is supported by Alan (2021), who presents several studies emphasizing the importance of personality characteristics. The experience of managers is also mentioned, as interpersonal skills through Personality are among the most desirable skills for success in organizations and for managerial efficiency (Rios et al., 2020; Beenen et al., 2018). Google recently concluded that skills such as coaching others and effective communication are more important than scientific, technological, engineering, and mathematical skills.

Subsequently, the managers responded to an open-ended question about additional factors that impact their success. Out of 156 managers, as many as 58 respondents did not mention any other factors. Among the remaining 57 respondents, the following factors were mentioned: Fifty-nine respondents identified communication skills and proper employee communication as success factor. Thirty-eight respondents mentioned teamwork or collaboration. Only one respondent mentioned creativity as a success factor.

However, the results are influenced by the employment situation in the country, income levels, economic status, goals, and other factors that may influence managers' views on critical success factors. Currently, we observe a trend of a workforce shortage of the necessary qualities and knowledge for performing their professions, which significantly affects the perception of critical managerial traits from both organizational and managerial perspectives. It also highlights the need for practical education of students to prepare them for their managerial roles.

The following Table 2 describes statistically significant correlations between age and managers' assessment of the importance of selected success factors.

Table 2. The relationship between managers' age and selected factors is as follows

		Personality	Emotional intelligence	Social intelligence	Education	Experience
Age	Spearman Corr.	-,270**	-,023	-,003	-,056	,358**
	Sig.	,005	,814	,976	,571	,000

Source: own processing

The results indicate statistically significant correlations between personality and managerial experience. As managers grow older, they consider personality and individuality less influential, and they increasingly lean towards experience as a more influential factor for success. This result may be because older managers, with more experience and a longer tenure in managerial positions, have observed in their younger colleagues that their personality traits are insufficient and cannot replace experience in their work.

The attitude of managers towards the retirement age of their older employees is related to their retirement planning. Managers who intended to work beyond 66 considered it more important to retain older workers after this age than managers who planned to retire at 66. Managers stated that older individuals were more cautious, had valuable experience, skills, and life knowledge in the workplace, and helped guide new and younger employees. On the other hand, most managers agreed with the stereotypical belief that older people are slower, resistant to change, less educated, and hostile towards technology (Nilsson, 2022). In some cases, these age-related differences (whether normative or pathological) can disadvantage older workers as their job performance may be lower than younger workers. However, in other cases, the crystallized knowledge and experience of older managers and their positive outlook on work are likely to be greater at the age of 50 than at the age of 20 (Wegman, McGee, 2004).

Table 3. Descriptive statistics

	Min	Max	Mean	SD.
1. Career growth	1	5	3,42	1,129
2. Contribution to the company	1	5	4,25	,829
3. Company's success	1	5	4,27	,846
4. Respect from colleagues	1	5	3,42	1,094
5. Recognition and praise	1	5	3,14	0,699
6. Employee satisfaction	1	5	3,62	0,901

Source: own processing

From Table 3, we can observe the ratings of the statements: "3) I believe that I contribute to the success of our company," obtained the highest average score of 4.27. The statement "5) I often receive praise and recognition for my work" received the lowest average score of 3.14 among the respondents. Based on the table, the respondents largely agree with statements about their contribution and success in the company. However, they must agree more with statements about employee satisfaction, career growth, colleague respect, and receiving praise. The results indicate that in terms of self-assessment by managers and their contribution to the organization, the average scores are higher than the assessment of the organization itself, specifically in terms of support, respect, and praise received within the organization. It is necessary to discuss whether this result is due to a bias in self-assessment and organizational assessment or if it genuinely reflects employee dissatisfaction regarding their contribution to the organization.

Many organizations recognize the need for effective leadership and management. However, they are still unsure about the good management practices, leadership styles, and behaviors that are most effective for the growth and development of the business sector, multinational companies, and small and medium-sized enterprises, along with the development of their human resources (Kelly, Hearld, 2020). Leadership and management in organizations are crucial in ensuring the success of both multinational and small and medium-sized enterprises. While multinational companies may have more resources and a more formal structure, smaller businesses often have a more flexible and agile approach to leadership and management. Ultimately, the key to success in both types of organizations is to have leaders and managers who can inspire and motivate their teams to achieve their goals (Siyal, 2023).

From this perspective, it is necessary to focus on employee and manager satisfaction, emphasizing the differences in their self-assessment and organizational assessment, which may indicate possible issues.

Table 4. The relationship between a manager's success and the utilization of democratic leadership style

Leadership - democratic		
Success	Spearman Corr.	,477**
	Sig.	,000

Source: own processing

In the case of self-assessment in utilizing a democratic leadership style and performance evaluation within the company, Spearman's correlation coefficient displayed in the table indicates a statistically positive relationship. This means that as managers rated themselves higher in utilizing the democratic leadership style, they also considered themselves more successful and valuable to the company. Rosing et al. (2022) argue that democratic leadership, rather than autocratic leadership, increases trust in the leader. The findings highlight the importance of leader characteristics in emergencies and demonstrate the value of blending autocratic and democratic leadership behaviors in different stages of team performance to build trust in the leader.

However, there is still ample room for theoretical research on participatory leadership and organizational practice, and the current challenge of "employee participation in decision-making" needs to be optimized and improved. It is urgently necessary to balance organizational practice and theoretical research on "employee participation" and "scientific decision-making" at the leadership level (Wang et al., 2022).

4. Discussion and Conclusion

We interpreted the following findings from our research and posed the question: How to monitor, evaluate, and improve these factors in managers? It is complex to monitor and evaluate the psychological aspects of a manager, such as personality and intelligence. To ascertain this, we recommend exposing the manager to challenging and complex situations or using simulation methods that put the manager under pressure, allowing their strong personality traits to emerge. Subsequently, it is essential to observe how the manager behaves when tasked with leading a group of employees who are unwilling to cooperate and reject their commands and advice. Alternatively, observing the manager in simulations where they face tasks with impossible time constraints can also provide insights. This is where the manager's effectiveness in working with their personality and managing their emotions in social situations becomes evident.

Sometimes, it may be simpler for the manager to rely on common sense to solve problems or conflicts rather than employing complex methods they may not even master. The same applies to experience. Years of practice do not necessarily guarantee the most efficient completion of work or success, although this factor can significantly facilitate working with people and tasks.

When evaluating, it is crucial to consider the type of manager and leader the individual is and the specific focus of their work. We must assess personality and personal characteristics differently for a human resources manager who leads a group of people compared to a project manager responsible for all aspects of a project. This topic and objective require in-depth analysis and extensive research conducted on managers and employees under their leadership. By gathering such results from managers and subordinate employees, we could develop a model of critical success factors for managers that could be applied in managerial practice.

Nevertheless, our findings indicate that managers in Slovakia know the importance of personality and other characteristics for their success in managerial roles. Older managers are more aware of the need for experience, whereas younger ones place more emphasis on personality. Differences are also observed in the self-assessment of managers and the assessment of the organization they work for. Managers who believe they apply a more democratic leadership style also consider themselves more successful for the organization.

The limitations of the research lie in the restricted sample size and the drawing of certain conclusions based on average values. This contribution provides a foundation and questions for further research.

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Nature of Internal Communication among e-Workers, Case Study

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Abstract

Research background: COVID-19 pandemic caused a rapid shift to full-time remote work environment. Workforce productivity, engagement, and success are affected by how the company interacts with its workforce. Human-to-human connection without clear communication is impossible. Communication is essential for a stable, engaged company. In e-work environment even more.

Purpose of the article: the purpose of this study is to investigate real e-employees' perceptions of the flow of information in a remote work environment, their communication preferences, and their sense of community.

Methods: a quantitative study (web-based survey) in a Greek multicultural company has been used. Authors tried to find answers to following research questions: How do e-employees perceive internal communication methods in their organization? Which of the internal communication channels were used most effectively?

Findings & Value added: Based on the created questionnaire, a total of 7 hypotheses were determined, all of which were statistically confirmed. Obtained data confirms the raising importance of internal communication, especially in times of crisis as employees considered as a homogenous. We can underline the sample based in Greece but located various European countries and in a context of unprecedented crisis. English as predominant spoken language. Finally, this research only explores the role of internal communication in an organizational context (formal, casual, organized, or unplanned). The survey was conducted during pandemics and has some interesting implications for communication professionals and researchers in the field of internal communication. The present study examines internal communication in e-working settings. Previous studies have excluded the situation for e-employees. The results provide new insights into internal communication behaviour in e-work.

Keywords: internal communication, e-work, methods, channels, multiculturality

JEL classification: D83, M12, M21, M54, J21

1. Introduction

According to EU statistics, in 2019, 5.5 % employees worked from home, in 2020, due to the pandemic, this share increased to 12.3 %; and in 2021, to 13.5 % (Eurostat, 2022). Work from home (WFH) or e-commuting (Beno & Caganova, 2023) allows flexibility for individuals with personal and professional goals. However, it also comes with challenges (Ambikapathy & Ali, 2020; Kurkland & Bailey, 1999; Beňo, 2021). Especially in relation to workplace engagement, including communication (Cagaňová et al., 2019). Erum et al. (2020, p. 16) stated that "when employees have a calling to their work they find themselves more adjusted for their job and are more likely to feel passion towards it, they are intrinsically motivated to perform it thus deriving happiness in their workplace". This disengagement causes various problems due to lowered productivity and decreased satisfaction. Lal et al. (2021) highlighted that social interactions (in the on-site workplace) are an essential feature of social life and shape the workforce's experience of work. However, organizations are able to work to intentionally address these issues. The potential tool may be internal communication (IC) (Cagaňová et al., 2015). It may help e-workers feel more socially connected.

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IC is often interlinked with an organization's reputation and brand. But one of the most crucial links in the organization, which is easily overlooked, is the internal one, namely the workforce. They are the ones who create the brand. Organizations are able to convey the ambitions and values of the brands, but very often sufficient information flow is missing. IC increases trust in organizations, which is often associated with business success. (Cagaňová et al., 2010).

IC should be a deliberate, well-planned, and well-articulated element of a company's communication strategy. Many organizations are still operating remotely with employees scattered across the nation and around the world, like the authors' sample. Thus, it can be difficult to communicate in a way that keeps everyone engaged. Numerous studies have examined the main issues of IC (Flynn & Mazor, 2017; Oak, 2022, RobertHalf, 2013; QueensUniversity, 2023) and have linked IC and the degree to which employees are informed to job satisfaction and performance. The competitive benefits of IC come not only from satisfaction, productivity and sense of community but also from the positivity of external public relations.

The purpose of this study was to investigate real e-employees' perceptions of the flow of information in a remote work environment, their communication preferences, and their sense of community. Simply identify and describe IC according to e-employees. A quantitative IC study has been chosen to identify the issues faced by e-employees in order to answer these questions. The following research questions were outlined:

- How do e-employees perceive IC methods in their organization?
- Which of the internal communication channels were used most effectively?

The company under investigation required anonymity. Its internal communication system was launched several years ago. In the questionnaire survey, employees and basic managers made up the largest sample, but middle and top managers also participated. The survey was conducted in a Greek multicultural company, with employees from Poland, Germany, the Czech Republic, Greece, Portugal, and Romania. All interviewees (total 182) met the condition of remote working mode.

2. Methods

According to McDonough & McDonough (1997), the authors of this study implemented both interpretive and evaluative case study with the aim to interpret the data by developing conceptual categories and add judgement to the phenomena in the data. It allows a deeper understanding of the specifics of IC, providing a close understanding of the e-employees on IC and its meaning.

Because of the nature of a case-study, purposeful sampling was conducted with the emphasis on selecting an information rich group of respondents. The study is conducted on the entire target population which consists of 182 e-employees (57.7 % of females, 40.7 % of males and 1.6 % diverse) with an average age 32, median 30 of a global Greece organization in operating in sector service. This confirms that service sector is the area with the highest female labour rate (Worldbank, 2021). Effective IC can be expected to be an important variable among surveyed e-workforce. All respondents worked for an Greek company, but they work in a remote working mode, i.e. they meet the conditions for the research of this work. At the same time, these are respondents from European countries, mainly from Poland, the Czech Republic, Greece, Germany, Portugal, and Romania.

The data from this research was collected using an online Google survey that was distributed through email accompanied by a brief explanation (with a link that directed to the compilation of a Google form approved by the head of surveyed company) from the 18th May till 9th June 2022. An online survey was chosen (on a voluntary base) as a means for collecting the data due to the company remote work environment and various locations internationally. As Evans & Mathur (2005) stated the suitable reason to utilize an online survey is when a large sample size is desired over a wide geographical area. It included 46 questions (7 open ended and 39 closed questions) asking IC constructs and remote work experience. Questions were modeled specifically on the areas highlighted in this study that may either mitigate or compound the effects of IC in remote work environment. The compilation time was estimated in approximately 15 minutes. Questionnaire was pre-tested with 3 respondents and redesigned in accordance with it. 5 point-Likert scale to measure satisfaction, positivity or negativity and 3 point-Likert and 5 point-Likert scale to measure agreement has been used.

In order to test seven hypotheses, the authors' set seven dimensions central to IC based on Ruck and Welch (2012) six dimensions. In this study, Pearson's chi-squared test has been used to analyse whether the characteristic values of the first variable are influenced by the characteristic values of the second variable and vice versa. The observed and expected frequency of 0.05 has been given. Statistical analyses were performed using Excel and SPSS.

3. Results

As stated previously, this study will focus on the results of those surveyed who expressed some increase or decrease in their levels of internal communication, with discussion of neutral responses where necessary or of relevance to the study. These questions appeared at Questions 15 and 19 (identification), 33 and 35, (workplace relationships), 37 (channel) 42 and 46 (role), 41 and 46 (voice), 10 and 16 (performance), 28 and 37 (support).

IC is receiving focus and organizations are investing in the function (Chalmers, 2008; Helsby, 2009). The main role of IC is to improve corporate values by communicating effectively with the workforce, an important asset, and a sense of belonging.

3.1 Identification

- **H1: Relationships with colleagues related to feeling of connectedness with my employer / team members.**

In the question "How is your relationship with your colleagues?" we can only compare the values "Average" and "Extremely satisfied", since the value "dissatisfied" did not reach a sufficient frequency to participate in the test. Only 1.1 % of employees were dissatisfied with their colleagues. Similarly, the choice "Negative" in the question "My sense of connection with the employer/colleagues" did not reach sufficient representation (0.6 %), therefore this option cannot be tested.

It is also possible to read from Table No. 1 that we obtained a total of 177 answers to the question, although 182 respondents participated in the questionnaire, and 5 employees refused to answer the question. The test criterion value is 104.043, and the p-value of the test is 0.000. The p-value is lower than the chosen significance level of 0.05, so the dependence between relationships with colleagues and the feeling of connection with employees or team members has been confirmed. According to the table, those who are extremely satisfied with their relationships with colleagues have a statistically significantly higher likelihood of having a positive or rather positive relationship with their colleagues. From this, we can say that when employees feel connected to the company, either because they share the same vision as the company's leaders or because they feel that their co-workers have become like family, they are much less likely to want to look for employment elsewhere and thus are more productive.

Table 1. A sense of connection between employees and colleagues.

19) How is your relationship with your colleagues?	15) My feeling of connectedness with my employer / team members				Total
	Neutral	Positive	Rather negative	Rather positive	
Average	42	24	0	0	66
%	63.64	36.36	0.00	0.00	
Extremely satisfied	0	59	7	45	111
%	0.00	53.15	6.31	40.54	
Total	42	83	7	45	177

Source: Authors' work

Based on this data, fulfilling relationships within the work environment are interlinked with meaningful connections with co-workers. When employees feel connected to one another, they feel better. Connection seems to be the most crucial component because connected teams drive collaboration.

3.2 Workplace relationships

- **H2: Daily contact with your team leaders is related to being satisfied with the frequency of communication from leadership.**

More than 4/5 employees confirmed that they communicate with the team leader at least once a day. This majority is also satisfied with the frequency of communication they receive from management. The test criterion value is 156.865 and the p-value of the test is 0.000. The p-value is lower than the chosen significance level of 0.05, so the dependence between daily contact with team

leaders and satisfaction with the frequency of communication with management was confirmed. Those who do not have daily contact with team leaders are also less satisfied with the frequency of communication with management. This means that employees would like to be in contact with management more often (see the Table 2).

Table 2. Frequency of H2

33) Do you have daily contact with your team leaders?	35) How satisfied are you with the frequency of communication of leadership?			
	Extremely satisfied	Neutral	Slightly / very satisfied	Total
Mostly disagree	0	0	14	14
%	0.00	0.00	100.00	
Slightly agree	0	0	17	17
%	0.00	0.00	100.00	
Mostly agree	0	25	52	77
%	0.00	32.47	67.53	
Completely agree	56	13	0	69
%	81.16	18.84	0.00	
Total	56	38	83	177

Source: Authors' work

Corporate communication is vital element. Generally, communication with team leaders is a big challenge. Leaders typically hold the key to advancement within the organization. The highest managerial goal is to create a pleasant working atmosphere and find the most successful technique of motivating each employee, which is very difficult due to the diversity of employees and different personalities, but in this company this goal would be met.

3.3 Channel

➤ **H3: More than 40 % of employees prefer to use Zoom as communication tool.**

Employees' channel preferences vary based on the activity and who they are interacting with. As audio and video communications have become more common in daily lives, people often start collaborations with the question: which video communications platform do you know and like to use? We will test this single hypothesis using the proportion test. The software provides only the p-value in the output. It is equal to 0.0379. It is therefore again smaller than the chosen level of significance, and we have thus managed to confirm that Zoom is the most popular communication channel for more than 40 % of employees. In second place, e-mail is preferred by 30.77 % of respondents, and the last chat is preferred by 5.49 % of employees.

3.4 Role

➤ **H4: Chitchatting related to clarity of objectives.**

More than half (61.7 %) of the research participants perceive Zoom as the majority source of information, another 21.7 % slightly disagree. The remaining 16.6 % of respondents reject this, thus they receive information in another way. A more important finding is that 89 % of employees are clear about their assigned daily/weekly tasks. The test criterion value is 108.854 and the p-value of the test is 0.000. The p-value is lower than the chosen significance level of 0.05, so the dependence between communication using chitchatting and understanding the goals every day / week was confirmed. Those who are not satisfied with the course of communication using normal calls are significantly more often not completely clear about the assignment of the task (clarity of goals). On the contrary, those who are very satisfied with informal conversations are clear about their daily goals. The table of observed frequencies are shown in Table 3.

Table 3. Frequency of H4

42) Most of the information is through chitchatting.	46) Are your work objectives clear each day? Each week?			
	Completely / mostly agree	Slightly / mostly agree	Completely agree	Total
Completely/mostly agree	0	21	5	26
%	0.00	80.77	19.23	
Slightly agree	5	34	0	39
%	12.82	87.18	0.00	
Mostly agree	3	18	51	72
%	4.17	25.00	70.83	
Completely agree	0	0	43	43
%	0.00	0.00	100.00	
Total	8	73	99	180

Source: Authors' work

3.5 Voice

- **H5: Communication using informal written channels is related to understanding daily/weekly goals.**

More than half (54.5 %) of the participants confirmed that they receive work messages through informal written channels. 22.5 % of respondents reject this statement only slightly. 23 % mostly and completely disagree. This means that informal communication is accepted as casual communication between co-workers in the workplace. It is unofficial in nature and is based on informal social relationships that are formed in the workplace outside the normal hierarchy of the business structure. The test criterion value is 38.986 and the p-value of the test is 0.000. The p-value is lower than the chosen significance level of 0.05, so the dependence between communication using informal written channels (messages, chats) and the understanding of goals every day/week was confirmed. This type of communication is important in the workplace because it can help with employee morale and encourage a sense of belonging for both employees and clients or customers. Those who are not satisfied with the course of communication using informal written channels are significantly more often not completely clear about the assignment of the task (clarity of goals). On the contrary, those who are very satisfied with informal written communication are clear about their daily goals (see Table 4).

Table 4. Frequency of H5

41) Most work-related information from teammates and team leaders to me is transmitted through informal written channels (i.e., instant messages, chat).	46) Are your work objectives clear each day? Each week?			
	Completely / mostly agree	Slightly / mostly agree	Completely agree	Total
Completely/mostly disagree	0	27	15	42
%	0.00	64.29	35.71	
Slightly/mostly agree	8	48	53	109
7.34	44.04	48.62		
Completely agree	0	0	31	31
%	0.00	0.00	100	
Total	8	75	99	182

Source: Authors' work

3.6 Performance

With all the modern comforts of home vying for our attention, it would be understandable if employers saw a drop in productivity with remote workers. However, the opposite is true. In fact, 88 % of employees seem to enjoy working remotely, with another 6.6 % slightly disagreeing with this statement and 5.4 % rejecting it. Almost half (49.5 %) of respondents say their productivity has increased as a result of working from home. Only 7.1 % of employees feel a decrease in work performance. The test criterion value is 137.556 and the p-value of the test is 0.000. The p-value is lower than the chosen significance level of 0.05, so the dependence between productivity and whether employees enjoy remote work has been confirmed. From Table 5, it can be said that those who enjoy working remotely increased their productivity significantly more often than those who did not enjoy working remotely.

Table 5. Frequency of H6

10) I enjoy working remotely.	16) Has your work productivity changed when you have started work remotely?			
	Decreased	Increased	Same	Total
Completely / mostly disagree	0	5	5	10
%	0.00	0.00	50.00	
Slightly / mostly agree	0	10	74	84
7.34	0.00	11.90	88.10	
Completely agree	13	75	0	88
%	14.77	85.23	0.00	
Total	13	90	79	182

Source: Authors' work

3.7 Support

- **H7: The choice of the preferred communication channel is related to the number of requests for help.**

A somewhat disturbing finding emerged for the last hypothesis, where 27.1 % of employees have difficulty asking for help. So, it seems that the open-door policy is only partially working. Workplaces reflect norms and standards set by management, which are then accepted (or not). Much of this depends on how these norms are enforced and demonstrated. Building a culture of helping is about the art of practicing what you preach. In this hypothesis, we tested whether these concerns are related to the communication channel. The test criterion value is 64.086 and the p-value of the test is 0.000. The p-value is lower than the chosen significance level of 0.05, thus the dependence between communication channel and concern about asking for help is confirmed. From Table 6, it can be seen that those who prefer chat as their communication channel are significantly more often not afraid to ask for help than those who use Zoom or e-mail.

Table 6. Frequency of H7

37) What communication channels work best for you.	28) I feel uncomfortable asking other for help?					Total
	Completely disagree	Mostly disagree	Slightly agree	Mostly agree	Completely agree	
Zoom	14	21	21	29	29	114
%	12.28	18.42	18.42	25.44	25.44	
E-mail	12	31	1	8	14	66
7.34	18.18	46.97	1.52	12.12	21.21	
Chat	12	20	3	0	1	36
%	33.33	55.56	8.33	0.00	2.78	

Undefined	3	12	8	0	8	31
%	9.68	38.71	25.81	0.00	25.81	
Total	41	84	33	37	52	247

Source: Authors' work

4. Discussion

The authors' survey results confirm that it is increasingly important for IC professionals to consider the diversity of the internal team in the organization, as highlighted in previous research (Suh & Lee, 2016; Yeomans & FitzPatrick, 2017). Additionally, as highlighted by McQuail (2010) effective communication requires delivering the right channel, the right message, to the right audience, through the right channel at the right time.

The received data from the first hypothesis is in the vein of past studies that highlight that overall organizational efficacy and efficiency depend on its IC (Grimshaw & Mike, 2008, Hayase, 2009). Communication plays an essential role (Levinson, 1980) as further demonstrated. Interestingly, those who do not have daily contact with team leaders are also less satisfied with the frequency of communication with management. This means that employees would like to be in contact with management more often as confirmed by H2. Because as Men & Yue (2019) explained communication increases stakeholder awareness and satisfaction with what leaders are making and whether their decisions will mitigate tension and improve interpersonal relationships. Almost identical to Stauss & Hoffmann (2000) who stated that IC is practiced through top-down, bottom-up or horizontal communication. IC without internal communication digital channels does not work (Smith et al., 2015). Zoom is the most popular communication channel for more than 40 % of employees. In second place, e-mail is preferred by 30.77 % of respondents, and the last chat is preferred by 5.49 % of employees. Almost similar to Friedl & Verčič (2011) who noted that millennial workforce prefer traditional media. This means that without these channels, it is impossible to match employees to the company priorities, goals and promote creativity. The difference between formal and informal communication lies in the material, not the instrument (Rodrigues et al., 2016; Welch & Jackson 2007). But, based on H4 and H5 data, those who are very satisfied with informal conversations and informal written communications are clear about their daily goals. Identical to Men (2014) who highlighted that the choice of medium for communication is important. According to Bočková & Lajčín (2021) job satisfaction, productivity, engagement and, with mandatory remote working during this pandemic, is more of a challenge for employers than ever before. Thus, H6 confirmed that those who enjoy working remotely increased their productivity significantly more often than those who did not enjoy working remotely. Similar to Dhanesh & Picherit-Duthler (2021) who highlight that social connection mediated the relationship between new ways of working and employee engagement. A somewhat disturbing finding emerged for the last hypothesis, where 27.1 % of employees have difficulty asking for help. Probably, because as Zhao & Epley (2022) indicated those needing help consistently underestimated others' willingness to help, underestimated how positively helpers would feel, and overestimated how inconvenienced helpers would feel. Possible tool seems to be the modern technology because those who prefer chat as their communication channel are significantly more often not afraid to ask for help than those who use Zoom or e-mail. This result is in the vein of Jämsen et al. (2022) statement that communication technology played a crucial role in experiences. Obtained results confirm that "the most important driving force behind the modern economy today is creative, innovative and motivated employees" (Pilukienė, 2017, p. 223).

Conclusion

IC in the surveyed organization is viewed as important and as a specific segment within each element or task. This research has some interesting implications for communication professionals as well as researchers. Obtained data confirms the raising importance of IC, especially in times of crisis as employees considered as a homogenous.

The following research questions were outlined:

- How e-employees perceive IC methods in their organization?

They perceived IC as being tailored to their specific needs. But based on the data, it still invites us to re-consider the specific needs to adapt the content of the messages, their formats, and the best communication channels to these needs. E-employees who perceive communication as transparent are satisfied by the communication in their organization. It means that organization partly created an

effective IC strategy. It has to be prepared and ready to react to sudden changes and circumstances. Creating an effective IC strategy involves evaluating and reviewing the current strategy and identifying the strengths and weaknesses as demonstrated in the research data. Especially when employees are reluctant to ask for assistance.

➤ Which of the internal communication channels were used most effectively?

Technology tools affect how e-workers feel about their organization and work. Communication is the most important predictor of feelings of value and engagement. Both formal and informal IC channels are the way by which e-employees communicate and connect. Zoom is the most popular communication channel for more than 40 % of employees. In second place, e-mail is preferred by 30.77 % of respondents, and the last chat is preferred by 5.49 % of employees. E-mail seems not to be the most common way of connecting in the office anymore.

The study has found that the largest proportion of staff was positively affected in the areas of IC.

Regarding the limitations of this research, we can underline that the sample of our survey only concerned employees from organization based in Greece but located various European countries and in a context of unprecedented crisis. Authors were limited in studying certain fields on more detail. Additionally, the spoken predominant language in organization was English and it may cause problems of understanding and interpretation of sets of questions. This research only explores the role of IC in an organizational context (formal, casual, organized, or unplanned).

For future research, it would be interesting to extend this research by conducting a qualitative study. Other studies could aim to add more companies in different sectors. Future research may focus on the implications of feedback in IC.

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Intervening Variable in Business: Burnout in Sales Representatives

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Abstract

Research background: The usual cause of burnout in entrepreneurs includes lack of support, unrealistic expectations, constant need to adapt and evolve in business sphere, unsatisfactory work-life balance, high levels of stress and psychological pressure. Therefore, the goal of the study was to determine the extent to which burnout affects individuals outside the helping professions and whether there exist a relationship between the age, length of practice and burnout.

Purpose of the article: The ambition of the context of the article is for individuals to realize that burnout affect workers outside the helping professions that having a manageable workload and being able to talk about it is the key to healthy mental flexibility.

Methods: The Maslach Burnout Inventory (MBI) was used in the study. It is a questionnaire developed by two American psychologists Maslach and S. Jackson (1986). The questionnaire contains 22 items as statements, feelings, and attitudes. Of these, 9 items focus on Emotion Exhaustion (EE), 5 items focus on Depersonalization (DP), 8 items focus on Personal Accomplishment (PA). Two subscales (emotional burnout and depersonalization) are tuned negative, and only one is tuned positive (personal success).

Findings & Value added: An important finding is that the rate of burnout is not related to age or length of practice. Solving the problem of burnout in sales representatives by reducing or increasing the average age of employees will not bring the desired effect. Burnout affects workers in helping professions, as well as business representatives. The added value of the article lies in the awareness that burnout may arise from a long-lasting mismatch between working individuals and work settings in terms of fairness, values, workload, reward or control and community. Based on that, the article aimed to emphasize the importance of perceiving of sales representatives in context, rather than individually.

Keywords: intervening variable, burnout, mental exhaustion, sales representatives, entrepreneurs

JEL classification: M2, M5, M12

1. Introduction

The study of burnout syndrome within the sales context has found the interest. It includes not only focusing on emotional exhaustion but also examining the other two dimensions (depersonalization and personal accomplishment) of burnout (Ambrose et al., 2021).

Currently, there are several studies and tutorials on how to be successful in business. New sales trends, more efficient communication techniques, and special training of employees are implemented for sale to increase efficiency in offering and selling goods, services, or products. This study aims to point out one of the variables that can negatively affect efforts by traders. The variable is burnout. Customarily used term that appears in the professional literature in the Slovak equivalent, as a burnout syndrome. Because of the simple Anglophone form, the English form burnout will be used instead of the Slovak term burnout syndrome in this study. As it was already mentioned, the burnout of salespersons and sales representatives can simply and unobtrusively sabotage companies' efforts for significant revenue, more clients, and subsequent market expansion. One such company represents a joint-stock company operating in Slovakia and the Czech Republic. Because of its anonymity, it will be undescribed in more detail in this study. Despite its stable market position, digital innovation, expansion of services, portfolio of services and products, and regular and meaningful staff training, it has not made significant progress. Where did the

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mistake in the improvement happen? Who from sales efficiency specialists made a mistake? It is possible that no one.

Assuming that the company's settings were proper, it is necessary to look for intervening variables, the impact of which was unconsidered in the first plan. One of them, which is the subject of the analysis of the study, is burnout.

1.1 Burnout and its characteristics

This construct was first named and identified by Freudenberger (1975) in the social support professions. Under certain conditions, burnout can express an extraordinary burden for the individual. Burnout syndrome is included in the 11th Revision of the International Classification of Diseases as a syndrome resulting from unsuccessfully managed, chronic stress that activates emotional exhaustion, feelings of unproductivity, cynicism, withdrawal, unsuccessfulness, loss of idealism, and ineffectiveness (WHO, 2019). Burnout syndrome represents one of the most studied work-related syndromes in recent years, especially within the healthcare and services sector (Heinemann, 2017). Individuals who are burned-out distance themselves cognitively and emotionally from work activities, experience high levels of chronic fatigue (Bakker & Costa, 2014). Burnout is a reaction to persistent work stress and so-called work-related burnout is conceptualized as a three-dimensional construct, examined by the Maslach Burnout Inventory (MBI) via determinants of Emotional Exhaustion: described as the feeling of being emotionally drained, depleted, includes symptoms of fatigue, increased sensibility to stressors from the external surrounding or feeling of having very low energy; Personal Accomplishment: a negative self-evaluation, loss of satisfaction and motivation, by a low efficiency on work-related actions (Fontana et al., 2020); Depersonalization or Cynicism: negative feelings, having a lower empathy towards people, bad perceptions about the clients, patients, colleagues with the attempt to be distanced from them. This perception of others, who are considered callous or dehumanized, may lead members of staff to see the clients, colleagues, patients, etc., as somehow deserving of their troubles.

There exist also three different types of this syndrome, overload syndrome – frenetic, which occurs due to continuous demands and responsibilities, under-challenged syndrome – demotivating, produces feelings that everything is developing in a bad direction, then comes total apathy, and the last one is a worn-out syndrome – wear out, brings chronic or repeated need to avoid or ignore all duties (Gold, 1984).

Burnout is considered the result of not having a good support structure and being very stressed. Beneficial or healthy relationships with an appropriate environment, with a good work organization, and the ability to use free time properly, and learn to be assertive means a perfect help from the perspective of prevention (Kohoutek, 2018). This state affects dissimilar professions but mostly nurses, athletes, artists, medical or doctoral students, lawyers, teachers, managers, people in leading positions, early-career people, businessmen, and individuals who put the greatest effort into passion or work – known as perfectionists (Brubaker & Beverly, 2020). Burnout has become a serious problem and we can see that not only businessmen suffer from feelings of being alienated and angry. Work burnout is a type of oversteering that results from prolonged job-related and chronic stressors. The best way how to perceive burnout syndrome is to understand it as a mental state of exhaustion and as a result, starting to appear, e.g., low work efficiency, cynicism, loss of motivation, depersonalization, etc. (Smith, 2020). It is a feeling when an individual is very intensely preoccupied with tasks (ideas), concludes that he can no longer exist in this way, and loses his enthusiasm. It causes nervousness, irritability, and fatigue (Křivohlavý, 2001). The completion of burnout syndrome results in psychological detachment from work, decreased engagement, cynicism, apathy, and rigidity.

Burnout causes physical, emotional, and mental exhaustion. Emotional exhaustion is accompanied by feelings of hopelessness, helplessness, and the feeling of being trapped. Mental exhaustion is characterized by a negative attitude towards oneself, work, and the world (life) in general. The accompanying effects can significantly reduce the work efficiency of the company's salesperson or sales representative. Can this happen despite an experienced employee who is responsible and has a successful work history in the company? Can burnout affect a young and less experienced seller as well? Křivohlavý (2001) states that the most endangered group of employees are those who work above the level of their capacity, consider work as a mission, they are the most efficient, responsible, and consistent. Under normal circumstances, these people are considered workaholics who cannot adequately rest and relax (Křivohlavý, 2001).

1.2 Mental exhaustion among sales representatives and entrepreneurs

Related but different and unfavorable stress outcomes indicate burnout and manifestations of depression (Hammen, 2005). There is an overlap between burnout syndrome and depression, considering some societal etiological factors and symptoms (Bianchi et al., 2017). Symptoms of depression, depressed moods, and anhedonia (inability to experience joy, the first symptom of depression) are outlined in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). The spectrum of depressive symptoms does not exceed the symptoms of burnout. Although the constructs are related, they are different. Burnout includes responses to chronic stress, such as occupational inefficiency, emotional exhaustion, depersonalization.

There exist reasons why sales representatives face stress and why stress is known as an imbalance between environmental requirements and an individual's ability to react. While many sales representatives can successfully reduce the stress of doing business, it is practical to realize that demanding stress processes are necessary for traders to some extent because they cannot be circumvented. Thus, they sporadically invest their energy into the activities that involve a great uncertainty, time pressure, conflict, extended working hours, and ambiguity, thus showing high-stress responses (Baron, Franklin & Hmieleski, 2016). Theories emphasizing the negative effects of stress often point to high demands and perceptions of external stimuli or events, while other theories emphasize the positive effects of control and adaptive replies to stress perception. The conceptual unification of sales representatives' stress construct is ambiguous, contains conflicting results, and almost non-existent theoretical framework of metastudies. Because of it, the conceptual unification of trade stress is a challenge for researchers (Harkness, 2020).

The theory of stress assessment and resulting burnout syndrome remains criticized for its subjectivity – individuals take responsibility for assessment and business stress research is not properly separated from employee stress literature – identified stressors among paid employees are of minimal importance in the business environment (Eager, Grant & Maritz, 2015). However, stress is a complex phenomenon composed of stressors, perceived stress, and tension (Bliese, Edwards & Sonnentag, 2017). Business researchers argue that stressful problems at the individual and organizational levels create perceived stress (PS) (Rauch, Fink & Hatak, 2018). Obstacle stressors are characterized by basic limitations of resources and abilities valuable for the welfare of sales representatives. Cognitively driven stressors are characterized by the formation of a gap between an individual's perception and real outcomes (Monroe & Slavich, 2019). Perceived entrepreneurial stress (PES) interferes with critical competencies related to innovation and decision-making (Su et al., 2020).

Ghanimeh (2019) distinguishes between existential and circumstantial categories of burnout. The first is based on a loss of meaning in professional life, a reduced level of communication with the environment, a very weak professional identity, and a lack of self-acceptance. The second is based on inadequate work requirements, disrespect for personal life - no free time to regenerate physical and mental strength.

The report on professional identity, burnout, and managerial work states that low identification with the job description – weak professional identity – carries a higher risk of early burnout. In conclusion, a critical link between burnout and inadequate approval of specific standards of professional identity was confirmed, often in terms of gratitude and work requirements (Hamouche & Marchand, 2021). Not only these findings underscore the importance of examining the associations between work intensity and the stress-causing mental exhaustion.

1.3 Problem, goals and hypothesis

Can burnout act as an intervening variable in business? Can this syndrome also affect workers outside the helping professions? Is there a significant relationship between the age, the length of the practice, and burnout? This study aims to find out to what extent burnout affects individuals outside of the helping professions, particularly sales representatives. Another aim is to find out whether there is a statistically significant relationship between the age of employees, the length of their experience, and burnout. It can be assumed that burnout will not significantly affect the organization's employees. At the same time, it can be assumed that there is no statistically significant relationship between the age of employees, the length of their practice, and the extent of the burnout syndrome.

2. Methods

The Maslach Burnout Inventory (MBI) is a questionnaire developed by American psychologists Maslach and S. Jackson (1986). It is one of the most widespread tools in the detection context of burnout syndrome. The questionnaire contains 22 items as statements, feelings, and attitudes. Of these, 9 items focus on Emotion Exhaustion (EE), 5 items focus on Depersonalization (DP), 8 items focus on Personal Accomplishment (PA). Two subscales (emotional burnout and depersonalization) are tuned negative, and only one positive (personal success). The response framework is an interval from 0 to 6 (0 - never, 1 - several times a year, 2 - monthly, 3 - several times a month, 4 - weekly, 5 - several times a week, 6 - daily). The Emotional Burnout subscale represents professional exhaustion and is usually associated with work perceived as serious, tiring, stressful, and so on. Unlike depression, which has similar symptoms, the symptoms of emotional exhaustion may likely be alleviated during vacation/recreation. Within the measured levels, the most emotionally depleted are people with a high degree, and the least exhausted are with a low degree. Low level of emotional burnout: up to 16 points (inclusive). Medium level of emotional burnout: 17 – 26 points (inclusive). High level of emotional burnout: over 27 points (inclusive). Items for emotional burnout: 1, 2, 6, 8, 13, 14, 16, 20.

The second subscale of inventory, depersonalization, or loss of empathy is typical for a loss of respect for others (clients, colleagues) and the maintenance of a greater emotional distance. It can be manifested by cynicism and derogatory remarks, or callousness. Within the measured levels, the most depersonalized are individuals with a high degree and vice versa. Low level of depersonalization: up to 6 points (inclusive). Medium level of depersonalization: 7 – 12 points (inclusive). High level of depersonalization: over 13 points (inclusive). Items for depersonalization: 5, 10, 11, 15, 22.

The third subscale is personal success and expresses job fulfillment. It is a feeling that acts as a safety valve and helps to achieve balance if the employee is emotionally exhausted and depersonalized. It ensures the fulfillment of work duties and a positive view of professional success. People with a high degree have the highest satisfaction, and people with a low degree have the lowest satisfaction within the measured levels. Low level of personal success: over 39 points (inclusive). Medium level of personal success: 32 – 38 points (inclusive). High level of personal success: up to 31 points (inclusive). Items for personal success: 4, 7, 9, 12, 17, 18, 19, 21.

2.1 Research sample

The research sample of 56 companies was selected by a simple random sampling from 234 trading companies in eastern Slovakia. Subsequently, sales representatives of these companies (N=56) were addressed to participate in the research. The research sample (N=56) presents approximately ¼ of the population (N=234) and it is considered large enough. The representativeness guarantees the way it is chosen – not its size. The population is not based on one enterprise. Given the homogeneity of the population and the type of sample, it is possible to assume that the sample is representative.

Table 1. Descriptive analysis of the research group in terms of age

	M	σ	Min	Max	N	Mis
age	54.11	6.987	30	64	55	1

Source: authors (2023)

Note: M – Average Value, σ – Standard deviation, Min – minimum score, Max – maximum score, N – population size, Mis – missing values

Results of descriptive analysis showed that the age within the whole research sample (N=55) reached the average value of M=54.11, with a standard deviation of σ =6.987. The minimum score that represents the lowest age has reached 30 years. The maximum score representing the highest age in the sample is 64 years. Missing age data were in one subject (Mis=1).

Table 2. Descriptive analysis of the research group in terms of gender

	n	%
women	2	3.6
men	54	96.4

Source: authors (2023)

Note: n – sample size, % – percentage

The results of the descriptive gender analysis showed that the research group included 54 men and 2 women, representing 96.4% of men and 3.6% of women.

Table 3. Descriptive analysis of the research group in terms of years of practice

	M	σ	Min	Max	N	Mis
years of practice	10.00	6.912	1	26	54	2

Source: authors (2023)

Note: M – Average Value, σ – Standard deviation, Min – minimum score, Max – maximum score, N – population size, Mis – missing values

Descriptive analysis results of the years of practice showed that years of practice within the whole research sample (N=54) reached the average value of M=10.00, with a standard deviation of $\sigma=6.912$. The minimum score that represents the lowest year of practice has reached 1 year. The maximum score representing the highest year of practice in the sample is 26 years. Missing data from years of practice were in two subjects (Mis=2).

3. Results

Sales representatives may transfer positive emotions through the tone of positivity in the workplace that improves cooperation and decreases conflicts. Their followers in the positive leadership condition generate more original and valuable problem solutions (Morganson et al., 2014). It should be used in applicable way to encourage work-family balance and well-being not only among employees since entrepreneurs are perceived as a significant source of work-life balance support (Todd & Binns, 2013). The following tables clearly summarize the research results.

Table 4. Results of descriptive analysis of the rate of Emotional Burnout

	M	σ	Min	Max	N
Emotional Burnout	20.95	7.275	6	42	56

Source: authors (2023)

Note: M – Average Value, σ – Standard deviation, Min – minimum score, Max – maximum score, N – population size, Mis – missing values

Descriptive analysis results of the rate of Emotional Burnout showed that the average score of Emotional Burnout within the whole research sample (N=56) reached the value of M=20.95, with a standard deviation of $\sigma=7.275$. The minimum score representing the lowest rate of Emotional Burnout achieved the value of 6. The maximum score representing the highest rate of Emotional Burnout in the sample stands for the value of 42.

Table 5. Results of descriptive analysis in terms of degree of Emotional Burnout

	n	%
low degree	20	35.7
moderate degree	29	51.8
high degree	7	12.5

Source: authors (2023)

Note: n – sample size, % – percentage

The results of a descriptive analysis of the degree of Emotional Burnout showed that a low degree of Emotional Burnout was recorded in twenty subjects (n=20), representing 35.7% of subjects from the whole group. A medium degree of Emotional Burnout was recorded in the 29 subjects (n=29), representing 51.8% of the subjects from the whole group. The highest degree of Emotional Burnout was recorded in seven subjects (n=7), representing 12.5% of subjects from the whole group.

Table 6. Results of descriptive analysis of the rate of Depersonalization

	M	σ	Min	Max	N
Depersonalization	12.30	4.686	4	23	56

Source: authors (2023)

Note: M – Average Value, σ – Standard deviation, Min – minimum score, Max – maximum score, N – population size, Mis – missing values

Descriptive analysis results of the rate of Depersonalization showed that the average score of Depersonalization within the whole research sample (N=56) reached the value of M=12.30, with a standard deviation of $\sigma=4.686$. The minimum score representing the lowest rate of Depersonalization achieved the value of 4. The maximum score representing the highest rate of Depersonalization in the sample stands for the value of 23.

Table 7. Results of descriptive analysis in terms of degree of Depersonalization

	n	%
low degree	2	3.6
moderate degree	26	46.6
high degree	28	50.0

Source: authors (2023)

Note: n – sample size, % – percentage

The results of a descriptive analysis of the degree of Depersonalization showed that a low degree of Depersonalization was recorded in two subjects (n=2), representing 3.6% of subjects from the whole group. A moderate degree of depersonalization was noted in twenty-six subjects (n=26), representing 46.4% of the subjects from the whole group. The highest degree of Depersonalization was recorded in twenty-eight subjects (n=28), representing 50.0 % of subjects from the whole group.

Table 8. Results of descriptive analysis of the rate of Personal Accomplishment

	M	σ	Min	Max	N
Personal Accomplishment	20.20	8.269	6	46	56

Source: authors (2023)

Note: M – Average Value, σ – Standard deviation, Min – minimum score, Max – maximum score, N – population size, Mis – missing values

Descriptive analysis results of the rate of Personal Accomplishment showed that the average score of Personal Accomplishment within the whole research sample (N=56) reached the value of M=20.20, with a standard deviation of $\sigma=8.269$. The minimum score representing the lowest rate of Personal Accomplishment achieved the value of 6. The maximum score representing the highest rate of Personal Accomplishment in the sample stands for the value of 46.

Table 9. Results of descriptive analysis in terms of degree of Personal Accomplishment

	n	%
low degree	51	91.1
moderate degree	4	7.1
high degree	1	1.8

Source: authors (2023)

Note: n – sample size, % – percentage

The results of a descriptive analysis of the degree of Personal Accomplishment showed that a low degree of Personal Accomplishment was recorded in fifty-one subjects (n=51), representing 91.1% of subjects from the whole group. A moderate degree of Personal Accomplishment was noted in four subjects (n=4), representing 7.1% of the subjects from the whole group. The highest degree of Personal Accomplishment was recorded in one subject (n=1), representing 1.8% of subjects from the whole group.

Table 10. Results of correlation analysis between the age and the rate of Emotional Burnout

	r	p	N
age – the rate of Emotional Burnout	.032	.814	55

Source: authors (2023)

Note: r – Pearson correlation coefficient, p – significance, N – population size

Correlation analysis results between the age and the rate of Emotional Burnout did not show a significant relation between variables (p=0.814). Pearson correlation coefficient value in the sample N=55 reached only r=0.032 in this relation.

Table 11. Results of correlation analysis between the age and the rate of Depersonalization

	r	p	N
age – the rate of Depersonalization	-.046	.739	55

Source: authors (2023)

Note: r – Pearson correlation coefficient, p – significance, N – population size

Correlation analysis results between the age and the rate of Depersonalization did not show a significant relationship between variables (p=0.739). Pearson correlation coefficient value in the sample N=55 reached only r=-0,046 in this relation.

Table 12. Results of correlation analysis between the age and the rate of Personal Accomplishment

	r	p	N
age – Personal Accomplishment	-.178	.194	55

Source: authors (2023)

Note: r – Pearson correlation coefficient, p – significance, N – population size

Correlation analysis results between the age and the rate of Personal Accomplishment did not show a significant relationship between variables ($p=0.194$). Pearson correlation coefficient value in the sample $N=55$ reached only $r=-0,178$ in this relation.

Table 13. Results of correlation analysis between the length of practice and the rate of Emotional Burnout

	r	p	N
practice length – Emotional Burnout rate	.089	.521	54

Source: authors (2023)

Note: r – Pearson correlation coefficient, p – significance, N – population size

Correlation analysis results between the length of practice and the rate of Emotional Burnout did not show a significant relationship between variables ($p=0.521$). Pearson correlation coefficient value in the sample $N=54$ reached only $r=0,089$ in this relation.

Table 14. Results of correlation analysis between the length of practice and the rate of Depersonalization

	r	p	N
practice length – Depersonalization	.010	.944	54

Source: authors (2023)

Note: r – Pearson correlation coefficient, p – significance, N – population size

Correlation analysis results between the length of practice and the rate of Depersonalization did not show a significant relationship between variables ($p=0.944$). Pearson correlation coefficient value in the sample $N=54$ reached only $r=0.010$ in this relation.

Table 15. Results of correlation analysis between the length of practice and the rate of Personal Accomplishment

	r	p	N
practice length – Personal Accomplishment	-.036	.794	54

Source: authors (2023)

Note: r – Pearson correlation coefficient, p – significance, N – population size

The results of the correlation analysis between the length of practice and the rate of Personal Accomplishment did not show a significant relationship between variables ($p=0.794$). The value of the Pearson correlation coefficient in the sample $N=54$ reached only $r=-0.036$ in this relation.

To summarize it up. Descriptive analysis of the Emotional burnout rate showed that the average score of Emotional Burnout within the whole research sample ($N=56$) reached the value of $M=20.95$, with a standard deviation of $\sigma=7.275$. The minimum score, which represents the lowest rate of Emotional Burnout, reached 6 points. The maximum score representing the highest rate of Emotional Burnout in the sample reached 42 points. Analysis of the degree of Emotional Burnout noted in twenty subjects ($n=20$), a low degree of Emotional Burnout that is 35.7% of the whole group. A medium degree of Emotional Burnout was noted in the twenty-nine subjects ($n=29$), representing 51.8% of the subjects in the group. The highest degree of Emotional Burnout was identified in seven subjects ($n=7$), representing 12.5% of subjects in the whole group.

Descriptive analysis of the rate of Depersonalization displayed that the average score of Depersonalization within the whole research sample ($N=56$) reached the value of $M=12.30$, with a standard deviation of $\sigma=4.686$. The minimum score, which represents the lowest rate of Depersonalization, reached 4 points. The maximum score representing the highest rate of Depersonalization in the sample achieved 23 points. Analysis of Depersonalization showed in two subjects ($n=2$) a low degree of Depersonalization that is 3.6% of the whole group. Moderate Depersonalization was noted in the twenty-six subjects ($n=26$), representing 46.4% of subjects in the whole group. The highest Depersonalization was identified in twenty-eight subjects ($n=28$), representing 50.0% of subjects in the entire group.

Descriptive analysis of the rate of Personal Accomplishment showed that the average Personal Accomplishment score within the whole research sample ($N=56$) reached the value of $M=20.20$, with a standard deviation of $\sigma=8.269$. The minimum score that represents the lowest rate of Personal Accomplishment, reached 6 points. The maximum score representing the highest rate of Personal

Accomplishment achieved 46 points in the sample. Analysis of personal accomplishment showed in fifty-one subjects (n=51) low Personal Accomplishment that is 91.1% of the entire group. The average Personal Accomplishment was noted in four subjects (n=4), representing 7.1% of subjects in the whole group. The highest Personal Accomplishment was noted in one subject (n=1), representing 1.8% of subjects in the whole group.

Correlation analysis results between the age and Emotional Burnout rate did not show a significant relationship between variables ($p=0.814$). Pearson correlation coefficient value reached only $r=0.032$ in the sample (N=55) in this relationship. The analysis between the age and Depersonalization rate did not show a significant relationship between variables ($p=0.739$). Pearson correlation coefficient value reached only $r=-0.046$ in the sample N=55 in this relationship. Similarly, the results of the correlation analysis between the age and Personal Success rates did not show a significant relation between variables ($p=0.194$). Pearson correlation coefficient value reached only $r=-0.178$ in the sample of N=55.

The correlation analysis between the length of practice and Emotional Burnout rate did not show a significant relationship between variables ($p=0.521$). The Pearson correlation coefficient reached a value of only $r=0.089$ on sample N=54 for this relationship. The analysis between the length of practice and Depersonalization rate did not show a significant relationship between variables ($p=0.944$). The Pearson correlation coefficient reached only $r=0.010$ value on sample N=54 for this relationship. Similarly, the results of the correlation analysis between the length of practice and the rate of Personal success did not show a significant relationship between variables ($p=0.794$). The Pearson correlation coefficient reached only $r=-0.036$ on sample N=54 for this relationship.

4. Discussion

Based on the results, it could be stated that burnout affects not only workers in the helping professions but also workers in the field of trade and business. The highest degree of Emotional Burnout representing professional exhaustion was diagnosed in 12.5% of subjects, and a moderate degree reported up to 51.8% of subjects. The lowest degree reported 35.7% of subjects. With the highest and medium degree of Emotional Burnout together, up to 64.3% of sales representatives perceived their work as difficult, tiring, and stressful. Depression-like symptoms may occur with a high degree of Emotional Burnout (12.5% of subjects). Based on the correlation analysis there was no relationship neither in the length of practice nor in the age. It can be mentioned that other intervening variables caused a higher rate of emotional exhaustion. However, certainly not the age and length of the practice. According to Moss (2019) prevention strategies may reverse formation of burnout or its symptoms because roots of it do not relate only with the individual but with the society around him, e.g., his colleagues, style of leadership, work atmosphere, social support etc. Also, the most common causes of burnout are lack of the role clarity – ambiguity, unreasonable time pressure, lack of communication and work support, unmanageable workload, unfair work treatment. Beck et al. (2011) adds that individuals who suffer from stress, depression or emotional burnout tend to focus on negative experiences while failing to recognize the positive ones; any new activities seem hopeless and pointless. This goes with thoughts like *I am not going to text my friends because they will not want to meet up with me*, or *I am not going to apply for this job because perhaps I will not get an interview*. We may say that the stress resulting from views like this threatens careers because individuals avoid talks, they are hardly smiling, have poor dress code (it makes them less visible) or do not realize positive qualities.

Another of the measured variables was a degree of Depersonalization representing a loss of empathy, characterized by a loss of respect for clients and the maintenance of a greater emotional distance, manifested by cynical and derogatory statements or callousness. Even at this subscale, a high rate was recorded among trade workers. Demonstrated the highest Depersonalization was in up to 50.0% of employees and the average degree in 46.4% of employees. Only 3.6% of employees reported a low depersonalization rate. Based on the correlation analysis, there was no relation with the length of practice or the age. It could be stated that a higher degree of Depersonalization causes other intervening variables. However, certainly not the age and the length of the practice. For example, the research of Čigarská and Birknerová (2021) reported a higher tendency of female entrepreneurs and sales representatives to be more often emotionally exhausted than males. But Personal Accomplishment and Depersonalization did not report any statistically significant differences in terms of gender. The research assumed the existence of positive differences between the assessment of determinants of burnout syndrome in terms of gender.

Negative attitude or depersonalization toward customers, colleagues, clients, patients etc. can be major problem for individuals who hold sales and service work that requires kindness or sensitivity

in interactions with others. Based on this, sales representatives show depersonalization as an uncaring response or cold-hearted attitude towards other individuals.

The third construct saturating burnout was Personal Success that expresses work satisfaction also. It was recorded high accomplishment in only 1.8% of employees and the average one in 8.1% of employees. For these employees, this feeling acts as a safety valve and contributes to achieving balance if the employee experiences emotional exhaustion and depersonalization. It ensures the fulfillment of work duties and a positive view of professional success. A low feeling of personal success that also represents a very low level of job satisfaction, was recorded in up to 91.1% of employees. We dare to say that personal success characterizes the self-confidence of individuals in the ability to accomplish a job and meet goals since it is considered one of the key factors for effective performance. Civelek and Pehlivanoğlu (2019) add that their study about personal accomplishment contributes to the existing literature by explaining statistically significant links between emotional fatigue, depersonalization, and personal accomplishment.

The question was whether personal the success of the sales department employees from the pharmaceutical industry is affected by emotional exhaustion and depersonalization or not. The result was a negative statistically significant relationship between emotional exhaustion and personal success, and negative statistically significant relationship between personal success and depersonalization. Therefore, the achievement of balance is low for most employees, and consequently, it is also a low tendency to perform work duties without a positive perception of work results. In this factor neither the relationship with the age of employees nor with the length of experience was confirmed. Other intervening variables affect the low rate of personal accomplishment. It is possible to assume that the elimination of problems in the performance of their profession could increase it.

According to Shapiro (2020), individuals confronted by challenging situations tend to respond by either increasing their self-esteem or deepening their shame, but it does not work at all. Instead, it creates the reverse biological response of releasing stress hormones (norepinephrine or cortisol) that distract cognitive flexibility and eliminate the capacity to learn. Based on this, we suggest to sales representatives not repeat the same mistakes but start to learn from them - use it as an original coping strategy even if it is not easy. We suggest applying self-care habits, practice saying no and setting boundaries, scheduling regular breaks throughout the day, separating personal life from work (not checking e-mails after work hours), avoiding multitasking whenever feeling exhausted and worn-out, practice favorite sports, devoting time to a favorite hobby, taking a walk-in nature, do different kind of art, etc.

One of the methods to raise the satisfaction or success is regular socio-psychological training of employees focused on the positive attributes in the performance of their profession, and the subsequent acquisition of skills to perceive more positive aspects. When a challenging situation occurs, entrepreneurs can distract themselves from negativity through meditation, favorite music, talking to relatives, writing down thoughts, breathing techniques, etc., because it is believed that the effective could be literally breaking the cycle of negative thoughts as they arise – *the domino effect of negative thoughts will not follow* (Čigarská & Birknerová, 2021).

Conclusion

We conclude that sales representatives should support the necessity of prevention and make time for relaxation, sports, activities that help to feel happy, not frustrated. While the issue of burnout considers primarily medical workers, we tried to point out *another field of occupation that brings a burden on its workers* – entrepreneurs and sales representatives.

Burnout affects workers in helping professions, as well as business representatives. It can be assumed that it also *contributes significantly to the success of companies. An important finding is that the burnout rate is not related to the age or length of the practice.* Solving the problem of burnout syndrome in sales representatives in a company by reducing or increasing the average age of employees will not bring the desired effect. Symptoms of emotional exhaustion can be temporarily alleviated during recreation or even if stressful situations are permanently eliminated. Regular socio-psychological group training is one of the enduring ways to relieve Emotional Burnout, where employees would learn and train skills to cope with stressful situations. Due to the massive occurrence of high and average depersonalization, it is appropriate to include employees in regular socio-psychological training focused on interpersonal skills. Otherwise, it is possible to expect a decrease in turnover and loss of clients, to a significant extent. Other intervening variables affect the low rate of Personal Accomplishment. It is promising to assume that the elimination of problems in the performance of their profession could increase it. One of the methods to increase the satisfaction or success is regular socio-psychological training of employees focused on positive attributes

in the performance of their profession and following acquisition of skills to perceive more positive aspects than negative in their professional performance.

The study *has its limitations*, resulting from self-expression and self-selection. The findings that point to burnout, do not give the impression that the answers of respondents were overstated or otherwise adapted. According to the current overview of the issue, we can say that an important role can be played not only by the characteristics and the resulting differences at the level of individuals but also due to cultural and national differences, original family habits while upbringing. For instance, the specificity of women positions in society, different working conditions, the legal background for the performance of the managerial profession, etc. These could explain inconsistent findings of the role of gender, length, age in the incidence or intensity of burnout in sales representatives. Our plan is to compare burnout in terms of demographic perspectives and we intend to implement meta-analyzes to require more applicable results.

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Human Resource Management in the Context of the Migration Physicians and Medical Students from Slovakia: A Study on the Push Factors

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Abstract

Research background: The migration of physicians has become a global problem with far-reaching consequences for health care systems in countries of origin. Medical students represent a source of potential labour, but their attitude towards migration is equally positive.

Purpose of the article: The aim of the study is to examine the migration intentions of physicians and medical students and the factors that influence their decision-making.

Methods: A questionnaire survey of physicians and medical students is being conducted. The questionnaire is administered as part of the APVV and VEGA project. The study analyses the impact of basic characteristics of respondents and personnel practices of hospitals on migration intentions. Correspondence and factor analysis will be used for statistical analysis.

Findings & Value added: The study will point out the specificity of weighing pull and push factors. It identifies and evaluates groups of pull and push factors for intentions to migrate. Medical graduates are a potential source of labour, how can their migration intentions or possible return migration be influenced? The findings will provide important information for workforce planning in the healthcare system in Slovakia.

Keywords: migration intentions, physicians, medical student

JEL classification: F22, J28

1. Introduction

Recently, migration flows have been changing dramatically due to economic, social, health and cultural factors. Globally, health worker migration has become a critical issue with massive consequences for the functioning of health systems around the world (Dohlman et al., 2020). In general, health systems focus on three main goals: ensuring good health for population, responding to population's expectations, and financial equity of reimbursement. To achieve these goals, health systems need a well-trained and motivated workforce, properly maintained infrastructure, and reliable supply of medicines and technologies, supported by adequate financing, robust health plans, and evidence-based policies (World Health Organization, 2021). It is the human resources that are the primary and essential input of the health care industry, which plays a crucial role initiating and using all other resources (Buchelt, 2020; Li, Sun, 2019). Health care systems worldwide are placing more emphasis on effective personnel management. Personnel management activities have been observed to have direct impact on patient outcomes. Staff numbers and skill sets have a correlation to clinical outcomes such as lower mortality rates, healthy life years, and reduced number of years lost etc. (Fanelli et al., 2020; Cugin et al., 2017; Wysocka, 2017). Hospitals will increasingly prioritize productivity, flexibility and sustainability as important indicators of success while maintaining high standards of quality and safety (Kenderessy, 2020). This shift from quantity to quality is a reflection of current developments in the healthcare industry.

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This reinforces the importance of the need for hospitals to have effective human resource management processes in place. High-performing hospitals in the future will rely on committed, competent and contributing human resources. Therefore, there is a need to emphasize employee retention and meeting the needs of competent and knowledgeable employees (Ulrich, Dulebohn, 2017; Jankelová, 2021).

The healthcare sector faces a significant shortage of both quantity and quality of human resources, with global trends indicating a growing challenge (Jankelová, 2021). The increasing demand for health services due to ageing population and the need for preventive healthcare, is a source of exponential demand for labour in the health professions.

Personnel management plays a crucial role in ensuring adequate numbers and appropriate skill sets of physicians are available when needed (Shipton et al, 2016). However, the current negative trend in the number of health workers and the capacity crisis in healthcare facilities makes this task challenging. This has resulted in the inability of health institutions to function effectively, so it is necessary to focus on the sources of recruitment of physicians and stabilisation of the health workers.

Research on health worker migration focuses on individual behaviour and factors such remuneration, career development, skill training, motivation, working relationships, and working conditions. Becker, (2022); Castro-Palaganas et al (2017); Ndikumana (2018) highlights the importance of these factors in determining health worker migration patterns. For healthcare facilities to thrive, HR managers must focus not only on attracting and retaining quality staff (Becker, 2022; Castro-Palaganas et al, 2017), but also on their continuous improvement, training, and development because even the best technical equipment is no substitute for skilled physicians, nurses, or other medical staff (Dimitropoulos, 2017). It is obvious that it is the personnel activities that can regulate the labour migration of health workers abroad.

2. Methods

The aim of the study is to examine the migration intentions of physicians and medical students and the factors that influence their decision-making process.

Data for this study were collected through a questionnaire survey with physicians and medical students between April 2022 and November 2023. The questionnaire designed under the framework of the APVV project No. 19-0579 Setting up personnel management processes in hospitals and its impact on the migration of physicians and nurses for employment purposes abroad and VEGA No. 1/0691/22 Economic aspects of emigration of medical graduates in the context of the sustainability of staffing of health care institutions in the Slovak Republic. The first part of the questionnaire gathered information regarding the basic characteristics of the respondents and the health facilities they worked. In the second part, respondents were asked to assess their satisfaction with the setup of HR processes in the hospitals (measured factors: Organization of work, Remuneration, Employee benefits, Office appearance/furniture, Shortage of physicians - the work load, Bureaucracy, Communication and relations with colleagues, Communication and relations with superiors, Communication and relations with patients, Training and career development, Physical and spatial conditions, Instrumentation, Digitalization of work, Prestige of medical profession, Current political, economic and social situation in Slovakia). A total of 338 respondents participated in the study, including 212 physicians and 126 medical students. The questionnaire was distributed online through Google Forms by directly approaching the management of the hospitals and universities.

The data obtained was subjected to normality of distribution testing through histogram, with the Gaussian curve showing that the data did not have a normal distribution in either set of respondents. We then verified the results by Kolmogorov-Smirnov test ($n > 50$) and Shapiro-Wilk test ($n < 50$).

The analysis of the obtained data and the evaluation of the empirical survey were carried out through mathematical and statistical methods: descriptive statistics, correspondence analysis, Kaiser-Meyer-Olkin test (KMO), Bartlett's test of sphericity and factor analysis.

3. Results

The study addresses the intentions to migrate of physicians and students of general medicine as the factors that influence their decision-making process. Correspondence analysis was used to examine the impact of specific background characteristics of the respondents on their intentions to

seek work abroad. The specific background characteristics of the physicians were (Table 1): gender, age, completed attestation training. The medical students included in the study were identified based on their gender, year of study and their level of satisfaction with the study of general medicine (Table 1). This qualitative variable was included to provide insight into how the students feel about their educational experience in this field.

Table 1. Relative frequencies of physicians' responses to the analysis of migration considerations and age of respondents

Physicians		
Average age	43,22 rokov	
	N	% of Total
Gender	168	100%
Female	103	61,3%
Male	65	38,7%
Competed attestation	168	100%
Without attestation	32	19,0%
With attestation	136	81,0%
Medical students		
Gender	125	100%
Female	81	64,80%
Male	44	35,20%
Ročník	125	100%
1 - 2 year of study	8	6,40%
3 - 4 year of study	21	16,80%
5 - 6 year of study	96	76,80%

Source: authors' elaboration, STATISTICA output

There is no significant difference between the factors of physicians' considerations about working abroad and gender. Calculated value of χ^2 test is 4.28237 at $df=4$ ($p=0.3692$), thus we can conclude that at the significance level $\alpha = 5\%$ there is no significant relationship between the gender of physicians and their propensity to look for a job outside the Slovak Republic.

Table 2 shows differences in physicians' migration considerations with respect to age category.

Table 2. Relative frequencies of physicians' responses to the analysis of migration considerations and age of respondents

Percentage of total (Table 1)						
Row variable: migration considerations (5)						
Column variable: age (5)						
	to 30 years of age	31-40	41-50	51-60	above 61	Total
No	2.844	6.161	11.374	8.531	6.635	35.545
Rather no	2.370	7.583	4.739	6.161	0.948	21.801
Neither yes nor no	1.422	2.844	3.318	1.896	0.474	9.953
Rather yes	4.265	10.427	7.583	0.948	0.000	23.223
Yes	2.370	2.844	3.791	0.474	0.000	9.479
Total	13.270	29.858	30.806	18.010	8.057	100.000

Source: authors' elaboration, STATISTICA output

χ^2 value is je 43.2208 at $df=16$ ($p=0.0003$), thus age is significantly associated with the migration intentions of the physicians at the selected significance level. Figure 14, a correspondence map, reveals that physicians in the under 30 and 41-50 age categories are more likely to consider looking for work abroad than other age categories.

The correspondence map in Figure 1 depicts the relationship between age and considerations to migrate.

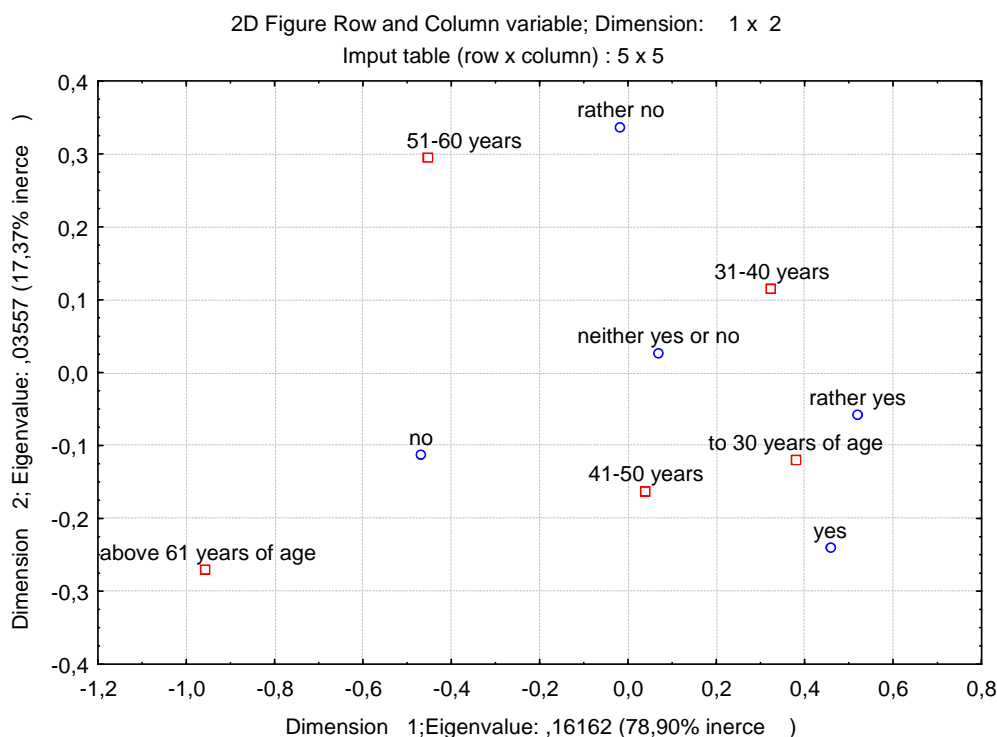


Figure 1. Correspondence map to analyse age and migration – physicians
 (Source: authors' elaboration, STATISTICA output)

Statistically significant differences were found in migration considerations based on attestation (Table 3). χ^2 value in nurses is 11,6528 at degree of freedom $df=4$ reach the significance level of 0.0201 at $\alpha = 5\%$. The study found statistically significant differences in migration considerations among attested physicians. This suggest that attestation plays a role in the decision-making process of whether to migrate or not.

Table 3. Relative frequencies of physicians' responses to the analysis of migration considerations and competed attestation

Percentage of total (Table 1)			
Row variable: migration considerations (5)			
Column variable: competed attestation (2)			
	Without attestation	With attestation	Total
No	4.265	31.280	35.545
Rather no	4.265	17.536	21.801
Neither yes nor no	1.896	8.057	9.953
Rather yes	8.531	14.692	23.223
Yes	2.844	6.635	9.479
Total	21.801	78.199	100.000

Source: authors' elaboration, STATISTICA output

Gender does not have a significant impact on the migration intentions of medical students after they complete their education. The calculated value of χ^2 test is 2.26558 with two degrees of freedom and a p-value of 0.3221 at the significance level of 5%.

The statistical analysis shows that there is a significant relationship between the year of study and the likelihood of students considering leaving the country. The chi-square value of 23.6895 with four degrees of freedom and p-value of 0.0001 suggest that the higher the year of study, the more likely the students are to consider leaving the country (Table 4).

Table 4. Relative frequencies of medical students' responses to the analysis of migration considerations and the year of study

Percentage of total (Table 1)				
Row variable: migration considerations (5)				
Column variable: year of study (3)				
	1-2 year of study (YoS)	3-4 YoS	5-6 YoS	Total
No	0.000	1.600	25.600	27.200
Not thinking about it	3.200	5.600	4.800	13.600
Yes	3.200	9.600	46.400	59.200
Total	6.400	16.800	76.800	100.000

Source: authors' elaboration, STATISTICA output

The correspondence map in Figure 2 depicts the relationship between the year of study and considerations to migrate.

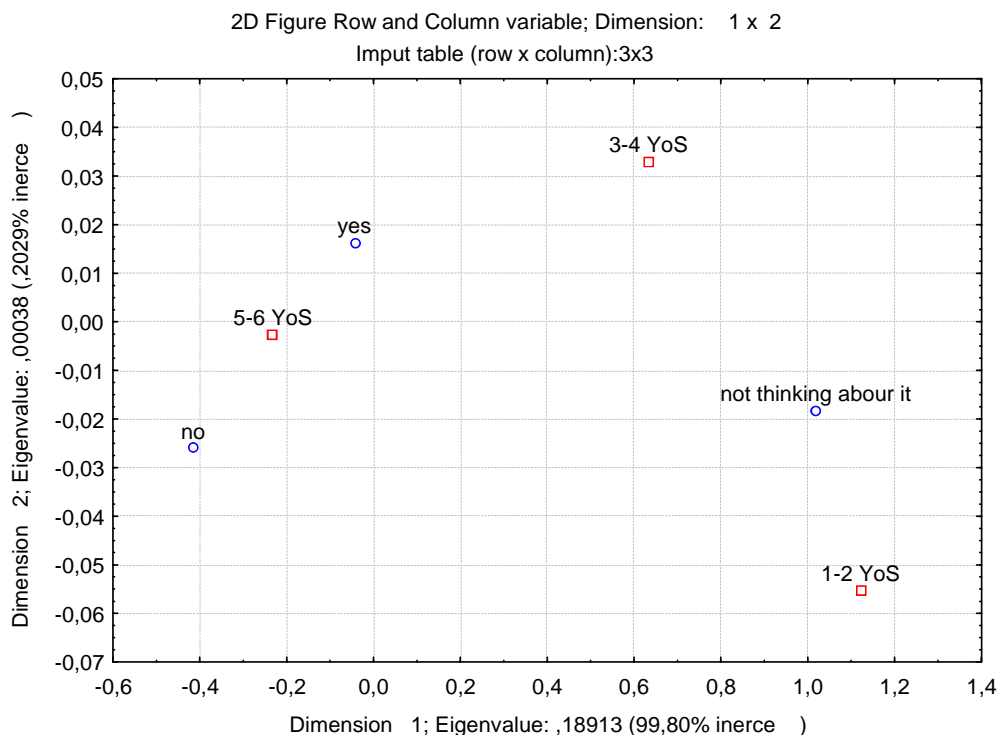


Figure 2. Correspondence map to analyse the year of study and migration – medical students (Source: authors' elaboration, STATISTICA output)

The result of the χ^2 test indicated non-significant impact of satisfaction with medical studies on migration. With a χ^2 value of 2.77949 and four degrees of freedom, the p value was 0.5954, indicating that the result was not statistically significant at $\alpha = 5\%$ level of significance. This suggests that the students are satisfied with their studies.

3.1 Factor analysis of physicians' satisfaction with working conditions – results

The Kaiser-Meyer-Olkin test (KMO) and Bartlett's test of sphericity were used to assess the appropriateness of using factor analysis to assess physicians' satisfaction with working conditions in hospitals. The KMO test value is 0.812, which represents a highly appropriate and justified use of factor analysis for processing research data. In addition, Bartlett's test of sphericity, which is a statistical test of correlations between the original attributes, was performed. The result of Bartlett's test of sphericity is 1031.99 with 105 degrees of freedom. The significance level of the test was set at $\alpha=5\%$, but the corresponding significance value is much smaller, less than 0.0001. Based on the results of KMO and Bartlett's test, it can be concluded that the realization of the sample correlation matrix with 15 satisfaction factors is not unitary, so the factor analysis method is suitable for processing these data.

The factor model's quality was evaluated using the estimated and residual correlation matrices. The correlation results are consistent with the model used.

The eigenvalue matrix was used to determine the number of common explanatory factors underlying the model. Using the Kaiser criterion (R), an eigenvalue greater than one is required. Table 5 shows that there are 4 common factors standing behind the correlation matrix of data with 15 variables through principal components factor extraction method, which cumulatively explain 60.76% of the total variance.

The use of other methods of principal factor analysis through communality explains only 33.14%, iterated communality (MINRES) 32.72%, maximum likelihood factors 32.56%, centroid method 33.79% and principal axis method 32.69% of the total variance.

Table 5. Eigenvalues of the sample correlation matrix (R) – physicians

Eigenvalues (Table 1)				
Extraction: Principal component				
	Eigenvalue	% total variance	Cum.eigenvalue	Cum. %
1	4.632	30.881	4.632	30.881
2	1.943	12.956	6.576	43.837
3	1.329	8.863	7.905	52.700
4	1.209	8.063	9.114	60.762

Source: authors' elaboration, STATISTICA output

Factor analysis is a method that examines factor loadings of extracted factors. In the study, varimax factor rotation was used to produce Table 6, which displays the sum of variances for individual items in each row.

The first factor has the highest correlation with training and career development (0.760255), communication and relations with superiors (0.749659), work organization (0.680765), employee remuneration (0.642252) and employee benefits (0.570087). It is about satisfaction with the hospitals' internal setup of HR processes and management. The quality of communication and relations with superiors have a significant impact on the creation of conditions for physicians' training or career development. Supervisors play a crucial role in organizing work and managing people. Remuneration and employee benefits are part of the personnel activities that fall under the internal personnel management system. The results of factor rotation show that the first factor accounts for 2.773767 of the total variance, explaining 18.49% with 15 variables.

The second factor has the highest correlation with the variables of communication and relationships with colleagues (0.837921), communication and relationships with patients (0.618086), and prestige of the medical profession (0.553248). Effective communication and building strong relationships are crucial components of a physician's daily tasks, both within the medical team and with patients as clients. The importance of this aspect needs to be seen in terms of creating the culture and values of the hospital. Good relationships and clear communication among medical professionals are crucial for maintaining the reputation of the medical field. It is important to work in an environment where these factors are prioritized. The factor rotation method shows the strength of the second factor at 1.734912 total variance, which is 11.57% with 15 variables.

The third factor has the highest correlation with the variables of material equipment and space (0.833118), instrumentation (0.767590), office equipment (0.720858) and digitalization of doctors' work (0.575695). This is the factor grouping the tangible conditions of physicians' work. Hospital facilities and material equipment impact both physicians' satisfaction and the quality of care provided to patients. The appearance of the office can affect greatly the way patients perceive the physician's practice environment. The advancement of technology has enabled physicians to streamline their work processes and allocate more time to their patients and practice. Based on factor rotation, the third factor accounts for 1.317812 of the total variance, or 19.24% for the 15 variables examined.

The fourth factor has the highest correlation with the current political, economic, and social situation in Slovakia (0.740961), bureaucracy (0.626973) and shortage of physicians (0.568779). Physicians are highly sensitive to the contextual factors influencing their work, including policy decisions, administrative processes, and the broader socioeconomic landscape. All these factors have implications for the quantity and quality of the health workers. The factor rotation method shows the strength of the fourth factor at total variance of 1.734912, which is 11.47% with 15 variables.

Table 6. Factor loadings for a factor model of physicians' satisfaction with working conditions

Factor loading (Varimax normaliz.) (Table 1)				
Extraction: Principal component (marked loads >,700000)				
	Factor	Factor	Factor	Factor
Organization of work	0.680765	0.013589	0.127685	0.182618
Remuneration	0.642252	-0.193481	0.406822	0.190845
Employee benefits	0.444240	-0.207318	0.570087	0.226778
Office appearance/furniture	0.218764	0.075530	0.720858	-0.151244
Shortage of physicians	0.501527	-0.052129	0.048674	0.568779
Bureaucracy	0.233664	0.094746	0.129945	0.626973
Communication and relations with colleagues	0.234547	0.837921	-0.009034	-0.103564
Communication and relations with superiors	0.749659	0.369470	0.146076	-0.013957
Communication and relations with patients	-0.023858	0.618086	0.273838	0.188700
Training and career development	0.760255	0.045932	0.144693	0.143665
Physical and spatial conditions	0.108347	0.139103	0.833118	0.104168
Instrumentation	0.116663	0.180180	0.767590	0.135383
Digitalization of work	0.104846	0.227885	0.575695	0.296671
Prestige of medical profession	-0.333766	0.553248	0.321433	0.355164
Current situation in Slovakia	0.056609	0.065763	0.066500	0.740961
Variance	2.773767	1.734912	2.885487	1.720204
% total variance	0.184918	0.115661	0.192366	0,114680

Source: authors' elaboration, STATISTICA output

In addition to the parameters of the factor model, factor analysis offers estimates of common factors, which are also referred to as factor scores. The values taken by the common factors for the observed n -observations are a useful tool for data diagnostics.

3.2 Factor analysis of medical students' perceptions of working conditions in hospitals - results

The Kaiser-Mayer Olkin test (KMO) verified the appropriateness of using factor analysis for students which took the value of 0.791. The KMO test result indicates that it is appropriate and valid to use factor analysis for processing data on the factors of students' satisfaction with working conditions in hospitals. In addition, Bartlett's test of sphericity was used, which yielded a result of 128.31 with 36 degrees of freedom. The significance value is less than 0.0001, which is less than the chosen significance level of $\alpha = 5\%$. The results of KMO and Bartlett's test show that the realization of the sample correlation matrix at 15 factors is not unitary, thus it is appropriate to use the factor analysis method to process the data.

The quality of the factor model obtained was evaluated with estimated correlation matrix and residual correlation matrix. The correlation results align with the model utilized.

As with physicians, the goal is to identify a number of common explanatory factors underlying the model and an eigenvalue matrix was implemented. Based on the Kaiser criterion (R), the eigenvalue must be greater than one. In the background of the correlation matrix of data with 9 variables through the principal component method of factor extraction, there are 3 common factors standing behind the correlation matrix, which cumulatively explain 55.87% of the total variance (Table 7).

The use of other methods of principal factor analysis through communality explains only 31,28%, iterated communality (MINRES) 32,02%, maximum likelihood factors 32,22%, centroid method 31,87% and principal axis method 32,40% of the total variance.

Table 7. Eigenvalues of the sample correlation matrix (R) – students of general medicine

Eigenvalues (Table 1)				
Extraction: Principal component				
	Eigenvalue	% total variance	Cum.eigenvalue	Cum. %
1	2.445	27.163	2.445	27.163
2	1.319	14.658	3.764	41.821
3	1.265	14.057	5.029	55.878

Source: authors' elaboration, STATISTICA output

Table 8 lists the results of using the varimax factor rotation method, through which 3 factors combining 9 variables were extracted.

The first factor includes the following variables: setting the professional and career development processes of physicians in hospitals (0.747697), organization of work (0.625429), relations between colleagues (0.626381), actions and behaviour of supervisors (0.587391). The results of factor rotation show that the first factor accounts for 1.846549 of the total variance, explaining 20.51% with 15 variables. Medical students acknowledge the significance of management and organizational culture in determining physician satisfaction. The immediate supervisor's personality and competence affect and workplace atmosphere, as well as relationships with colleagues. A systematic approach to the organization of work paves the way to attestation training. The second factor has the highest correlation with the following variables: instrumentation and material equipment (0.530413), legal norms, regulations and job requirements, i.e. bureaucracy (0.623067) and good social climate (0.815014) impacting the perception of the prestige of the medical profession as well as the current situation in the country. The results of factor rotation show that the first factor accounts for 1.914182 of the total variance, which explains 21.27% with 15 variables. The third factor has the highest correlation with performance evaluation and remuneration (0.836048) and standard of living (0.625428). Even though the medical field is considered a helping profession, the salary of physicians remains an important consideration for students. The setting of wage levels for physicians plays a crucial role in determining their standard of living and public perception. Based on the factor rotation carried out, the fourth factor accounts for 1.268296 of the total variance, which is 14.09% with 15 variables.

Table 8. Factor loadings for a factor model of physician satisfaction with working conditions

Factor loading (Varimax normaliz.) (Table 1) Extraction: Principal component (marked loads >,700000)			
	Factor 1	Factor 2	Factor 3
Organization of work	0.625429	0.031776	-0.075598
Instrumentation and material equipment	0.161984	0.530413	0.107347
Performance evaluation and remuneration	0.099208	-0.121031	0.836048
Set up of training or career development processes	0.747697	-0.119572	0.247866
Legal norms, regulations, job requirements	0.325184	0.623067	0.050165
Supervisors' actions and conduct	0.587391	0.411562	-0.161903
Relationships among colleagues	0.626381	0.336605	-0.265976
Good social climate in the country	-0.053041	0.815014	0.003280
Standard of living	-0.104396	0.520731	0.625428
Variance	1.846549	1.914182	1.268296
% total variance	0.205172	0.212687	0.140922

Source: authors' elaboration, STATISTICA output

4. Discussion

Having investigated the given basic characteristics, it was found that the migration of Slovak physicians to work abroad is influenced by age. The study found that physicians under the age of 30 are more likely to migrate than their older counterparts. An interesting piece of research finding is that physicians aged 41 to 50 are more likely to explore employment opportunities outside their home country than their younger counterparts aged between 31 and 40. This can be due to the attestation training that physicians undergo in this age range. This is also confirmed by the results of the impact of completed attestation training with respect to migration considerations. It was found that gender and number of dependent children are statistically insignificant variables for physicians and gender for medical students in relation to the research topic. However, for medical students, the year of study at the time of the research was significant at the selected level of significance.

In the next step, through factor analysis, we investigated the impact of the setting of staffing activities on the satisfaction of physicians and general medical students with the conditions of work in health care facilities in the country's health care system. Next, factor analysis was conducted to determine the influence of personnel activities on the satisfaction of physicians and students of general medicine regarding their working conditions in health care facilities. Several scholarly studies suggest that push factors hold more significance than pull factors when it comes to migration decisions. Satisfaction with working conditions is a trigger - a push factor - in a physician's migration decision-making process. In physicians, four factors were extracted from the 15 variables examined. The study found that the physical conditions of work have the most significant influence on employees, followed by the internal setting of personnel processes, organizational culture, and external setting of working conditions.

In students of general medicine, the factor model consisted of 3 extracted factors. Factor 2 external setting of working conditions resulting from government policy had the most significant impact, followed by factor 1-management and organisation of internal processes, and factor 3 performance evaluation, remuneration and standard of living was least significant for students.

Based on the results, it can be concluded that the physical conditions, which can be divided into the work environment and the instrumental or material conditions of physicians' work are the key factor of satisfaction. The factor closely relates to health financing and efficient allocation of resources which can be achieved at national, local and top management levels. Consequently, we can talk about the strength of the internal setting of personnel processes in the hospitals themselves, which falls within the authority of direct supervisors and their managerial competence.

Conclusion

The migration of physicians has become a global problem with far-reaching consequences for health care systems in countries of origin such as Slovakia (more than 5,200 doctors from Slovakia migrated abroad for work). Medical students represent a source of potential labor, but their attitude towards migration is even more positive (8 out of 10 medical students want to migrate after completing their medical studies).

Research on health worker migration focuses on individual behaviour and factors such remuneration, career development, skill training, motivation, working relationships, and working conditions. In Slovakia, similar research is missing.

The aim of the study is to examine the migration intentions of physicians and medical students and the factors that influence their decision-making process in Slovakia.

The study found that physicians under that the migration of Slovak physicians to work abroad is influenced by age (under 30 years, 41 to 50), of completed attestation training and for medical students the year of study at the time of the research. In the parts of the research, through factor analysis, we investigated the impact of the setting of staffing activities on the satisfaction of physicians and general medical students with the conditions of work in health care facilities in the country's health care system. Several scholarly studies suggest Satisfaction with working conditions is a trigger - a push factor - in a physician's migration decision-making process, while they indicate wages as the most important. The study found that the physical conditions of work have the most significant influence on employees only then followed by the internal setting of personnel processes (with wages). In students among students, this factor was placed at the end of the reasons for migration. Based on the results, it can be concluded that the physical conditions are the most significant. The factor closely relates to health financing and efficient allocation of resources, therefore, a systematic approach to the management and financing of healthcare by the state is important.

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Managed Family: Application of Management Principles on Family Dynamics

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Abstract

Research background: This article aims to highlight the similarities between managerial abilities in the workplace and their relevance to parenting. By examining the interconnectedness of personal experiences within families and professional experiences in the organizational context, a circular learning process can be established.

Various managerial skills parallel parenting attributes. Proficient managers adopt pragmatism, directness, active listening, and methodical workflows. These align with parenting's empathy, sharing, and fostering of belonging. Effective management involves staying updated, offering support, and setting boundaries—akin to parenting's rules and encouragement. Just as parents draw from managerial skills for family dynamics, familial experiences inform organizational contexts.

Purpose of the article: Illustrate how the connection between the worlds of parenting and management is parallel and how to use skills and insights from the management field in the family field and vice versa.

Methods: My approach is theoretical, and includes data analysis from empirical studies, bibliographic analysis, and process monitoring in the research field. Although I am not collecting empirical data, the goal is to provide a foundation for future research and practical applications in the fields covered in the review.

Findings & Value added: The results reveal four distinct similarities between concepts in the realms of work and family: socialization and social structures, skills and social relations, leadership in both family and organizational contexts, parental and business visions.

This perspective offers a fresh and distinct understanding of how individuals in the workplace and family members influence and are impacted by processes of change within their respective institutions, as well as the interconnected processes between them.

Keywords: managers, management skills, family, parental authority, modern family

JEL classification: A14

1. Introduction

Although everyone has an understanding of what management is, it is not easy to define it formally. The fundamental assumptions and perspectives regarding management derive from various theories that have developed over the years (whether the organization is a machine, a living organism, a social network, etc.). "Management is the attainment of goals through others. To fulfill this definition of management, you must understand your objectives and the others through whom you will achieve these goals" (Shaked, 2022).

This article comes to illustrate how the relationship between the worlds of management and parenting is parallel and even circular. Thus, claims the concept of "the managed family". Here I will propose to call the connection between the worlds of management and parental conduct and the use of skills and insights from the field of management in the family field "the managed family". I assume that when you bring skills from the management field to the family and from the family to the organization, you create a more positive environment that promotes growth and development.

There are similarities between a family and an organization. An organization is defined as a purposeful social system that produces products or services through coordinated and controlled activity

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cycles. This system is intentionally established by a group of individuals who cannot achieve their objectives through other means. Similarly, the origin of a family lies in the connection of two individuals (usually) to fulfill a goal - romantic relationship, procreation, etc. - that neither of them can accomplish alone. Couples form partnerships, divide roles between them, and consciously or unconsciously work towards achieving the goals that brought them together. With the birth of children, the "organization" grows, power dynamics and hierarchy change, and the pattern of communication becomes more complex and enriched.

This is a relevant connection since, from an individual's perspective, the family creates the strongest social experience. The family is the primary and most influential social group. The individual brings their early family experiences with them to new groups or organizations, and these experiences influence their functioning within them. Therefore, the metaphor of the family is relevant in understanding an individual's membership in an organization.

"Parents are the managers of the most important and complicated organization - the family" (Amit, 2006, p. 109). I assume that the family organization management tool can be used for better management skills and vice versa.

1.1 Socialization and Social structures

The family is a boundary concept, that is, a concept that challenges a series of accepted distinctions and the establishment of conceptual boundaries. For example, it is not clear where the family is placed given the distinction between private and public. Is it more correct to understand the family through categories of ownership, rights, and obligations or in psychological terms (David, 2012).

The philosophy of "managed family" encompasses the principles and strategies required for efficient management and maintenance of a family unit. It recognizes the family as a complementary institution to broader social structures such as education, religion, and governance. Just as these institutions contribute to the socialization of individuals, the family plays a critical role in shaping the values, beliefs, and behaviors of its members.

The primary goal of socialization is to enable the continuity of social order by imparting social values, norms, and customs to children. The process of socialization can occur throughout a person's life, but it is most intensive during childhood and adolescence when individuals learn about their roles and how to interact with others.

Parents and other family members are the primary agents of socialization, providing guidance and support and promoting the development of social, emotional, and cognitive skills in children. Parents benefit from a systemic presence in which they experience themselves and are supported by others. However, parents do not operate in an empty space but are constantly influenced by one another, by people, culture, and institutions in which they live (Omer, 2000).

Parenting is not simply about having or not having certain styles, but rather it is a complex social practice that is constantly influenced by spatial, temporal, and socio-cultural factors. Above all, parenting is about dynamic, emotional relationships between parents and children that are subject to change (Allgurin and Enell, 2022, p. 109).

People's meaning-making is shaped by their interaction with social, cultural, historical, and material contexts. The meaning of being a father, mother, husband, wife, partner, son, or daughter is likely to be changing, and how individuals embody these roles may change as a result of these shifting meanings (Eikrem and Sjøhelle Jevne, 2022).

The basic unit of human organization has always been the family, although the meaning and composition of "family" have changed throughout thousands of years of human existence. The current perspective in Western thought is that there is a distinct dichotomy between the family and other social organizations, particularly those related to work. Broadly speaking, the family is considered in the realm of private human interaction, while work organizations are in the realm of public interaction (David, 2012). The family is seen as a prototype on which relationships in other social spaces are based. The natural evolution of cities and civil life is a product of the expansion of kinship relationships within family units to larger circles, concepts from family life such as authority, submission, obedience, sovereignty, and governance are derived into the political and social spheres (David, 2012).

According to Bandura's social learning theory, managers are an essential and significant source for shaping the behavior of employees, learning new abilities, acquiring optimal behavior, and adopting expected norms. The reason for this lies in the high status that managers have in the organization, their great power in the organizational hierarchy, and the degree of influence they have in the decision-making

process. According to the social learning theory, this design process takes place through four psychological and social learning mechanisms: learning through imitation, social learning, setting a personal example, and contagion. Through these mechanisms, managers "imprint" desired patterns in employees on how their role should be performed, how quality service should be provided, and how they are expected to conduct their daily work tasks (Eldor, 2023).

Every organization strives to gain a competitive advantage in the business game. In order to achieve this, organizations adopt strategies aimed at motivating employees to be more committed to organizational goals and objectives. One such strategy is to make employees perceive and relate to their organization as a family. The decrease in the significance of traditional family enhances the number of people who do not see themselves fulfilled in starting a family and raising children. However, more unmarried people are feeling a huge dissatisfaction with life, though they often try to conceal it. Some of them find an alternative to overworking and burn themselves out. (pachkova, 2018). The justifications for encouraging family life by the state are based on two sets of arguments. The first indicates the vitality of family life for the individual, the emotional security that family life gives to the individual and their being decisive for the development of his identity, character traits, and personality. The second group emphasizes the national social benefit of the existence of a family - the family contributes to the strength of society and to the creation of a tradition of passing on values and rituals (David, 2012).

So how can we view these two systems as transferring values and messages between each other? How can parents draw upon their knowledge as managers and employees and vice versa, considering that these are two very different frameworks in nature? On one hand, there is a large, goal-oriented, non-emotional, and profit-driven organizational framework, which is tested for survival in a highly competitive economic world. On the other hand, there is a small, intimate, emotionally committed, non-profit-driven family framework, which is tested for creating a nurturing environment for its members' development.

I would argue that there are also similar characteristics between family and organization. These characteristics allow for significant transfer processes from one framework to another.

According to Bronfenbrenner's socioecological theory of human behaviors, which offers a framework for integrating various factors associated with parenting, parenting skills depend on an interplay of several ecological subsystems, including the individual parent, child, family, and the broader social context in which the parent-child interaction is embedded (Massarwi, Cluver, Meinck, Doubt, & Green, 2022). The individual in the family grows within the complete ecosystem. This system consists of social subsystems that help support and guide human growth. These systems are spread out starting with the micro-system that refers to the relationships between a developing person and his immediate environment (such as school and family) and ending with the macro-system that refers to institutional patterns of the culture such as economy, customs, and bodies of knowledge. Therefore, to understand human development, we must take into account the complete ecosystem within which growth occurs (Omer, 2000).

1.2 Social Skills and Relations

An organization is defined as a purposeful social system that produces products or services through coordinated and controlled activity cycles. An organization is not formed as a result of a natural evolutionary process. It is an artificial system, intentionally created and conceived initially by a group of individuals who could not or should not achieve their goals through other means (Amit, 2012). The organizational field is defined as "a community in which the participants share a common system of meanings, and in which they engage in frequent and fateful interactions with one another and with players outside the field" (Nicklich, Endo, & Sydow, 2022).

In this sense, a family is also rooted in the connection of two individuals (generally) to fulfill a specific purpose romantic relationships, procreation, etc. that cannot be accomplished by each individual alone. With the birth of children, the organization grows, power relations and hierarchies become more diverse, the system of relationships becomes more complex, and communication patterns enrich.

Spouses form a partnership at their wedding or by choosing to live together. They share roles and work—consciously or unconsciously—to achieve the goals for which they established their partnership. Parenthood is the most common occupation in the world (Rosenbaum, 2017).

Virginia Satir, one of the great figures in family therapy, referred to the family as a business, concerning family management, Satir asserts that the management of a family is not vastly different from any other form of management, as families, like any organization, require individuals, time, space, and resources to carry out their assigned tasks (Amit 2012).

The concept of family encompasses various aspects in contemporary times: expression of blood ties and genetic relationships, the fabric of social life and personal identity, the nurturing of individual emotional and personality development, a framework of communication patterns, legal rights and obligations, and the manifestation of love, responsibility, and care (David, 2012).

"Family taught us several management concepts and organizational philosophies; the corporate mindset has prevented us from applying that wisdom or even grasping it! We have engrossed our minds to be fast-tracked in everything. Hence it seems too trivial to notice that we have, in fact, learned the management skills and organizational values in childhood or adulthood itself...our management style reflects what we've inherited from our upbringing in families" (Ogiralá, 2018).

Piaget stated that a schema is a cognitive structure that contains a collection of actions, and ideas through which we act and adapt to the environment. And through assimilation and accommodation, we work to create change. and adapt existing schemes to new information we receive from the environment (David, 2012).

Human beings exist within a larger whole - the social field: the family, the kindergarten, the school, work, the neighborhood, the city, the country, the world, the universe. The family is the primary social field that a child encounters. "The family is the field in which a person grows, and their personality is shaped" (Rosenblau, 2017). As they subsequently encounter additional social fields, they will examine and relate to them according to the values they have developed within the family regarding the nature of a social field and how it operates. Therefore, the family plays a central and unique role for the child in preparing them for the expected social interactions in the future (Rosenbaum, 2017). Children live their daily lives within a social discourse about childhood (Michelson, 2022). This means that every child is surrounded by ideas shaped in the context of what it means to be a child and what children can do, that is, ideas about the identity and agency of children. These ideas exist at every level of children's lives: in their family context, in the local community, and society as a whole (Michelson, 2022).

A well-structured society is based on individuals capable of integrating into society normatively. This requires individuals to possess the social skills, values, and behaviors necessary to function efficiently within the broader social fabric. A family that embraces the philosophy of family management contributes to the development of individuals with the required characteristics for successful social integration. These individuals can then make a positive contribution to society and work towards its improvement.

When managers allow themselves to connect their work with their experiences in their own families, both in their current family and in their family of origin, their managerial abilities are enriched, both in cognitive understanding and emotional engagement.

the first to coin the concept of employee engagement (Engagement Employee) is Kahn. According to Kahn (Eldor, 2023), employee connectedness is the bond that engages oneself in work behaviorally (a high sense of vigor), emotionally (a sense of pride and dedication to work), and cognitively (deepening the job tasks). The organization emotionally and are cognitively focused on their work. If so Connected employees are currently considered in the literature of employee motivation as a relationship pattern between an employee and the organization because of the multidimensional-behavioral, emotional, and cognitive investment of the employee at work. In other words, Matan. The hands, heart, and feet of the employee to achieve the goals of the organization and its success (Eldor, 2023). Akio Morita, one of the founders of Sony and former chairman and CEO of the company, writes, "The most important task facing a Japanese manager is to develop a healthy relationship system with employees and create a sense of family within the organization - a sense that managers and employees share a common destiny" refers to the significance of family in terms of its meaning and importance. He emphasizes the level of emotional commitment. Other managers emphasize the sense of equality within the family and the organization (Amit 2012).

When matters flow smoothly in the family, the ideal family dream also flows peacefully along a hidden path. However, when problems arise in the family (and when does that not happen?), when we fail to exert a comfortable influence and family relationships deteriorate, when it seems that we are losing our way, it is important to stop, examine ourselves, and reassess our parenting goals and the way we pursue them (Amit, 2006, p. 124).

According to Shaked, the goals set by a manager in an organization are the manager's own., not of others, not of his boss, and not of the organization. Others are the ones with whom the manager interacts to achieve his goals. A manager manages 360 degrees around him. He manages his employees, but also his colleagues and those above him in the hierarchy. Since he needs resources to achieve his goals, he

must ensure that his manager provides them, so some of the others he interacts with to succeed are also his managers (Shaked, 2022).

1.3 Leadership in the family and Organization

In order to lead, sources of power and inspiration are required, and the vitality of clear internal sources alone is not sufficient. There are also external sources of power, such as role models, leaders, family members, processes, and shaping events (Hirsh, 2019). Henry Kissinger said "The task of a leader is to bring his people from where they are to where they have never been" (Amit, 2006, p. 72).

A parent is not a friend of their children - they are their parent. A manager is not a peer of their employees - they are their manager (Hirsh, 2019). The parent, as an individual, brings to the family also their parts as a worker or as a manager from the professional sphere. The parent has a role not only in their professional sphere but is also a parent and a family member from the personal sphere (Omer, 2000, p. 40). Parents have needs and desires beyond their parental role.

A leader must have a goal, and their life journey will be meaningful (Hirsh, 2019). Parental leadership is the ability of parents to guide their children towards a worthy goal and motivate them to perform tasks and missions that they may not always want to do, all without coercion or minimal use of it. Parental leaders shape the desired family reality in various ways. They create their family through shared goals, rules, and customs. They intelligently imply their children and set reasonable boundaries for their aggressive behavior. They listen to their children and try to help them according to the guiding values. They strengthen and support their children's personal development and more (Amit, 2006).

The ability of leadership within the family is associated with the delegation of authority both within and outside of it. "We cannot demand collaboration; we must be entitled to it," wrote Dreikurs and Soltz. "The best way to earn collaboration is to freely discuss what each individual thinks and feels and together seek ways to improve mutual relationships" (Rosenbaum, 2017). These ideas find expression in the professional field as social skills, which enable the flexible adaptation of different interests and social competencies aimed at either change or maintenance. Social skills are precisely defined as "the ability of actors to induce cooperation in other actors to produce, contest, or reproduce a given set of rules" (Nicklich, Endo, & Sydow, 2022, p. 6).

There are two main aspects of parental leadership: setting family goals and making decisions to guide the family toward achieving those goals (Amit, 2006, p. 78). A family leader should strive to create an environment that fosters the mental, emotional, and physical well-being of all family members. The path to the right way, as mentioned earlier, refers to the principles and values that guide a family to ensure the overall well-being of its members. This approach includes prioritizing the mental, emotional, and physical health of individual family members. It involves nurturing positive relationships, supporting personal development, and providing a sense of belonging and security within the family.

Numerous studies in the literature suggest that cultural values and beliefs shape how individuals and families respond to life adversities. For Example, In Chinese culture, positive family relationships and interpersonal harmony are considered essential for a happy family (Fu Keung Wong, La Yim Lau, Sze Chan, Zhuang, 2022).

Parents should strive to achieve presence and not impose conditions on their children. Parental presence is a principle that aims for dialogue. A parent seeks to be present in a relationship of mutuality, where parental presence assumes a dialogue-based relationship. Parents aspire to be present for and with their children (Omer, 2000). According to this parenting model, children raised in such families are likely to grow up to be successful in the business field. This is supported by Stoyanov and Stoyanova's article, which explores how collaborations contribute to the success of complex projects. Successes in this context are characterized by the synergistic integration of diverse expertise and interests, even among individuals separated by cultural and institutional boundaries (Stoyanov & Stoyanova, 2022).

In the professional field, when the principle of dialogue is not realized, for example, when an employee chooses such behavior because that's how things are done, it is not individually learned. It is not related to risk and self-defense specifically in the context of speaking to authorities. Silence is not something you learn; it is someone you are (Mygind du Plessis, 2022). The data demonstrates how sensemaking and self-reflectiveness (as part of inward identity work) and the relational process of identity negotiation (as part of outward identity work) enable individuals to span knowledge boundaries. (Stoyanov & Stoyanov, 2022).

Leading by Doing is a practical involvement of managers in working in the field together with the employees (giving a personal example and showing the employees how tasks should be carried out).

Unlike other leadership approaches prevalent today among managers, which emphasize the verbal channel as a tool to motivate employees and raising business performance, the emphasis in Leading by Doing is on the behavioral channel, giving a practical example in the field as a tool to increase employee engagement, productivity, and service quality (Eldor, 2023). True leadership is leadership from within, closely connected to people, to the extent of leading from within them. The leader is the first to take on any duty and the last to claim any right. First in task, first in responsibility, and first in leadership. People observe the leader, their behavior, actions, way of life, and speech. They understand what is right and appropriate through the leader's deeds and actions, not through explanations of the correct way to behave. The leader is first among equals (*Primus inter pares*) (Hirsh, 2019). Leading society means being a "builder of watches, not a teller of time". Building society is the important thing, not the leader and their personality (Collins & Porras, 1995).

Through personal example (Modeling), we help our children establish their attitude toward other people, animals, plants, and natural treasures. We serve as a meaningful reference model for our children. A child who knows they have someone to rely on can develop a healthier personality (Rosenbaum, 2017).

To fulfill all the characteristics and values befitting a leader, an organization needs to cultivate an environment conducive to leadership. This includes creating an organizational climate, culture, and leadership approach that encourage and facilitate the growth of new leaders. A worthy leader is constantly engaged in the development and preservation of a leadership-fostering environment, driven by a sense of responsibility for the growth of the next generation of leaders (Hirsch, 2019). Parental leadership within the family facilitates a socialization process that promotes the desire and ability of children to later integrate into the workforce as adults (Pachkova, 2018). This process occurs both during vocational training and the onboarding process at a specific workplace (every workplace has its own dress code, behavior expectations, norms, etc., which the new employee must be aware of). A child who grows up in a family that respects laws and boundaries will be able to integrate into any other system, from kindergarten to school and youth movements, university, and the world of work (Rosenbaum, 2017).

Flexibility, adaptability, and the ability to cultivate one's network are central characteristics of successful individuals, preferred by those capable of navigating, establishing connections, and realizing their potential in dynamic organizations, at the expense of individuals who are not the individual requires assistance, and with answers on how to acquire security, achieve well-being, and succeed within new structural conditions (Mygind du Plessis, 2022, p. 87). However, relations among actors and changes regarding these relations are central to the governance of those fields and influence the actors' status and possibilities (Nicklich, Endo and Sydow, 2022).

Currently, the theoretical approach that views organizations as open social systems is widely accepted. An organization as an open system maintains ongoing interrelationships with its environment. At its core are reciprocal relationships: the acquisition of resources necessary for survival and functioning, and in return, the provision of products or services that the environment requires. This can be described as the conversion of inputs into outputs (Amit, 2012). Similarly, a family can be described as a system that converts inputs into outputs through conversion processes. Among the family inputs, one can include knowledge of household management and child-rearing, time, willingness, support factors (such as grandparents), and more. Among the conversion processes, one can mention parenting style, family structure, communication patterns, and so on. Family outputs can include, for example, a healthy child, an independent child, a happy child, and so forth.

In families where interactions occur in open and non-territorial spaces, parental roles are filled by the parent who is available at the time. This allows children to develop a richer personality (Rosenbaum, 2017), with self-confidence, self-belief, and emotional resilience.

Resilience is defined in developmental psychology literature as demonstrating competence in functioning (Owens, Stokes & Haskett, 2022).

1.4 Parental and Business Vision

Israeli companies are perceived as a "fun" place to work, and charismatic leadership is crucial to their success. These companies are visionary, achieving exceptional performance beyond the norm, in the long run (Collins & Porras, 1995).

Family functioning is considered an important indicator of family well-being and quality of life. It refers to how families meet their physical and psychological needs to maintain the family unit and thrive as a group (Fu Keung Wong, La Yim Lau, Sze Chan, Zhuang, 2022).

We live and function within a human community. We are social beings in need of a sense of belonging. We shape the image of society, and it is through society that we can feel a sense of belonging. Parents who establish a parental vision envision how their children will be in their adulthood and how they will perform various life tasks that each faces. They establish their parental vision by incorporating the most meaningful values for them to develop the desired future image. Values serve as benchmarks, criteria that determine what is right and wrong, what is correct and incorrect, and what is good and bad (Rosenbaum, 2017). Family Vision and parental leadership aim not to control children but to motivate each child toward the goal they define for themselves, taking responsibility for it willingly. In such a parenting style, goals and vision convey the message: "Here at home, we fulfill goals. Here, we initiate rather than react. A meaningful vision promotes significant success" (Duvdevani, 2023).

A parent who establishes a vision takes the initiative to promote it. The recommended educational methods to promote our parental vision encourage and promote the child's independence, responsibility, and a positive sense of self-worth. A child who can maintain positive and reciprocal relationships with the environment. Through interpersonal relationships, collaboration and significant achievements can be reached in the business field (Stoyanov & Stoyanova, 2022).

relations among actors and changes regarding these relations are central to the governance of those fields and influence the actors' status and possibilities (Nicklich, Endo, & Sydow, 2022).

Just as in organizations, rules and boundaries are essential for the proper development of children in a family. The family serves as an agency of connection, with its crucial role as the most significant educator of children, teaching them to function according to social codes and legal systems. In the family, the law is an obligatory expectation derived from the system, while boundaries represent the personal logic of an individual and define one's personal space. Family leaders are the parents, with their expertise and responsibility. Therefore, parents choose the rules by which the household operates (Rosenbaum, 2017).

According to Emery and Dillon, boundaries are explicit or implicit rules that define the structure of family relationships and the psychological space of an individual or a relationship. They safeguard the family's autonomy and subsystems by managing closeness and hierarchy (Eikrem and Sjøhelle Jevne, 2022).

Despite the differences between a family and a business organization, it has been observed that managers often strive to establish connections between them. Many managers aspire to develop a familial atmosphere and a family culture within the workplace, even though not everyone openly agrees with this notion. Each manager understands to some extent what a family culture entails in the context of the organization.

A harmonious and cohesive parental stance, rooted in understanding the needs of the child, serves as a compass for proper and respectful conduct by the parent, enabling the child to develop in appropriate conditions.

Parenting reflects the needs, emotions, and values of the parents. Values and personal style are not made of one mold (Omer, 2000, p. 103). In family management, it is the responsibility of parents to create and maintain a positive family atmosphere. This includes fostering open communication, promoting trust and respect, setting clear boundaries and expectations, and resolving conflicts constructively. Similar to parenting, leadership does not necessarily require choosing between option A or option B; one should not submit to "authoritarianism" when both option A and option B are available. The term "both" here replaces the "or," and successfully, one can choose both to achieve profit and gain, preserve the core ideology of the society, and implement significant changes (Collins & Porras, 1995).

Every individual desires to feel that they have an impact on their lives. The role of a parent is to mediate the demands of reality and enable the child to choose between options through reasonable flexibility. Instead of prohibiting and resorting to power struggles, our role as parents is to enable our children to feel empowered through contribution, usefulness, and cooperation (Rosenbaum, 2017). Sometimes, despite the desire to create stability, parents revolve around what they cannot control and help children cope with uncertainty by focusing on what they can provide, such as letting the child know they are loved (Rose & Co., 2022). Love is essential in leadership (Hirsch, 2019).

Managers in many organizations employ family and cultural models to create a sense of belonging and camaraderie among employees. They understand the importance of establishing a positive family culture within the organization to encourage trust, collaboration, and a stable working environment. A

positive family culture can foster an atmosphere of openness and support, which contributes to employee satisfaction, productivity, and overall organizational success.

2. Methods

My article focuses on theoretical analysis and does not include data collection but aims to develop a concept with potential implications for future research and behavioral change, my methodological approach is anchored in theoretical analysis. I aim to provide a strong theoretical basis for understanding the "managed family" while highlighting its potential for practical applications and future empirical research. This approach paves the way for a comprehensive investigation of the concept's impact on the field of organizational and family counseling and its potential to drive positive behavioral changes in the field of parenting and management.

2.1. Methodological approach: My approach is mainly theoretical and conceptually oriented, with the aim of laying the foundation for future empirical research and practical applications related to a positive and optimal environment for families and organizations.

2.2. Development of a conceptual framework - Literature review: My methodological approach begins with a comprehensive review of the existing literature in the fields of parental authority, psychology, sociology and theories in the field of management and human resources in the organization. I analyze relevant theories and concepts, such as socialization and social structures, social skills and relationships, leadership in family and organizational contexts and parental and business vision in order to identify gaps and potential connections that can explain the connection between the worlds of parenting and management.

2.3. Theoretical fusion: This review deals with theoretical fusion, blending concepts from diverse fields, such as psychology, sociology, and management theory. By combining these concepts, he provides a comprehensive framework for understanding the connections between family and organizational dynamics.

2.4. Implications and future research: While the primary focus of this review is theoretical, it offers practical implications. Organizations that aim to foster a sense of commitment and belonging among employees may benefit from adopting family structures or principles. Recognizing the emotional aspects of work relationships can lead to improved workplace dynamics and employee well-being. and how parents can apply their parental leadership in the workplace. As parents draw on managerial skills for family dynamics, family experiences lead to organizational contexts.

Future Research: The theoretical analysis presented here opens avenues for future research. Future studies can explore how management principles and leadership styles in organizations can be adapted from parenting models and vice versa. This indicates a potential for a two-way flow of knowledge and practices between the family and organizational domains.

In addition, future research could delve into the specific mechanisms through which family dynamics influence organizational behavior and vice versa. Understanding these mechanisms can lead to more effective organizational strategies and family support programs.

3. Results

The concept of "the managed family" serves as a theoretical framework for applying management principles to family dynamics. The research findings yield a comprehensive review, emphasizing several key issues. First, they emphasize the complex interrelationships between family and organizational structures in a managerial context. Second, they emphasize the significant role of managers in the workplace as well as of parents in the family in shaping employee behavior and values, which are aided by various psychological and social learning mechanisms, and ultimately influence the organizational culture and employee conduct. In addition, the study emphasizes the importance of recognizing common characteristics between family and organizational systems, emphasizing the influence of family experiences on management styles. Finally, the findings highlight the critical importance of fostering employee engagement and maintaining positive relationships in the workplace as in families.

Furthermore, the study highlights basic concepts and results. First, it delves into the complexity inherent in leadership, and includes various internal and external factors. Second, it emphasizes the central

role of parental leadership in families, which extends beyond care and includes establishing shared family values and guiding children towards meaningful goals. Finally, it addresses the universal principles governing the influence of leadership and adaptability in diverse contexts, emphasizing the relationship between parenting and leadership.

This comprehensive review provides a concise summary of the main contributions and insights derived from the theoretical review. Such an understanding has the potential to guide future research and practical applications in the fields of parenting and management.

family and organizational structures, even though they are different, show remarkable similarities, which enable the transmission of values and messages between them.

Summary of findings: Family and organizational, if we refer each of them as a social structure then they develop separately, simultaneously, and together.

In each of them, the leader plays a central role, both in family and organizational contexts. Effective leadership qualities and positive guidance in shaping behavior and values, driven by psychological and social learning mechanisms, ultimately influence organizational culture, employee behavior, as well as family atmosphere and family members. Achieving a balance between autonomy and setting boundaries is vital for the healthy development of individuals in both structures.

Both families and organizations. Influenced by communication patterns, power dynamics and relationships. Parental leadership is not only taking care of the family members, but it includes establishing common family values and guiding the children towards meaningful goals. As a good manager is not only a leader of the organization but also takes care of the vision and advancement of the employees and the system in which he works for significant achievements. In order to maximize the organization's potential and foster a functioning family, it is essential for leaders in both contexts to encourage involvement and maintain positive relationships, both in the workplace and within families.

4. Discussion

The strength of the family lies in meaningful emotional relationships among its members. However, at times, family members may struggle to deal with conflicts in an objective manner due to an excess of emotional involvement. Emotional dependence among family members and the intensity of their relationships can turn everyday conflicts into major and unproductive disputes. Discussions around decision-making topics may deteriorate into mutual blame due to personal sensitivities within the family.

Therefore, an approach that focuses on relevant content within the family and enables decision-making on practical matters is necessary. Modern management is characterized by an objective, task-oriented approach rather than emotional relationships. Organizational management emphasizes objective goals external to the organization's members, such as product production, development, and marketing. It is understood that emotional conflicts are prevalent in organizations. Competition, power struggles, jealousy, fear of failure, fear of layoffs, aspiration for power, and more, are potential motives for conflicts. In such situations, employees are called upon to focus on achieving the common objective and adopt an objective-oriented approach. The fear of losing one's job security, personal boundaries, incentives provided to employees, enjoyment of work, shared sense of success, and more, all enable employees to focus on shared work content and coexist reasonably despite tensions and conflicts. Practical issues can be resolved even amidst interpersonal tensions.

In the modern family, parents often struggle with their ability to guide the way due to the ambiguity of societal expectations for a democratic approach within the family, the proliferation of educational-psychological messages, and the decreasing dependence of children on their parents in a society characterized by open mass communication. In such circumstances, concerns about family dispersion and disintegration have grown.

Therefore, it is necessary to adopt an approach that teaches parents to utilize more effective tools for democratic and inclusive family management.

In contrast to traditional management, which was authoritative, hierarchical, and rigid, modern management is significantly more democratic, participatory, and flexible. The reasons for this shift are intriguing but beyond the scope of this discussion. Nevertheless, the image of the manager as a police officer, inspector, and organizer has now significantly transformed into that of a coach, educator, and facilitator. The contemporary workplace is characterized by a new language of collaboration, empowerment, employee involvement, shared leadership, and quality teams. Organizations encourage

employees to increase their skills while adopting growth interventions and policies to foster employee development (Rogers, Siegel Christian, Jennings, and Lanaj, 2023).

Conclusion

The social and economic changes that have occurred in recent decades have made the management of work and family life closely linked, which has led researchers to pay more attention to the different forms of integration between work and family.

One of the aspects of this integration concerns the work-family interface. That is, the connections between the activities, attitudes and interpersonal relationships defined for the field of work and characteristics in the family.

Initially, the studies in this area focused mainly on work-family conflict, according to which participation in the work context made it difficult to participate in the family, but recently, researchers also discovered the positive effects of combining work and family functions.

Following this development, the structure of work-family enrichment emerges, emphasizing the fact that resources accumulated at work promote better family performance, and therefore, personal quality of life (Gabardo-Martins, Ferreira & Valentini, 2023).

The relationship between the family and the organization offers important insights into management and leadership practices. By recognizing the parallels between these two systems, people can leverage their knowledge and experience in one area to enrich their abilities in the other. Understanding the role of the family in socialization and the principles of managing the family unit can provide effective leadership strategies within organizations. Moreover, adopting the values of presence, dialogue and mutual support found in families can contribute to a positive organizational culture and employee satisfaction. By combining the wisdom gained from the family context, employees, managers and leaders can create cohesive and thriving organizations.

An intense family life engulfs the parents, with ongoing, routine, and overwhelming management. The ability to adapt, renew and change is essential in family management, just as it is essential in advanced organizational management. Innovation and creativity can help the process of renewal and change. A parent who can perceive parenting and his family from a fresh perspective, making connections between their family experiences and professional encounters, is about to embark on a creative and enriching journey. By tapping into a wellspring of personal perceptions, experiences, skills, and ideas, they can integrate and augment aspects of their personal and professional narratives. Throughout this transformative process, both personal growth and personal development occur within the family unit.

This study contributed to my understanding of how parents can help and use family dynamics by learning from their experience and knowledge from the professional field and their role as employees or managers and vice versa.

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3. Business and Marketing

The Companies' Attitude towards the Fairtrade Social System

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Abstract

Research background: The article focuses on the social concept of Fairtrade for micro, small, medium and large enterprises in selected EU countries with a focus on the Czech Republic. 14 out of 37 companies were included in the sample. The research was conducted in the form of CAWI in the autumn of 2021.

Purpose of the article: The main objective of the article is to analyse the benefits and limitations of the involvement of companies in the Fairtrade system and to determine the attitudes of the companies involved in this system.

Methods: To meet the sub-objectives, an analysis of platforms of European countries that are part of similar Fairtrade platforms and represent their business or licensing partners was compiled. To uncover the benefits and attitudes of the companies themselves, a marketing questionnaire survey was conducted. The chosen quantitative research method was CAWI, which is a method of data collection through online surveys.

Findings & Value added: Most European companies categorise their business partners into commodity areas (coffee, cocoa) or into their field of activity (manufacturer, wholesale, retail, etc.). Despite the different structure of the European platforms compared to the Czech platform, this does not change the fact that companies' approaches to fairtrade issues are not based directly on increasing competitiveness, but on helping disadvantaged producers in developing countries. In this case, the results of the questionnaire survey suggest a greater involvement of smaller companies, which, beyond helping disadvantaged producers, are also interested in gaining new customers.

Keywords: fairtrade, analysis, survey, certification, companies

JEL classification: F18, L20, L21, Q01

1. Introduction

Fairtrade is one of the trading systems that have emerged in the last few decades to promote sustainable agriculture in developing countries. (Petersen, Snapp, 2015) According to De Pelsmacker and Janssen (2007), Fairtrade is an alternative trading approach that aims to offer better trading conditions to discriminated producers and workers in developing countries. Fairtrade has a positive social impact on farmers and workers in developing countries by supporting improvements in their living and working conditions (Becchetti & Costantino, 2008; Valkila, Haaparanta & Niemi, 2010). Fairtrade ensures a minimum income that covers the cost of sustainable production while providing a premium for investment in community development (Nicholls & Opal, 2005). Specifically, Fairtrade certification provides smallholder farmers with higher prices, access to pre-financing, protection against price volatility, and price premiums that enable them to adopt sustainable agricultural production techniques. (Borsky and Spata, 2016) To access these benefits, farmers must comply with certain requisites of environmental and socioeconomic measures and regulations for "sustainability". (Makita, Tsuruta, 2017) Socioeconomic measures aim to increase smallholder income stability, strengthen farmer organizations, and improve farmers' access to markets on more equitable terms. The means by which Fairtrade attempts to achieve more equitable conditions includes paying higher and therefore 'fair' prices to producers in developing countries, enabling these

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producers not only to increase their income but also to develop their skills and knowledge and to benefit their communities and to improve the environment. (Rosen, Kishawy, 2012)

Fairtrade is understood according to DeCarlo (2011:2), as a trade partnership based on a two-way dialogue between producers from so-called developing countries and their partners from developed countries. Long-term collaborations are a prerequisite to ensure the transparency of the whole relationship. According to Hunt (2012), the main essence of this system is the grouping of individual farmers from developing countries under single producer organisations, which significantly strengthens the bargaining position vis-à-vis large traders whose demand is usually to buy large quantities of production. Chambolle and Poret (2013) explain the fairtrade system as a vertical communication between producers (farmers) and spot market distributors who sell finished products. Fairtrade, according to Manning et al. (2012), is an innovative value chain that aims to provide higher economic value and social benefits to primary producers in less developed countries through international trade in food, beverages and domestic products. According to Renard (2005), sales of Fairtrade certified products, which were previously limited to specialised markets, are growing rapidly and are now sold through mainstream channels. According to Andorfer and Liebe (2012), research on Fairtrade products has so far mainly focused on consumer attitudes following a theoretical approach based on social psychology and sociology. (Chatzidakis et al., 2007; Doran, 2010; Hwang and Kim 2018)

However, the issue of business involvement in the Fairtrade system, which is the focus of the paper, is not well addressed in the literature. The aim of the paper is to understand and map the views, attitudes of companies involved in the Fairtrade system on its benefits and limitations.

2. Methods

The main objective of the article is to analyse the benefits and limitations of the involvement of companies in the Fairtrade system and to determine the attitudes of companies involved in this system, with a focus on the Czech Republic. A sub-objective is to compile an analysis of platforms of European countries that are part of similar Fairtrade platforms and represent their business or licensing partners and to conduct quantitative marketing research in the form of questionnaires aimed at mapping their opinions, attitudes and real benefits of selected companies involved in the Fairtrade system and to create profiles of major companies involved in the Fairtrade system.

The authors based the following research assumptions in pursuit of the paper's objective:

- In the Czech Republic, the representation and structure of companies is different than in other selected European countries.
- The main reason for small companies to join the certification is to increase their production.
- The benefits of Fairtrade certification for companies are based on the possibility of gaining new business partners.
- Higher representation is given to firms that trade mainly in finished products in the Czech Republic.

The following methodological approach was chosen to meet the objective of the paper:

1. Definition of basic approaches to the problem of the article, based on the current state of knowledge of the problem at the theoretical level.
2. Specifying the aim of the article and the corresponding research method.
3. Compiling an analysis of platforms of European countries and conducting marketing research based on questionnaires.
4. Data analysis and evaluation.
5. Discussion
6. Conclusion

In line with the methodological approach, an analysis of the structure of the platforms of European countries was carried out in 2020, based on available resources. These platforms communicate Fairtrade issues and also provide information on a database of companies that have been certified and offer or broker Fairtrade products. The list of countries was taken from the Fairtrade International website (fairtrade.net). The greatest benefit of the analysis is its applicability to different types of textual data, but also its adaptation to the research design. (Hendl, 2009)

In addition to the above analysis, quantitative marketing research was carried out. The marketing research was conducted in accordance with the procedure according to Preston (2009). The main characteristics of marketing research may include its uniqueness, high telling power and timeliness of the information obtained.

(Gaál et al, 2021) According to Affek et al (2019), the main focus is on objectivity and systematicity in the design of the plan and the actual implementation of marketing research, which does not use a single method but is a combination of methods and information obtained from multiple sources independent of each other. The marketing research instrument was a questionnaire containing a total of 12 questions. It was a combination of open, semi-open and closed questions. Data was collected online through a request sent to a specific company. The questionnaire was focused on the database of Fairtrade Czech Republic and Slovakia platform companies, which at the time of data collection contained 37 companies. Of the 37 companies, 14 companies completed the questionnaire. The resulting sample is relatively small in terms of the number of respondents, which is due, among other things, to the small size of the population. It represents 37 % of the companies contacted. These are small, medium and large companies operating on both the domestic and international markets for a long time.

3. Results

3.1 Analysis of European country platforms

In order to evaluate the research assumption whether the representation and structure of firms in the Czech Republic is different than in other selected European countries, it was necessary to analyse the platforms of European countries. From the available Fairtrade International resources, European countries that have established a Fairtrade platform were analysed. From the websites of these platforms, the number of trading companies per platform and the breakdown by product offering were identified for some countries. This method varied with some platforms only listing their partner companies, while others classified these companies into different forms according to the commodities traded (coffee, cocoa, tea, sugar, bananas, etc.) or according to the service provider in the form of wholesalers, retailers, online shops. The structure and number of firms participating in the Fairtrade platform is shown in Table 1.

Table 1. Structure and number of companies in platforms in selected European countries

country	number of companies	division by form	
		product categories	service providers
Belgium	105	yes	none
Denmark	26	yes	none
Finland incl. Baltic States	59	yes	none
France	340	yes	yes
Germany	127	yes	yes
Ireland	58	none	
Italy	27	yes	yes
Luxembourg	30	yes	yes
Netherlands	249	yes	none
Norway	146	yes	none
Spain and Portugal	73	yes	none
Sweden	35	yes	
Switzerland	324	yes	yes
United Kingdom	155	yes	yes
Czech Republic and Slovakia	37	none	
Poland	56	yes	yes
Austria	118	none	

Source: Šalamoun (2020)

Table 1 shows that the structure of firms in other countries differs compared to the structure of firms in the Czech Republic. This may be due to historical aspects, in other words, a deeper perception of fair trade issues. Under the label Division by form, there is a categorization of products such as coffee, cocoa, tea, sugar, dry fruits, cosmetics, cotton, alcohol and service providers, which include retailers,

wholesalers, shops providing online services, etc. Of the 17 country groups, it was found that 9 of them have a form within their platform, either based on product categorization or service provider. Another difference in the comparative structure of companies in our country and abroad may be the fact that many companies are perceived locally abroad (such as Lidl in Germany) compared to our international perception.

Table 2. Number of Fairtrade companies per 1 million inhabitants

country	number of inhabitants (in millions)	number of companies	number of companies/one million inhabitants
Belgium	11,46	105	9,162303665
France	66,99	340	5,075384386
Germany	83,02	127	1,529751867
Ireland	4,904	58	11,82707993
Netherlands	17,28	249	14,40972222
Norway	5,433	146	26,87281428
Switzerland	8,57	324	37,80630105
United Kingdom	66,65	155	2,325581395
Czech Republic	10,69	36	3,367633302
Poland	37,97	56	1,474848565
Austria	8,859	118	13,31978779

Source: Šalamoun (2020)

Table 2 shows the differences in the number of Fairtrade firms per million population. Switzerland has the largest representation, followed by Norway, the Netherlands, Ireland and Austria. Further, the differences are not very large for foreign firms and this may stem from various reasons. For example, the smallest differences are for Germany, France and the UK. Although there is relatively high purchasing power, similar to Switzerland, Norway, the per million population ratio is still quite low. For this trio of countries, we believe that there will probably be other similar platforms.

3.2 Evaluation of quantitative marketing research

This research was carried out online by contacting Fairtrade partner companies of the Fairtrade Platform Czech Republic and Slovakia focused on their fairtrade operations. A total of 14 completed questionnaires were received. The completed questionnaires include not only micro and small enterprises, but also medium and large international companies with operations in the Czech Republic. The research sample will be presented first - it was an exhaustive survey as representatives of all Fairtrade Czech Republic and Slovakia platform partner companies were contacted.

Composition of the sample of respondents by company size

The size of enterprises was monitored according to the number of employees, in accordance with the criteria for the classification of a specific enterprise set out in Annex I to Commission Regulation (EC) No 800/2008.

For the sake of clarity in the following text, companies have been classified into different categories, precisely on the basis of size. Henceforth, only these categories will be used:

Table 3. Companies size categories

micro	1-9 employees
small	10-49 employees
medium	50-250 employees
large	over 250 employees

Source: own processing (2022)

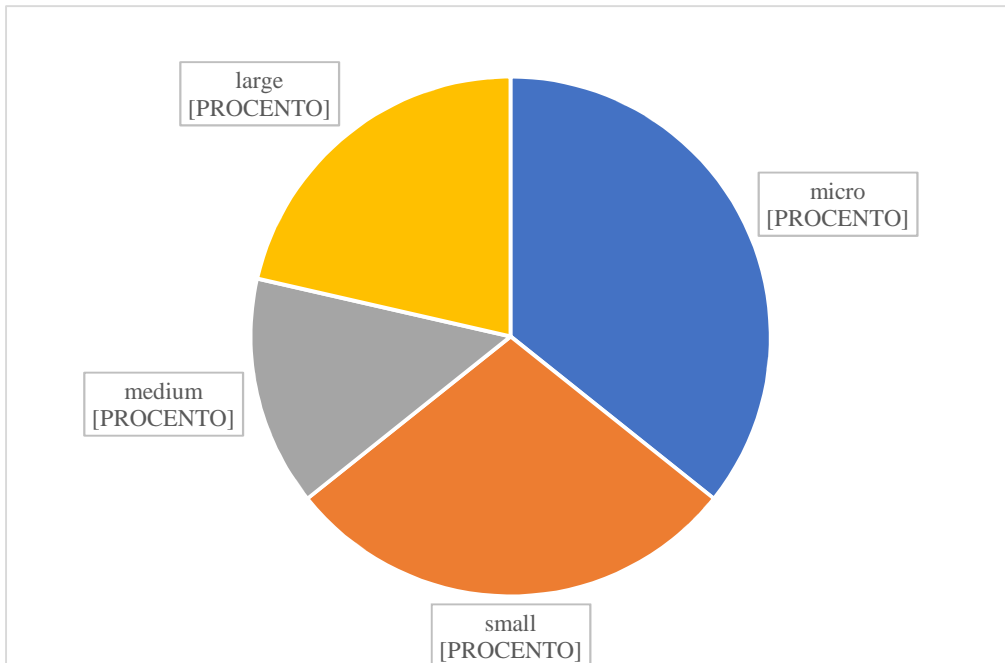


Figure 1. Structure of the research sample by size of companies
Source: own processing (2022)

Figure 1 shows that the research portfolio consisted of micro enterprises - 36% of the total 14 respondents and small enterprises - 29%, medium enterprises accounted for about 14% of the respondents and 21% of the respondents belonged to the large enterprise category.

Reasons for and expectations of Fairtrade certification

In order to fulfil the aim of the article, it was also necessary to find out what the reasons and expectations of Fairtrade certification are for individual companies. Some partial conclusions can be drawn from the results, which reflect the implications of certification for new entrants to the market.

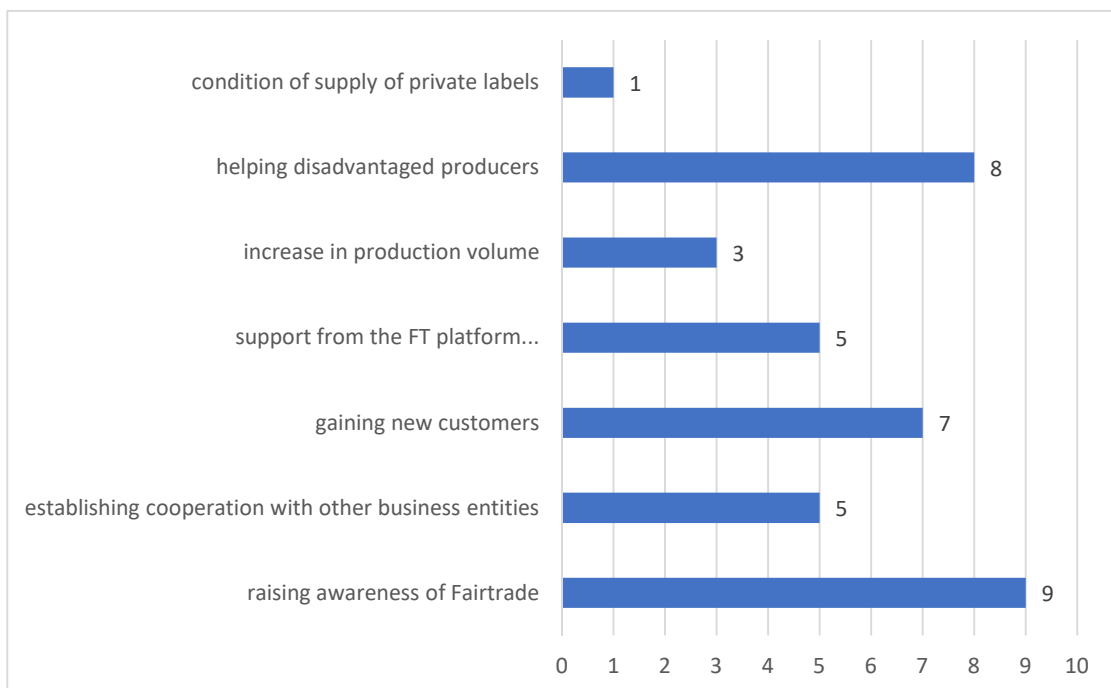


Figure 2. Fairtrade certification, reasons and company expectations
Source: own processing (2022)

In order to analyse the individual reasons or expectations of Fairtrade certification for respondents in more detail, it was necessary to identify the reasons and expectations of certification for firms according to their size based on pairwise analysis.

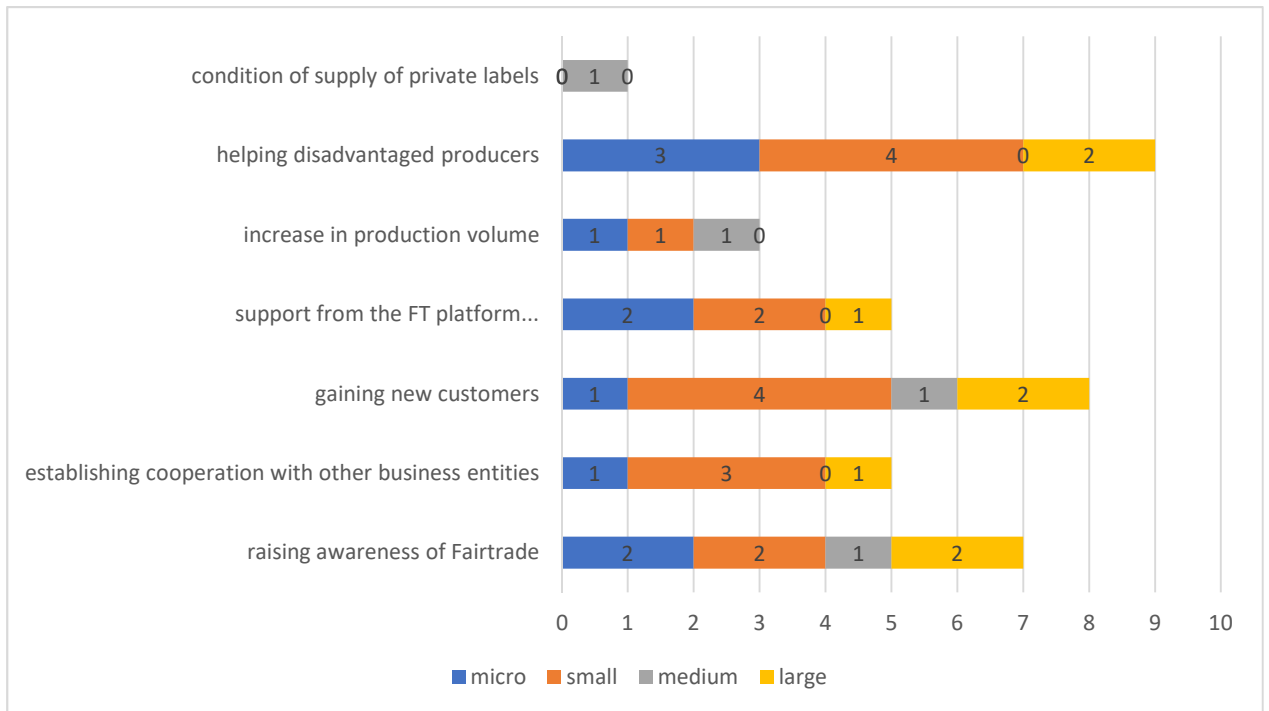


Figure 2.1 Comparison of reasons for and expectations of Fairtrade certification by company size
Source: own processing (2022)

The reasons and expectations for Fairtrade certification tend to be more on the side of micro and small businesses. However, a significant expectation of most businesses is to help disadvantaged producers in developing countries. This reason is further reinforced by the coronavirus pandemic, resulting in the reality of weakening business relationships between Fairtrade commodity producers and intermediaries to customers and final consumers.

It can also be noted in the graph that the reason for certification is also to attract new customers. This was most pronounced for small enterprises and for large enterprises. It can be seen that even large enterprises are concerned about gaining new customers, if only because they are constantly strengthening their range of fairtrade products.

Such a balanced reason or expectation from Fairtrade certification is to gain awareness of Fairtrade. Of course, businesses offering Fairtrade products, have at least a basic awareness of Fairtrade, but have responded in terms of increased interest in regular or more detailed information about this social certification.

Benefits of Fairtrade certification from a business perspective

In this part of the thesis I come to the main issue, on the basis of which the aim of the thesis is also defined, which should reveal, on the basis of the analysis, the possible steps for entering companies into the certification process itself, or checking the possibilities whether the certification system can be recommended for new companies entering the Fairtrade concept.

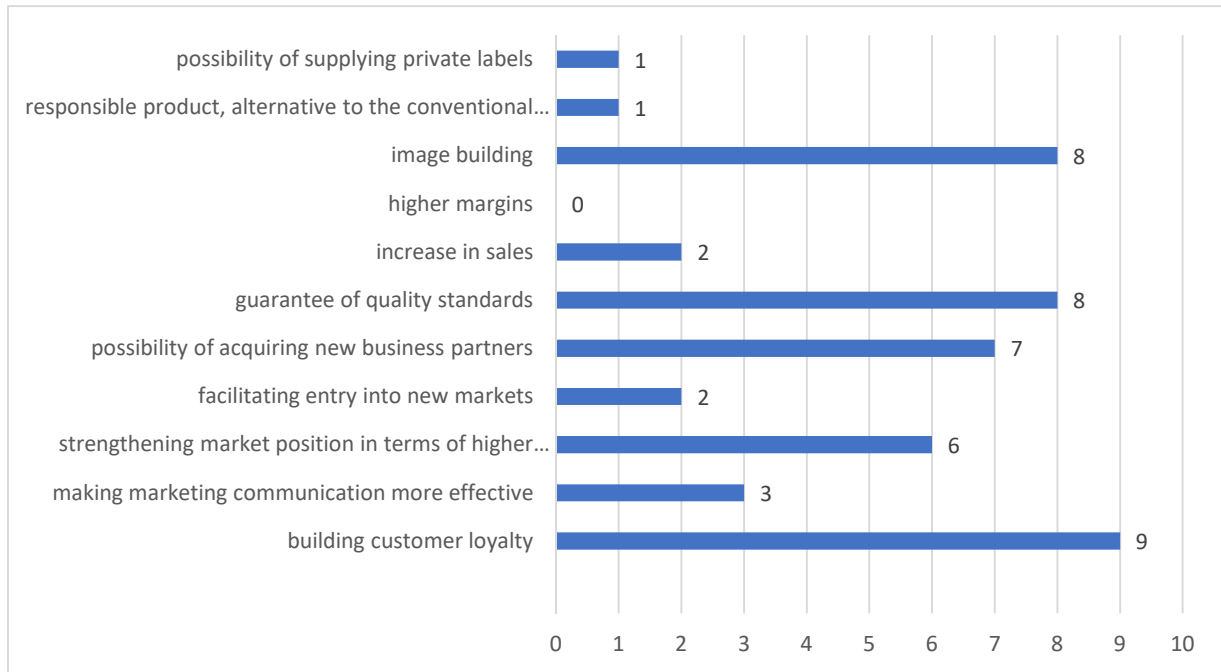


Figure 3. Benefits of Fairtrade certification for compenies
Source: own processing (2022)

Since the benefits differ across categories of firms, it is necessary to use pairwise analyses to evaluate the benefits for different sizes of firms.

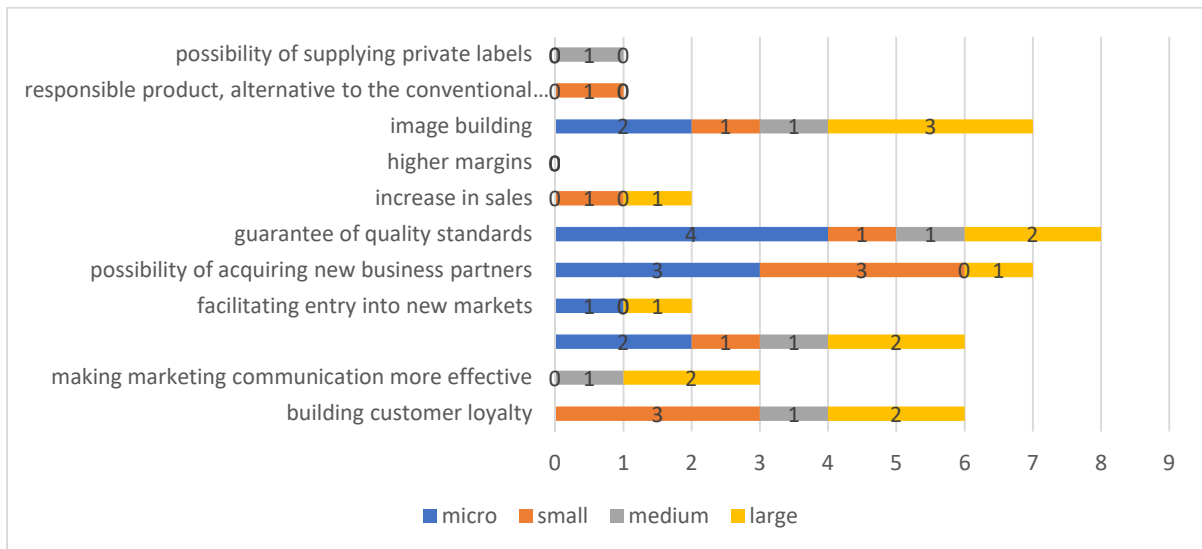


Figure 3.1 Comparison of the benefits of certification by companies size
Source: own processing (2022)

The benefits of Fairtrade certification for businesses are perceived more significantly by micro-businesses. From the number of different answers in the questionnaires, the majority of respondents belong to micro companies. From this it can be concluded that the entry into the certification process is likely to be significant for micro companies. On the other hand, even large companies perceive this possibility as a certain advantage or help for the visibility of a product category. In addition to micro companies, small companies are also standing out in this matter, so it could perhaps already be partially concluded that the certification system can be recommended for smaller companies entering the Fairtrade concept. On the other hand, medium-sized enterprises do not find much advantage in certification for their inclusion among licensing partners.

In general, it can be seen from the graph that the areas of building customer loyalty, guaranteeing quality standards and image building are of the greatest importance for businesses to Fairtrade certification.

Image building or corporate image enhancement is of course a goal of most organisations, whether profit or non-profit. However, within the general concept of corporate social responsibility, this should not be the most important issue, but it should not be neglected either.

The answer offered by the "higher margin" option was not selected by any respondent. The question therefore remains whether this option is not subject to certification or whether it is just perceived as such.

Only for a small percentage of responses can we notice the impact of certification on 'increased sales'. This response was noted for small and large companies.

Business activities of the sample companies

This result uncovered established relationships between what firms produce, use, import, trade and what does not concern them.

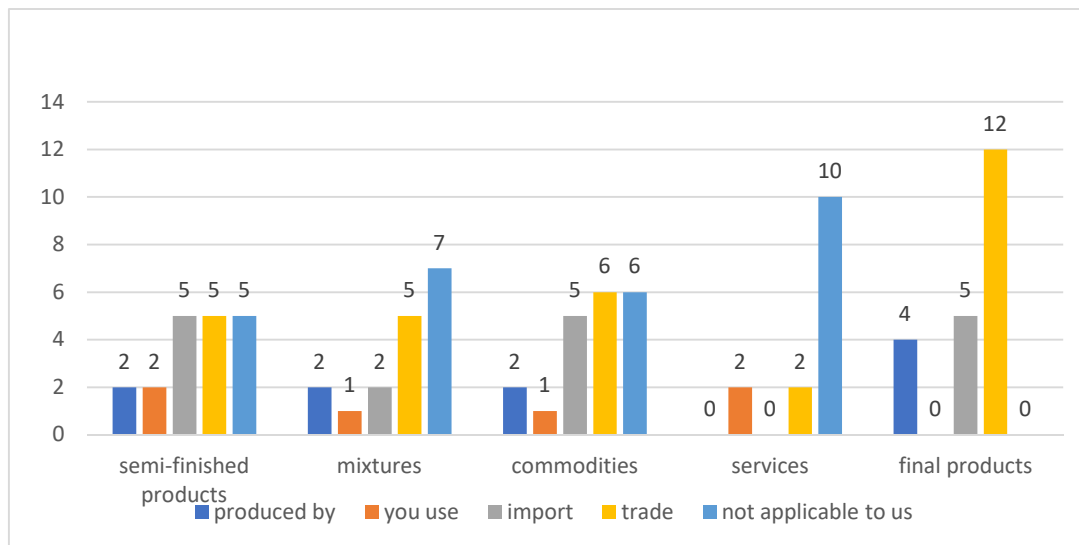


Figure 4. Business focus of the companies in the research sample
Source: own processing (2022)

At first glance, it is clear that the firms in the sample are on the one hand the most active in final products and on the other hand the least active in services. This finding may suggest that there is little awareness of fairtrade production on the part of firms.

4. Discussion

Two applied methods were used in this paper: platform analysis of European countries and marketing research. The applied methods were carried out with local and temporal differences and their focus also differed. The applied methods aimed not only to gain important insights into attitudes towards the Fairtrade system, but also to fulfil, among other things, the objectives of this paper, to confirm or refute the research assumptions.

In the Czech Republic, the representation and structure of companies is different than in other selected European countries.

On the basis of the analysis of firms from European countries, it can be confirmed that the structure of firms in the Czech Republic is different compared to firms from abroad. The structure differs both in the number of firms in individual countries, where the number itself is exceeded by up to three or four times, as is the case, for example, in Great Britain, Switzerland, Austria, Germany, the structure differs in comparison with individual products and there are also differences in the number of Fairtrade firms per one million inhabitants. The difference can also be seen, according to Csikszentmihalyi (2000), in ethical consumption as a way for European consumers to take responsibility and become more involved in sustainability, which nowadays allows them to address the contradictory idea of an ever growing market and the limited resources of the planet. This may also be the reason for the different structure

of companies in the Czech Republic compared to other companies in European countries. The fact that firms in the Czech Republic are different in terms of representation and structure than in other selected European countries may also be based on the historically long-lasting operation of the planned economy in the socialist establishment between 1948 and 1989. These more than forty years may still have an impact on the current behaviour of firms and consumers.

The main reason for small companies to enter certification is to increase their production.

In the case of this assumption, we conclude that the main reason for small firms to enter certification is not to increase their production. This reason does not emerge from the other firms (micro, medium and large) either. Therefore, this assumption can be refuted because the main reason is to gain new customers and help disadvantaged producers.

The benefits of Fairtrade certification for companies are based on the possibility of gaining new business partners

In the case of this assumption, the research did not lead to a clear confirmation or refutation, because the results of the individual categories often showed very similar values, such as: building customer loyalty and image, guaranteeing quality standards and also the possibility of acquiring new business partners. Fairtrade certification often helps farmers in training, apprenticeship and input supply. (Sellare et al., 2020a) One study has shown that Fairtrade certification is associated with higher production prices and higher incomes for smallholder farmers in many situations. (Dragusanu et al., 2014) Several other studies have also shown positive effects of certification on overall household living standards. (Becchetti et al., 2012) However, higher prices of certified Fairtrade products in markets are not always sufficient to increase household incomes and living standards. (Beuchelt and Zeller, 2011)

Higher representation has companies that trade mainly with final products in the Czech Republic.

In order to evaluate this assumption, relationships were established between what firms produce, use, import, trade and what they do not.

Since firms mainly trade in final products, this assumption can be confirmed. The general trend in some European countries is to produce or process final fairtrade products alongside trade in them. In the Czech Republic, we are more likely to encounter trade in final products themselves.

The overall limit of the paper can be considered to be the sample used for the purpose of evaluating the questionnaire survey, which is relatively small. Of the 37 companies contacted, only 14, or 38%, were able to obtain data. In this case, we focused on specific companies operating in the fairtrade sector. For the selection, we relied on the available sources reported by the Fairtrade Czech Republic and Slovakia platform, which lists these entities as business partners in the Czech Republic. Also because they are business and licensing partners of the platform, we also thought that the return would be slightly higher. Nevertheless, the companies in the research sample include very important companies with an annual turnover of tens of billions of crowns, especially in the area of consumer goods.

A recommendation for companies could be to participate jointly in the ESG methodology, or Environment, Social and Corporate Governance. This is a relatively young discipline that seeks to invest in companies that are socially responsible to their environment, their employees, their shareholders, and overall to all stakeholders that shape the operation of the company (Jamali et al, 2017).

Conclusion

The article focused on mapping the attitudes, opinions and benefits of the Fairtrade concept by manufacturing or trading companies on the Czech and international market. The idea is based on the mission of the concept itself, i.e. the need for an ever-increasing level of sustainability and mediated fair trade. The Fairtrade concept brings many benefits throughout the supply chain. However, it supports the most vulnerable links, i.e. the growers and producers of Fairtrade products. They are entitled not only to a fair price for their work, but also to other social benefits such as educational support. It is the complexity of the whole Fairtrade concept that makes it stand out, but this complexity also brings with it the obstacle of the difficulty of entering the system.

The aim of the article was to analyse the benefits and limitations of the involvement of companies in the Fairtrade system and to determine the attitudes of companies involved in this system. In order to fulfil

the aim of the article, it was necessary to create an analysis of the platforms of European countries and to carry out a questionnaire survey.

The analysis of platforms in European countries has clearly demonstrated the relationships and attitudes of European platforms towards companies in comparison with the platform in the Czech Republic. Based on the analysis of firms from European countries, it was possible to confirm the assumption that the structure of firms in the Czech Republic is different compared to firms from abroad. The structure differs both in the number of firms in individual countries, where the number itself is exceeded by up to three or four times, as is the case in the UK, Switzerland or Austria.

The scope of the research carried out by questionnaire survey was to address all partner companies of the Fairtrade Czech Republic and Slovakia platform, focused on the operation in the field of fairtrade. Thus, the entire core group was contacted, which, however, only includes 37 companies. A total of 14 completed questionnaires were received, which gives a return rate of almost 40%. With a small base set, it goes without saying that the total number of respondents included will not be very high. However, it is important to have a sufficiently diverse composition of the research sample, as the respondents include not only micro and small enterprises, but also medium and large international companies with operations in the Czech Republic.

The marketing research shows that the main reason for companies to enter certification is not only to increase their production, to increase their own image, but mainly to support disadvantaged producers, which was especially evident in small companies. It was also found that the benefits of Fairtrade certification for firms are based, among other things, on attracting new business partners, both from the Global South and the Global North. The paper examined the differences between the Czech Republic and other countries in the European Union. The results show that the difference is not only in the structure of firms according to the Fairtrade Czech Republic and Slovakia platform, nor per million inhabitants, but also in the representation of the firms themselves, which in the Czech Republic trade mainly in final products.

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Willingness of Consumers to Undergo Neuromarketing Research

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Abstract

Research background: The gradual introduction and use of medical devices in marketing research has led to the emergence of a separate discipline called neuromarketing. The willingness of consumers to become respondents to neuromarketing research is often paralyzed by ignorance and fear of the unknown.

Purpose of the article: The objective of this paper was to investigate in which cases the respondents would be willing to participate in neuromarketing measurements. When examining this willingness, the age of the respondent, the type of research (in terms of the purpose of using the obtained data), and the proposed neuromarketing methods that the respondent should undergo were taken into account.

Methods: Two hypotheses were established and statistically verified using the data from a questionnaire survey. According to the first hypothesis, the respondents' willingness to participate in neuromarketing research relates to their age. The premise of the second hypothesis was that there are statistically significant differences between generations in the willingness to participate in the neuromarketing research.

Findings & Value added: The results showed that younger respondents are more willing to participate in the neuromarketing research than the older ones. At the same time, differences between the generations in the willingness to participate in such research studies were demonstrated. Generational differences in terms of willingness to participate in the research were not demonstrated when taking the defined neuromarketing methods into account.

Keywords: age differences, consumer generations, neuromarketing, willingness, innovative methods

JEL classification: D12, E71

1. Introduction

As Lee, Butler and Senior (2010) accentuate, application of neuroscientific tools and a neuroscientific way of thinking to business problems will, undoubtedly, have a major impact on the way we understand marketing and business in the near future. Gonchigjav (2016) adds that „business companies' leadership have become aware of the importance of this science and see marketing as business philosophy and understand that analyzing the market, business environment and conditions by consumers is the key to success“.

A number of scientists (e.g., Schafer, 2005; Walton, 2004; Petty & Cacioppo, 1983) agree that the traditional method of obtaining data through a questionnaire survey does not provide accurate and truthful information. Morin (2011) also points to the lack of traditional research, which depends primarily on the will and abilities of the subjects, and then a description of how they feel when they are exposed to advertising, when they decide to buy goods or services or when they consume this product. The research participants have to verbalize their answers, which leads to some distorted data within their expressive abilities. Aydınođlu and Sayın (2016) state that concerns about the inaccuracies of traditional surveys have led to the use of different techniques aimed at measuring the physiological responses that accompany the affective, conative, and cognitive processes that consumers undergo.

Concerning these issues, the paper describes a non-traditional, or innovative perspective of conducting a survey, particularly in the context of neuromarketing, which is defined in the following section.

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1.1 Theoretical background to neuromarketing

The gradual introduction and use of medical devices in marketing research has led to the emergence of a separate discipline called neuromarketing. Neuromarketing is defined as a field of study that uses the application of neuroscientific methods to analyze and understand human behavior in relation to markets and market changes (Lee et al., 2007; Ariely & Berns, 2010; Morin 2011; Babiloni, 2012). Neuroeconomics as well as neuromarketing use clinical information about brain functions and mechanisms to help explain what is happening inside the black box, leading to an explanation of consumer behavior (Fugate, 2007; Eser et al., 2011). According to Khushaba et al. (2013), consumer neuroscience combines neuroscience, psychology, and economics to study how marketing and advertising strategies physiologically influence the brain. It is an interdisciplinary field that acts as a tool for obtaining data about the customer, how, where, and in what environment they prefer to shop, and where they spend the most money and time shopping (Dooley, 2012).

Examining a number of different definitions of neuromarketing, de Oliveira and Giraldo (2017) compiled a merging definition: "Neuromarketing is an interdisciplinary field of science that uses various tools traditionally used in medicine, psychiatry and psychology on neurofeedback, biofeedback and metabolic processes measures, in conjunction with traditional marketing tools in the search to better understand the most diverse types of emotions, cognitions, physiological reactions, behaviors and thoughts of economic agents, both conscious and unconscious related to typical issues of Marketing and its various sub-areas".

Lim (2018) mentions five key aspects in defining neuromarketing: 1. interdisciplinarity – the nature of the knowledge on which neuromarketing is based and which develops in it; 2. neuroscientific methods – types of methods used in neuromarketing; 3. studies on the brain and nervous system – results from the use of neuromarketing methods; 4. understanding instinctive human behavior in applied marketing environments; 5. conceptual and managerial implications for marketing theory and for planning and implementation of marketing strategies – impacts of the results of neuromarketing studies.

Lindström (2009) argues that neuromarketing is a tool for finding out what a customer thinks about products or specific brands. Through neuromarketing, we can also detect unfair business practices of traders. Neuromarketing tries to explain why and how what consumers tell us in research differs from what they actually do. The implicit approach also shows advantages over the explicit in the form of not obtaining information through the "question and answer" system and thus minimizes possible mutual misunderstanding between the researcher and the respondent.

Neuromarketing is thus characterized by the use of special tools to examine human behavior, which are currently as follows:

- Positron emission tomography – PET (Hsu, 2017);
- Functional Magnetic Resonance Imaging – fMRI (Harrell, 2019);
- Electroencephalography – EEG (Sebastian, 2014);
- Eye tracking (Krafka et al., 2016);
- Heart rate and respiration (Gorgiev & Dimitriadis, 2015);
- Galvanic skin response – GSR (Orzan et al., 2012).

The willingness of consumers to become respondents to neuromarketing research is often paralyzed by ignorance and fear of the unknown. As the most common reason for potential respondents not to participate in the research, several authors state that their free will would be jeopardized, thereby violating their personal privacy to a completely unacceptable extent (Wilson et al., 2008; Stanton et al., 2017). Non-invasive techniques, such as brain scan research, have also a slightly negative reputation. Moore (2005) claims this may be one of the reasons of possible unwillingness of respondents to participate in market research studies.

2. Methods

The aim of the paper is to examine the willingness of consumers to undergo neuromarketing research in terms of age and in terms of type of research (purpose of data use and type of measurement method).

Based on the aim, two hypotheses were formulated:

- H1: The willingness to participate in neuromarketing research is statistically significantly related to the age of the consumer.
- H2: There are statistically significant differences between generations of consumers in their willingness to participate in neuromarketing research.

The data for verifying the hypotheses were obtained through an online questionnaire survey, which took place in March 2022 among Slovak consumers.

The research sample was selected by non-probability (occasional) selection. The sample consisted of 192 respondents, of whom 86 (44.8%) were men and 106 (55.2%) women. The average age of the respondents was 34.47 years (min. = 19, max. = 81, SD = 11.983). In terms of education, 108 (56.3%) respondents completed secondary and 84 (43.8%) higher/university education. To find out how the age groups differ in terms of the researched issue, we created age categories based on the marketing division of generations, as reported by Shams et al. (2020):

- Baby Boomers – year of birth before 1965 (in 2022: people aged 58 and over);
- Generation X – year of birth 1965-1979 (in 2022: people aged 43-57);
- Generation Y – year of birth 1980-1994 (in 2022: people aged 28-42);
- Generation Z – year of birth after 1994 (in 2022: people under the age of 27).

An own questionnaire was used to collect data which examined the degree of willingness to participate in neuromarketing research from two perspectives:

- neuromarketing methods used: brain scanning, biometrics, eye tracking,
- purpose of using the obtained data: medicine, science, military forces, marketing.

These investigated variables were selected based on the results of our previous research (Birknerova et al., 2022), where they proved to be significant parameters in the evaluation of respondents' willingness to participate in neuromarketing research. The questionnaire consisted of 3 demographic items (gender, age, education) and 12 survey items.

Respondents had the opportunity to respond to the questionnaire items in terms of the following Likert scale: 1 – strongly disagree, 2 – partially disagree, 3 – neutral, 4 – partially agree, 5 – strongly agree. The analysis was performed using the IBM SPSS statistical program.

Examples of survey items:

- Would you be willing to participate in a brain scan for medical purposes?
- Would you be willing to participate in biometric measurements for scientific purposes?
- Would you be willing to participate in eye tracking for military purposes?

Table 1. Descriptive statistics of survey results

Neuromarketing method	Purpose of using the obtained data	N	Min	Max	Mean	SD
Brain scanning	Medicine	192	1	5	3.34	1.564
	Science	192	1	5	3.29	1.461
	Military forces	192	1	5	2.66	1.578
	Marketing	192	1	5	3.09	1.511
Biometrics	Medicine	192	1	5	3.17	1.596
	Science	192	1	5	3.21	1.558
	Military forces	192	1	5	2.53	1.531
	Marketing	192	1	5	2.93	1.526
Eye tracking	Medicine	192	1	5	3.23	1.602
	Science	192	1	5	3.38	1.485
	Military forces	192	1	5	2.70	1.599
	Marketing	192	1	5	3.14	1.609

Source: own processing

Table 1 shows the results of the research items of the questionnaire survey. The answers show that respondents were more willing to participate in neuromarketing research for medical and scientific purposes and less for military purposes.

3. Results

The presumed relationship between the willingness to participate in neuromarketing research and the age of the respondent was confirmed by the Pearson's correlation coefficient (Table 2).

Table 2. Correlation of the degree of willingness to participate in neuromarketing research with the age of the respondents

Variable	Correlation Coefficient	Sig. (2-Tailed)	N
Age	-.210**	.004	192

** Correlation is significant at the 0.01 level (2-tailed).

Source: own processing

Hypothesis 1 was thus supported and based on the results of the analysis it can be stated that the researched willingness of respondents decreases with increasing age.

To verify the second hypothesis, the respondents were categorized into groups according to generations: 6 Baby Boomers (3.1%), 48 Generation X (25.0%), 68 Generation Y (35.4%), 70 Generation Z (36.5%) (Table 3).

Table 3. Descriptives of generations

Generation	N	Mean	SD	Std. Error
Baby Boomers	6	2.00	1.000	.577
Generation X	48	2.71	1.654	.338
Generation Y	68	3.59	1.328	.228
Generation Z	70	3.80	1.052	.178
Total	192	3.40	1.395	.142

Source: own processing

Due to the small group of respondents in the Baby Boomers generation, this generation was not included in further analyses.

One-way ANOVA demonstrated the existence of intergenerational differences in the willingness to participate in neuromarketing research (Table 4), and the similarity of generational variance was confirmed by Levene's test.

Table 4. Generational differences in willingness to participate in neuromarketing research

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	48.329	3	16.110	9.418	.000
Within Groups	321.587	188	1.711		
Total	369.917	191			

Source: own processing

Mutual differences between the generations were subsequently confirmed by the Bonferroni test (Table 5).

Table 5. Multiple comparisons – willingness to participate in neuromarketing surveys among generations of respondents

		Mean Difference	Std. Error	Sig.	Lower Bound	Upper Bound
Generation X	Generation Y	-.880*	.247	.003	-1.52	-.24
	Generation Z	-1.092*	.245	.000	-1.73	-.46
Generation Y	Generation X	.880*	.247	.003	.24	1.52
	Generation Z	-.212	.223	.777	-.79	.37
Generation Z	Generation X	1.092*	.245	.000	.46	1.73
	Generation Y	.212	.223	.777	-.37	.79

* The mean difference is significant at the 0.05 level

Source: own processing

Based on the results of the analysis it can be concluded that there are statistically significant differences between Generation X and Generation Z, as well as between Generation X and Generation Y in the degree of willingness to participate in neuromarketing research, so Hypothesis 2 was supported. With increasing age, this willingness decreases, so Generation Z has a higher degree of willingness than Generation Y.

Furthermore, the intergenerational differences in the use of data obtained by neuromarketing research were investigated, while the examined areas of data use were: medicine, science, military forces and marketing.

As illustrated in Table 6, One-way ANOVA showed differences between the generations in the willingness to participate in neuromarketing research in terms of the use of data obtained from such research.

Table 6. Generational differences in willingness to participate in neuromarketing research in terms of the purpose for which the data were used

		Sum of Squares	df	Mean Square	F	Sig.
Willingness – medicine	Between Groups	28.408	3	9.469	6.148	.001
	Within Groups	289.571	188	1.540		
	Total	317.979	191			
Willingness – science	Between Groups	16.965	3	5.655	3.653	.014
	Within Groups	291.035	188	1.548		
	Total	308.000	191			
Willingness – military forces	Between Groups	16.155	3	5.385	3.775	.012
	Within Groups	268.158	188	1.426		
	Total	284.313	191			
Willingness – marketing	Between Groups	14.251	3	4.750	2.960	.034
	Within Groups	301.728	188	1.605		
	Total	315.979	191			

Source: own processing

In terms of marketing tools used, intergenerational differences were examined, and the research methods were: brain scanning, biometrics and eye tracking (Table 7).

Table 7. Multiple Comparisons – Generational differences in willingness to participate in neuromarketing research in terms of neuromarketing methods used

			Mean Difference	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Willingness – brain scanning	Generation X	Generation Y	-.58333	.39626	.866	-1.6519	.4852
		Generation Z	-1.06905*	.39391	.048	-2.1312	-.0069
	Generation Y	Generation X	.58333	.39626	.866	-.4852	1.6519
		Generation Z	-.48571	.35790	1.000	-1.4508	.4794
	Generation Z	Generation X	1.06905*	.39391	.048	.0069	2.1312
		Generation Y	.48571	.35790	1.000	-.4794	1.4508
Willingness – biometrics	Generation X	Generation Y	-.47794	.40866	1.000	-1.5799	.6240
		Generation Z	-.82500	.40623	.271	-1.9204	.2704
	Generation Y	Generation X	.47794	.40866	1.000	-.6240	1.5799
		Generation Z	-.34706	.36910	1.000	-1.3423	.6482
	Generation Z	Generation X	.82500	.40623	.271	-.2704	1.9204
		Generation Y	.34706	.36910	1.000	-.6482	1.3423
Willingness – eye tracking	Generation X	Generation Y	-.73529	.40963	.456	-1.8399	.3693
		Generation Z	-.90000	.40720	.177	-1.9980	.1980
	Generation Y	Generation X	.73529	.40963	.456	-.3693	1.8399
		Generation Z	-.16471	.36997	1.000	-1.1623	.8329
	Generation Z	Generation X	.90000	.40720	.177	-.1980	1.9980
		Generation Y	.16471	.36997	1.000	-.8329	1.1623

* The mean difference is significant at the 0.05 level.

Source: own processing

The Bonferroni test demonstrated intergenerational differences in willingness to participate in neuromarketing research in terms of the neuromarketing methods used between Generation X and Generation Z in willingness to undergo brain scans (Table 7). The rate of this willingness is higher for Generation Z.

4. Discussion

The representativeness of the research sample in the case of neuromarketing research is much more dependent on the willingness of consumers to participate than in the case of traditional research methods. One of the basic socio-demographic characteristics is the age of the respondent, so in our research we focused on the relationship between age and willingness to participate in such research. The sample consisted of 192 respondents, but after dividing them into defined generations, we performed analyses with 186 respondents. Through a questionnaire survey, the degree of willingness to participate in neuromarketing research in terms of neuromarketing methods used (brain scanning, biometrics, eye tracking) and the purpose of using the obtained data (medicine, science, military forces, marketing) was determined.

From a general point of view, the survey showed that the respondents are more willing to undergo neuromarketing measurements if the data is used for medical and scientific purposes. A lower willingness was shown in the case of military purposes. These results can be explained by the fact that the mentioned neuromarketing methods are generally associated with the medical and scientific environment. Our previous research (Birknerova et al., 2022) shows that the less information people have, the more they fear the unknown. This may be the case when the respondents did not sufficiently understand the reasons for using neuromarketing for military purposes.

The relationship between the age of the respondent and the willingness to participate was confirmed, and the differences between Generation X and Generation Z, as well as between Generation X and Generation Y in the willingness to participate in neuromarketing research were also confirmed. Subsequent examination of generational differences in the willingness to participate in research in terms of neuromarketing methods used and in terms of the use of data obtained in this way were confirmed in all research areas – medicine, science, military forces and marketing.

The reason for the proven differences may also be the fact that the younger generation is more informed about the news, while neuromarketing can still be considered a new trend in marketing research. Ignorance or insufficient information often raise concerns and fears of the unknown, which may be the cause of the reluctance of the older generation to take part in new research. Nádanyiová (2015) conducted research on the perception of neuromarketing by Slovak consumers. In her study she recorded a great deal of ignorance of neuromarketing among the respondents as well as distrust of this method as they generally perceive neuromarketing as dangerous and unethical.

Pescatore (2021) studied the connection between the age of the respondents and their willingness to undergo neuromarketing research and found out that the respondents over 40 distrust neuromarketing more than the younger ones. Uydaci and Karabiyik (2015) examined the relationship between the perception of the fMRI method as dangerous to health and demographic characteristics and then between willingness to engage in fMRI research and demographic characteristics, confirming the existence of correlations with the age, education, social status and income of the respondents.

The media's approach to neuromarketing has only strengthened people's distrust of the new technology (Lindstrom, 2009) as they feel manipulated to make purchasing decisions in favor of a particular company, product, or service. The abuse of more vulnerable segments of the population is one of the ethical problems of neuromarketing. We state this fact because it is the older generations that belong to vulnerable groups. As reported by Murphy et al. (2008) and Acuff (2005), older people, children and people with mental disorders are considered more vulnerable audiences in this case. Neuroscientists can provide their findings about these vulnerable groups to marketers who may misuse such information to manipulate these consumer groups, as they are easier to handle.

Conclusion

It can be concluded that the results of our research confirm the findings of previous studies, accentuating the fact that younger consumers are more willing to participate in neuromarketing research than older ones.

Effective and modern leadership incorporating insights from neuroscience should be, according to Waldman et al. (2011), guided by the fact that a practical solution is to create research or application teams with relevant expertise in neuroscience, leadership, software applications and so on.

By adopting a neuroscientific approach, it is possible to design specific remuneration that is designed for the individual worker, which should maximize productivity as well as job satisfaction. From a consumer behavior perspective, this feeds through to knowledge regarding the most effective design of marketing communications, including social marketing, which aims to prevent undesirable behavior (Lee et al., 2010).

The limits of our research were mainly the smaller sample size and the occasional sampling method. This study may serve as a prerequisite for further investigation of the relationships between socio-demographic characteristics and factors of neuromarketing research.

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Consumer Perceptions of Neuromarketing Research in the Context of Socio-demographic Characteristics

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Abstract

Research background: The topic of neuromarketing sparks discussions on ethics due to concerns that it may not just remain at reading consumers' thoughts but also has the potential to influence them through neuromarketing research. In certain cases, neuromarketing can create a negative attitude towards companies employing such practices if consumers perceive them as unethical (Fořtov, 2015).

Purpose of the article: The aim of this study is to examine consumers' opinions on the issue of neuromarketing in the context of their socio-demographic characteristics. The hypotheses set forth predicted differences in the perception of neuromarketing based on the gender and education of the respondents.

Methods: The research methodology used was based on Flores et al.'s (2014) approach, which examines respondents' opinions regarding their endorsement of neuromarketing by companies and perceived threats to consumers. The questionnaire consisted of 13 survey items, divided into four sections based on defined factors: Attitudes Towards Neuromarketing, Word of Mouth, Privacy Invasion, and Behavior Manipulation. The study was conducted on a sample of 183 respondents, consisting of 111 females (61%) and 72 males (39%), with an average age of 39.26 years. In terms of education, the respondents were divided into two groups: 91 respondents (49.7%) had secondary education, and 92 respondents (50.3%) had higher education.

Findings & Value added: The analysis did not confirm any significant statistical differences in the examined socio-demographic characteristics. The survey confirmed the results of previous studies, indicating that respondents still have concerns about their privacy and unwanted manipulation when it comes to the use of neuromarketing by companies.

Keywords: neuromarketing, gender, education, consumer behavior, consumer perceptions

JEL classification: M31

1. Introduction

This article seeks to bridge the gap in existing research by examining the relationships between socio-demographic characteristics and consumer perceptions of neuromarketing. Understanding how different groups of consumers perceive this novel marketing approach can provide valuable guidance for companies seeking to employ neuromarketing strategies responsibly and ethically.

"Neuromarketing," also known as "consumer neuroscience," is a neuroeconomic subfield that investigates marketing-relevant issues (Hubert, 2010). It is an interdisciplinary area that combines psychology, neuroscience, and economics to study how advertising and marketing strategies physiologically influence the brain (Khushaba et al., 2013). Currently, consumer market research focuses on utilizing diagnostic techniques from neuroscience, thereby advancing neuromarketing as a modern form of marketing research (Nemorin & Gandy, 2017; Plassmann et al., 2012). Neuromarketing examines consumer responses to marketing stimuli using medical technologies to measure activity in specific brain regions. Its fundamental goal is to understand why and how consumers make decisions, which brain regions are activated during the process, and what influences their behavior (Eser, Isin, & Tolon, 2011; Fugate, 2007; Morin, 2011).

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Based on the examination of multiple definitions of neuromarketing, de Oliveira and Giraldo (2017) have compiled a comprehensive definition: "Neuromarketing is an interdisciplinary field of science that combines various tools traditionally utilized in medicine, psychiatry, and psychology, such as neurofeedback, biofeedback, and measures of metabolic processes, together with conventional marketing tools. Its aim is to gain a better understanding of a wide range of emotions, cognitions, physiological reactions, behaviors, and thoughts exhibited by economic agents, both consciously and unconsciously, in relation to typical issues in marketing and its various sub-areas."

For studying the brain's response to environmental stimuli, scientists employ various measurements, which can be categorized into neurological and physiological methods. Physiological research includes facial expressions, eye tracking, electrodermal activity, respiration, heart rate, and response time (Genco, Pohlmann, & Steidl, 2013). Neurological methods encompass techniques such as electroencephalography (EEG), magnetoencephalography (MEG), positron emission tomography (PET), Doppler sonography (fTCD), and functional magnetic resonance imaging (fMRI) (Hsu, 2017; Sebastian, 2014).

One advantage of neuromarketing as a measurement technique is that the obtained results are not influenced by consumers' opinions or their unwillingness to reveal the truth. There is nothing inherently wrong with using this technology, but a potential issue is that researchers may gain insights beyond the boundaries set by consumers for such testing. The use of neuromarketing thus raises ethical concerns, which can be divided into two categories: protection of consumer autonomy and safeguarding the interests of various groups that could be harmed or exploited by such research. The privacy of individuals involved in neuroscientific studies conducted in medical institutions is typically protected by law. However, in the case of neuroresearch for commercial purposes, outside of medical institutions, legal protection does not apply, and the preservation of respondent autonomy is left to the moral values of researchers (Murphy et al., 2008). Exploitation of vulnerable population groups represents another ethical issue in neuromarketing. Older adults, children, and individuals with mental disorders are considered more vulnerable in this context. The results of neuroscientific research on these groups could be provided to marketers who might misuse this information for manipulation, as these groups are more easily influenced. For instance, video game manufacturers employ children for this type of research to create new games based on the findings (Murphy et al., 2008; Acuff, 2005).

Some critics of neuromarketing research argue that methods investigating the human brain should only be used for the purpose they were primarily designed for: socially beneficial research in the field of human health. There should not be the possibility to utilize them for completely different commercial purposes of companies. The argument is strengthened by the claim that these companies did not contribute to the development and rigorous testing of these methods. According to opponents, these companies are merely parasitic on the results that were originally intended for use in a completely different field (Koukolík, 2012).

The topic of neuromarketing sparks discussions on ethics due to concerns that it may not just remain at reading consumers' thoughts but also has the potential to influence them through neuromarketing research. In certain cases, neuromarketing can create a negative attitude towards companies employing such practices if consumers perceive them as unethical (Fořtová, 2015). This attitude is also linked to the fear that advertising and marketing campaigns utilizing neuromarketing research could become so effective that consumers would lose their ability to resist. This could jeopardize consumers' free will and invade their privacy (Stanton, Sinnott-Armstrong, & Huettel, 2017).

Ulman, Cakar, and Yildiz (2015) emphasize that the concept of human dignity should serve as the foundation for ethical principles such as autonomy, self-determination, privacy, confidentiality, protection of vulnerable groups, reliability, and honest interpretation of research results in line with the risk of manipulation by commercial entities. Studies by AlSayegh et al. (2020), Gorgiev (2020), or Berlińska and Kaszycka (2016) highlight variables such as social status, respondents' education, social environment, and cultural stereotypes, which play an important role in their willingness to participate in research involving physiological observations. The two main ethical concerns when using neuroscientific methods in marketing are the protection of test subjects and the scientific reliability, validity, and transparency of neuroscientific findings (Lim, 2018). Neuromarketing is a discipline that should complement marketing research and, as such, should provide the most realistic results possible without violating ethical rules, as the analysis results would be used to produce and sell products based on consumer preferences (Šola, 2013).

2. Methods

The aim of the study is to examine consumers' opinions on neuromarketing in the context of their socio-demographic characteristics. The research was based on two hypotheses:

- H₁: We assume that there are statistically significant differences in opinions on neuromarketing based on gender.
H₂: We assume that there are statistically significant differences in opinions on neuromarketing based on education.

Data collection was conducted through a questionnaire, the methodology of which was based on a study by Flores et al. (2014). The questionnaire consisted of 13 items, which were divided into four parts based on defined factors:

- Attitudes Towards Neuromarketing - items 1-4.
- Word of Mouth - items 5-7.
- Privacy Invasion - items 8-10.
- Behavior Manipulation - items 11-13.

The first two factors (Attitudes Towards Neuromarketing, Word of Mouth) are composed of items with positive statements about neuromarketing. The next two factors (Privacy Invasion, Behavior Manipulation) consist of items expressing potential threats of neuromarketing. Respondents had the opportunity to answer on a Likert scale from 1 to 7 (1 - strongly disagree to 7 - strongly agree).

The hypotheses were tested on all four factors of the utilized methodology using t-tests.

The study was conducted on a sample of 183 respondents, including 111 women (61%) and 72 men (39%), with an average age of 39.26 years (min. = 18, max. = 80). In terms of education, the respondents were divided into two groups: 91 respondents (49.7%) had secondary education, and 92 respondents (50.3%) had higher education. The sample was selected using convenience sampling from the population of Slovak consumers.

3. Results

The questionnaire survey revealed different results in responses according to individual factors. The values were calculated from the response scale of 1 to 7, with the score for each factor expressed as the sum of responses corresponding to the items. The higher the average score, the more respondents leaned towards agreeable answers.

In the case of the factors Attitudes Towards Neuromarketing (mean = 19.11) and Word of Mouth (mean = 12.99), respondents showed more agreement with positive statements about neuromarketing. For the factors Privacy Invasion (mean = 12.33) and Behavior Manipulation (mean = 12.14), agreement was expressed towards statements about the threats of neuromarketing, with respondents showing slight agreement. Table 1 displays the results of the questionnaire survey.

Table 1. Descriptive statistics of questionnaire survey

	Attitudes Towards Neuromarketing	Word of Mouth	Privacy Invasion	Behavior Manipulation
Mean	19,11	12,99	12,33	12,14
Median	20,00	13,00	12,00	12,00
Std. Deviation	5,678	4,806	4,402	4,755
Minimum	4	3	3	3
Maximum	28	21	21	21

Source: own processing

The first hypothesis assumed statistically significant differences in opinions about neuromarketing based on gender. The results of testing hypothesis H1 are displayed in Table 2.

Table 2. Gender differences in opinions about neuromarketing.

Factors	Items	t-test for Equality of Means				
		t	df	Sig. (2-tailed)	Mean Dif.	Std. Error Dif.
Attitudes Towards Neuromarketing	1. Neuromarketing is a good practice for organizations to use	-0,699	181	0,486	-0,161	0,230
	2. An organization's use of neuromarketing is good for consumers	-0,313	181	0,754	-0,084	0,268
	3. Neuromarketing is a practice I would advise organizations to use	-1,516	181	0,131	-0,373	0,246
	4. Neuromarketing should be used if an organization can afford to pay for its use	0,427	181	0,670	0,111	0,260
Word of Mouth	5. I would say positive things about organizations that use neuromarketing	-0,781	181	0,436	-0,209	0,268
	6. I would recommend organizations that use neuromarketing to others	-0,440	181	0,660	-0,116	0,264
	7. I would encourage friends and relatives to purchase from/donate to organizations that use neuromarketing	-1,028	181	0,305	-0,279	0,272
Privacy Invasion	8. I believe that neuromarketing invades my privacy	1,730	181	0,085	0,509	0,294
	9. I believe that neuromarketing allows organizations to know what I am thinking	-1,143	181	0,255	-0,301	0,263
	10. I believe that neuromarketing diminishes my ability to maintain privacy for thoughts I want to be kept private	0,602	181	0,548	0,172	0,285
Behavior Manipulation	11. I believe that neuromarketing Can influence my behavior	-1,370	181	0,172	-0,387	0,283
	12. I believe that neuromarketing can make me purchase from/donate to organizations that I otherwise would not	-1,297	181	0,196	-0,356	0,274
	13. I believe that neuromarketing can influence my behavior	-2,149	181	0,033	-0,602	0,280

Source: own processing

From Table 2, it can be observed that a statistically significant gender difference at a significance level of $p \leq 0.05$ was confirmed only in one case, specifically for item 13 (I believe that neuromarketing can influence my behavior) in the factor Behavior Manipulation. According to Table 3, on average, men had a more positive opinion (mean = 4.46).

Table 3. Descriptive statistics of item 13. of questionnaire survey

Item	Gender	N	Mean	Std. Deviation	Std. Error Mean
13. I believe that neuromarketing can influence my behavior	women	111	3,86	1,778	0,169
	men	72	4,46	1,964	0,231

Source: own processing

The second hypothesis assumed that there are statistically significant differences in opinions on neuromarketing based on education. The results of testing hypothesis H2 are shown in Table 4.

Table 4. Differences in opinions on neuromarketing based on education.

Factors	Items	t-test for Equality of Means				
		t	df	Sig. (2-tailed)	Mean Dif.	Std. Error Dif.
Attitudes Towards Neuromarketing	1. Neuromarketing is a good practice for organizations to use	-0,241	181	0,810	-0,054	0,225
	2. An organization's use of neuromarketing is good for consumers	0,517	181	0,606	0,135	0,262
	3. Neuromarketing is a practice I would advise organizations to use	1,031	181	0,304	0,248	0,241
	4. Neuromarketing should be used if an organization can afford to pay for its use	2,085	181	0,038	0,524	0,251
Word of Mouth	5. I would say positive things about organizations that use neuromarketing	0,896	181	0,372	0,234	0,262
	6. I would recommend organizations that use neuromarketing to others	1,511	181	0,133	0,387	0,256
	7. I would encourage friends and relatives to purchase from/donate to organizations that use neuromarketing	1,829	181	0,069	0,483	0,264
Privacy Invasion	8. I believe that neuromarketing invades my privacy	-2,021	181	0,045	-0,580	0,287
	9. I believe that neuromarketing allows organizations to know what I am thinking	-0,108	181	0,914	-0,028	0,258
	10. I believe that neuromarketing diminishes my ability to maintain privacy for thoughts I want to be kept private	-1,184	181	0,238	-0,329	0,278
Behavior Manipulation	11. I believe that neuromarketing Can influence my behavior	-0,864	181	0,389	-0,239	0,277
	12. I believe that neuromarketing can make me purchase from/donate to organizations that I otherwise would not	-0,367	181	0,714	-0,099	0,269
	13. I believe that neuromarketing can influence my behavior	-0,984	181	0,327	-0,272	0,277

Source: own processing

From Table 4, it can be concluded that statistically significant differences based on the education of respondents at a significance level of $p \leq 0.05$ were confirmed in two items: item 4 (Neuromarketing should be used if an organization can afford to pay for its use) in the factor Attitudes Towards Neuromarketing, and item 8 (I believe that neuromarketing invades my privacy) in the factor Privacy Invasion. Table 5 indicates a higher level of agreement for item 4 among respondents with secondary education (mean = 5.22) and for item 8 among respondents with higher education (mean = 4.25).

Table 5. Descriptive statistics of item 4. and 8. of questionnaire survey

Item	Education	N	Mean	Std. Deviation	Std. Error Mean
4. Neuromarketing should be used if an organization can afford to pay for its use	secondary school	91	5,22	1,711	0,179
	high school	92	4,70	1,689	0,176
8. I believe that neuromarketing invades my privacy	secondary school	91	3,67	2,022	0,212
	high school	92	4,25	1,855	0,193

Source: own processing

Differences in the perception of neuromarketing based on the gender and education of respondents were confirmed in only three cases, therefore, based on our sample, it is not possible to conclude significant differences.

4. Discussion

The results of our study did not reveal significant differences in the perception of neuromarketing based on the gender and education of respondents. However, we found that respondents expressed positive views about neuromarketing and considered it a useful technique for businesses and marketing firms. On the other hand, respondents agreed with statements regarding the threats of neuromarketing, such as privacy invasion and manipulation of consumer behavior.

In comparison to the results of the study by Flores et al. (2014), which served as the basis for our methodology, their respondents achieved an average value of 14.56 in the Privacy Invasion factor, while our respondents had an average value of 12.33. Similarly, in the Behavior Manipulation factor, their respondents had an average value of 13.74, while our respondents had an average value of 12.14. In both cases, our respondents expressed less concern about these threats of neuromarketing.

Luna-Nevarez (2021), in their study on social media, states that two topics that interest consumers regarding neuromarketing are the lack of regulation and standards, leading to unethical practices by companies, and the tendency of companies to use their experiments and findings to manipulate consumers through subliminal advertising.

According to Hensel et al. (2017), any existing or future ethical code of neuromarketing should include five critical components: protection of research subjects, protection of vulnerable population groups from marketing exploitation, full disclosure of objectives, risks, and benefits, accurate media and marketing representation, and internal and external scientific validity.

Conclusion

Our research, similar to previous studies, suggests that respondents still have concerns about new techniques used in modern marketing. These concerns revolve around potential privacy invasion and undesirable influence on purchasing behavior. Nevertheless, they generally view neuromarketing positively when considering the perspective of businesses and marketing firms. Addressing the issue of negative consumer perception of neuromarketing can involve several measures and approaches.

Consumer awareness of what neuromarketing is and how it works can help alleviate their concerns and mistrust. Companies should provide clear and understandable information about the data they collect and how they use it, enabling consumers to feel more informed and in control of the situation. Firms should adhere to ethical standards and principles when utilizing neuromarketing techniques. Respecting consumer privacy and protecting their data should be a priority. Transparency towards consumers and safeguarding their rights can help rebuild trust. Companies should provide transparent information about how consumer data is collected, stored, and used. Accountability for the proper and ethical use of neuromarketing should be clearly defined and demonstrated.

A limitation of our research is the convenience sampling and the level of understanding and awareness among respondents regarding neuromarketing. Further research can be focused on neuromarketing research in terms of other socio-demographic variables such as social status or age, as well as differences in willingness to undergo the same type of research for medical purposes. This opens up opportunities for further exploration of this issue, considering other factors as well.

In conclusion, exploring consumer perceptions of neuromarketing research in the context of socio-demographic characteristics is crucial to navigate the ethical and practical implications of this cutting-edge marketing technique. By gaining insights into how different consumer groups respond to neuromarketing, we can foster a more informed and transparent relationship between businesses and their target audiences. Ultimately, this research can contribute to the development of ethical marketing practices that enhance consumer satisfaction while respecting individual rights and values.

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The Analysis of the Connections between Neuromarketing Attributes and Business Behaviour Determinants

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Abstract

Research background: Neuromarketing uses concepts and techniques of cognitive neuroscience and examines the basic brain mechanisms involved in consumer decision-making. Neuromarketing influences the subconscious, which can reevaluate purchasing decisions.

Purpose of the article: The paper presents the results of the research that focuses on the neuromarketing attributes of Willingness, Attitude, and Awareness. It also approaches the determinants of business behaviour from the consumer's perspective, such as Engagement, Assertiveness, Manipulation, and Empathy for stress. The aim of the research is to determine the existence of statistically significant connections between the attributes of neuromarketing and the determinants of business behaviour.

Methods: 232 respondents aged between 18 and 60 took part in the research (average age was 25.65 years, standard deviation 7.864 years), of which 114 (49.1%) were women and 118 (50.9%) were men. The research was based on the correlation analysis using the Pearson correlation coefficient.

Findings & Value added: The research results show that there are statistically significant connections between the attributes of neuromarketing and the determinants of business behaviour. There are many other attributes of neuromarketing that can be investigated, but the research examined specific attributes such as Willingness, Attitude, and Awareness in the context of business behaviour determinants from the consumer's perspective, particularly Engagement, Assertiveness, Manipulation, and Empathy for stress. The results can contribute to creating better relationships with customers and retaining their trust.

Keywords: neuromarketing, attributes, business behaviour, determinants

JEL classification: M3, M31

1. Introduction

Neuromarketing represents the union of two scientific disciplines of neurology and marketing. The main reason for this connection was the creation of an effort to gain insight into the human brain, in the context of understanding the behaviour of consumers in their purchasing behaviour and decision-making. This insight brought the possibility of influencing their behaviour through the subconscious in the form of subliminal advertising, marketing based on smell, emotions, and the like. In today's society, it is very difficult to satisfy the constantly changing and growing preferences of consumers, so companies focus on the subconscious, which the consumers cannot influence despite their high preferences. The aim of the paper is to focus attention on neuromarketing as an independent scientific discipline and to examine specific attributes, namely Willingness, Attitude, and Awareness in the context of business behaviour determinants from the consumer's perspective, particularly Engagement, Assertiveness, Manipulation, and Empathy for stress.

1.1 Neuromarketing and attributes of neuromarketing

Neuromarketing uses concepts and techniques of cognitive neuroscience and examines the basic brain mechanisms involved in consumer decision-making. It has significantly advanced conventional marketing, which clarifies how unconsciously our reactions and emotions influence decision-making processes in consumer behaviour (Mileti et al., 2016). Neuromarketing is based on the condition that represents the

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identification of sensory and motor systems in specific networks of brain cells, as well as on the condition that represents the fact that the observation of neural networks can reveal the very unconscious and rational characteristics of consumer decision-making that conventional quantitative and qualitative research cannot reveal (Achrol & Kotler, 2012). Dragolea & Cotirlea (2011) understand neuromarketing as a new field of marketing that uses medical technologies such as nuclear magnetic resonance (NMR) to study the brain's response to marketing stimuli.

According to Hubert & Kenning (2008), neuromarketing is the application of knowledge from neuroscientific consumer research within managerial practice. Kotler & Keller (2009) define neuromarketing as a means of describing the activities of the brain under the influence of marketing stimuli, which, using specific tools, cooperates with the psychological reaction to the stimuli exposed to it - advertisements.

The basic attribute of neuromarketing is the application of neuropsychology as a scientific field to marketing research. It deals with the study of human behaviour in consumer decision-making through research, its cognitive, affective, and sensorimotor reactions (Birknerová et al., 2021). The authors describe the following areas of research and use of neuromarketing: Subconscious research; Emotion research; Multisensory processes in the brain; Emotional-cognitive processing; Neurolinguistics; Neuromarketing personality research; Neuroscientific research on gender differences; Neuromarketing research of age (Birknerová et al., 2021).

1.2 Determinants of business and consumer behaviour

According to Kotler et al. (2007), a businessman performs various professional activities that include finding new customers, taking care of the customer, and activities leading to the success of the business through customer satisfaction. A businessman is a person who sells their products for resale, with or without further processing. The task of the businessman is to obtain all the necessary information and provide it to the customer. Determinants of business behaviour play a key role in business relations. Birknerová & Koval'ová (2018) describe the determinants - the engagement of businessmen, their assertive behaviour, handling of manipulative expressions, and empathy for stress. Frankovský, Štefko & Baumgartner (2006) use a situational approach to assessing the behavior.

The term 'engage' or 'engagement' is associated with co-creation, feedback, and interaction (Honora, Chih & Ortiz, 2023). Macey et al. (2009) define engagement as purposefulness and focused energy that others perceive as personal initiative, adaptability, effort, and persistence of an individual leading toward the achievement of the organization's goals. Alfes et al. (2010) define engagement as a means for achieving better results. Engaged salespeople are more innovative, interested in staying in the current organization, achieve better personal well-being, and perceive their workload as sustainable.

Assertiveness is defined by Ward & Holland (2018) as the ability to express one's thoughts and feelings, both positive and negative, in an open, direct, and honest way. Hamraoui et. al. (2023) add that assertiveness as the ability to express one's opinions, is closely related to self-esteem, and it is a skill that can be learned. Assertiveness is based on the assumption that it is possible for an individual to acquire skills, knowledge, and specific techniques that allow a person to overcome emotions in the communication sphere and, thanks to this, be able to effectively express their feelings and opinions (Lahnerová, 2012). The goal of assertiveness is to teach a person to adequately express their emotions, opinions, and attitudes (Lelková, 2014).

Manipulation is defined by Sinha (2022) as the action of handling and managing a situation skillfully to serve one's goals. It can have negative connotations, too, such as carrying out cunning behaviours to abuse and control others using emotional and psychological tactics to change or alter someone's perception or behaviour. Kubík (2023) defines manipulation as a behaviour where we force people to do things in a dishonest way that these people would never freely decide to do.

Empathy can be understood as the ability to empathize with the psychological state of another individual, to see through the eyes of another person, to listen with that person's ears, and to be able to feel with their heart. Bitektine & Song (2022) emphasize that empathy is associated with cooperation, the common good, and concern for others. According to Černohorský (2020), thanks to empathy, a person can estimate human behaviour, understand the consequences of a person's behaviour towards another person, be able to understand the wishes of others, their concerns, and fears, motivate people around them and be sensitive to their own stress, as well as the stress of other individuals.

The paper's research seeks the existence of connections between the mentioned attributes of neuromarketing and the determinants of business behaviour.

2. Methods

The goal of the research project is to find out the existence of statistically significant relationships between selected neuromarketing attributes using the neuromarketing attribute methodology (AN) and business behaviour determinants using the business behaviour determinants methodology (DOS).

The AN methodology (Birknerová et al., 2023) is aimed at capturing the respondents' attitudes toward selected attributes of neuromarketing. Its subject focuses attention on the respondents' potential willingness to undergo neuromarketing research, their opinions on neuromarketing as a scientific discipline, and their views on the application of various sales techniques in order to shape and subsequently indicate the direction of consumer decision-making.

The DOS methodology (Birknerová & Kovařová, 2018) is focused on the engagement of sellers, their contribution to the business, and positive relations with customers. The subject of the DOS methodology emphasizes the assertiveness of sellers and the benefit of assertive behaviour toward customers. Part of the DOS methodology is also the manipulation determinant, as well as empathy towards stress, which represents the consumer when showing empathy and consideration towards stressed-out sellers.

Attributes for neuromarketing and determinants for business behaviour are assessed on a Likert scale from 1 to 6, where 1 = definitely no and 6 = definitely yes, and evaluated by Pearson's correlation coefficient in the statistical program SPSS 26.

The research group consisted of 232 respondents aged between 18 and 60 (average age 25.65 years, standard deviation 7.864 years), of which 114 (49.1%) were women and 118 (50.9%) were men. Consumers indicated their status as senior managers 24 (10.3%), middle managers 14 (6.0%), junior managers 26 (11.2%), executives 38 (16.4%), part-time workers 53 (22.8 %), and students 77 (33.2%).

Based on the research objective, we established the hypothesis: "We assume that there are statistically significant correlations between neuromarketing attributes and determinants of business behaviour" which was verified by using Pearson's correlation coefficient (r).

3. Results

To evaluate the correlations between attributes and determinants, Pearson's correlation coefficient (r) was used. We recorded the results of the correlation analysis in Table 1.

Table 1. Relationships between neuromarketing attributes (AN) and determinants of business behaviour (DOS)

		Attributes of neuromarketing – AN methodology			
			Attitude	Willingness	Awareness
Determinants of the DOS methodology	Engagement	r	0.548**	0.097	0.340**
		p - value	0.000	0.139	0.000
	Assertiveness	r	0.597**	0.138*	0.418**
		p - value	0.000	0.036	0.000
	Manipulation	r	0.367**	0.103	0.448**
		p – value	0.000	0.088	0.000
	Empathy for stress	r	0.115	0.089	0.306**
		p - value	0.081	0.179	0.000

Source: own processing (2023)

By means of correlation analysis, the presence of several significant correlations between the factors of the DOS and AN methodology was found. The AN methodology factor of Attitude achieves a positive correlation score in connection with the DOS methodology factors of Engagement, Assertiveness, and Manipulation. AN methodology factor Willingness achieves a positive correlation score in only one correlation with the Assertiveness factor. The AN methodology factor Awareness achieves the highest correlation score, it is the factor's ability to correlate with all the DOS methodology factors. Overall, a sufficient correlation score was manifested between all selected factors of the DOS and AN methodology at least once.

The neuromarketing attribute of Attitude focuses on the Attitude of a person, as an individual, toward neuromarketing as a tool for creating advertising campaigns and as a tool that uses specific technologies for human brain research. This attribute is positively correlated with the business behaviour

determinants of Engagement, Assertiveness, and Manipulation. The Attitude attribute is positively correlated with the Engagement determinant because a positive opinion can positively influence a person's engagement and vice versa. The Attitude attribute is also positively correlated with the Assertiveness determinant, which means that an individual's assertiveness depends on the individual's opinion on neuromarketing as a scientific discipline, i.e. the more knowledge we have about neuromarketing, the more positive our opinion is, which we can interpret more clearly through assertive behaviour. Manipulation is another determinant that is positively correlated with the Attitude attribute. The reason for the positive correlation is the fact that individuals who hold a positive opinion on neuromarketing are not the target of marketers' manipulations because their perspective does not perceive neuromarketing sales techniques as manipulative. The attribute Attitude is not statistically significantly related to the determinant Empathy for stress because an individual with a positive opinion of neuromarketing does not show stress if exposed to neuromarketing techniques or methods.

Neuromarketing Willingness attribute focuses on the individual and their willingness to undergo neuromarketing research, the course of which consists in completing various types of research based on testing through various technologies used in neuromarketing research. The attribute of Willingness is positively correlated with the determinant of Assertiveness, which means that respondents with assertive behaviour who participate in neuromarketing research are not worried about the impact of research on their subconscious because they are capable communicators and can clearly interpret their feelings and opinions. A person with assertive behaviour represents the best candidate for participation in neuromarketing research.

The attribute of Willingness is not statistically significantly related to three determinants of the DOS methodology – Engagement, Manipulation, and Empathy for stress. The attribute of Willingness is not significantly related to Engagement, which means that despite the individual's willingness to undergo neuromarketing research, their future engagement in this field does not develop in any way, and often some motivation plays a significant role in participation in neuromarketing research, in most cases it is only a financial motivation. Another statistically insignificant correlation appears to be the attribute of Willingness with the determinant Manipulation, which simply means that the willingness to undergo neuromarketing research is in no way related to manipulation in consumer decision-making. We interpret the last correlation of the attribute Willingness with the determinant Empathy for stress as statistically insignificant, which represents a similar situation to the correlation with the determinant Manipulation. The individual's willingness to undergo neuromarketing research is not affected in any way by the expression of empathy towards stress during consumer decision-making between a customer and a merchant.

The neuromarketing attribute of Awareness is focused on the consumer's awareness and attitude when making a purchase decision. It presents the ways in which the consumer can be influenced and different types of tricks that influence the respondent during the purchase decision, whether it is the packaging, the price, or the quality of the product. The Awareness attribute is positively correlated with all business behaviour determinants used in the research. The correlation of the Awareness attribute with the Engagement determinant is statistically significant, which represents a situation where the consumer's behaviour is externally influenced, and the sellers' engagement during sales increases because they try to turn that influence into action and trigger a purchase decision in favor of the merchant. The Willingness attribute is also significantly correlated with the Assertiveness determinant, which means that the more it is outwardly known that the consumer's awareness is affected, the more beneficial the seller's assertive behaviour is. The Awareness attribute is positively correlated with the Manipulation determinant, which means that the more the consumer's awareness is influenced by the type and kind of product, the lower the effectiveness of the manipulation by the merchant will be. The Willingness attribute is also significantly correlated with the last determinant, Empathy for stress, which means that the more the consumer's awareness is affected, the more important the display of empathy and consideration from both sides.

Based on the correlation analysis using the Pearson correlation coefficient, it is possible to accept the hypothesis: *"We assume that there are statistically significant connections between the attributes of neuromarketing and the determinants of business behaviour."*

4. Discussion

Consumer and marketing researchers have been interested in understanding the potential influence of situations, circumstances, or contexts on consumer behaviour (Junghyun, Minki & Pradeep, 2022). MacInnis et al. (2020) state that marketing-relevant consumer research can affect significant stakeholders,

including marketing academics and as well as a broad range of market players (e.g., business practitioners, policymakers, the media, and society). Consumer and business behaviour is discussed from various perspectives and contexts. De La Rosa & Tully (2022) analyze the spending decisions of consumers. Frankovský, Ištvaníková & Štefko (2009) focused their research on the selection of behavior strategies based on the situation. Yin & Huang (2022) show that social jetlag decreases conspicuous consumption. Lawrence, Scheer, Crecelius & Lam (2021) find that the customer and seller experience the most desirable outcomes when the salesperson advocates strongly for both parties. Anderson, Chintagunta, Germann & Vilcassim (2021) examine the effects of a business support intervention of international professionals to improve consumption and business growth. This research project was based on the analysis of connections between neuromarketing attributes and the business behaviour determinants methodologies. Through correlation analysis, it was found that the attributes of the Neuromarketing attributes methodology are closely related to the determinants of the Business behaviour determinants methodology.

A possible move forward is to ensure awareness in the form of promotion. Along with the promotion of opportunities to participate in neuromarketing research, it is important to provide information about neuromarketing and, in this way, prepare the consumer for neuromarketing research and ensure the supply of information that will create a sense of security. Neuromarketing influences consumers' subconscious, which can reevaluate purchasing decisions. Engaged salespeople are, therefore, an important part of the business. When choosing them, attention should be paid to their empathic side, desire to work, and communication skills.

Conclusion

Awareness and knowledge of neuromarketing are key factors. The first way is information through the media, as well as social networks, where the customer spends more free time. This creates favorable conditions for the promotion of projects focused on collective knowledge. The second way is teaching neuromarketing in schools. Most marketing schools do not pay enough attention to neuromarketing despite its influence on consumers every time they visit a shopping center to make a purchase.

If a store has assertive employees, it can be seen as prosperous, as customers can turn to them at any time if needed. Nowadays, consumers are more often exposed to manipulative behaviour, which makes them able to detect it in time and avoid it. Disclosure of manipulation by consumers can damage the reputation of the business. In order to build trust with the customer, it is important to avoid undesirable forms of behaviour as well as stress. It is advisable to show empathy towards customers, as it leads to openness and friendliness and relieves the stress of purchasing decisions. A negative atmosphere caused by inappropriate forms of behaviour leads to the creation of stress and pressure on the customer. A friendly atmosphere will ensure that they do not buy under pressure and return as loyal consumers.

There are many other attributes of neuromarketing that can be investigated in the same way, which in other cases could probably achieve higher correlation scores, which could mean elucidating new connections connected to purchasing decisions and the subconscious of human thinking. This is a possible direction for further research.

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Engaging with Brands Online: A Study of Consumer Online Brand Related Activities on Tik Tok as a Part of Brand E-commerce

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Abstract

Research background: This research primarily delves into the domain of social media engagement, focusing on the consumer's Online Brand-Related Activities (COBRAs) as a part of e-commerce ecosystem on platforms like TikTok. It aims to comprehend the key motivators for consumers' escalating levels of engagement, such as the need for information, desire for entertainment, social interaction, and remuneration, while examining how these activities influence brand awareness, referrals, purchase intent, and customer loyalty in the form of Word of mouth. TikTok, with its unique short video content format, high user engagement, and potential for content virality, provides a suitable landscape for studying these engagement behaviors.

Purpose of the article: The study evaluates the interplay between specific motivations, COBRAs, and their influence on e-commerce branding, particularly word of mouth, using TikTok within the Slovak market as a model.

Methods: Our approach combined Confirmatory Factor Analysis (CFA) and Maximum Likelihood Estimation (MLE) to study attitudes related to e-commerce brand activities on TikTok. Metrics such as Average Variance Extracted (AVE), Composite Reliability (CR), and Root Mean Square Error of Approximation (RMSEA) were crucial for latent variable analysis. The Partial Least Square - Path Modeling (PLS PM) method further delineated relationships.

Findings & Value added: Our results affirm five hypotheses, particularly noting the impact of information and entertainment motives on e-commerce COBRA content consumption on TikTok. The remuneration motive consistently influenced all COBRA and e-commerce relationships. A significant connection was identified between content consumption and word of mouth for online shopping brands. Differences from earlier studies possibly arise from TikTok's distinct nature, expanding our insights into e-commerce user behavior on the platform.

Keywords: consumer, activity, motive, TikTok, e-commerce

JEL classification: M31

1. Introduction

Social media has radically changed the way customers communicate and interact with everyone and with brands. The growing number of customers on these platforms has created new opportunities and challenges for brands. Active customer engagement on these platforms has become fundamental to value creation and brand strategies. Promoting customer interaction with content on social media is often a key element of brands' online strategies. A framework for online customer engagement, referred to as COBRA (Consumers' Online Brand-Related Activities), defines three levels of customer engagement. The first tier, content consumption, is a fundamental step to increasing brand awareness and acquiring new fans. More active engagement, such as contributing to a brand's content through comments or even creating their own content, represent higher levels of engagement that are more challenging for brands to achieve.

This study focuses on understanding what motivates consumers to higher levels of engagement. As part of the analysis, it assesses how these activities influence brands and, based on these findings, seeks to identify which activities are most relevant to brands.

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In addition, research is also being conducted to assess the brand implications of COBRA activities to better understand how these activities affect brand awareness, referrals, purchase intent, and customer loyalty. As an example, the social network TikTok is used to analyze the different trajectories of motivations and their impact on COBRA activities and consequently on "Word of Mouth" about the brand. This approach allows to generate a detailed view of customer engagement on social media and its impacts on brands.

1.1 Consumers' online brand related activities

The research of consumers' engagement with brands, known as Consumers' Brand-Related Activities (COBRAs), has been significantly informed by the U&G Uses and gratification theory. According to this theory, individuals selectively use different forms of media based on their personal needs and expectations, with the goal of satisfying those needs. Social media represents an intriguing dimension of this landscape, given that it requires active user participation. In their work, Muntinga et al. (2011) segmented this participation into three distinct tiers of involvement: low-level engagement, which consists of content consumption (such as watching videos or reading posts); mid-level engagement, characterized by content contribution (including rating products and commenting on posts); and high-level engagement, represented by content creation (like producing user-generated videos, images, or blog posts).

Four primary motivations have been identified as driving these engagement levels: the need for information, the desire for entertainment, social interaction, and remuneration (as proposed by Dolan et al., 2017; Schivinski, 2021; Azar et al., 2016). The information motivation is central to the function of virtual communities, directing consumers in their search for product or brand-related information, such as reviews (as discussed by Foster et al. 2010; Lin & Lu 2011; Zaglia 2013). Entertainment motivation is understood as the pursuit of relaxation, escape, and pleasure, which has been observed to increase community participation and encourage content sharing (referenced by Cheung et al., 2011; Lin & Lu, 2011). Social interaction serves as a means of strengthening social identity and sharing experiences with a brand, and has been predicted to boost levels of content consumption, contribution, and creation (as mentioned by Kang et al., 2014; Luarn et al., 2015). Lastly, remuneration motivation is driven by economic incentives and has been least studied, but is believed to encourage involvement in brand-related activities (as posited by Azar et al., 2016; Davis et al., 2014).

COBRAs, fueled by these motivations, can have a broad impact on brands. They may stimulate brand awareness and generate Word of mouth, further enhancing consumer engagement (as highlighted by Pöyry et al., 2013; De Vries & Carlson, 2014; Jahn & Kunz 2012).

1.2 Social media engagement on TikTok

TikTok has rapidly become a platform of paramount importance for social media engagement. According to Datareportal's "Digital 2021 Global Overview Report", TikTok was the seventh most used social network in the world in 2021, boasting over 689 million monthly active users worldwide. Its unique format, focused on short, user-generated video content, often set to popular music, has resulted in high user engagement. This has opened new avenues for personal expression, creative content production, and marketing opportunities. A report by Influencer Marketing Hub (2021) highlighted that TikTok users spent an average of 52 minutes per day on the platform, indicating high levels of user interaction and content consumption.

Research from the Pew Research Center (2020) demonstrated that the platform's user base skews young, with nearly half of all U.S. adults between the ages of 18 and 29 reported using the app. This demographic concentration presents specific opportunities and challenges for brands seeking to engage audiences on TikTok. It's worth noting that while TikTok started as a platform mostly for dance and lip-syncing videos, it's since expanded to include a wide range of content, from educational to comedic skits, which diversifies the potential for user engagement. Brands interested in leveraging TikTok for business can take advantage of the platform's unique algorithm, which tailors content distribution based on user behavior, making it possible for content to go viral even without a large following (Hootsuite, 2021).

2. Methods

This study aims to contribute significantly to the existing body of knowledge on the topic. The primary goal can be stated as: to evaluate the importance of the effects resulting from selected motivations and consumers' brand-related activities' trajectories, and subsequently, to assess the significance of the effects of these activities' trajectories on the brand in terms of Word of mouth. The investigation is tailored

towards the Tik Tok social network platform within the scope of the Slovak market. In relation to the goal mentioned above, the research query has been developed: does a meaningful trajectory exist between the examined motivations, activities, and the impact on the brand in the context of the Tik Tok social network? This question forms the foundation for the following hypotheses to be proposed:

- H1:** Consumer information motivation has a significant relationship with selected COBRA activities associated with the brand on the social network TikTok.
- H2:** Consumer entertainment motivation has a significant relationship with selected COBRA activities associated with the brand on the social network TikTok.
- H3:** Consumer social interaction motivation has a significant relationship with selected COBRA activities associated with the brand on the social network TikTok.
- H4:** Consumer remuneration motivation has a significant relationship with selected COBRA activities associated with the brand on the social network TikTok.
- H5:** Selected consumer COBRA activities associated with the brand on the social network TikTok have a significant relationship with Word of mouth about the brand.

All the data that constitute the subject of this analysis are of a primary character. Data were collected over two months, from February 2023 to March 2023. The research was conducted via Google Forms in the form of an anonymous questionnaire. The questionnaire was distributed through social networks and email communication. Through this, 314 respondents' responses were collected, however, 27 (8.6%) of them were disqualified due to incorrect completion or some other criterion. There were several reasons for disqualification, such as not completing all mandatory questions in the questionnaire or respondents' age, which was outside the age interval of the target sample. Based on the gathering of available resources, data collection, and our own materials obtained from February 2023, we can state that the Slovak market is most represented by 2 age groups of reachable audiences: 18-24 years and 25-34 years. This criterion was also applied in our research file, and the results of the analysis can be generalized precisely for a specific age category. Another criterion was that respondents have an active account on the social network TikTok.

The questionnaire contained a total of 35 questions, of which 6 pertained to the respondents' demographics and behavior in the realm of social networks, and 29 questions were dedicated to the explored COBRA (Consumer Online Brand-Related Activities) concept on the social media platform TikTok. These questions were identified by an exploratory factor analysis (EFA) in the study by Piehler et al (2019) under the conditions of social networks. In our analysis, manifest variables were presented, the reduction of which yielded the latent variables of the COBRA concept under the conditions of the TikTok social network. A 5-point Likert scale of agreement was used to detect these constructs. Factors related to the measurement of consumption, contribution, and creation of content from the COBRA concept were published in studies by Muntinga et al. (2011), Men and Tsai (2013), and Azar et al. (2016). Factors describing the motive of social interaction and rewards were formulated in the study by Hennig-Thurau et al. (2004), for the information motive in the study by Ko et al. (2005), and for the motivation of entertainment by Taylor et al. (2011).

Table 1. Research sample - basic demographic structure and social media use

CHARACTERISTICS	PERCENTAGE (%)
Characteristics of the gender of respondents	
Male	85 (29,62%)
Women	202(70,38%)
Age characteristics of respondents	
18 - 24 years old	201 (70,03%)
25 - 34 years old	86 (29,97%)
Characteristics of the respondents' region of residence	
Banská Bystrica Region	6 (2,09%)
Bratislava Region	22 (7,67%)
Košice Region	60 (20,91%)
Nitra Region	6 (2,09%)
Prešov Region	168 (58,54%)
Trenčín Region	6 (2,09%)
Trnava Region	8 (2,78%)
Žilina Region	11 (3,83%)

Characteristics of the social status of respondents	
Student	175 (60,98%)
Employed	86 (29,97%)
Self-employed	11 (3,83%)
Unemployed	6 (2,09%)
Other	9 (3,13%)
Number of active social media accounts	
2 active accounts	61 (21,25%)
3 active accounts	89 (31,01%)
4 active accounts	78 (27,18%)
5 or more active accounts	59 (20,56%)
Number of brands actively followed on social networks	
1 - 2 brands	33 (11,50%)
3 - 5 brands	56 (19,51%)
5 - 10 brands	49 (17,07%)
10 - 15 brands	52 (18,12%)
15 - 20 brands	31 (10,80%)
20 - 30 brands	13 (4,53%)
30 or more brands	53 (18,47%)

Source: own processing (2023)

The implementation of the main goal mainly relies on the application of Confirmatory Factor Analysis (CFA) using Maximum Likelihood Estimation (MLE). With the help of this procedure, it was possible to exclude individual items that did not disrupt, or did disrupt, the internal structure of the tool's factors. Subsequently, this captured selected areas of attitudes and perception of the issues of activities associated with the brand under the conditions of the TikTok social network. The Average Variance Extracted (AVE) and Composite Reliability (CR) metrics were implemented according to Fornell et al. (1981) and Hair et al. (2014). The mentioned AVE and CR metrics were applied to describe and assess the suitability of the construction of the analyzed latent variables. When assessing the manifest latent ones for CFA, we used the Factor Loadings (FL) metric. We further applied the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and also the Standardized Root Mean Square Residual (SRMR). The mentioned metrics are considered common procedures for the application of this type of analysis. After the Confirmatory Factor Analysis (CFA), we conducted the analysis using the Partial Least Square - Path Modeling (PLS PM) method, which describes the relationships under investigation.

3. Results

In the first stage, confirmatory factor analysis (CFA) was used for the purpose of subsequent application of the PLS PM equations. Confirmatory factor analysis was performed on a sample of 287 observations, and at 351 degrees of freedom, the result of a given confirmatory analysis is significant (p value $\chi^2 < 0.001$).

Table 2. Confirmatory analysis of the COBRA model on TikTok

Manifest Variables	Latent Variables	LF	CR	AVE
Info_1 Info_2 Info_3	Information (motive)	0.912 0.882 0.939	0.936	0.830
Entertain_1 Entertain_2 Entertain_3 Entertain_4	Entertainment (motive)	0.942 0.922 0.945 0.922	0.964	0.870
SocInter_1 SocInter_2 SocInter_3	Social Interaction (motive)	0.881 0.911 0.877	0.919	0.792
Remu_1 Remu_2 Remu_3	Remuneration (motive)	0.919 0.949 0.912	0.048	0.959

Cons_1 Cons_2	Content consumption (activity)	0.964 0.964	0.963	0.929
Contr_3 Contr_4 Contr_5 Contr_6	Content contribution (activity)	0.874 0.905 0.887 0.903	0.940	0.796
Crea_1 Crea_2	Content Creation (activity)	0.977 0.977	0.977	0.955
WOM_1 WOM_2 WOM_3 WOM_4 WOM_5 WOM_6	Word of mouth (brand impact)	0.805 0.916 0.911 0.902 0.899 0.836	0.953	0.773

Source: own processing (2023)

The PLS PM analysis was performed using the bootstrap method at 500 iterations (bootstrap resamples) by applying a centroid weighting scheme, and 27 manifest and 8 latent variables were entered into the calculation.

Table 3. Test selected effects for content consumption on TikTok (PLS PM model)

Content Consumption				
DV	Estimate	Std. Error	T value	Pr(>|t|)
Intercept	0.000	0.040	0.000	1.000
Information	0.174	0.059	2.946	0.003
Entertainment	0.440	0.062	7.061	0.000
Social interaction	0.132	0.063	2.104	0.036
Remuneration	0.128	0.048	2.690	0.008

Source: own processing (2023)

The first dependent variable we tested is content consumption. In the case of brand-related content consumption, significant effects were observed at the $\alpha < 0.05$ level in all the motives analyzed, i.e., the information motive, the entertainment motive, the social interaction motive, and the reward motive. In all the mentioned domains, it was a positive effect, as a higher value of the mentioned motives can be expected in the domain of consumption of brand-related content in the conditions of TikTok social network.

Table 4. Test selected effects for content contribution on TikTok (PLS PM model)

Content Contribution				
DV	Estimate	Std. Error	T value	Pr(>|t|)
Intercept	0.000	0.048	0.000	1.000
Information	0.136	0.070	1.924	0.055
Entertainment	0.093	0.075	1.249	0.213
Social interaction	0.196	0.075	2.619	0.009
Remuneration	0.299	0.057	5.244	0.000

Source: own processing (2023)

The second dependent variable we tested is represented by the activity of contributing to brand-related content. Significance at the $\alpha < 0.05$ level was confirmed in this case only in two motifs. These were the motives of social interaction and reward. In both cases, a positive effect was reported and thus we can expect that if the value of the social interaction motive or the reward motive is higher, the contribution rate of brand-related content on the social network TikTok may also increase.

Table 5. Test selected effects for content creation on TikTok (PLS PM model)

Content Contribution				
DV	Estimate	Std. Error	T value	Pr(>|t|)
Intercept	0.000	0.055	0.000	1.000
Information	0.115	0.079	1.454	0.147
Entertainment	-0.018	0.084	-0.218	0.828
Social interaction	0.151	0.084	1.789	0.075
Remuneration	0.234	0.064	3.648	0.000

Source: own processing (2023)

The creation of brand-related content was the last of the theme-level effects examined. In this case, significance at the $\alpha < 0.05$ level was observed for only one motive, and that was reward. We can conclude that this is a positive effect. As with the previous effects, we can expect that if the value of the reward motive is higher, so will be the rate of brand-related content creation in TikTok social network terms.

Table 6. Test selected effects for Word of mouth on TikTok (PLS PM model)

Word of mouth				
DV	Estimate	Std. Error	T value	Pr(>|t|)
Intercept	0.000	0.043	0.000	1.000
Consumption	0.506	0.052	9.675	0.000
Contribution	0.233	0.064	3.669	0.000
Creation	0.040	0.057	0.711	0.478

Source: own processing (2023)

The last effect we analyzed was the effect of word of mouth activities about the brand in terms of the TikTok social network. A significant effect at the $\alpha < 0.05$ level was confirmed in two cases, namely content consumption and brand-related content customization. In both cases, this was a positive effect. Based on the above findings, we can expect higher levels of word of mouth at higher levels of consumption.

4. Discussion

Based on the above results, we can accept all 5 stated hypotheses. We observed only one significant effect of information motive with COBRA content consumption activities in the TikTok social network condition by confirmatory analysis. Since the given effect is even weaker, more detailed research would be appropriate. To some extent, we can see the similarity with the scientific studies of Piehler, et al. (2019) and the study of de Vries (2012), where information motive was also not observed as significant. However, the results of non-significance of the information motive on two of the three activities examined by us do not go in line with the findings of Jahn and Kunz (2012) and Pöyry, et.al (2013). The reason for this inconsistency may be due to the different conceptualization of all four motivations in the selected studies and also due to the specificity of the social network in question. The significance of this single but not strong enough effect towards content consumption can also be explained by the fact that TikTok has a myriad of varied and extensive content in the form of videos and is also one of the most used apps ever. In addition to entertaining videos, users on this social network can often find various tips and techniques to help them solve a problem. Information as such is not enough to motivate people to contribute or create some content. Regarding the entertainment motive in the TikTok social network setting, like Piehler, et al. (2019), we observed only one significant trajectory of the relationship of the entertainment motive to the activity of consuming brand-associated content. The examined findings related to the significance of that relationship have support in many scholarly studies such as De Vries and Carlson 2014; Jahn and Kunz 2012; Pöyry, Parvinen, and Malmivaara 2013. In the case of non-significance of the fun motive in relation to contribution activities, this is supported by the study of de Vries et al. (2012). The definition of the fun motive plays an important role here. The latter does not require particularly interactive behaviour to fulfil the needs related to the fun motive. To a large extent, behaviour associated with consuming brand-related content is sufficient for this. In a study by Pletikosa Cvijikj and Michahelles (2013), some contradictory results were observed. However, that study discussed a different definition of the entertainment motive

and also exhibited several elements of the social interaction motive. Therefore, it is particularly important to be able to distinguish between these two motives, which may have many similarities in their definitions, but the effect on COBRA activities may be quite different. In the case of social interaction on the social network TikTok, we identified the significance of two trajectories to the activities of consuming content and contributing to content. No significant relationship was identified to the content creation activity. This may be due to the nature of the social network in question, as it is much easier to share something than to create the content in question. For this finding, we identified a similarity in the study by Buzet et al. (2020). We can also support the signaling of the motive for social interaction as a whole with findings in selected scholarly studies (Piehler et al. 2019; Davis, Piven, and Breazeale 2014; De Vries and Carlson 2014; Dolan 2015; Jahn and Kunz 2012; Kang, Tang, and Fiore 2014; Luarn, Lin, and Chiu 2015). On the TikTok social network, the remuneration motive emerged as significant for all three relationships to COBRA activities. In the case of the remuneration, the brand requires a higher level of interaction or engagement. A consumption metric such as the number of video views is social network specific and is a particularly important variable in the TikTok social network algorithm. It can also help other content perform better. Our results support the findings of Pletikos Cvijikj and Michahelles (2013) who identified an effect on comments, Luarn et al. (2015) who identified an effect on likes, and Piehler et al. (2019) who identified effects on contributing and creating. Our findings thus broaden the perspective of the specifics of the network in question and thus enrich the knowledge base related to the remuneration motive and its effect on COBRA activities. The effects of COBRA activities on word of mouth as offline brand waste were the next set analyzed. In the case of the social network TikTok, we identified two trajectories as significant. These were content consumption and content contribution activities and their impact on the brand. The result of our investigation is supported by the study of Piehler et al. (2019) who also identified the same significance and equally in relation to Word of Mouth. In studies by Jahn and Kunz (2012) and de Vries and Carlson (2014), we found partial support for this pathway in the context of brand loyalty. In the present study, significance was also confirmed in the case of content contribution, but as this was a broader concept related to brand loyalty, which Word of Mouth only partially constitutes. Therefore, omitted aspects of loyalty that were not included in our investigation may play a significant role here. We can also see a partial correspondence in the study by Pöyry, Parvinen, and Malmivaara (2013), in which content consumption activities were significant in the same way in our study, but not anymore in the case of participation in content contribution and creation activities.

Conclusion

Our analysis focused on the social network TikTok, through which we determined and appealed to the call of authors Piehler et al. (2019). In this study, the given contexts were analyzed exclusively on the social network Facebook and in the conditions of the German market. They assumed that the individual results would be different based on different social networks and our investigation confirmed this assumption. The reason for this variability is the uniqueness of social networks and as there are still enough platforms that have not yet been explored. Therefore, it would be a good idea to replicate this research to other social networks. It is also essential to explore the contexts in question in other cultures or countries, as according to the authors Tsai and Men (2017) this can be a very important factor. Another limitation is related to the potential impacts of COBRA activities. Because this analytic investigation focuses exclusively on the word-of-mouth aspect, future studies should examine the visible effects of COBRA on other brand-related outcomes. In addition, potential variables such as the social status of consumers, the market category in which the brand might operate, the size of the brand site community, or engagement in different product categories were not included in the present analysis. All of these variables may be important factors in future research. The present study is one of the first to use confirmatory analysis to confirm the exploratory model of motives and consequences of COBRA activities put forward by Piehler et al. (2019). They were the first to use four categories of motives and a spectrum of activities in three stages in relation to the offline consequence of word of mouth towards a brand. We also drew attention to a number of differences in the outcomes of the selected motives and activities, based on which we later postulated potential reasons from our perspective. We then formulated implications based on these results that flowed from them. The results of our analytical investigation are significant in answering questions such as why consumers engage in brand-related activities on social media, what types of brands are most likely to be able to get consumers to engage with social media, or what types of marketing activities influence consumer interaction with brand-related content in a social media environment. From a global perspective, it is clear that individual COBRA activities could be applied by social media

administrators to individual consumer motives and thus increase the chances of achieving the desired outcome for the brand. Thus, we consider the aim of the study to be fulfilled and conclude that we have contributed to the state of theoretical knowledge through our observed significance of the trajectories of the relationships between motives, COBRA-related activities and offline impacts for the brand in the form of word of mouth.

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Socio-Demographic Differences in Consumer Behavior and Purchase Intentions: The Role of Sustainability in Online Shopping

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Abstract

Research background: With consumers becoming more environmentally conscious, sustainability has emerged as a crucial element in the online shopping landscape. The demand for eco-friendly products and brands is steadily increasing. Various socio-demographic factors also influence the online purchasing decisions and behavior of consumers, based on which it is also possible to divide consumers into different market segments.

Purpose of the article: The research aimed to explore disparities in consumer behavior and purchase intentions related to sustainability in the context of online shopping, considering specific socio-demographic factors. The focus was on specific socio-demographic characteristics, particularly education and net monthly income.

Methods: Sources of secondary data were international scientific and statistical databases. The research employed a questionnaire survey as the primary data collection method, targeting 506 Slovak consumers as the sample. Socio-demographic differences among the respondents were examined using the Kruskal-Wallis H test, utilizing the IBM SPSS Statistics 26 program.

Findings & Value added: The findings from the study revealed noteworthy variations in environmentally sustainable consumer behavior and purchase intentions when shopping online, which were found to be influenced by their educational background and net monthly income. Significant differences in future purchase intention were found, with consumers holding the 1st degree university education scoring the highest. The results indicate that by supporting the increase of consumers' environmental awareness, it is possible to achieve their pro-environmental online shopping behavior. These results provide valuable insights for online sellers to develop targeted marketing strategies that take into account the socio-demographic differences among consumers.

Keywords: online shopping, e-commerce, sustainability, online consumer, purchasing behaviour

JEL classification: M14, M30, M31

1. Introduction

E-commerce has had a profound influence on the market dynamics, reshaping it and opening up a myriad of possibilities for businesses and consumers alike. The convenience, speed, and ease of online shopping have greatly enhanced the consumer experience. Businesses make use of e-commerce as a means to sell their products or services and optimize profitability by streamlining costs. The setup and maintenance of an online store entail lower expenses compared to a brick-and-mortar store. Furthermore, e-commerce businesses operate 24/7, providing uninterrupted service and relying solely on internet connection. The flexibility of e-commerce allows businesses to operate without fixed opening hours or the requirement for staff availability during specific times. Furthermore, the extended accessibility provided by online platforms grants e-commerce businesses the opportunity to reach a wider pool of customers. A vital aspect of their operations involves customer targeting and segmentation, which is simplified by collecting relevant consumer information. In the context of e-commerce, the process of data collection is notably more efficient (Nolan 2022).

In today's consumer landscape, engaging in online shopping has become an immensely popular endeavor. The online market provides individuals with the opportunity to engage in more accessible,

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convenient, and efficient shopping experiences. It empowers consumers to explore and purchase a diverse array of products and services at their own convenience, from any location. Moreover, online platforms consolidate all relevant information about the offerings in one place, including customer reviews. It is not uncommon for online stores to offer lower prices compared to their brick-and-mortar counterparts (Pillemer 2020).

When making a purchase, consumers embark on a decision-making journey that significantly shapes their buying behavior and purchase intentions. They carefully evaluate the options available to them, weighing the advantages and disadvantages of each potential purchase. Numerous factors contribute to consumer buying behavior, with social, psychological, and personal elements being recognized as particularly influential (Fontanella, 2022). Personal factors encompass demographic information, such as age, gender, and cultural background, which shape the individual's buying tendencies. Psychological factors, including attitudes, opinions, perceptions, and motivations, greatly impact the consumer's response to marketing campaigns. Additionally, social factors encompass the consumer's affiliations with different social groups throughout their life, as well as their income and level of education, all of which play a pivotal role in their purchasing decisions and intentions (Radu 2023). Extensive research conducted by Nagra and Gopal (2013) has demonstrated that gender, age, and income play a significant role in shaping consumer shopping behavior and purchase intentions. When examining online consumer behavior and purchase intentions, various factors come into play, including seller characteristics and credibility, product or service attributes and quality, and website quality. Additionally, delivery options and time, price, security, customer service, payment methods, and supplementary services can all influence consumer behavior (Wu et al. 2018). Svajčiaková (2023) emphasizes that the clarity and uniqueness of the website, ease of navigation, sufficient product information, price comparisons, delivery time, shipping costs, reviews, and shopping safety are all influential factors in online consumer purchasing behavior.

As the number of Internet users continues to increase annually, there is a parallel rise in the number of online shoppers. In line with this trend, consumers are increasingly considering the environmental impact of their purchases. The aspect of sustainability has gained prominence in consumer behavior and intentions. Caldwell (2021) highlights the growing emphasis on renewable energy sources, sustainable environmental practices, and a long-term sustainable mindset among consumers and governments alike. Consequently, many consumers make brand choices based on the brand's commitment to environmental issues. Embracing sustainability and tailoring products or services accordingly can lead to increased popularity, trustworthiness, and customer loyalty for a seller. Today, consumers place great importance on the materials used in products, the brand's commitment to environmental sustainability, and its endeavors to minimize negative effects associated with its activities. The increasing environmental awareness has long influenced public consciousness, making environmental issues a significant subject that motivates individuals to adopt pro-environmental behavior (Chang et al. 2015). Despite the emphasis on the environmental outcomes of pro-environmental behavior, researchers in this area often overlook behavior with tangible environmental effects. Nevertheless, there is general agreement that e-commerce, in numerous scenarios, offers a more environmentally friendly alternative to conventional commerce (Lange et al. 2018).

Socio-demographic factors, including gender, age, income, occupation, education, and lifestyle, have a substantial influence on both the inclination to purchase eco-friendly products and the environmental purchasing behavior of consumers (Comi, Nuzzolo 2016). Previous studies have revealed varied outcomes and significant distinctions in purchase intentions and pro-environmental purchasing behavior concerning these socio-demographic characteristics. (Nielsen 2018). It can be argued that consumer behavior is a vast and complex topic. Gaining a comprehensive understanding of consumer behavior and having a perfect grasp of their habits and needs is a challenging task. Accurately predicting consumer behavior in specific situations is nearly impossible. Therefore, sellers strive to exert influence on consumer behavior in a desired manner. Given the ever-changing purchasing behavior of customers, it becomes crucial for businesses to adapt their marketing strategies accordingly. Environmental issues have a significant influence on customers' emotions and purchase intentions. To effectively engage with their target audience, green marketers must have a deep understanding of their customers, including their consumer behavior and the underlying factors that guide their decisions. Analyzing and comprehending customers' purchasing intentions becomes paramount as it allows for the prediction of their future purchasing behavior (Fontes et al. 2021).

2. Methods

The objective of the study was to examine variations in consumer behavior and purchase intentions concerning sustainability within the context of e-commerce. The focus was on specific socio-demographic characteristics, particularly education and net monthly income. The research aimed to derive managerial implications from the findings, and the following research questions were formulated:

RQ1: Are there significant differences in consumer behavior with regard to the aspect of sustainability in the context of e-commerce in terms of selected socio-demographic characteristics of consumers?

RQ2: Are there significant differences in the intention to purchase green products online in terms of selected socio-demographic characteristics of consumers?

Based on the formulated research questions, the following research hypotheses were established:

H1: We assume that there are statistically significant differences in consumer behavior with regard to the aspect of sustainability in the context of e-commerce in terms of selected socio-demographic characteristics.

H1a: We assume that there are statistically significant differences in consumer behavior with regard to the aspect of sustainability in the context of e-commerce from the point of view of education.

H1b: We assume that there are statistically significant differences in consumer behavior with regard to the aspect of sustainability in the context of e-commerce in terms of net monthly income.

H2: We assume that there are significant differences in the intention to purchase green products online in terms of selected socio-demographic characteristics of consumers.

H2a: We assume that there are significant differences in the intention to purchase green products online in terms of education.

H2b: We assume that there are significant differences in intention to purchase green products online in terms of net monthly income.

To conduct the literature review, secondary sources from international scientific and statistical databases were utilized. The primary data was obtained through the inquiry method, employing a questionnaire survey created using Google Forms. The data collection period spanned from November 2022 to February 2023. The research sample was selected based on availability and voluntariness, utilizing a nonprobability sampling method known as convenience sampling (Lunsford and Lunsford, 1995). The sample primarily consisted of Generation Y and Generation Z consumers. The research sample was selected based on the rationale that young consumers are frequent users of digital technologies, including online shopping, and show a greater concern for environmental protection. The classification of generations followed the framework proposed by Young et al. (2017). The questionnaire was distributed to respondents using the authors' personal e-mail database and also via the social network Facebook.

At the beginning of the questionnaire, respondents were asked to provide four socio-demographic details, namely gender, year of birth, education attained, and net monthly income. The main body of the questionnaire encompassed 11 items designed to gauge respondents' agreement or disagreement on a 7-point Likert scale, ranging from 1 (completely disagree) to 7 (completely agree). These items focused on consumer behavior in terms of e-commerce and the inclination to purchase environmentally-friendly products online. Specifically, six items explored respondent's environmentally-conscious consumer behavior (Barbarossa and De Pelsmacker 2014; Peterson 2021; Cuc 2022), while five items delved into their intentions to buy green products (Yang et al. 2018; Peterson 2021).

In order to statistically analyze the obtained results, the following techniques were employed. To assess the internal consistency reliability, Cronbach's Alpha (α) coefficient was computed. As per Kline (2011), reliability coefficients are evaluated as follows: $\alpha \geq 0.7$ indicates adequate internal consistency of responses; $\alpha \geq 0.8$ suggests very good internal consistency of responses; $\alpha \geq 0.9$ signifies excellent internal consistency of responses. The normality of the data was examined using the Shapiro-Wilk normality test (or alternatively, the Kolmogorov–Smirnov test). Subsequently, the non-parametric Kruskal-Wallis H test was used to explore differences among respondents. The statistical software IBM SPSS Statistics 26 was employed for data processing.

3. Results and Discussion

The initial research sample comprised 537 participants, and after excluding incomplete or irrelevant responses, the final sample consisted of 506 participants. Table 1 presents the socio-demographic characteristics of the finalized research sample.

Table 1. Frequency table of socio-demographic characteristics of respondents

Item	Value	Frequency	Percentage
Gender	Male	146	28.9
	Female	360	71.1
Generation	Generation Y	313	61.9
	Generation Z	193	38.1
Education	Secondary education	289	57.1
	University education - 1st degree	150	29.7
	University education - 2nd degree	67	13.2
Monthly Income	less than 500 €	326	64.4
	501 - 1000 €	110	21.7
	1001 - 1500 €	46	9.1
	1501 - 2000 €	12	2.4
	2001 - 2500 €	6	1.2
	more than 2500 €	6	1.2

Source: author's own work based on results of the questionnaire survey

Table 2 presents the descriptive statistics (Mean, Median, Standard Deviation, Skewness, and Kurtosis) for each aspect and specific questionnaire items obtained during the evaluation and analysis of the questionnaire responses. It is noteworthy that within the Environmental Purchasing Behavior aspect, the statement "I prefer online shopping to brick and mortar" received the highest level of agreement among respondents. Similarly, in the Future Purchase Intention aspect, the statement "I believe that I will become more interested in shopping for green products online in the future" received the highest level of agreement. Furthermore, Table 2 includes Cronbach's Alpha coefficient values, which indicate the internal consistency of the measuring instrument for the investigated aspects.

Table 2. Descriptive statistics of researched aspects and items

	Mean	Median	SD	Skewness	Kurtosis	Cronbach's α
Environmental Purchasing Behavior	3.52	3.50	1.26	0.24	-0.33	0.81
EB1: When shopping online, I only buy green products.	2.76	2.00	1.638	0.686	-0.381	
EB2: When shopping online, I purchase from retailers who care about the environment.	3.07	3.00	1.729	0.530	-0.632	
EB3: Buying green products online makes me feel like a green consumer.	3.71	4.00	1.777	0.061	-0.942	
EB4: I feel good when shopping for green products online.	3.74	4.00	1.851	0.080	-0.992	
EB5: I prefer online shopping to brick and mortar.	4.45	4.50	1.817	-0.322	-0.793	
EB6: I recommend people I know to shop online because it's more eco-friendly.	3.39	4.00	1.733	0.213	-0.830	
Future Purchase Intention	3.95	4.00	1.43	-0.12	-0.47	0.91
PI1: In the future, when shopping online, I am determined to give up those products that are not green.	3.67	4.00	1.612	0.038	-0.670	
PI2: In the future, I am determined to buy only green products online.	3.37	3.00	1.698	0.210	-0.828	
PI3: In the future, I will recommend online shopping for green products to acquaintances.	3.77	4.00	1.686	0.039	-0.728	
PI4: In the future, I intend to buy green products online more often than today.	4.32	4.00	1.706	-0.277	-0.664	
PI5: I believe that I will become more interested in shopping for green products online in the future.	4.63	5.00	1.626	-0.527	-0.342	

Source: output from IBM SPSS Statistics 26

To validate the hypotheses, the normal distribution of data was examined using the Shapiro-Wilk test of normality and the Kolmogorov-Smirnov test (Table 3). A significance level of $p < 0.05$ was employed

for all investigated scenarios, and it was determined that the data did not adhere to a normal distribution, rendering the use of parametric tests inappropriate. Consequently, the non-parametric Kruskal-Wallis H test was employed to assess the hypotheses, specifically examining whether statistically significant differences existed in terms of education and net monthly income.

Table 3. Results of Shapiro-Wilk test of normality and Kolmogorov-Smirnov test

	Shapiro-Wilk test		Kolmogorov-Smirnov test	
	<i>W</i>	<i>p-value</i>	<i>K-S</i>	<i>p-value</i>
Environmental Purchasing Behavior	0.988	0.000	0.065	0.000
EB1	0.199	0.000	0.883	0.000
EB2	0.174	0.000	0.907	0.000
EB3	0.122	0.000	0.938	0.000
EB4	0.123	0.000	0.932	0.000
EB5	0.128	0.000	0.927	0.000
EB6	0.141	0.000	0.928	0.000
Future Purchase Intention	0.984	0.000	0.056	0.001
PI1	0.144	0.000	0.946	0.000
PI2	0.135	0.000	0.931	0.000
PI3	0.140	0.000	0.944	0.000
PI4	0.136	0.000	0.940	0.000
PI5	0.175	0.000	0.927	0.000

Source: output from IBM SPSS Statistics 26

The first hypothesis sought to establish whether noteworthy variances in consumer behavior concerning sustainability in e-commerce were present across distinct socio-demographic factors, specifically education and net monthly income. Likewise, the second hypothesis aimed to identify potential statistically significant distinctions in the intention to acquire green products online, taking into account the same socio-demographic factors as in the previous hypothesis (education and net monthly income). The Kruskal-Wallis H test results, displaying statistical significance at $p < 0.05$, can be found in Table 4. Regarding education, significant variations in Future Purchase Intention were substantiated, with respondents holding a university education - 1st degree scoring the highest. When examining specific questionnaire items, the statement "I believe that I will become more interested in shopping for green products online in the future" garnered the highest level of consumer agreement among those with a university education - 1st degree. In terms of net monthly income, no statistically significant differences were observed at the $p < 0.05$ level. However, when considering the $p < 0.10$ level, significant differences were found in both investigated variables, with respondents earning between 2,001 – 2,500 € attaining the highest score. The item "I prefer online shopping to brick and mortar" received the highest score for Environmental Purchasing Behavior. Regarding the Future Purchase Intention aspect, the item "I believe that I will become more interested in shopping for green products online in the future" achieved the highest score.

Table 4. Results of Kruskal-Wallis H test - Hypothesis 1 (1a, 1b) and Hypothesis 2 (2a, 2b)

Aspect	Education differences		Monthly income differences	
	<i>Kruskal-Wallis H</i>	<i>p-value</i>	<i>Kruskal-Wallis H</i>	<i>p-value</i>
Environmental Purchasing Behavior	3.670	0.160	9.981	0.076
Future Purchase Intention	8.384	0.015	10.548	0.061

Source: output from IBM SPSS Statistics 26

In their study, Steiner et al. (2017) incorporated socio-demographic factors such as income and education to examine and describe distinct consumer segments based on their motivation for engaging in environmentally friendly behavior when purchasing sustainable products. Nogueira et al. (2023) conducted research that revealed individuals with higher education exhibit greater pro-environmental tendencies when engaging in online shopping, indicating a higher consideration for environmental protection. Furthermore, their findings indicated that consumers with higher incomes showed less

inclination towards the sustainability aspect. These findings align with similar conclusions drawn by Rai et al. (2019).

The research included participants from Generation Y and Generation Z, two consumer groups recognized for their heightened awareness of environmental concerns and their consideration of ecological impacts when making consumer choices. These generations are known for their readiness to embrace green products as a regular part of their lives, acknowledge the intrinsic value of pro-environmental practices, and have the ability to motivate and influence others to prioritize sustainability. They not only recognize the significance of sustainability in the present but also display a growing inclination to make online purchases that align with green principles. Due to these characteristics, they are regarded as influential catalysts for promoting sustainable online shopping behavior and intentions (Nielsen 2018).

Contemporary consumers exhibit a growing inclination to consider sustainability and the environmental consequences when engaging in online shopping. This encompasses evaluating the impact of products and the entire purchase process, ranging from order placement to product utilization and delivery. Online merchants who recognize and proactively address this opportunity have a higher probability of attaining a competitive advantage over their competitors (Rajnoha et al. 2019). Consequently, it is crucial for future research to focus on examining the influence of environmental aspects on online shopping, given its pertinence and potential significance. With the Internet permeating every aspect of consumers' lives, it is widely acknowledged among researchers that online sellers must continually discern distinctive behavioral patterns exhibited by various consumer segments. These patterns encompass gender, education, income, and other socio-demographic characteristics. By uncovering and comprehending the preferences, priorities, and needs of online consumers, retailers can devise pertinent marketing strategies. Moreover, the insights gained can aid in devising information and communication strategies that enhance awareness among online consumers regarding product sustainability and the purchasing process (Rai et al. 2019).

Conclusion

The objective of the study was to discern disparities in consumer behavior and purchase intentions regarding sustainability in terms of e-commerce, focusing on selected socio-demographic characteristics such as education and income. The findings revealed significant variations in environmental online shopping behavior and purchase intentions among consumers, both in terms of educational attainment and net monthly income. Consumers with a 1st degree university education exhibited the highest inclination to purchase green products online, while those with an income ranging from € 2,001 to € 2,500 demonstrated similar tendencies. However, it is important to note that these outcomes might be influenced not only by consumers' perception of sustainability but also by their financial capabilities.

As part of the support for online shopping of green products, it is necessary to implement public policies and marketing activities to increase awareness of the sustainability of green products and their environmental impacts. It could subsequently lead to the support of the circular economy, which should be in the interest of government policies. In the same way, businesses should support increasing the environmental awareness of consumers and the subsequent increase in the sale of green products, which would lead to an increase in their profits and the satisfaction of not only economic but also environmental goals.

The issue of consumer behavior has garnered substantial attention from researchers and marketers alike, and it continues to be a prevalent area of study today. Numerous academics and researchers are dedicated to exploring consumer behavior for various reasons. Understanding consumer behavior is believed to have a direct impact on the overall success and prosperity of businesses. To thrive in a competitive environment, entrepreneurs must consistently offer high-quality products or services, establish attractive pricing structures, and ensure convenient customer access. Furthermore, they must maintain regular communication with existing and potential customers, suppliers, and other relevant parties. As a result, emphasis should be placed on effective marketing strategy, as it is the decisive tool able to sway consumer perceptions when executed appropriately. By carefully planning and delivering targeted communication messages, entrepreneurs can influence customer attitudes towards particular products or services, compelling them to make a purchase (Yeboah, Atakora 2013).

It is important to acknowledge a possible limitation of this study - the geographical scope of the research, which was limited to Slovakia. Since the research was conducted exclusively in Slovakia, caution must be exercised when generalizing the findings to online consumers worldwide. Nevertheless,

the same research could be duplicated in other countries, including those within the V4 region, allowing for comparative analysis and a more comprehensive understanding of consumer behavior.

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Research on the Issue of Positive Effects of Artificial Intelligence on the Activity of Companies and Online Consumers Behaviour

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Abstract

Research background: The timeline of artificial intelligence is relatively brief, spanning no more than half a century when we consider recent times. Artificial intelligence has evolved into a formal scientific and academic field, constituting a distinct area of study. Throughout the history of artificial intelligence, we have witnessed phases characterized by undue optimism, achievements, subsequent downturns in enthusiasm, and a resurgence in the significance of artificial intelligence.

Purpose of the article: This paper's central aim is to investigate whether there is evidence of the positive influence of artificial intelligence within companies. In pursuit of this goal, a research question was framed to assess whether a statistically significant link can be identified between the constructive effects of artificial intelligence on society and the prospects of future opportunities in the field of e-commerce.

Methods: A questionnaire was sat down for the quantitative part of the research. The established research hypothesis was verified using the correlation analysis. Since the variables entering the analysis were measured on an ordinal scale, Spearman's correlation coefficient was used to test the hypothesis.

Findings & Value added: Based on the analyzes carried out, it can be concluded that the respondents register a positive impact of AI in their company. Moreover, the respondents are of the opinion that AI will bring new opportunities to the field of e-commerce. The research carried out also confirmed that there is a statistically significant connection between the positive impact of artificial intelligence in society and the perception of future new opportunities that artificial intelligence would bring to the field of e-commerce.

Keywords: artificial intelligence, consumer behavior, company, digital marketing.

JEL classification: M30, M31, M37

1. Introduction

Artificial intelligence is a ubiquitous discipline in both global and local educational contexts, encompassing nearly every specialization within the computer science domain. The content and expectations associated with an artificial intelligence study program, including its primary areas of focus, derive from the fact that informatics is categorized as a distinct scientific field. It belongs to a cluster of cognate sciences that share content similarities and exhibit a closely related character. Consequently, as an academic discipline, artificial intelligence aligns with other closely affiliated fields of study (Copeland 2000). The unquestionable legitimacy of this classification prompts the consideration of why artificial intelligence holds such a significant standing within the realm of informatics.

Historically, artificial intelligence is a relatively youthful discipline, yet its very name elicits considerable optimism (Europarleuropaeu 2022). In its most extreme forms, there may even arise both theoretical and practical interest in the creation of a phenomenon that could be somewhat inaccurately described as an "artificial being" (Barták 2017). The primary objective of activities within the field of artificial intelligence is to conceive and construct intelligent entities, comprehending their capabilities and modes of operation. It chiefly revolves around the application of computational processes, establishing a fundamental link with computer science while also exhibiting distinctions from other disciplines centered on intelligence.

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Notably, artificial intelligence does not inherently seek to answer the fundamental question of what constitutes intelligence, although it often contributes to this line of inquiry (Floridi 2018). The definition of artificial intelligence is founded on the notion that it involves the capacity of a device to exhibit abilities that are equivalent to or reminiscent of human capabilities, such as planning, logical reasoning, creativity, and learning. Certain technical systems, enabled by embedded artificial intelligence, have the capacity, for example, to differentiate their environment, identify discernible issues, and pursue specific objectives (Gregor & Gregor 2015). Artificial intelligence systems possess the capability to function independently and, to a certain extent, adapt their capabilities by analyzing past actions. The continuity of artificial intelligence is maintained when computer systems or programs remain unaltered. This adaptability and expansiveness are exemplified by the statement from *Europarlepupaeu* (2022). The pivotal role of artificial intelligence in the digitalization of businesses underscores its status as a top priority in both research and educational institutions, as highlighted by Barták (2017).

Remarkably, artificial intelligence, or its constituent elements, is now pervasive across various levels of social life, often unnoticed. The anticipation of epochal changes arising from its future applications is widespread (Pavliček 2010). It is imperative to sustain current trends, where advancements in computer technology, the abundance of data, information, and novel algorithms have led to numerous groundbreaking discoveries (Sekaj 2021). Artificial intelligence can be categorized into two primary types, as delineated by Joshi (2019; van Esch & Black 2021): software-based and embedded in devices. Software-based artificial intelligence encompasses a diverse range of systems, including those for shape recognition (including faces), speech processing, image analysis, and various search engines. Within this context, we can also mention the presence of virtual assistants, as highlighted by Návrát (2006). On the other hand, embedded artificial intelligence is found within devices such as drones, autonomous vehicles, IoT (Internet of Things) devices, and various types of robots, as described by Sraders (2019). It involves the integration of artificial intelligence components into a wide array of systems, like vacuum cleaners, motion sensors, medical devices, and more, thereby enabling them to perceive and respond to stimuli. The speed of response required for each specific task is also of paramount importance (Vysekalová et al. 2012).

The applications of artificial intelligence span a broad spectrum (Frey 2008): web search, automatic translators, online shopping and advertising, digital personal assistants, cars, smart cities, homes and infrastructure, and cyber security. Search on the web – search engines know how to get the necessary information for the user from an enormous amount of data. In this case, the reaction time is usually enormously short. Search engines are characterized by high reliability (Vincent 2018). Automatic translators – this feature enables instant translation of word meanings, serving as a translingual tool that translates lexicons between languages.

Alternatively, it often provides multiple synonyms for a given word, which is crucial for effective communication (Popenici & Kerr 2017). Online shopping and advertising - Online shopping plays a pivotal role in generating personalized shopping suggestions and proves invaluable in warehouse and logistics management (Wertime & Fenwick 2008; Yang et al. 2021). Digital personal assistants is the terminus technicus for the device's ability to search for and offer certain procedural solutions. They are found in smartphones, e.g. as navigation, which helps to optimize movement along a certain route (Joshi 2019; Lawton 2023). Automobiles – passenger or freight cars – represent a very important civilizational factor of today. In the developed world, they are relatively affordable and represent a necessity rather than a luxury (Kinelski 2022).

The automotive industry has fully embraced the incorporation of artificial intelligence as a strategic move (Canva 2020). In today's vehicles, AI components abound, providing support in tasks like navigation and vehicle operation. While self-driving cars are a reality, their widespread adoption still faces delays due to various factors (Karam 2012). Furthermore, artificial intelligence plays a pivotal role in the development and regulation of smart cities, households, and infrastructure, aiding in tasks such as managing transportation to reduce congestion and improve connectivity (Emeritus 2023). Within households, AI devices like smart thermostats contribute to energy conservation (Vincent 2018; Janouch 2014). At a broader level, connectivity signifies the level of intercommunication among computers, enabling multiple systems to exchange information on various aspects, including traffic conditions and a patient's health status (Koman et al. 2020). Cyber security – when it comes to cybersecurity, artificial intelligence systems prove invaluable by continuously storing data, identifying patterns, and conducting retrospective analyses, including tracking back through various activities such as criminal acts and various

types of attacks. This capability aids in the detection and prevention of cyberattacks (Hedggde & Shainesh 2018).

2. Methods

The main goal of this paper is to find out whether the companies perceive any positive impact of artificial intelligence.

Based on this objective, the following research question has been formulated:

RQ: Is there a statistically significant link between the positive societal effects of artificial intelligence and people's outlook regarding the future potential of artificial intelligence in the e-commerce sector?

Based on the above research question, the following hypothesis has been formulated:

We assume that there is a statistically significant connection between the positive impact of artificial intelligence in society and the people's outlook regarding the future potential of artificial intelligence in the e-commerce sector.

Data for this analysis were collected using a questionnaire approach, which encompassed six demographic inquiries dividing respondents based on gender, age, region, highest education level, current employment status, and their position within their respective companies. The subsequent 15 questions focused on artificial intelligence, offering respondents the choice of responding on a Likert scale or selecting predefined options. The research hypothesis, once established, will undergo validation through correlation analysis. Given that the variables under examination are measured on an ordinal scale, Spearman's correlation coefficient will be employed to assess the hypothesis. This coefficient can yield values within the range of $\langle -1, 1 \rangle$. Statistically significant relationships between variables will be affirmed if the p-value from the test falls below the significance level $\alpha = 0.05$.

The survey sample comprises individuals categorized into four distinct age groups, a methodology inspired by the approach employed by the author Young (2017) at Ogilvy & Mather. Utilizing this method, we conducted an online questionnaire survey facilitated by the Google Workspace suite, specifically Google Forms. Data collection occurred during the period of February through March 2023. This online survey was distributed to specific target groups with professional exposure to artificial intelligence, resulting in a total sample size of 160 respondents.

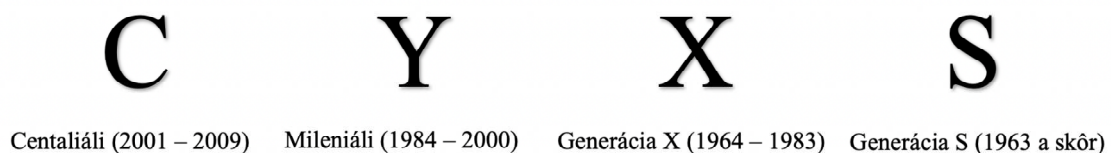


Figure 1. Age distribution of respondents
Source: Young (2017)

3. Results

Item no. 9 employed a 5-point scale to gauge respondents' perceptions of the positive influence of AI in their organization, with a rating of 5 signifying the most substantial positive impact on society. The majority of respondents selected level 5, constituting 33.80 % of the participant pool. This was followed by the 3rd rating, chosen by 25.60 % of respondents. Level 3 was succeeded by level 4, which represented 20 % of respondents' responses. The 3rd rating was trailed by the 1st rating, accounting for 11.90 % of participant responses. The least frequently chosen option was the 2nd rating, selected by 8.80 % of respondents. Based on these findings, it is evident that respondents perceive a positive impact of AI within their organization.

Item no. 20 aimed to assess the potential impact and growth of AI in the realm of e-commerce. A five-point scale was utilized once again, with level 1 denoting the lowest value, "definitely not," and level 5 signifying the highest value, "definitely yes." A majority of respondents, specifically 58.80 %, selected level 5. This was followed by level 4, chosen by 26.90 % of respondents, and subsequently, level 3, with 11.90 % of responses. The least frequently chosen options were levels 1 and 2, both selected by the same number of respondents, i.e., 1.30 %. Based on the responses received, it can be inferred that AI is expected to bring new opportunities to the field of e-commerce.

Subsequently, the subject hypothesis was verified:

H: We assume that there is a statistically significant connection between the positive impact of artificial intelligence in society and the people's outlook regarding the future potential of artificial intelligence in the e-commerce sector.

H0: No significant relationship was demonstrated between the analyzed variables.

H1: A significant relationship was demonstrated between the analyzed variables.

To assess the hypothesis at hand, an investigation was conducted to determine whether a statistically significant correlation exists between the favorable societal effects of artificial intelligence and the anticipation of future opportunities in the e-commerce sector. The analysis incorporated responses to questionnaire items 9 and 20. The findings, as presented in Table 2, provided support for the established research hypothesis, as indicated by the p-value (0.0000) falling below the predetermined significance level (0.05). Spearman's coefficient, calculated at 0.4470, denotes a positive and monotonic relationship between the variables. This implies that a favorable perception of artificial intelligence's societal impact corresponds to an equally positive perception of future e-commerce opportunities. The hypothesis in question was thus confirmed.

Variables	Spearman's rank correlation coefficient	p value
Impact of AI AI opportunities	0.4470	0.0000

Figure 2. Results of hypothesis verification

Source: own processing (2023)

4. Discussion

Artificial intelligence has the power to captivate and excite, but it can also evoke unease among individuals. It's evident that AI is poised to play an increasingly prominent role across various industries and in different facets of our social lives. Recent developments hint at an AI revolution that may have already occurred and may now be beyond our complete control. In a way, artificial intelligence is starting to comprehend us, and this fact serves as both an observation and a cautionary note. We've been integrating AI into our lives for several years, but the real excitement began when it started "conversing" with us, making us feel understood. Although programmers have taught machines to grasp human language, they're now pushing further. Some machines can discern emotions and moods, a capability that has advantages in fields like e-commerce. Undoubtedly, artificial intelligence brings numerous benefits, streamlining and expediting various work processes. Yet, there's another side to its application. AI can replace humans in tasks, leading to depersonalization, which can pose challenges under certain circumstances. The rise of artificial intelligence is an irreversible process, with humanity deeply intertwined with it. We encounter AI almost everywhere we go. However, it's crucial to remember that numerous jobs and roles still demand the unique human skills of creativity and professionalism.

Research in this area has already been carried out in Slovakia, specifically by the Go4insight portal (2023). However, this research focused on Slovaks' experiences with artificial intelligence in the online environment. Artificial intelligence was employed, albeit infrequently, by a minority of respondents; nevertheless, both in our study and in their experiences, the prevailing sentiment is one of positivity rather than negativity.

The research conducted has limitations primarily stemming from an inadequately representative sample of respondents. Furthermore, the findings in question should not be extrapolated to the entire population of Slovakia, as over half of the respondents originated from the Košice and Prešov regions (63.8 %).

For future research, it would be intriguing to replicate the current study with a representative sample encompassing the entire country of Slovakia. Additionally, it could be valuable to compare the findings from this research with those obtained in similar studies conducted in the neighboring V4 countries.

Conclusion

Drawing from the conducted research, it was evident that a significant portion of companies does not currently integrate artificial intelligence into their operational workflows. The largest group of respondents, comprising 46 individuals or 28.7 %, reflected this trend. Consequently, a recommendation emerges, suggesting that these companies should consider implementing artificial intelligence to streamline their processes and enhance efficiency. Another noteworthy observation was the anticipation

that artificial intelligence will contribute to simplifying societal and corporate workflows, as indicated by the majority of respondents, totaling 80 individuals or 50 %. The final aspect considered the potential impact of artificial intelligence on specific job sectors, with a substantial 62 respondents or 38.8 % believing that certain professions may face extinction due to AI.

From the analyses conducted earlier, it can be deduced that the respondents acknowledge a favorable influence of UI within their company, and they also hold the view that UI will usher in fresh prospects for the e-commerce sector. Furthermore, our research has validated the existence of a statistically significant correlation between the positive societal impact of artificial intelligence and the perception of forthcoming opportunities in the realm of e-commerce.

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The Impact of the Corona Crisis and Support Measures on Micro, Small and Medium-sized Enterprises in Slovakia

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Abstract

Research background: The COVID-19 pandemic has become a global threat with a direct impact on the economy and business environment. In addition to endangering public health, it caused fundamental restrictions on private and working life. It significantly affected all business entities, which had to adapt very quickly to new challenges. The Government of the Slovak Republic has approved several support measures aimed at mitigating the economic impact of the COVID-19 pandemic.

Purpose of the article: The purpose of the article is to find out the effects of the crisis on micro, small and medium enterprises. We find out how entrepreneurs perceive the support measures adopted by the government, whether these measures were sufficient and how they helped entrepreneurs overcome the difficult period of the corona crisis.

Methods: The research is based on a questionnaire survey conducted with the managers or owners of small and medium enterprises in Slovakia. The questionnaire research was subsequently evaluated using the methods of descriptive and inferential statistics.

Findings & Value added: Based on the questionnaire research, we can conclude that the pandemic has largely affected the economic situation of business entities. Employers often had to provide their employees with a temporary change of work activity in order to avoid their dismissal. The COVID-19 pandemic has forced business entities to reassess their business and, if possible, adapt to the new market needs. It can be concluded that employers used state aid to maintain employment, but assessed this aid as insufficient. At present, in times of high uncertainty, business is most affected by expensive energy, inflation, expensive and difficult-to-access loans, and a lack of qualified labor in many business sectors. The presented research provides a new perspective and current responses of the micro, small and medium-sized enterprises (MSME) to the corona crisis.

Keywords: crisis, micro, small and medium-sized enterprises, support measures

JEL classification: D22, E24, J21, L26

1. Introduction

Crises of any type have become an integral part of business activity, and responses to them can mean the difference between survival and failure. This applies especially to small and medium-sized enterprises (SME) (Durst et. Al 2021.). The economic crisis caused by public policy measures caused by the COVID-19 pandemic was truly new compared to any other types of crisis that global and local economies have experienced so far (Landmesser, 2021; Liu et al., 2021). The COVID-19 crisis represents a new type and quality of challenge for companies. (Kraus et. al. 2020) In terms of economic impact, it is compared to the great economic crisis of the 1930s. Almost all countries of the world took measures due to the lack of any successfully proven drug for the spreading epidemic that could prevent a large increase in the number of infections, with a negative impact on national economies and the level of economic activity of their citizens (Kuc-Czarnecka, 2020; Zinecker et al., 2021).

The COVID-19 pandemic crisis was significantly different from previous crises in terms of its onset, development, scope, strong effects on the economy and the proper functioning of countries. It was characterized by its unpredictable duration, as well as its effects on various areas of the economy. It had

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no geographical boundaries. As a result of this crisis, millions of people died and many economies of individual countries were shocked. It led to the deepest recession and subsequently to the financial crisis.

Due to the fact that the number of infected people in the individual countries increased sharply and uncontrollably, individual countries of the world approached strict quarantine measures, which were associated with curfews, closing schools, shops, companies, and limiting leisure activities (Leite, Hodgkinson, Gruber, 2020).

The first wave of the pandemic began to fully manifest itself in the spring of 2020, when several countries began to restrict economic and social life, to the so-called lockdown of the economy. All countries tried to deal with the consequences of the crisis and adopted a wide range of measures to prevent the spread of the disease and subsequently measures to jump-start the subdued economy.

In addition to the impact on public health, the disease COVID-19 has caused a major economic shock and the biggest consequences have been felt by small and medium-sized enterprises. As a result of the crisis caused by the COVID-19 pandemic, countries and their companies are facing major problems of sustaining human and business capacities (Gavric et al., 2021).

1.1 Anti-pandemic measures

The first measures that were taken after the outbreak of the COVID-19 pandemic were to protect human health, prevent the spread of the disease by limiting direct contact between customers and service providers. Strict restrictive measures were gradually introduced in Slovakia, which were among the strictest in Europe. Operating companies in sectors with a higher risk of spreading COVID-19 were forced to reduce or to completely close their operations. Borders, international transport, operations, schools, cultural facilities, etc. were closed.

As a result of the massive cancellation of vacations, the suspension of international transportation at the beginning of the pandemic, there was also a change in the tourism industry (Gallego et al., 2020).

In many countries, including the territory of the Slovak Republic, a state of emergency was declared in connection with the constantly worsening situation within the second wave of the pandemic. The state of emergency negatively affected the economic situation of several business and non-business entities (Shen et al., 2020).

The anti-pandemic measures taken during the COVID-19 pandemic managed to lower the epidemiological curve, but contributed to a sudden and sharp economic decline, unemployment and an increase in public spending. The COVID-19 pandemic has significantly affected major economic variables such as economic growth, world trade, public spending, unemployment, foreign direct investment, production and sales, household consumption, business investment etc. (Khan et al. 2021).

1.2 Impact of corona crisis on the economy of Slovakia

All problems were also reflected in macroeconomic indicators. During 2020 and 2021, there was a decline in the gross domestic product, which in the critical second quarter of 2020 reached a year-on-year drop of 8.8%. In the following months, the situation in the economy stabilized and such high year-on-year declines did not occur. The decline also occurred in the industry sector, representing more than 30% year-on-year. This is mainly a consequence of anti-pandemic measures, which also meant the closure of industrial production.

From the point of view of other macroeconomic indicators, the development of inflation is interesting. During the first wave and the second wave of the coronavirus, it dropped to values around zero. From March 2021, there was a reversal of the interannual trend of the Harmonized Index of Consumer Prices. By the end of the year, inflation had already reached more than 5%. Moreover, inflation continued to grow during the following period, with month-on-month inflation reaching 2.8% in January 2022. Year-on-year inflation reached more than 10% in 2022, which represents long-term records. Price growth can be seen across all sectors. The price growth of industrial products in 2022, after the end of the corona crisis and also due to the conflict in Ukraine, reached the limit of 30%, which is the highest in the last several decades.

The development of unemployment appears to be relatively positive during the corona crisis. A significant impact on reducing the effects of the corona crisis, especially with regard to employment, are several measures of the government - aid packages.

The effects of the corona crisis on entrepreneurs are also significant. The negative impact on the microeconomic environment most affected entities that had to completely or at least partially limit their business as a result of anti-pandemic measures. According to e-kasa data, there was a decrease in sales,

most significantly in sectors such as tourism and gastronomy, or in the chemical and automotive industries, which secondarily affected many other companies that, although we do not directly classify them as car manufacturers, but are in the position of their suppliers of components or services.

Although the crisis caused by the COVID-19 pandemic affected all business entities in Slovakia, whether in the form of various restrictions or increased costs, not all industries were affected equally.

The analysis of the management of non-financial enterprises for the year 2020, carried out by FinStat in August 2021 (FinStat, 2021a), showed an average decrease in sales by 6.1% and the result of management by 11.3%. At the same time, the industries that recorded the largest increase in sales in 2020 were determined. Specifically, it concerned gambling operators, retail (excluding pharmacies and fuel), pharmaceuticals (production, wholesale distribution, pharmacies), agricultural sector, manufacturers of boilers and radiators, couriers, healthcare, ICT sector, wagon production.

1.3 Measures taken to mitigate the economic impact of the corona crisis

All countries tried to deal with the consequences of the crisis caused by the COVID-19 pandemic, to adopt a wide range of measures and to restart the suppressed economy.

Most countries introduced measures to support SMEs and self-employed persons, primarily aimed at maintaining short-term liquidity of companies and employment.

The amount of measures adopted by the government of the Slovak Republic since the beginning of the pandemic can be divided into two groups, namely anti-pandemic measures to prevent the spread of the disease and support measures to help entrepreneurs and employees most affected by anti-pandemic measures.

First, the most significant measures were taken, which aimed to reduce mobility and the number of contacts within the population. In practice, retail sales and schools were closed, but also (also due to measures in other states) a large number of industrial enterprises were closed.

As regards support measures aimed at mitigating the economic impact of the COVID-19 pandemic, new types of social benefits in the form of pandemic sick and nursing allowances were first approved. Subsequently, on March 31, 2020, the government of the Slovak Republic also approved a scheme of direct assistance to maintain jobs, the so-called "First aid" package. It was co-financed from the European Social Fund, aimed at compensating for the loss of income and wages of entrepreneurs, self-employed persons (SZČO in Slovak) and employees.

For almost two years, the "First Aid" project was the main tool for protecting jobs and household incomes from the pandemic in Slovakia. It was prepared and implemented by the Ministry of Labour, Social Affairs and Family, taking into account the risk of the dynamic development of the pandemic. The project had a flexibly set framework of rules, thanks to which the state was able to modify it so that it was effective even after unexpected changes in the pandemic rules and could promptly react to instability in the economy and in the labor market. During the project, the Government of the Slovak Republic issued a total of 13 resolutions by which "First Aid" was improved and adapted to the current situation.

In accordance with the development of the epidemic situation, "First Aid" was legislatively amended several times, with the aim of relieving the burden on employers and the SZČO and covering part of their wage costs. The original framework was replaced and direct financial support increased in the period October 2020 - January 2021 in the form of "First aid +". With this adjustment, the compensation was simultaneously expanded from 80% of the gross salary to 80% of the total price of the work. From February 2021, the more attractive "First Aid ++" came into force. The amount of the contribution was capped at 100% of the total price of the work. With the calming of the pandemic situation and the economic recovery, the need to subsidize the maintenance of jobs decreased, which was also reflected in the parameters of "First Aid". In the period July to October 2021, the basic framework "First aid" was applied, while aid was not paid for August. For November 2021, support was paid through the "First Aid +" framework, and in the period December - February 2022, micro and small businesses were allowed to use "First Aid +".

The eligible period of the project, within which employers and self-employed persons could apply for assistance, was from 13 March 2020 to 28 February 2022.

In the Labor Code Act no. 66/2020 Coll., which supplemented the law no. 311/2001 Coll. the Kurzarbeit model was introduced. Used since April 4, 2020, as a support during the reduced work, which appeared to be an effective tool for solving crisis situations on the labor market, when a large number of establishments were closed as a result of the anti-pandemic measures taken.

Employers and compulsorily insured SZČO, in the event of a decrease in sales by more than 40%, could apply for a postponement of the payment of levies, social insurance premiums and health insurance advances, for a postponement of income tax advances.

The government of the Slovak Republic has taken several measures in the area of fulfilling tax, customs and accounting obligations, whether in the area of income tax, VAT, customs, as well as local taxes, excise taxes or tax on motor vehicles, not forgetting also the mitigation of obligations related to the use of eKasa.

Indirect financial aid measures were aimed at deferring repayments of loans, leases, state bank guarantees, as well as providing advantageous financial products and services through state financial institutions such as EXIMBANKA, Slovenská záručná a rozvojová banka or Slovak Investment Holding. The recipients of financial assistance were small and medium-sized enterprises and SZČO.

The result of the corona crisis is also the introduction of the pan-European project Recovery and Resilience Plan. It is a program of incentives for the economies of individual countries, while the condition for its use is mainly the reform program of the given country.

2. Methods

The aim of the article is to characterize the support measures taken by the government of the Slovak Republic aimed at mitigating the economic impacts of the COVID-19 pandemic for companies SZČO and to analyze the perception and impact of these measures on micro, small and medium enterprises/MSMEs/. We focused on this type of business entity because the world economy is dominated by small and medium-sized enterprises (SMEs) in the number of total enterprises (90-99% of all enterprises, depending on the definition used) and in economic contributions (GDP growth, productivity, job creation, innovation, level of competition, etc.) (Lundstrom & Stevenson, 2001). Since small businesses create jobs, tax revenues, functional products, charitable donations, technological development and social contributions to communities, their success and sustainability are important for social and economic development (Gavric, T., et al. 2021).

In the first stage of the solution, it was necessary to carry out a literary search of domestic and foreign authors based on the analysis of secondary sources. In this stage, methods of scientific work such as summarization, synthesis of knowledge and methods of analogy and deduction were used. The second stage was focused on the analysis of primary sources obtained by conducting an empirical survey, using the inquiry method.

We determined the following research questions:

RQ1 How did the pandemic affect the business of individual companies,

RQ2 How do MSMEs perceive support measures from the state,

RQ3 What problems did MSMEs have in relation to using the aid,

RQ4 What were the reasons why entrepreneurs did not apply for assistance,

RQ5 What factors fundamentally affect MSME business nowadays, when the corona crisis has continuously turned into an energy and financial crisis.

Using the Google Form, we created an anonymous questionnaire that was distributed electronically to individual respondents. After selecting suitable questions for our questionnaire, we first determined their comprehensibility using pilot testing. In total, 7 respondents participated in this testing, based on their comments, we subsequently modified the questionnaire into its final form. The content and form of the questionnaire was adapted so that filling out the questionnaire took as little time as possible for the respondents and the questions were unambiguous. Our research sample was constructed by available sampling. For the research, we focused on micro, small and medium-sized enterprises. We approached the respondents via e-mail and social networks.

Research preparation began in October 2022 and data collection began in January 2023. Data acquisition was completed on March 21, 2023.

The questionnaire, through which the data collection was carried out, contained 13 closed questions and 2 questions with a choice of multiple options and one open question.

In the first five questions of the questionnaire, we obtained basic information about the respondents, such as the business sector, the size of the company according to the number of employees, the region in which the company does business, the legal form of the business and the length of the company's existence. We were also interested in how much the pandemic affected the business of individual companies, whether there was a change in the companies as a result of the anti-pandemic measures, or a

drop in sales, and whether state aid compensated them for the drop in sales. In the event that companies applied for support measures, what caused them the biggest problems in obtaining them, or how do they evaluate the support measures received. What were their reasons if they did not apply for support measures.

In the next part of the questionnaire, we were interested in whether they were forced to take measures to temporarily change their work activities, or whether they had to adapt production/service provision to new market needs.

In the end, we asked which factors negatively affect their business at present, in today's energy and financial crisis. We also interested in what positive things the crisis brought to businesses.

We also analyze the relationship between the size of the company and the impact of the COVID-19 pandemic on business in the MSME sample. We verify the assumed relationship by testing the hypothesis **H1: There is no statistical dependence between the size of the business and the impact of the COVID-19 pandemic on business.**

In the next part we test hypothesis:

H2: There is no statistical dependence between the size of the enterprise and the assessment of the possibilities of using support measures.

In addition to descriptive statistics, we also used inferential statistics to process the results obtained from the questionnaire survey. To evaluate the results, we replaced the ordinal answers with numbers.

We test the research hypothesis **H1** and **H2** by using χ^2 the independence test, which tests the independence of two discrete characters acquiring finitely many values. The frequencies of individual combinations of occurrences of the values of these characters are shown in the contingency table.

We test the hypothesis of independence, where, $H_0: p_{ij} = p_i \cdot p_j$, kde $p_{ij} = P(Y = i, Z = j)$, $p_i = \sum_j p_{ij}$, $p_j = \sum_i p_{ij}$, $i = 1, \dots, r$, $j = 1, \dots, c$, YY is a discrete quantity having values $1, \dots, r$, and the quantity Z is a discrete quantity having values $1, \dots, c$. Testing statistics has the following shape:

$$\chi^2 = n \sum_{i=1}^r \sum_{j=1}^c \frac{n_{ij}^2}{n_i \cdot n_j} - n,$$

where n_{ij} are empirical frequencies, $n_i = \sum_j n_{ij}$, $n_j = \sum_i n_{ij}$. We reject the hypothesis of independence H_0 at the significance level α if $\chi^2 \geq \chi_{(r-1)(c-1)}^2(\alpha)$, where $\chi_{(r-1)(c-1)}^2(\alpha)$ is the tabulated critical value (Andel 2019).

We performed the tests at the level of significance $\alpha = 0,05$; Data analysis for statistical processing was created in Excel using the Real Statistics Resource Pack (edition 7.6). Copyright (2013 – 2021).

3. Results

In this section, we present the results of the questionnaire survey. 82 respondents took part in the survey. From the point of view of regional representation, representatives based in all eight regions of Slovakia were approached in the survey. The representation of regions can be seen on the figure 1.

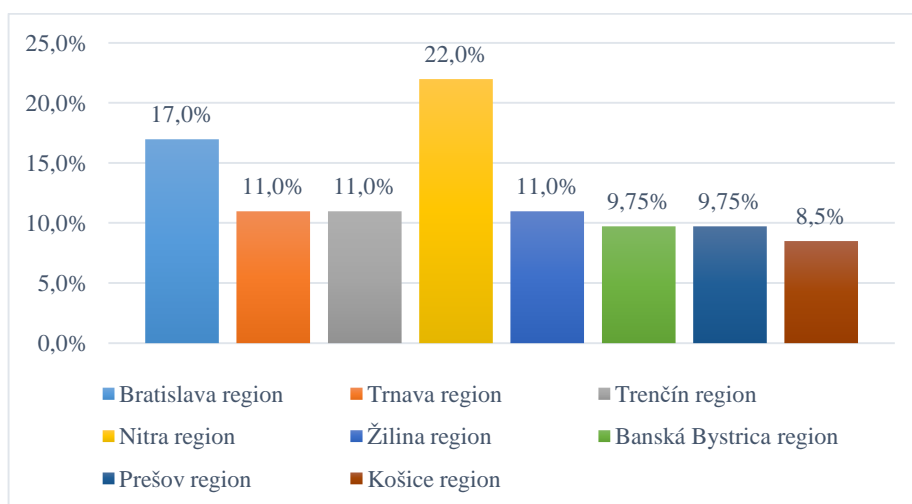


Figure 1. Business seat of the respondents
Source: author (2023)

The survey was attended by 53.7% of respondents belonging to the category of micro enterprises (1 to 9 employees). Small businesses (10 to 49 employees) made up 30% of the total number of respondents, and 16.30% were medium-sized businesses, which belong to the category employing 50 to 249 employees.

Looking at the structure of respondents represented by legal forms of business, the highest representation was limited liability companies (s.r.o.), which made up 45.1% of the total sample. This was followed by self-employed persons with a share of 32.9% and joint-stock companies with 9.8%. The sample was further supplemented by business entities with a different legal form (7.3%).

26.8% of the respondents were entities that carry out their main business activity in the accommodation and catering services sector. Representation of other activities can be seen on figure 2.

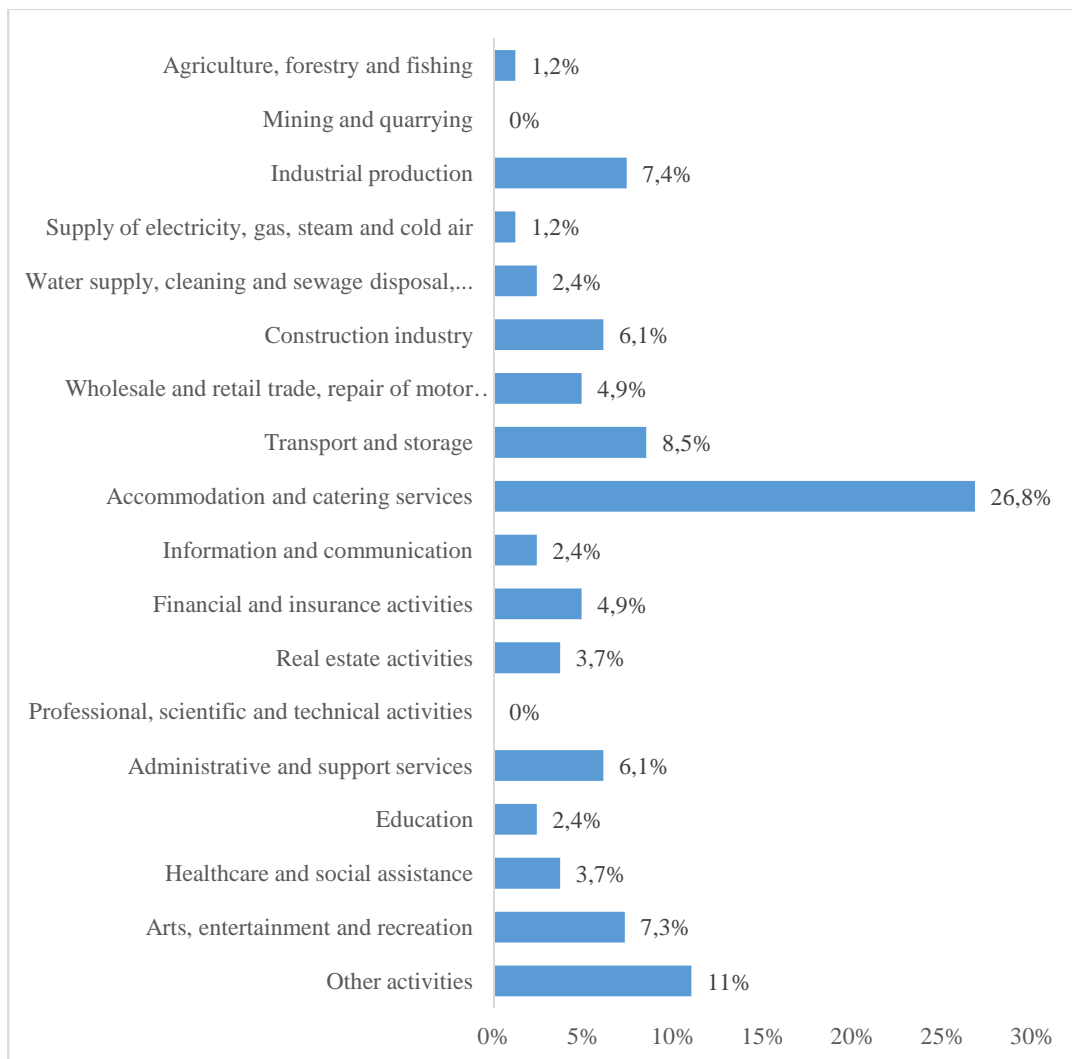


Figure2. Respondents by main type of economic activity
Source: author (2023)

50% of survey respondents were entrepreneurs who have been doing business in Slovakia for more than 10 years, 29.2% of respondents have been doing business for 4-9 years, 15.9% of respondents have been doing business for 1-3 years. The least represented category (4.9%) was respondents who have been in business for less than 1 year.

In the next part of the questionnaire, we were interested in how much the COVID-19 pandemic affected the respondents' business (figure 3)

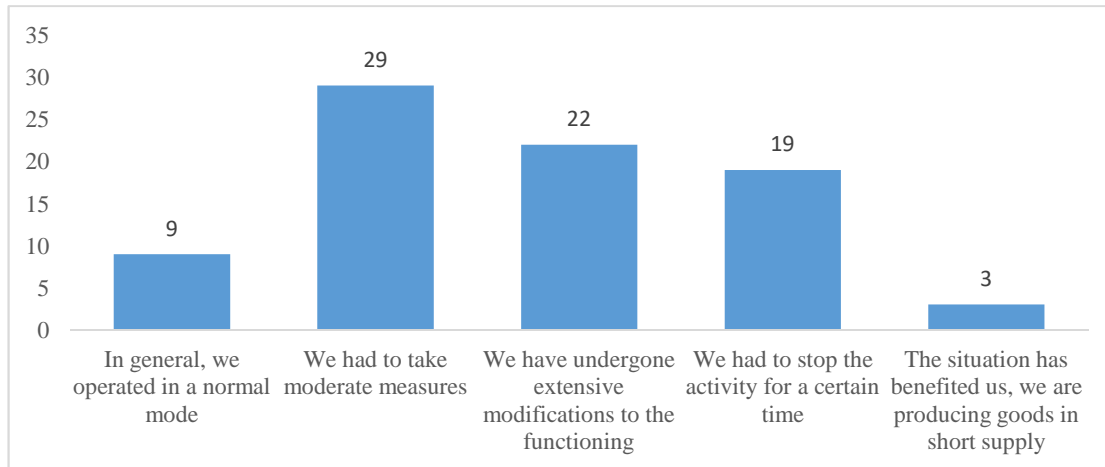


Figure 3. Impact of pandemic on the business

Source: author (2023)

In their answer to the question "How much has the COVID-19 pandemic affected your business?", many business entities stated that due to strict anti-pandemic measures aimed at slowing down, or to limit the spread of COVID-19, they had to close their operations completely or accept certain restrictions. As many as 62.1% of respondents said that they had to accept moderate or extensive changes in the functioning of their business. 23.2% of respondents had to stop their business activities, either because of the order of the Central Crisis Staff of the Slovak Republic or because of a significant drop in demand and sales. 11% of respondents worked in normal mode. 3.7% of respondents even benefited from the given situation, as they produced insufficient goods.

We verify the statistical dependence between the size of the company and the impact of the COVID19 pandemic on the business activities of the company by testing the hypothesis *H1: There is no statistical dependence between the size of the company and the impact of the COVID19 pandemic on the business activity of the company.*

In order to verify the tested hypothesis, the χ^2 independence test is used. Testing statistics is $\chi^2 = 13.24$ and on the importance level $\alpha = 0.05$ the $p - value = 0.1684$. As $p - value > \alpha$, we do not refuse the hypothesis *H1* on the importance level $\alpha = 0.05$. It can be concluded that there is no statistically significant dependence between the size of the company and the impact of the COVID19 pandemic on the business activity of the company.

Of the 82 respondents who answered the seventh question "Has there been a change in sales in your company as a result of the pandemic?", up to 72% confirmed that the pandemic reduced their sales, 17% of respondents did not notice any changes in sales, and 11% even saw sales increase.

In the next question, we investigated whether the aid provided compensated them for the drop in sales. Based on the survey, we can conclude that the drop in sales was significantly higher than the aid provided by the state for 24.4% of respondents. The worst situation was in the sector of accommodation and catering services, where the businessmen approached recorded a significantly higher decrease in sales than the aid received from the state. Support was able to at least partially compensate for the loss of sales caused by the pandemic in 43.9% of respondents. Not one of the 82 respondents answered that the loss of sales was completely compensated by the help from the state. For various reasons, up to 31.7% of the respondents did not use state aid.

In the next question, we found out how entrepreneurs evaluate the possibilities and conditions of using support measures aimed at mitigating the effects of the crisis. According to the results of the questionnaire survey, 55.1% of respondents consider the state's package of economic measures to mitigate the economic impacts of COVID-19 to be insufficient. Arts, entertainment and recreation, accommodation and catering services were among the most critical areas in the perception of the support measures taken. Respondents whose sales decreased during the pandemic rated the measures taken as insufficient more often. 30.2% of respondents could not assess the possibilities and conditions of using support measures, while only 2.5% of respondents rate the conditions as very good and 12.2% as sufficient. Entrepreneurs working in the healthcare sector and companies that achieved positive economic results despite the pandemic were the least critical of the adopted measures.

We were interested in whether the size of the company had an impact on the knowledge of support measures. We tested the hypothesis *H2: There is no statistical dependence between the size of the enterprise and the evaluation of support measures.*

In order to verify the tested hypothesis, the χ^2 independence test is used. Testing statistics is $\chi^2 = 5,63$ and on the importance level $\alpha = 0.05$, the $p - value = 0.0788$. As $p - value > \alpha$ we do not refuse the hypothesis *H2* on the importance level $\alpha = 0.05$. It can be concluded that there is no significant difference in the perception of support measures between micro, small and medium enterprises.

Given that the state created conditions for vulnerable groups of employees, entrepreneurs, and companies since the beginning of the pandemic, we were interested in what caused them the greatest problems when submitting applications (figure 4).

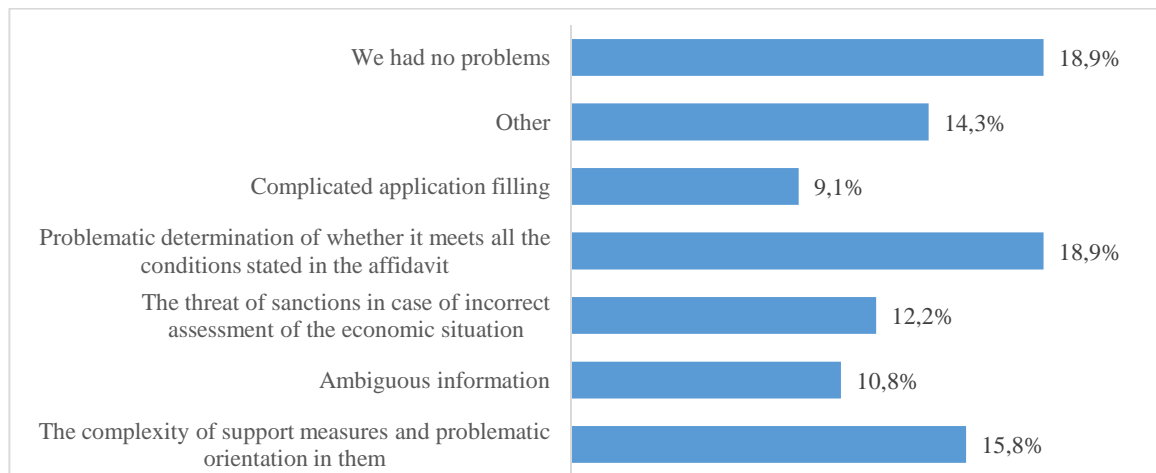


Figure 4. Problems related to the request for support measures

Source: author (2023)

In the event that the company did not apply for support measures, we were interested in the reasons for not applying for support to mitigate the effects of the pandemic. Respondents had the opportunity to mark several answers. The answers are clearly displayed in figure (figure 5).

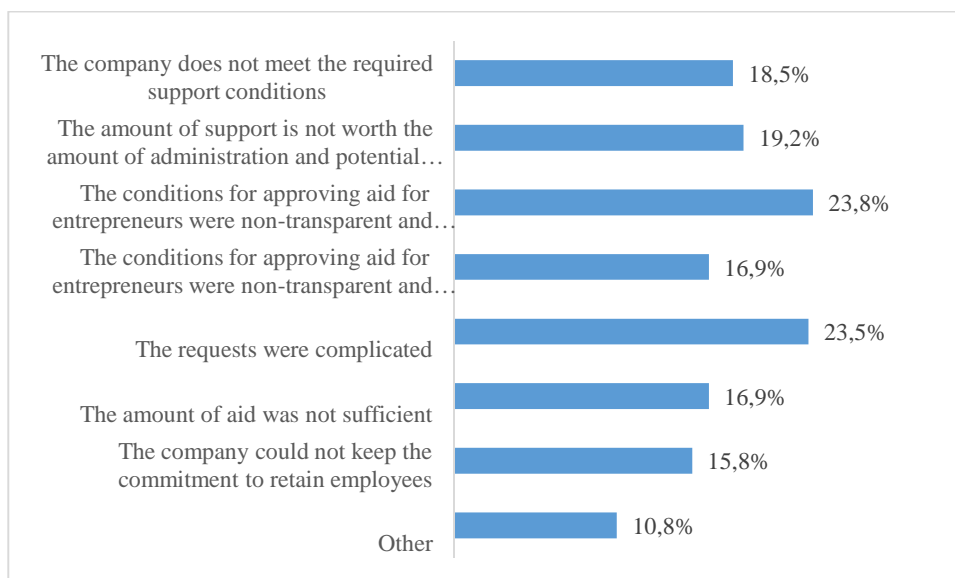


Figure 5. Reasons for not applying for support to mitigate the effects of the pandemic

Source: author (2023)

The most frequent reasons why the respondents did not apply for support were the complexity of the applications and the lack of transparency and ambiguity in the conditions for approving the aid.

Closing the so-called economy The lockdown also affected employment. As many as 47.6% of employers had to temporarily change the work activities of employees in order to prevent their loss.

The COVID-19 pandemic has brought about a number of measures that have changed most people's daily lives and forced business entities to rethink their field of business. As many as 69.5% of respondents indicated in the survey that they had to partially adapt production or service provision to new market needs. Full market adaptation was reported by 13.4% of respondents. Production, or 17.1% of respondents did not have to change the services provided.

In the last part of the questionnaire, the respondents had the opportunity to state the factors that negatively affect their business the most. Based on the questionnaire survey, we can conclude that currently the most negative influence on the respondents' business is expensive energy 38.3%, inflation 32.2% and lack of qualified labor 27.3%. As a result of the pandemic and the war, many industries face a shortage of materials and components (8.6%). 6.2% of respondents cited expensive and hard-to-get loans as a negative factor. Few companies can operate without credit. They are used either to bridge a difficult period, to acquire competitors, or to buy expensive equipment. The last question was open. We asked the respondents how the crisis helped their business. In up to 90% of companies, the crisis accelerated digitization, in 62% it brought flexibility of work, home office began to be used, 35% of MSMEs said that their portfolio of activities had changed, 21% said that they pay attention to substitutability.

4. Discussion

Based on the analysis of empirical data, we managed to answer all the research questions. The questionnaire survey revealed that the COVID-19 pandemic and the anti-pandemic measures adopted by the government, which led to the closure of operations, significantly affected the economic situation of MSME companies. 23.2% of respondents had to stop their business activities. As many as 62% had to adapt their business to changing conditions. Authors (Durst, S., et al., 2021) and (Gavric, T., et al., 2021) present similar results. Author (Durst, S., et al., 2021) points out the important role of crisis management.

MSMEs perceive support measures as insufficient. We found that the size of the company does not affect the perception of support measures.

There were several forms of aid, they were gradually modified, the conditions of acquisition were supplemented, which, according to the respondents, brought a lot of chaos and bureaucracy to the entire aid process. Many companies were deterred by the incomprehensible and complicated conditions for submitting an application and therefore preferred not to even ask for help. It follows that the system of providing assistance to business entities was complicated and unclear.

That is why we suggest that the government should set the rules for the aid provided in advance and not change them when drawing aid from the Recovery Plan. To offer administratively simple requests, uniform and substantive information that would not be confusing for business entities. It would be appropriate to clearly and comprehensibly explain who is entitled to help and what the help consists of through an information campaign. We also propose to create help centers for business entities that would provide accurate and up-to-date information on the conditions and possibilities of using aid.

Our findings show that expensive energy, inflation and shortage of skilled labor and poor availability of credit are currently the most negative factors affecting MSME business. According to (Soni, G., et al., 2022), for MSMEs, limited capital available for investment is an obstacle to growth.

On the other hand, the COVID-19 pandemic has opened up new challenges but also opportunities for MSMEs. As we found out, in up to 90% of companies, the crisis accelerated digitization and brought greater work flexibility.

Conclusion

The COVID-19 crisis meant one of the biggest tests for Slovakia and its economy since the founding of the republic. A pandemic of such dimensions has not occurred in our territory in the last hundred years.

The government had to proceed with strict quarantine measures, which were connected with a curfew, closing schools, shops, companies, and limiting leisure activities. This had a negative impact on the business environment, many entities closed their business. On the other hand, the COVID-19 pandemic has often changed the business activities of MSMEs, strengthened the ability and flexibility of MSMEs to solve major business problems. The crisis has accelerated the digitization of many areas, which has also caused a faster change in the demands on the workforce. It brought an increase in energy prices and high inflation, expensive and unaffordable loans.

The findings presented in this article may be of interest to the government, managers and executives of MSMEs, but also to universities and other educational institutions, which should adapt the content of education to the new needs of practice, especially digitalization. This survey provides current MSME responses to the pandemic.

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Innovative Forms of Marketing and their Impact on Customer Behaviour

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Abstract

Research background: As a consequence of technological advances, we are opening up to online space and environment for purchasing, and the need for innovative forms of marketing (digital, virtual and influencer marketing, social media). Customer preferences are changing with each generation. Today, Generation Z dominates - people born after 2000 who are quite different from their parents.

Purpose of the article: The aim of this paper is to highlight the innovative forms of marketing and their impact on customer behaviour, to describe in a selected segment of the target group the method of using viral marketing in a specific market segment. We obtained primary information using our own research.

Methods: A questionnaire was used for the quantitative part of the research. We focused on the target group Generation Z - young people from 12-20 years old. In the context of post processing were used traditional scientific methods: method of analysis, synthesis, induction, deduction, comparison and observation.

Findings & Value added: The output of the paper will be an evaluation of the impact of the use of social media and innovative forms on the buying behaviour of Generation Z. The aim of the contribution is to point out the usability of innovative forms of marketing and their impact on the purchasing behavior of young customers aged 12-20. Therefore, marketers have to adapt the form of their campaigns and focus on promoting products using innovative and creative marketing strategies to win new customers and also retain loyal ones.

Keywords: digital marketing, virtual marketing, influencer marketing, social media

JEL classification: M30

1. Introduction

With the advent of the Internet in the 1990s, digital marketing is becoming more popular. The first very popular tool for digital marketing was email. With the development of the internet, brands started to focus on communicating with customers through Facebook or Twitter. With the next evolution of the times, smartphones came into the market and with them came various apps such as Instagram and Tik Tok, opening the largest online shopping environment.

Almost all businesses are increasingly using the online space to promote their products or services. According to the report, in 2022, the internet has just over 4.95 billion users and 5.31 billion phone users use this device to access the internet. The most commonly used channels in digital marketing are: search engine optimization (SEO), pay per click (PPC), social media marketing, email marketing, affiliate marketing. (O'Brian, 2022)

Digital marketing has many benefits that can be very beneficial to companies.

Data analysis: nowadays it is very easy for marketers to analyse what is the traffic on their website, what demographic group visits it the most. This information is very valuable and from this, further strategy can be developed to drive customers to purchase.

Content creation: social networks are no longer just for individuals, but also for businesses to add their own content, where they can interact with customers, promote their products, and create an effective interaction with followers and potential customers.

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Real-time results: digital marketing is a very good tool to effectively evaluate a campaign or a chosen marketing strategy. Marketers can see the results immediately and can react instantly.

Digital marketing has many advantages, one of which is that small companies can compete with large corporate companies. On social media, a company doesn't have to pay for advertising to become popular, sometimes all a company needs are interesting content. It has never been easier to break through with a brand than it is now in the age of social media. (Mankad, 2019)

The presentation of brands using modern social networks has greatly developed during the measures to protect society from the spread of Covid. This helped to develop social media marketing activities and thus changed the behavior of customers.

Mobile applications and social media platforms have been claimed to be drivers of change in consumers' behavior. In this vein, the confinement measures had an enormous impact on the way in which people purchased. The Internet and the online shopping made possible the continued purchase of many products and services, yet it changed substantially the customer journey map, urging companies to understand this new experience and to adapt accordingly. (Vazquez-Martínez et al., 2021)

Monitoring the development of customer behavior on social networks is one of the important sources of information necessary for obtaining knowledge necessary for the development of marketing strategies of brands.

Considering that it was an experimental study that focused on identifying the research areas covered by the different researchers in marketing and social networks, specifically twitter, the study presents important points where its information can contribute to Knowledge. (Alarcón et al., 2018)

Generation Z is known for its special and unique way of looking at values. One of the facts is lifestyle. It is influenced both by social networks, but also by the social environment in which the individual is located. It is very important to examine the relationship of the individual and his lifestyle in relation to values in the decision-making process in purchasing behavior.

Finding quality dimension as an important value for the targeted segment is not enough. It is also critical to understand what the meaning of quality is for a given product or service. (Akkaya, 2021)

How the environment perceives it is very important when presenting a brand. Based on this, innovative brand strategies can be made. Although the impact of environmental reputation on brand performance is intuitively appealing, there is a limited understanding of the mechanism through which environmental reputation could predict brand performance. Our study shows that brand satisfaction is a mediator of the link between environmental reputation and brand performance. (Opoku et al., 2023)

Self-control of spending is very important in generation Z under the influence of changes in society and awareness.

Demonstration of spending self-control can effectively influence consumer purchase intention, as these factors enable consumers to perceive the social and epistemic value. (Yanhong et al., 2023)

Research into brand positioning on the market shows that it is very necessary to focus on the right market segment and to communicate in a targeted manner, e.g. product packaging.

Retailers could also use external cues to enhance the consumers' perception of store brand products' quality, such as the use of attractive labelling and packaging design. (Calvo-Porall et al., 2017)

The external characteristics of product packaging play an important role in the customer's decision-making process. In the battle for the dominant design, wise decisions need to be made on three key aspects: the market, the technology, and complementary assets. (Fernández, 2019)

There are many factors that influence the successful sale of a product. One of the basic factors is the name (name) of the product. This factor is closely related to the study of the customer's purchasing behavior and the digital strategic marketing of the brand in close connection with advertising.

More, behavioral data could be beneficial in order to examine the logistics startups' user engagement in depth. Additionally, social analytics can be extracted and analyzed in correlation to behavioral and technical factors in order to get a holistic approach to the digital entities. (Sakas et al., 2023)

1.1 Viral marketing

Viral marketing is a technique used in digital marketing. It aims to reach the largest possible audience through social sharing. There are different ways of viral sharing, how through emails, videos, mobile apps.

The main goal of viral marketing is to create a campaign or an advertisement that will be shared everywhere. This type of campaign is unique in that it does not use a paid distribution channel but relies on social sharing. If such content is shared by a celebrity or influencer, there is a high likelihood that it

will go viral. The faster and more frequently the content is shared, the faster it can go viral and attract a large following. (Directive, 2023)

In 2014, the Ice Bucket Challenge video for Amyotrophic Lateral Sclerosis (ALS) also went viral. It was a challenge where people poured ice water on themselves in support of the disease, such videos were shared on social media by celebrities, athletes, politicians. The challenge caused a sensation on the internet, millions of people joined in, raising awareness of ALS significantly. (Kagan, 2022)

As the potential of viral marketing began to become more and more apparent to companies, they struggled to understand the factors that influence a successful viral campaign. The STEPPS model describes six factors that are believed to contribute to the spread of content.

Social Currency, if a user believes that sharing a piece of content will make them look favourable to their audience, they are more likely to share it.

Triggers are anything that connects thoughts, ideas or different stimuli. For viral marketing to be effective, people should be able to identify with it, it should match the everyday experiences of consumers.

Emotions, people react most to content that evokes an emotional response in them. People who share such emotional content may feel that they are improving their status by showing interest in emotional, socially important issues.

Public, if it is a message, advertisement or video that is shared by many individuals or various celebrities, the user is more likely to share something like this.

Practical Value, an effective method of making content go viral is to provide some added value to those who share such content. People are happy to engage with something that promotes a good cause and are more likely to share such content.

Stories, people are more likely to understand things better if they are presented to them in the form of a story. The story must be engaging, it must tend to motivate social media users to share it. Sharing an advertisement about a company, a product in a concise, visually appealing format can have a very good effect, which can make the brand more visible. (Directive, 2023)

Viral marketing has its advantages and disadvantages. The advantages include:

- Cost effective – a good campaign will be effective and will not have a large cost as it relies on people sharing without the need to pay. Because of the ease of sharing content, there is no need to do extra work because content is shared naturally,
- Rapid growth – a company's digital presence can grow through viral content. If a company has a larger reach, it gives it a good opportunity to attract new customers and also retain customers,
- Brand awareness – viral content helps a brand to introduce itself to customers and showcase its products. People will first remember a funny video which they will then associate with the brand. This kind of advertising is most beneficial for startups or small businesses.

The disadvantages of viral marketing are:

- Negative advertising – the campaign can have a negative impact with users, which can cause negative advertising to spread, which can have a disastrous impact on the company. It may happen that customers stop buying the products of a given company because of such advertising, influencers stop working with them,
- Implementation and control – viral marketing is unpredictable, so there is a possibility that the ad may not reach the target group of users, making management and control more difficult,
- Wasted time – it may happen that the campaign does not generate interest among consumers. This can lead to financial losses for the company,
- Feedback – gathering feedback can be challenging as it is viral advertising which cannot be measured in any way. (Study Smarter, 2022)

1.2 Influencer marketing

The most charismatic among us have always influenced what we buy. It used to be the Mary Kay Lady, the Avon Lady, today it's the popular people on social media. (McKinsey&Company, 2023)

The word influencer marketing was searched on Google 465% more than ever in 2016. Influencer marketing is a collaboration between an influencer and a brand, whereby it is the promotion of a product or service. The role of an influencer is to promote a product or service on their profile. Many times they have different discount codes or contests in collaboration with the brand. The brand chooses the influencer to collaborate with according to different criteria such as : target audience, life

values, content on the profile, number of followers. Companies can collaborate with influencers not only to promote a product but also become ambassadors for the company. An ambassador gets free products on a regular basis, also promotes them and has different discount codes on a regular basis. (Geysler, 2023)

Brands have also been working with media celebrities for a long time. Compared to influencer marketing, this type of collaboration involves a much larger investment for companies and it is harder to determine an accurate return on investment. Influencer marketing is simpler in that it is easier to monitor the number of likes, shares and clicks on a page. (McKinsey & Company, 2023)

Further, companies can also work with micro influencers who, while they may not have hundreds of thousands of followers, have only a few thousand, but have a closer relationship with followers. Promotion from a micro influencer can be more natural and many times more persuasive than from a large influencer. (Geysler, 2023)

This type of marketing is not without risks. It can be riskier and harder for big brands to appear authentic when working with an influencer, as it is always a monetary transaction between the influencer and the company. On the other hand, when it's a lesser-known brand, the promotion may seem more authentic. It's also important to consider that influencer brand loyalty doesn't always have a positive effect. When a brand collaborates, it cannot influence social media behaviour and when influencers behave unprofessionally, it can jeopardise the brand's reputation. (McKinsey&Company, 2023)

1.3 Social media

In 1997, the first social network was created called SixDegrees.com where users could create their own profile, create a list of friends and chat with them. Later, sites like Friendster or Myspace were created that worked on a similar principle. (Hines, 2022)

In 2006, one of the most popular social networking sites that has over a trillion users, Facebook, came into the world. Later in 2010 came Instagram where users could add photos, the platform came through many upgrades and now users can not only add photos or even chat there, try different filters but also follow their favorite celebrities or influencers. And last but not least, TikTok came to the social networking world in 2018, it is the most used social media of today, which has over three trillion users. Users post short videos of themselves dancing, painting, doing various tricks, etc. (Britannica, 2023)

The Merriam-Webster dictionary defines social media as, "a form of electronic communication through which users create online communities to share information, ideas, personal rights, and content". The same dictionary also defines networking as, "the exchange of information or services between individuals, groups, or institutions, specifically: the cultivation of productive relationships for employment or business". (Dictionary, 2023)

The great advantage of social media is the quick feedback from customers, they share their positive and negative experiences with products or services. To which companies can quickly respond and resolve negative customer reviews. Marketers are also using social media for crowdsourcing. Crowdsourcing is getting information, opinions from a large group of people who share information on social media. (Edosomwan, 2011)

Social media has different forms of platforms, these can be divided into four main categories:

Social networks: users use social networks to communicate, share opinions or ideas. Users create a profile where they can share their age, gender, where they live, or they can choose to use such a platform to create different groups where people share their products, opinions, tips and tricks. Examples of such social networks include Facebook.

Media sharing networks: users create different 'content' which they share. This content can be of different nature, such as: funny, educational, informative. Many companies use such media to share information about their products and their company. Such media include YouTube, Instagram, TikTok.

Community social networks: this type is mainly used for discussions, users hold discussions on various topics. Each user can comment and contribute his/her opinion. An example of such a social network is Reddit.

Review social networks: this type of social network is focused on customer reviews of a product or service. An example of such social network is Yelp, users can write reviews on bars, restaurants and rate their experience. (Lutkevich, 2021)

Individual reaction to the product is an important element in the creation of the social context of the products. Social networks thus create a model of relationship with the evaluator based largely on his feelings, experience, or validity (his social impact in the community).

Individuals can take a series of actions on Facebook when engaging with a brand. They can like or react to a post, comment on another and share the other. Regarding reactions, an extension of the like button, users can express their sentiments (love, haha, wow, sad and angry) toward a publication. Furthermore, commenting provides users the opportunity to express their opinions through debate with others while sharing is considered the most valuable form of user engagement for brands, considering its potential for viral redistribution. Liking a post requires less commitment than commenting or sharing. Clicking is enough to like, while comments and shares demand additional actions and extra commitment. (Romão et al., 2019)

1.4 TikTok

TikTok, was first launched in 2016 in China. The app was very popular, so the parent company, ByteDance, introduced it to the international market. In 2017, with the acquisition of Musical.ly, the company was able to establish itself in the international market as it imported around 80 million users, most of which were from the US, onto the TikTok platform. In 2023, Tik Tok has just over 1.53 trillion active users, with just over 3 trillion people having downloaded the app, of which up to 57% are women. It is the world's sixth most popular medium. (IQBAL, Mansoor, 2023)

Table 1. Comparison of user ages to percentages

Age category	Percentage of users
13-17	28
19-29	35
30-39	18
39+	19

Source: <https://datareportal.com/reports/digital-2023-deep-dive-the-worlds-top-social-media-platforms> (2023)

Every day, a Tik Tok user spends 1.5 hours on the platform, for a yearly total of 547.5 hours. The most popular category is entertainment, followed by dancing, pranks, fitness, beauty, fashion, cooking. The engagement rate on Tik Tok in terms of micro-influencers is 17.96% as opposed to Instagram where it is only 3.86%. Larger influencers have an engagement rate of 4.96% on Tik Tok and 1.21% on Instagram. (Ruby, 2023)

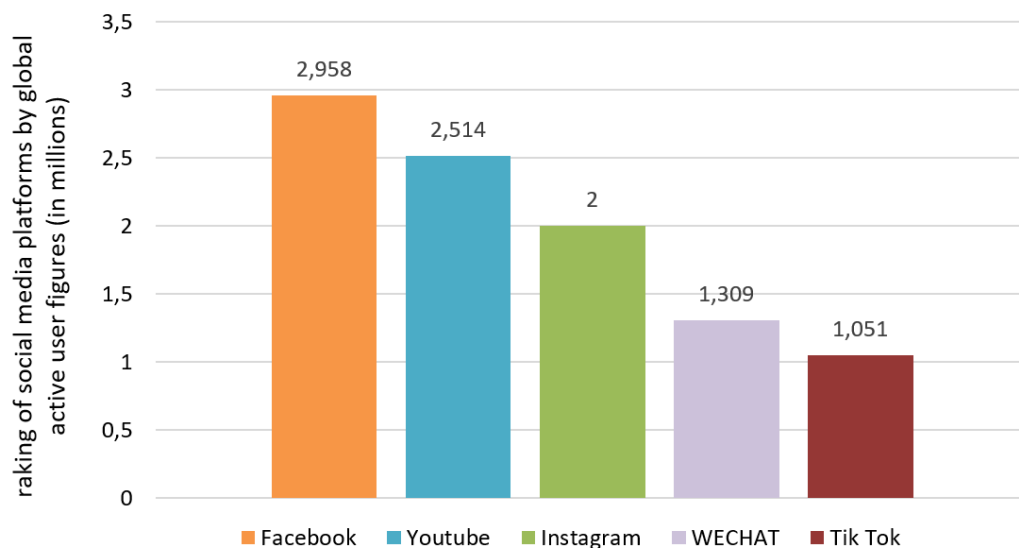


Figure 1. The world's most used social platforms in January 2023

Source: <https://datareportal.com/reports/digital-2023-deep-dive-the-worlds-top-social-media-platforms> (2023)

TikTok's algorithm is tailored to show users content that they have "liked" or watched in its entirety, then automatically show them videos in a similar genre. In Slovakia, not many brands have TikTok, so the

level of competition is low, while abroad companies use TikTok to promote their brand, either through their profile or through paid promotion by influencers.

The most used hashtag for 2021 was *tiktokmademebuyit*, with up to 67% of users confirming that TikTok introduced them to products they hadn't even considered buying before. It's important to remember that with such a huge number of videos, you need to be creative, follow trends and also post videos on a regular basis. A clever way to break through on TikTok, for example, is a 'challenge', where you try to get as many users as possible to take part in the challenge, with users using a hashtag that lets other users know what the challenge is about. This is a very good opportunity for businesses to connect with their customers. Other popular videos are lifehacks, where users present interesting tutorials to followers. (Gašparová, 2022)

2. Methods

The main objective of the present paper is to analyse the current state of the use of modern marketing methods, especially viral marketing in a specifically targeted group of respondents.

The basic scientific methods such as observation, method of analysis, synthesis, induction, deduction, abstraction and comparison have been used in the preparation of the paper.

At the first stage, we set the objectives of the paper, selected the relevant scientific methods to be used in the treatment of the chosen issue, then through the fulfilment of the partial objectives we get to the actual treatment of the issue and the assessment of the current situation. Based on the facts and facts dealing with the issue, we have identified the analysis of the results as an important factor, which we have formulated into conclusions, recommendations and evaluation of the objectives.

The paper presents the results of our own primary research carried out by questionnaire method. The questionnaire was created using the Click4Survey website and was made available from February 25, 2023 to March 25, 2023. Respondents were approached through acquaintances, family friends, students, and lecturers. A total of 335 potential respondents opened the survey, but only 252 responded.

Definition and characteristics of generation Z. According to which we selected the sample of respondents. Generation Z, defined as individuals born between 1995 and 2009, which is the youngest and largest consumer group for the period from 2017 to 2030. Members of this generation are known to be innovative, pragmatic, narcissism-oriented, and averse to negative events; they tend to have a strong focus on praise and a high level of social approval. Most importantly, they are known as technology-savvy digital natives, the first generation to be born into an entirely digital world, and thus they have grown up developing relationships with digital technologies extensively. From a marketing perspective, their great dependence on SNS plays a significant role in generating sales and revenue, especially under the economic disruption of the Covid-19 pandemic. (Wang et al., 2023)

The structure of the paper follows the structure of scientific papers: introduction, aim and methods, results and discussion, conclusion.

3. Results

In cooperation with Herba Drug, s.r.o., we focused on social media and digital marketing research in the field of hair and body cosmetics oriented to Generation Z - using a questionnaire survey, which was oriented to the target group of 12-20 years old. They identified the following three sub-objectives:

1. what social networks are most used by respondents
2. on what basis they choose a product
3. what external influences affect the purchase of products

The questions in the questionnaire were also communicated with Herba Drug, Ltd (a cosmetics company dealing with hair and body cosmetics), these were modified and asked in such a way that the survey would be beneficial for them as well. In the questionnaire we asked what social networks the respondents use (Figure2).

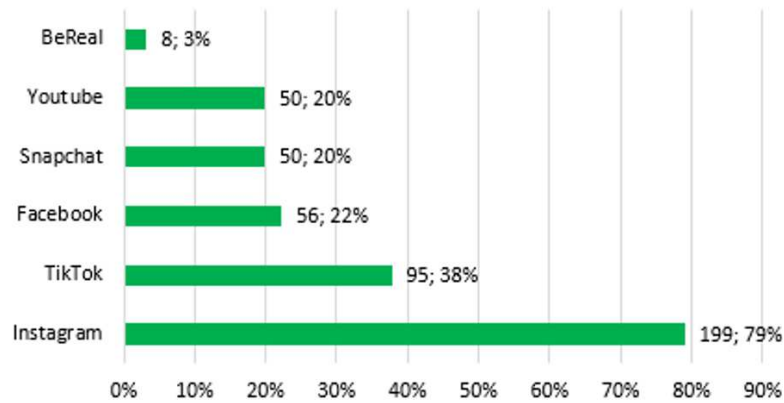


Figure 2. Number of users of social networks
Source: own processing (2023)

A question where respondents could select multiple answers was what social networks they use the most. The most used social network is Instagram, which is used by 199 respondents. The second most used network is Tik Tok, which is visited by 95 respondents. The least used network is BeReal, which is a relatively new social network, so we consider this to be an expected result. Only 8 respondents use this network.

In the next section, we asked what influences their purchase, if there is any viral video or advertisement that influenced them in hair and body cosmetics.

The questionnaire was created using the Click4Survey website and was made available from February 25, 2023 to March 25, 2023. Respondents were approached through acquaintances, family friends, students and teachers. A total of 335 potential respondents opened the survey, but only 252 responded.

In Figures 3 and 4, we can observe the response to the question of influencer's influence when it comes to choosing cosmetics. Up to 66% of respondents answered none or not at all to this question.

Of the Slovak influencers, Moma is the most followed, followed by chemist, mom and cosmetics product development manager b_b_w_k and the same number of respondents answered Jana Hrmová and Radka Žilinčík.

Of the foreign influencers, the most prominent are the Kardashians and Kylie Jenner, also footballers such as Cristiano Ronaldo and Robert Lewandowski.

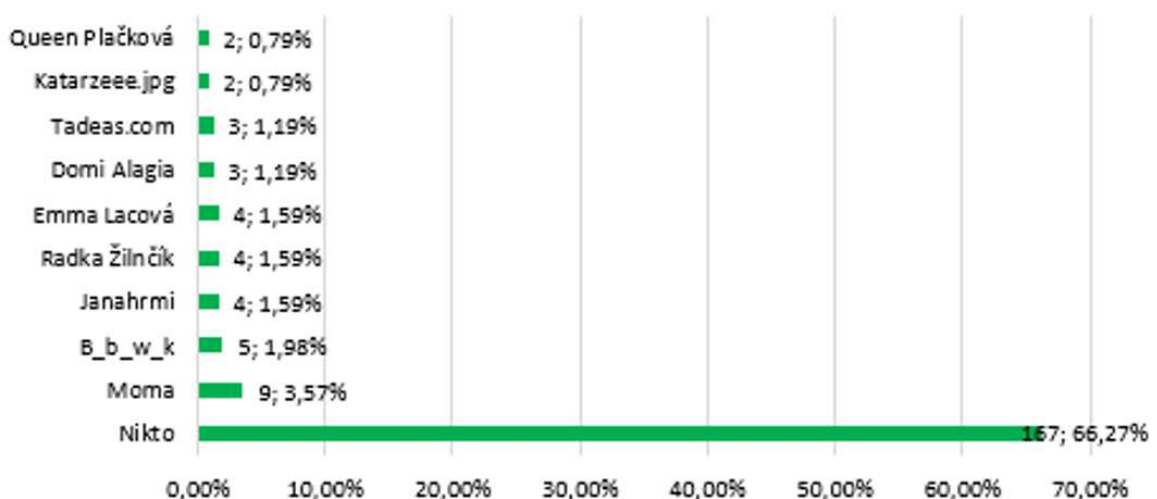


Figure 3. Number of respondents - Slovak influencers
Source: own processing (2023)

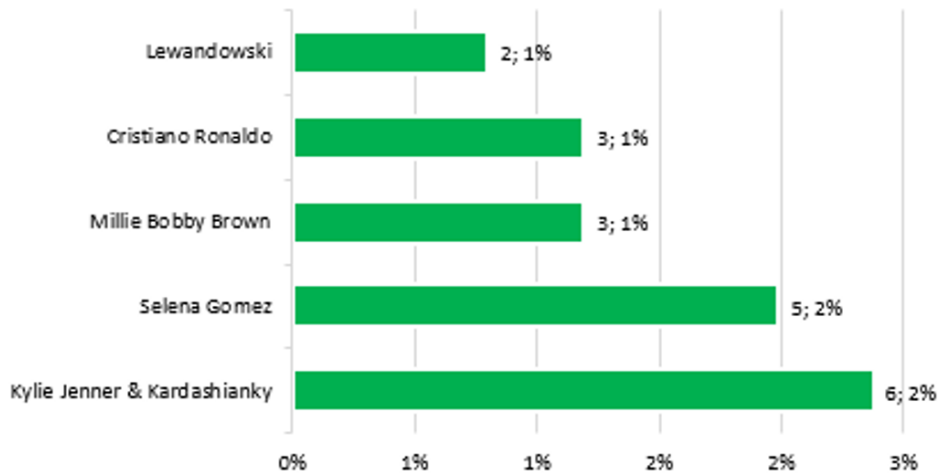


Figure 4. Number of respondents - Foreign influencers
Source: own processing (2023)

Another question in the survey asked what respondents choose cosmetics based on (Figure 5). Most respondents choose based on scent (65.1%), followed by price (50.8%). For 36.5% of respondents, recommendation from family and friends is important. The least important factor influencing the choice of cosmetics is advertising on TV and in the media, only 4.8% of respondents chose this answer.

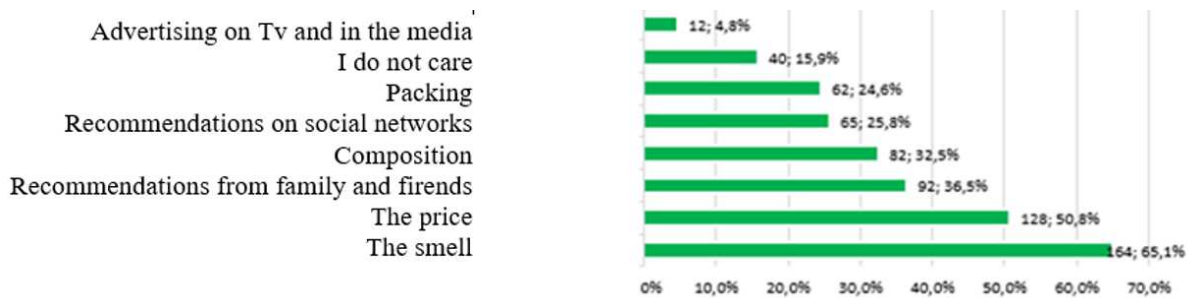


Figure 5. Reasons for choosing cosmetics
Source: own processing (2023)

In Figure 6 we can observe the answer to the question if there is any viral video, advertisement, billboard in the field of cosmetics that influenced the respondents. 83.3% of the respondents answered no or did not answer at all. Head & Shoulders brand advertisement influenced 2.8% of the respondents, the reason was footballers who were doing advertisement for the brand. The Old Spice brand was also written by 2.8% of respondents, only one reason was given and that was an animal in the shower. Respondents also wrote other brands such as Adidas, Schauma, Nivea, Florence by Mills, Nature Box.

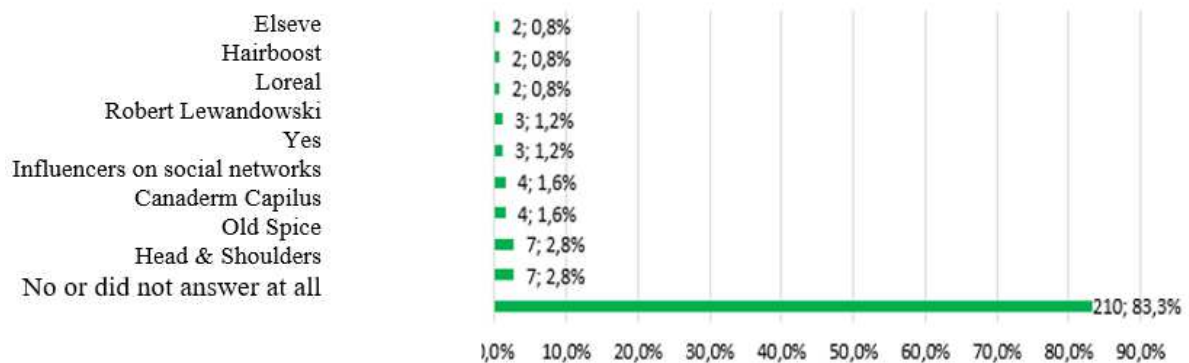


Figure 6. Viral video and advertising that influenced respondents
Source: own processing (2023)

4. Discussion

TikTok is currently the most used social network, where new users are added every day. Many companies abroad are using this medium to promote their brand. In Slovakia, this market is still new and unexplored. Few cosmetic companies use TikTok in Slovakia, there is a great potential here, because the competition is still very small.

From our market research we found that only 3 brands out of 20 have a Slovak TikTok. All three are Slovak brands. Out of 252 respondents, TikTok is used by 95 respondents, which is 38%. The most used medium is Instagram, which is used by 199 respondents, which is 79%. Videos that are uploaded on TikTok are also very popular on Instagram now. The app introduced Instagram Reels in 2020, as an effort to rival the TikTok platform. The app has also added a separate section where users can watch these short videos. Many users share the same content on both social networks. Instagram Reels is also a very good way for businesses to interact with their audience and promote their brand at the same time. In this way, they can showcase their products, share behind the scenes of production, and create various educational content, whether about their company, products, or ingredients. The length of a video on Instagram can be from 15- 90 seconds, while the length of a video on Tik Tok can be from 15 seconds to 10 minutes.

We found that only three brands have a Slovak Tik Tok, and they are Biofy, Kvítok and Two cosmetics. Biofy currently has 905 followers, Kvítok has 44 followers, and Two cosmetics has 1080 followers. All three are natural brands. Most of the brands have TikTok, but only the foreign one. The fact that not many brands in Slovakia have this social network yet, so the space on Slovak TikTok with hair and body cosmetics remains open. And right now is a good opportunity to take a leading position on this social network.

Conclusion

The paper is focused on identifying the state of use of current viral marketing methods in a specific group of respondents and in a specific market segment. Tik Tok is the most used viral tool for presenting videos especially among the young generation. Its main advantage is the "anatomical" positioning of the mobile device while viewing the video. It also changes the philosophy of artificially placing advertisements in videos which has caused an increase in the interest of respondents. Tik Tok is viewed by respondents on average twice as long as other viral assets. Young people of our respondents' age have abandoned traditional forms such as FB and are moving to viral networks such as Tik Tok and Instagram.

The presentation of the survey results shows that Tik Tok has a high potential to improve the sales leads of a specific product line especially grounded to a specific group of respondents. A big advantage is the expansion of the offer and product innovation. It is also of great importance for collecting data on the basis of which we would be able to specify customer needs to satisfy them by developing and innovating products and product lines.

The contribution of the presented article is the description of the current potential of using viral media and viral marketing for the presentation of specifically targeted products for generation Z. The paper also identifies channels for communicating information shared among a specific group of the population, which is absolutely different from previous generations, but forms a significant part of current and future buyers of products and services. Identifying these channels and needs defines the future framework and means of marketing, especially viral marketing.

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Digital Marketing in the Current Business Ecosystem

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Abstract

Research background: Today's highly interconnected and digital world, traditional forms of marketing alone are insufficient for business success. Companies need to engage in digital marketing strategies not only to reach their target audiences more effectively but also to remain competitive in a broader sense. It suggests that digital marketing has become an integral part of how businesses interact with their environments, affecting everything from customer acquisition to the brand's visibility and beyond. Social networking as an integral part of digital marketing has become a frequent topic of academic inquiry, with researchers examining the concept from a variety of perspectives, including participant motivation.

Purpose of the article: The paper deals specifically with the information search motive, that is, consumer search for information about products, brands, events or relevant news. The paper's objective is to highlight disparities in consumers' information requirements based on gender, particularly within the realms of social media platforms such as Facebook, Instagram, and Youtube.

Methods: Initially, it involved illustrating prevailing attitudes towards this issue using descriptive statistics. Additionally, the Mann-Whitney U test was employed to ascertain the significance of variations in perception between male and female users.

Findings & Value added: Interestingly, while Facebook did not exhibit noteworthy gender-based disparities in information search motive, the scenario on Instagram and Youtube was distinctly different. These findings can be instrumental in formulating more effective, targeted, and resource-efficient marketing strategies for businesses operating in the ecosystems of Facebook, Instagram, and YouTube. By understanding the nuanced behavior of different genders across these platforms, businesses can better allocate their resources and refine their approaches to customer engagement.

Keywords: digital marketing, social media, online platforms, information motive

JEL classification: M31, M37

1. Introduction

Technological development significantly affects the marketing and marketing policies of companies. Likewise, changes in the market environment resulting from current situational factors cause changes in marketing communication, and the key to success seems to be innovative technologies. As an integral part of marketing communication, digital marketing has changed the way businesses and other companies communicate with audiences. Frey (2008) understands digital marketing as an overarching term that includes not only online communication on the Internet, but all communication that uses digital technologies. It also includes on-line marketing and mobile marketing.

Consumers have the option of choosing from a wide range of domestic as well as foreign products. (Chaffey, Chadwick, 2019) The Internet has significantly changed marketing. Information about a product or service is easily available on the Internet today. People use the options to compare products, prices, and can express their feelings and satisfaction with purchases using opinions and share them with other customers. Internet is open to everyone, including retailers and local merchants. Compared to traditional marketing, the online interface offers many advantages, such as monitoring and measurement, 24/7 availability, comprehensiveness, individual approach and dynamic content. (Janouch, 2020) Continuous

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development has also taken the form of means of communication such as websites and social media, which have expanded and improved in the online world.

1.1 Digital Marketing and Social Networks

In recent times, there has been a growing integration of unconventional marketing communication tools into the communication mix. Alongside a heightened emphasis on creativity, this transformation is closely tied to the influence of the Internet and its associated applications. Persistent trends and the process of digitization are challenging traditional marketing methods and fostering the emergence of novel forms of marketing communication.

As stated Kessel et al. (2019) digital marketing involves the strategic use of internet-based or electronic technologies to promote products, services, or brands, encompassing a diverse range of activities, including search engine optimization (SEO), social media marketing, email marketing, and pay-per-click (PPC) advertising, among others. This means that digital marketing tools are all Internet services that support marketing activities within the online environment. The significant development of digitalization in the world has opened the door to new technologies, thanks to which various tools have been created to support digital marketing. A specific subcategory of digital marketing is social media marketing, focused on creating and maintaining relationships with a target audience through social media such as Facebook, Instagram, Twitter, and others. Both areas are closely connected. Social media marketing is one of the channels that digital marketing uses to achieve various goals, such as increasing brand awareness, customer engagement or conversions. Social media often serves as a platform for other forms of digital marketing, including content marketing and paid online advertising. This makes social media marketing an integral part of a comprehensive digital marketing strategy.

The popularity of social networks is constantly changing and therefore it is necessary to change the marketing strategy regularly. The marketing strategy should be tailored to satisfy the site's fans and, above all, to be a source of entertainment. It is not appropriate for the text form of communication to prevail on social networks. Visual posts are more memorable and unique. A big advantage is direct communication with potential customers. Nowadays, it is necessary for companies to devote themselves to social networks.

Social networks have become a frequent topic of academic inquiry, with researchers examining the concept from a variety of perspectives, including participant motivation (Raacke and Bonds-Raacke, 2008; Piehler et al., 2019), social interactions, and usage patterns (Azar et al., 2016; Luarn, Lin, and Chiu, 2015) and user characteristics (Schivinski, 2021). Less attention, however, has been paid to the role of social networks from a marketing perspective. Practitioners have largely been at the forefront of efforts to advise businesses on their social media content strategy, with a number of industry blogs, websites and best practice guides for social media marketing emerging in recent years. (Dehouche, 2020) Although the list of advice and strategies for social media marketing efforts seems endless, academic research and empirical evidence in this area remains rather scarce. While millions of brands have adopted sites such as Facebook, theory-based academic research guiding marketing and communication strategies in this regard remains limited.

Social networks are widely regarded as the most frequently visited websites. It's important to recognize that individuals frequent social networks for leisure and relaxation, as well as for the purpose of seeking information. This motive refers to the consumer's search for information about the brand's products, events or relevant news, searching for advice, experiences and opinions of other consumers, or searching for any other information that could be relevant for purchasing or using the brand's product. (Azar et al., 2016) And this need to search for information also drives the use of social networks as social media tools (Lin and Lu, 2011; Raacke and Bonds-Raacke, 2008), participation in virtual communities (Zaglia, 2013) and also contributing to groups on the social network Facebook (Park, Kee, and Valenzuela, 2009). Based on these findings to date, it is reasonable to assume that information available on brands' social media pages can significantly contribute to content consumption, content contribution, and brand content creation itself. The study of Pletikos Cvijikj and Michahelles (2013) found that brands' posts on social media with added informational value increase the rate of liking and commenting on posts, which is in line with content contributing activity. Pöyry et al. (2013) identified a positive relationship of utilitarian motivations to content browsing, i.e. content consumption activities.

Despite the recognition of the importance of information delivery through advertisements in more traditional media, attention is also paid to the role of informational advertising and content in online social media. Searching and retrieving information about a brand is one of the main satisfactions of consumer

participation in online brand communities (Raacke and Bonds-Raacke, 2008). The desire to seek information directly from brands is a motivating factor for consumers to continue using social media sites (Lin and Lu, 2011). Content satisfaction through information seeking, knowledge, and learning predicts consumer usage patterns (Stafford, Royne, and Schkade, 2004), attitudes toward websites and brands, purchase intentions, and interaction behavior (Ko, Cho, and Roberts, 2005).

2. Methods

The aim of the paper is to point out the gender differences in consumers' information needs, specifically in the conditions of social networks Facebook, Instagram and Youtube. The analysis relies on primary data, and in this section, we will detail the methods and techniques employed to acquire this data, along with the criteria used for dataset selection. The data collection spanned six months and was executed through Computer Assisted Web Interviewing (CAWI). Distribution was facilitated via social networking tools, involving platform-based advertisements and targeted email outreach to the selected respondent profile.

The structure of the research sample that entered the analysis fulfills the established criteria of age and activity on social networks, which were identified on the basis of current statistical data of the audience profile and social network preferences on the Slovak market. The sample consisted of 401 respondents, of which 131 (32.7%) were men and 270 (67.3%) were women. In terms of age, there were 247 (61.6%) respondents in the sample between 18 and 24 years of age, and 154 (38.4%) respondents between 25 and 34 years of age.

Drawing upon data extrapolated from research on social media and their advertising tools conducted in January 2021, we find that two specific age groups constitute the predominant target audience segments in the Slovak market. These age groups are individuals aged 18-24 years and 25-34 years. This same criterion was applied to our research dataset, allowing us to generalize the findings for this particular age demographic. The second criterion stipulated that respondents must possess active accounts on the selected social networks under investigation, namely Facebook, Instagram, and YouTube. Statista's 2020 statistics and the web analysis tool Similarweb's 2021 data both affirm that these are the most frequently used social networks in the Slovak market, with all three platforms ranking among the top 10 most visited websites in Slovakia (YouTube at 2nd, Facebook at 3rd, and Instagram at 10th).

Table 1. Gender differences on social networks _ information search motive - the statements

Information motive (latent variable)	
[BRAND]'s Facebook (Instagram /YouTube) page helps me learn about things I don't know yet.	FB/IG/YT _info_1
Facebook (Instagram /YouTube) brand page [BRAND] is a good place to research relevant information.	FB/IG/YT _info_2
[BRAND]'s Facebook (Instagram /YouTube) page helps me learn about things that are useful to me.	FB/IG/YT _info_3

Source: own work (2023)

The aim of the inquiry was to find out attitudes of the respondents to the issue using descriptive statistics, while the Mann-Whitney U test was used to identify the significance of the differences in perception between men and women.

3. Results

The first social network to be analyzed was Facebook. We analyzed the differences of 3 manifest variables and observed their significance. The results are shown in the table below.

Table 2. Gender differences on Facebook

Manifest Variables	Mann-Whitney U	FROM	Asymp. Sig. (2-tailed)
FB_info_1	15808.000	-1.586	0.119
FB_info_2	15858.000	-1.504	0.132
FB_info_3	15351.000	-1.706	0.088

Source: own work (2023)

With regard to Facebook, no significant gender differences were demonstrated in the case of the three manifest variables of the information search motive.

The second analyzed social network was Instagram. Here, too, we analyzed the differences of 25 manifest variables and observed their significance. The results are shown in the table below.

Table 3. Gender differences on Instagram

Manifest Variables	Mann-Whitney U	FROM	Asymp. Sig. (2-tailed)
IG_info_1	13048.000	-3.503	0.000
IG_info_2	13903.000	-2,650	0.008
IG_info_3	12997.500	-3.570	0.000

Source: own work (2023)

Significant gender differences were observed on the Instagram social network. These are all three cases of information search motifs, specifically IG_info_1 the value $\bar{x} = 3.49$ ($\tilde{x} = 4.00$) was observed for men and $\bar{x} = 3.93$ ($\tilde{x} = 4.00$) for women, then IG_info_2 reached $\bar{x} = 3$ for men, $\tilde{x} = 3.00$ and for women $\bar{x} = 3.60$ ($\tilde{x} = 4.00$) and the last information variable IG_info_3 reached for men $\bar{x} = 3.30$ ($\tilde{x} = 3.00$) and for women $\bar{x} = 3.70$ ($\tilde{x} = 4.00$).

With regard to Instagram, women evaluated the studied variables with a greater degree of agreement than men. In no case was this situation reversed. Other differences observed did not show statistical significance.

Table 4. Gender differences on Instagram

Manifest Variables	Mann-Whitney U	FROM	Asymp. Sig. (2-tailed)
YT_info_1	13727.000	-3.189	0.001
YT_info_2	13237.500	-3.554	0.000
YT_info_3	12284.500	-4,550	0.000

Source: own work (2023)

With regard to YouTube, a significant difference in the perception of the analyzed variables was observed in all cases between men and women. In the case of the information search motive, the values of $\bar{x} = 4.05$ ($\tilde{x} = 4.00$) for men and $\bar{x} = 3.59$ ($\tilde{x} = 4.00$) for women were observed for the YT_info_1 variable, while for the YT_info_2 variable $\bar{x} = 3.98$ ($\tilde{x} = 4.00$) for men and $\bar{x} = 3.49$ ($\tilde{x} = 4.00$) for women, while YT_info_3 acquired the values $\bar{x} = 4.13$, ($\tilde{x} = 4.00$) for men and $\bar{x} = 3.53$ for women ($\tilde{x} = 4.00$). All observed differences were in favor of a higher rate of agreement among men in the case of the YouTube social network. None of the differences were statistically insignificant.

4. Discussion

Despite the initial assumption, which finds support in the demographic composition of Facebook users (Statista, 2021a), where male users comprise a noticeable 56% majority, our analysis did not reveal significant gender-based differences in attitudes toward the areas of interest on the Facebook platform. This observation aligns with findings from Semeraro Dowling's study (2019), which also reported that Facebook exhibited the lowest average engagement levels among the set of social networks under investigation. This result is further substantiated by Statista's 2021b data, indicating that the primary motivation for using Facebook is to maintain connections with family and friends. In contrast, the pursuit of following and engaging with brands accounted for only a third of users' motivations for utilizing the platform. Nonetheless, this should not discourage brands from investing their resources, be it capital, human resources, finances, or time, in this network. Facebook still retains its position as the largest social network globally and maintains a high level of interaction with paid posts (Oberlo, 2020), thereby offering substantial marketing potential. Additionally, it's crucial to consider the content nature on this social network, as user content creation activities often begin on other platforms, with users subsequently sharing their content on Facebook. This scenario could be perceived as a concealed form of content creation. Nevertheless, the choice to invest in Facebook should always be evaluated within the context of the

brand's strategy and target audience. If the target audience is predominantly female, it may be appropriate to consider this platform or integrate content marketing efforts with other social networks.

On the social network Instagram, the scenario regarding gender differences stands in stark contrast to that observed on Facebook. Gender disparities were evident in all three cases, with women expressing much higher agreement with the statements under investigation. This outcome finds further support in the demographic makeup of Instagram users, where women constitute the majority at 57% (Statista, 2021c). Karatsoli and Nathanail (2020) highlighted that visually dominant content, such as photos and images (which are the core of Instagram), tends to resonate more with women than men. Even when it comes to the motives behind brand-related activities, women tend to evaluate them more positively. Success on Instagram is closely linked to the aesthetics and visual appeal of the content shared, making it a magnet for female users (Brahmadas, 2019). Another parallel can be drawn from the fact that women exhibit greater daily activity on social networks compared to men, and Instagram, in particular, embodies this temporal element through its chronological content display. The relatively less favorable assessment among men might be linked to their higher usage of desktop devices and laptops to access these platforms in contrast to women (Lounge, 2015). However, Instagram's graphic interface is primarily optimized for mobile devices, offering a less compelling user experience on other devices.

Gender disparities were also evident on the YouTube social network. In this case, we observed significant differences across all three variables under investigation, consistently with a more favorable evaluation among men. A parallel to this outcome can be found in a study conducted by Landrum in 2021, which identified a lower interest among women in this platform due to status-related reasons, which are better fulfilled by the female audience on Instagram. Moreover, in contrast to the discussion about the suboptimal user experience on desktop computers and laptops (Lounge, 2015), YouTube is a platform that performs exceptionally well on these devices, making it a crucial aspect given the nature of the content published on the platform. Furthermore, a study by Wegener et al. (2020), which explored the content creators on this platform, reported a significant prevalence of 73% male creators.

Conclusion

Digital marketing is a broad term that encompasses all marketing efforts that use electronic devices or the Internet. This type of marketing can include various channels such as search engines, email, mobile apps and other digital platforms. On the other hand, social network marketing is a specific sub-category of digital marketing, focused on creating and maintaining relationships with the target group through social media such as Facebook, Instagram, Tik Tok and the like. Both areas are closely connected. Social media marketing is one of the channels that digital marketing uses to achieve various goals, such as increasing brand awareness, customer engagement or conversions. Social media often serves as a platform for other forms of digital marketing, including content marketing and paid online advertising. This makes social media marketing an integral part of a comprehensive digital marketing strategy. Digital marketing is essential for businesses to survive and thrive in the modern marketplace. Digital marketing is often characterized by its ability to reach a global audience, provide measurable results, and adapt to evolving consumer behaviors and technological changes. We found out, while Facebook did not exhibit noteworthy gender-based disparities in information search motive, the scenario on Instagram and Youtube was distinctly different. these findings can be instrumental in formulating more effective, targeted, and resource-efficient marketing strategies for businesses operating in the ecosystems of Facebook, Instagram, and YouTube. By understanding the nuanced behavior of different genders across these platforms, businesses can better allocate their resources and refine their approaches to customer engagement.

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Exploring the Impact of Gender on E-commerce Growth in Central European Countries

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Abstract

Research background: The constant development of technology and the impact of digitalization has caused the e-commerce market to be on a constant rise. Consumers perceive many advantages to sell and buy products via the internet, however, the culture and consumer behaviour of different countries may also result in different developments in this sector. Monitoring the state of e-commerce can streamline management decision-making processes internationally.

Purpose of the article: The main goal of the presented paper is to map the development of electronic commerce in the countries of Central Europe. Using Eurostat's publicly accessible data, our objective is to examine the disparities between men and women in two aspects of e-commerce: (1) online shopping and (2) selling products or services over the Internet. The objective is also to contrast the state of e-commerce in these countries with the EU average.

Methods: Data for this study was sourced from Eurostat, the Statistical Office of the European Communities, and the European Institute for Gender Equality. Our research covers the timeframe from 2018 to 2022, targeting Slovakia, the Czech Republic, Hungary, Poland, Austria, and Slovenia.

Findings & Value added: Our findings highlight a progressive upswing in the Central European e-commerce market, with men holding a marginal edge over women in terms of participation. Moreover, the prevalence of online sellers differs significantly among these Central European countries, with men prevailing in this aspect as well. Understanding the state of e-commerce in international markets is especially important for those business entities that plan to expand abroad.

Keywords: e-commerce, online shopping, online sales, gender differences, Europe

JEL classification: M2, M21

1. Introduction

In the view of Khan (2016), e-commerce refers to the exchange of goods or services using the Internet. This contemporary phenomenon has brought about significant shifts in our daily lives, introducing highly effective concepts and processes. Consequently, it has become a top priority for many individuals and has provided entrepreneurs with opportunities to solidify their market position for their products and services (Taher, 2021). With the proliferation of internet stores and the trend of online shopping, it has become a favored and widely embraced activity for a substantial portion of the population. There exists a plethora of thoughts and conspiracies surrounding the potential demise of traditional brick-and-mortar establishments, foretelling their overshadowing of numerous established global brand e-commerce retailers. Undeniably, the momentum behind e-commerce stems from its popularity among the majority of the population, who increasingly embrace the convenience and benefits of this type of shopping facilitated by the Internet.

Unlike most studies that focus solely on investigating online purchasing behavior, our research also gives considerable attention to the dimension of selling products through digital platforms. It recognizes that e-commerce encompasses more than just shopping activities. Additionally, our study endeavors to identify gender-based differences in both buying and selling behaviors of products and services. By analyzing the prevalence of buyers and sellers in Central European countries, we aim to shed light on the e-commerce landscape in these nations and how they compare to the pan-European average. The article is

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structured systematically. It commences by laying out the theoretical underpinnings of the topic being explored, and subsequently, the analytical methodology is clarified. Thereafter, the results of the analysis will be presented and thoughtfully interpreted. In the closing segment, the findings are discussed in-depth, and potential areas for future research are outlined. The paper's primary objective is to serve as a supportive reference for future research in the international context, and at the same time, it aims to reveal the varied buying and selling tendencies among people residing in different countries.

2. Theoretical background

E-commerce functions as a virtual system where sellers conduct transactions involving products or services in exchange for money, facilitating communication and interaction with buyers through Internet platforms (Fu et al., 2020). An essential aspect of e-commerce is online shopping, enabling individuals to acquire goods or services through electronic stores accessible via websites or applications (Rao et al., 2021). Additionally, users have the convenience of shopping online using different devices like desktop computers, tablets, and mobile phones (Hamli & Sobaih, 2023). The e-commerce transaction commences when sellers advertise their products on a website, leading customers to engage in product evaluation, price comparison, and delivery option assessment before making a purchase and proceeding with payment (Ribadu & Rahman, 2019). Moreover, researchers emphasize the advantages of e-commerce for small and medium-sized businesses (Kartiwi et al., 2018).

The growth of e-commerce has been significantly fueled by remarkable technological and economic advancements (Nanda et al., 2021). Noteworthy is the fact that the per capita e-commerce market in Slovakia outperforms that of Hungary, Slovenia, or Croatia (Benčík, 2022). The e-commerce industry in Slovakia shows remarkable annual expansion, with online purchases reaching a substantial volume of 1.810 billion euros in 2022 (Borko, 2023). Concurrently, this growth has escalated competition, leading to the establishment of over 1,000 new online sales points in Slovakia annually, all continuously raising their standards of quality and professionalism. Determining the exact count of online sales points on the Slovak Internet is challenging as researchers' estimates vary slightly, and the calculation methodology is generally non-transparent. Presently, e-shops are estimated to range from 12,000 to 18,000 in number (Benčík, 2022). Interestingly, after three years of growth, Slovak e-commerce experienced a decline of 13% in 2022. Nonetheless, the future progress of e-commerce is anticipated to be contingent on the overall development of the economy and the unemployment rate, considering that e-commerce has become an integral component of the entire retail sector (Heureka, 2023).

However, recent studies have revealed exponential growth in e-commerce (Mofokeng, 2021) with Tarhini et al. (2018) noting that online shopping has been gaining momentum due to the time and effort-saving benefits it offers. Undoubtedly, online shopping provides customers with a wide array of products and services, enabling them to compare offerings from various intermediaries and select the most suitable option (Sivanesan, 2017). Nevertheless, this is not the sole reason why customers choose to shop online. Following pandemics and periods of uncertainty, consumers have undergone a transformation in their cognitive consumer behavior – they now turn to online shopping not only for the sake of convenience but also for security (Eger et al., 2021). According to other researchers, online shoppers seek enjoyment, recreation, and exciting deals. They are attracted to online channels for their access to modern products, trendy styles, and a wide range of offerings (Alavi et al., 2016). Additionally, online shoppers engage in price comparison among various online retailers, ultimately selecting the most competitive and acceptable price (Pandey et al., 2019).

Scientific literature indicates that consumer decisions to purchase specific products or services are rooted in their behavior (Wai et al., 2019), which requires an adjustment of business strategies (Rajnoha et al., 2019). Consumer behavior entails the examination of psychological, behavioral, and emotional processes that influence individuals' choices regarding what, how much, and how frequently they consume products and services (Mothersbaugh et al., 2020). It also encompasses individuals' personal thoughts and feelings during the purchase process (Famileki et al., 2015). Gaining an understanding of customer behavior, both before and after purchase, enriches knowledge in diverse scientific fields, including economics and psychology. Additionally, it significantly aids businesses in identifying new business opportunities (Qazzafi, 2019) and enables the prediction of future e-commerce trend (Gudigantala et al., 2016).

E-commerce's significance in today's business landscape is increasing, indicating the growing necessity of formulating effective e-commerce strategies (Yanes-Estévez et al., 2018). In the domain of strategic management for e-commerce, a key aspect involves identifying the determinants influencing its overall processes (Svatosova, 2020). Huseynov & Yildirim (2016) have underscored that comprehending

the motives driving consumers to shop online plays a pivotal role in successfully establishing and executing an Internet marketing strategy. Economic uncertainty prompts changes in buyers' behavior (Hamli & Sobaih, 2023), leading several researchers to emphasize the importance of identifying factors contributing to the adoption of e-commerce, particularly online shopping, as a substitute for conventional brick-and-mortar stores (Alflayyeh et al., 2020).

The question has been extensively addressed by several authors. According to a study conducted by Jadhav & Khanna (2016), the key factors influencing online shopping include availability, low prices, promotions, product comparisons, customer service, user-friendliness, time efficiency, and a variety of choices. Nachar (2019) discovered that customers embrace online shopping when the technology is easy to use and efficient. Various studies have explored consumer-related factors like hedonic value (Chang et al., 2016), shopping experience (Lim, 2015), and trust (Agag & El-Masry, 2016). In addition, other authors have delved into technical aspects such as website quality (Al-Debei et al., 2015), security and privacy (Hsu & Hsu, 2014), and the perceived usefulness of online shopping (Kim, 2017). Bruschi et al. (2019) emphasize the significance of online retailers fostering positive customer relationships by providing a gratifying shopping experience based on these values, which serves as the foundation for long-term success in online retailing.

3. Methods

The primary objective of this study is to examine the progression of e-commerce in Central European countries. Specifically, we aim to explore the disparities in online shopping and selling of products/services concerning gender characteristics among Europeans. In this context, we have formulated two research questions:

1. How has online shopping changed in Central European countries in the period under review in terms of differences between men and women?
2. How has the sale of products and services via the Internet changed in the countries of Central Europe in the monitored period in terms of differences between men and women?

Data for this study was sourced from Eurostat, the Statistical Office of the European Communities, and the European Institute for Gender Equality. The research process involved two indicators: (1) Digital single market - focusing on e-commerce promotion for individuals, and (2) Individuals using the Internet for selling goods or services. The study concentrated on six Central European countries, as defined by the European E-commerce Report (2022), which are Slovakia, Czech Republic, Hungary, Poland, Austria, and Slovenia. However, Switzerland, although geographically located in Central Europe, was excluded due to incomplete data. The objective of the research is to illustrate the e-commerce development between 2018 and 2022. The analysis covered the general population, specifically individuals aged 16 to 74, who had made at least one online purchase within 12 months or were involved in selling products and services through the Internet. The data is presented as percentages of individuals. The descriptive statistics method was used for the analysis, specifically we focused on the EU average.

4. Results

In this section of the paper, we will assess the acquired data. Initially, we will analyze the evolution of online shopping during the observed period, highlighting the disparities between men and women's shopping behaviors. Additionally, we will provide an overview of this entire topic in the context of Central European countries.

The data presented in Figure 1 highlights a consistent upward trend in the percentage of online shoppers, irrespective of gender, over the years. However, when comparing the differences between men and women in the monitored countries, the variations are relatively minor, with men showing a slightly stronger inclination for online shopping throughout the entire observed period. The same trend can be observed in the European average. In 2018, approximately 58.5% of European women shopped online, while the figure for men was approximately 60.5%. By 2019, both percentages experienced an increase of around 4%. Interestingly, in 2020, during the Covid-19 pandemic, which restricted physical shopping, the overall average of individuals in the EU shopping online rose by less than 2%. The subsequent years, 2021 and 2022, also saw moderate increases of approximately 2% and no significant change, respectively. Notably, the most significant surge occurred in 2019. Taking into account the entire monitored period, the data indicates a 9.2% increase in the percentage of female shoppers in the EU, while the increase for men reached 7.9%.

The data from Figure 1 indicates that in 2018, certain countries, namely Slovenia (50.7%), Poland (47.8%), and Hungary (41.2%), showed notably lower percentages of women engaging in online shopping compared to the European average (58.5%). However, Austria emerged as the leading country in Central Europe with the highest proportion of women shopping online (60.3%). Concerning men, the situation showed slight distinctions. In all surveyed countries, the percentage of men shopping online fell below the European average (60.5%), except for Austria, where 3.8% more men engaged in online shopping than the average. Notably, in 2018, men dominated online shopping in all surveyed countries, except for the Czech Republic, where more women (58.6%) shopped online compared to men (57.4%). The year 2019 marked the most substantial year-on-year increase within the monitored period (2018-2022). Despite this growth, the online shopping trends remained relatively consistent with the previous year. Interestingly, during this time, the Czech Republic recorded the highest percentage of women engaged in online shopping (64%), surpassing the EU average. On the other hand, among the Central European countries, Austria registered the highest proportion of men shopping via the Internet (65.4%). Conversely, Hungary had the lowest number of online shoppers in 2019, with women constituting 49.2% and men comprising 50.6% of the total. Poland was the second Central European country with the lowest share of men and women engaged in online shopping (women - 53.6%, men - 54.0%).

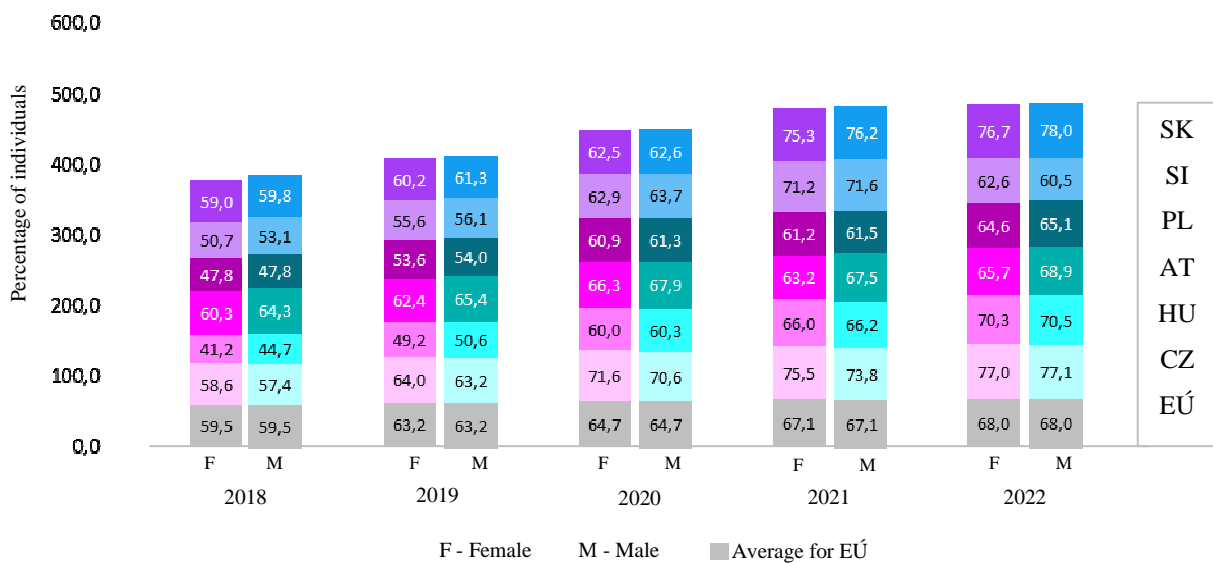


Figure 1. Share of online shoppers by gender across Central European countries
 Source: own processing according to Eurostat

Despite our previous observation of the highest year-on-year increase in the EU average occurring in 2019, individual Central European countries experienced this surge in 2020. Consequently, the state of online shoppers underwent significant changes during this year, especially among countries with lower shares in the past. Hungary, for instance, witnessed an exponential 10.8% increase in the proportion of women engaged in online shopping, while the share of men rose by 9.7%. Similarly, both women and men in Poland experienced a 7.3% increase, and in Slovenia, there was a 7.6% rise for both genders. In 2021, the impact of the pandemic and associated restrictions on physical stores was apparent, leading to a remarkable increase in online shopping. Slovenia, previously below the Central European average, saw a substantial surge, with online shoppers reaching 71.2% for women and 71.6% for men, significantly surpassing the European average (women - 66.5%, men - 67.7%). Additionally, it is intriguing to observe that while the percentage of buyers (both men and women) saw a rise in all monitored countries, Austria, which had been leading in this domain, experienced a decline of 3.1% for women and 0.4% for men. On the contrary, Slovakia emerged as the new leader in this area in 2021, with an impressive 76.2% of male shoppers, significantly surpassing the European average. As for women, their share closely resembles that of online buyers in the Czech Republic (75.3%).

The year 2022 marked the post-pandemic era, which saw a rapid transition to digital shopping, and this trend is expected to continue, leading to an expansion in the share of online shoppers. Based on Eurostat data, the development of online shoppers in Central European countries reflects a positive

trajectory, although the growth in the share of female shoppers has decelerated compared to the pandemic period. Surprisingly, Slovenia experienced an unfavorable trend, witnessing an 8.6% decrease in the share of women and an even more substantial 11.1% decrease in men shopping via the Internet. Austria's development has stagnated, with rates of 65.7% for women and 68.9% for men, placing it around the European average (slightly below for women). In contrast, Hungary significantly outperforms the average, boasting rates of 70.3% for women and 70.5% for men. The Czech Republic and Slovakia emerge as the leaders in this aspect, with the share of Czech men (77.1%) nearly matching the share of women (77.0%), while Slovakia maintains a higher presence of men (78.0%) in online shopping compared to women (76.7%). However, both countries notably exceed the European average (women – 67.7%, men – 68.4%).

In order to gain a comprehensive understanding of the e-commerce landscape, this paper delved into the differences between men and women engaged in selling products via the Internet, focusing on Central European countries. As depicted in Figure 2, the scenario for selling products differs from that of buying. However, one common aspect is the prevalence of men in this domain. Notably, the differences between men and women in selling are more pronounced than those observed in online shopping throughout the monitored period. Nevertheless, this trend does not hold true for the European average. In 2018, 17.9% of women and 20.8% of men engaged in selling products online. By 2022, the proportion of women remained steady compared to 2018, with a 1% decrease observed in 2021. On the other hand, men experienced a slight increase in 2019, reaching 21.6%, but saw decreases in 2020 and 2021. In 2022, the share of men selling via the Internet rose to 19.2%, which, in comparison to 2018, still represents a decrease of 1.6%.

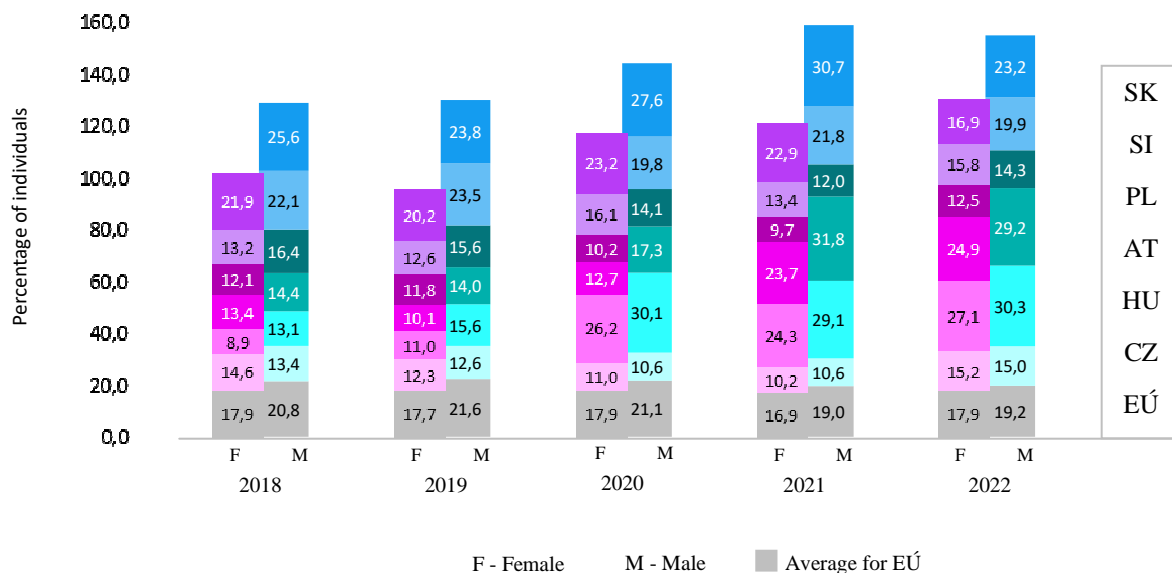


Figure 2. The share of online sellers in terms of gender across the countries of Central Europe
Source: own processing according to Eurostat

To some extent, it is apparent that in 2018, the proportion of women selling products online in all monitored countries was notably lower than the EU average. The lowest level was observed in Hungary (8.9%), which was almost 4% lower than Poland, where the share stood at 13.2%. In Slovenia, the proportion reached 13.4%, in Austria 13.4%, and in the Czech Republic 14.6%. However, Slovakia emerged as a leader in this domain, significantly surpassing the European average, with a share of women selling products online at the level of 21.9%. Surprisingly, in Slovenia, men surpassed women in the proportion of sellers, reaching up to 22.1%, which is higher than the European average. Slovakia (25.6%) was the country with the highest proportion of male sellers. In all other countries, the share of male sellers remained below the European average. In the Czech Republic, the share of male sellers was also lower (13.4%) than that of female sellers (14.6%). The year 2019 brought an interesting trend, as several countries experienced a decrease in the proportion of both male and female sellers using the Internet to sell products. In the Czech Republic, there was a 2.3% decrease, while Austria saw a 3.3% decline, Poland experienced a 0.3% decrease, Slovenia had a 0.6% decrease, and there were 1.7% fewer women selling products via the Internet. Notably, Hungary was the only country with a year-on-year increase, with a 2.1% increase.

According to Figure 2, 2020 was a pivotal year, particularly for Hungary, as both men and women significantly increased their participation in selling products online. For women, there was an impressive 15.2% surge, and for men, a notable increase of 14.4%. This upswing in Hungary surpassed the EU average, making it the clear leader among Central European countries. Interestingly, despite pandemic-related measures that led to the closure of physical stores, all other countries, except Slovakia, remained below the average. It appears that while people were compelled to buy products online due to the circumstances, the fear of uncertainty led to a decline in the number of people selling products online. It is also possible that the unfavorable situation led to the closure of many smaller businesses that operated both online and offline, contributing to the decline. In the Czech Republic, we observe another year-on-year decrease of 11.0% for women and 10.6% for men. On a positive note, Austria experienced an increase of 12.7% for women and 17.3% for men compared to the previous year. However, despite the improvement, it still falls short of the EU average. Poland recorded a slight year-on-year decrease of 1.6% for women and 1.5% for men. In Slovenia, the proportion of female sellers increased by 3.5%, but the share of male sellers declined by 3.7%.

The year 2021 showcased varying trends in selling products via the Internet between men and women in Central European countries, and the pandemic had a significant role to play. In the Czech Republic, the share of men (10.6%) slightly outpaced that of women (10.2%). Notably, while the share of men and women engaging in online shopping remained consistently high among Central European countries and exceeded the European average, the country fell below average in terms of selling products throughout the entire monitoring period. Hungary experienced an overall decrease, but the share still remained considerably above the European average. Conversely, Austria witnessed a substantial increase in both women and men selling products online in 2021. The proportion of women sellers rose by 11% to reach 23.7%, significantly surpassing the average. For men, there was a remarkable year-on-year increase of 14.5%, leading to a share of 31.8%, also exceeding the EU average. In Poland, there was a decline of 0.5% to 2.1% in both cases. Slovenia displayed a significant difference between men (21.8%) and women (13.4%). While the share of women experienced a year-on-year decrease of 2.4%, the share of men increased by 1.9%. In 2022, Slovakia witnessed a substantial decrease in the number of individuals selling via the Internet. For women (16.9%), the share even fell below the average. For men, there was a year-on-year decrease of 7.5%. Conversely, the Czech Republic observed an increase of 5% for women and 4.4% for men. However, this share still remains below the European average. Hungary's interesting aspect is its contrast between buying products online, where it falls below the Central European countries, and selling products, with both women (27.1%) and men (30.3%) maintaining a leading position well above the average, even in 2022.

5. Discussion

This paper offers a comprehensive overview of the e-commerce market's progression in Central European countries, emphasizing gender distinctions. Our study meticulously investigated two crucial factors: the digital purchase and sale of goods and services. Our findings consistently indicate a progressive rise in product acquisitions in all the observed countries and among both genders (Jedrzejczak-Gas et al., 2019). Generally, men tend to dominate online shopping activities in the monitored nations, except for the Czech Republic, where women exhibit a slight lead. Furthermore, our analysis highlights the notable shopping tendencies of Czech women and Slovak men.

We also take note of the notable surge in the share of online shoppers in Hungary, likely attributable to the pandemic, reaching the EU average level (Ebrahimi et al., 2021). Regarding the online sale of products, the percentages of female and male sellers exhibit substantial variations annually across all countries. Nevertheless, it is evident that men significantly dominate in this aspect. A compelling discovery is that despite Hungary's share of male and female shoppers being below average, the country emerges as the leading nation in selling products. Conversely, Czech women and men exhibit prominence in shopping, but their selling activities fall considerably below the European average.

Conclusion

In conclusion, it is evident that the e-commerce market in Central European countries is experiencing a continuous growth trend. The pandemic has likely influenced changes in shopping preferences in certain nations, while in others, the closure of physical stores had minimal impact on consumers' shift to the online realm. With technology consistently evolving and offering numerous advantages to both buyers and

sellers in the e-commerce landscape, it is reasonable to expect that online purchasing and selling will not remain an exclusive business channel but rather become the dominant one.

This study focused on examining the proportion of individual online buyers and sellers using data from the Eurostat database. However, a limitation of the study is the only two indicators from which we drew information, as well as the sample to which the data refer. Our future research endeavors aim to shed light on the preferred product assortments and shopping behavior of Europeans concerning expenditure and frequency of online purchases. The article serves as an overview of the e-commerce market in Central European countries, providing valuable insights for traders considering international expansion. Moreover, the study can be a foundational resource for future research inquiries.

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Resources

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Measuring the Communication Effect of Regional Product Brands in Slovakia

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Abstract

Research background: In the dynamic and diverse business world, brands play a vital role in establishing an identity and connecting with consumers. Even though global brands may dominate the global market, regional brands have their distinctive image and significance. A regional brand is a business or product primarily serving a local or regional customer base and operating in a specific geographic area.

Purpose of the article: The study's objective is to investigate the communication effect of regional brands of products established in Slovakia. Moreover, it identifies factors influencing respondents when purchasing regional brands. It reveals how many respondents know and purchase the brands - Nitrava, Ponitrie, Piešťansko, Záhorie, Kopanice and Malodunajsko-Galanstko. Finally, the study focuses on whether the respondents are satisfied with the brands.

Methods: The research is based on primary data. In total, 211 responses were collected. By applying the Z-test, the study verifies whether the respondents know the given regional brands. Using Friedman's test, groups of determinants affecting the purchases of regional products were identified.

Findings & Value added: Based on the results, 64% of respondents know the concept of regional brands. When exploring associations, it was found that women and respondents aged 25-34 have the most significant knowledge about regional brands. The main determinants affecting the purchasing decisions are primarily previous experience, the traditional method of production and the support of local producers. Fairs, exhibitions, and direct purchases were marked as important places where most respondents buy regional products. Results show that the most known brand of regional products towards respondents are regional products of Ponitrie (68%), Nitrava (64%) and Piešťansko (57%). According to the results, respondents claim they learned about regional products from the Internet and directly from the local producer.

Keywords: consumers, regional brand, regional products, Slovakia

JEL classification: M30, Q13

1. Introduction

Nowadays, cities and regions face intense competition to attract people and businesses due to globalisation, internationalisation, and statehood scaling (Ikuta et al., 2007). Many small local producers left the market as a result of globalisation and the gradual liberalisation of the market because they were insufficiently competitive. Different nations recognise territory branding as a crucial tactical tool of regional politics. (Zenker & Jacobsen, 2015). Moreover, regional branding has emerged as one of the critical ideas for fostering regional competition (Ikuta et al., 2007) and gaining a sizable market share. Therefore, regional branding creates an opportunity for small local producers as customer interest in rediscovering their identity, those of the local cultures, and traditional values (Pícha et al., 2017).

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According to Cayla & Eckhardt (2008), a regional brand is only used in the place of origin and ensures particular characteristics. Regional labelling of local products is a unified graphic designation of quality products and services produced or provided in a defined region and meeting predetermined criteria. They highlight the natural and cultural heritage, local people, gastronomy, traditional specialities, and accommodation services and events typical of the region (Jaďuďova et al., 2023). All of these regionally specific elements distinguish regional products and provide them with features that are challenging to replicate (Garcia-Galan et al., 2010). Chinnakonda & Telford (2007) claim that regional products can be examined as local products on a bigger scale. According to Van Ittersum et al. (2007), a regional product is one whose quality and origin are connected to a particular region. The fact that the product is marketed with the name of its origin place is a crucial characteristic. Local product labelling programmes are intended to ensure, typically by certification, a direct connection between a particular product and a specific area, enabling the producer to use a label signifying this connection (Kařkovia & Chromy, 2014). In order to create positive associations, provide value, and set the location apart from others, place branding entails creating brands for specific geographic locations, such as cities, regions, or communities (Eshuis & Klijn, 2012). As Zhou et al. (2023) reported, regional brands have regional characteristics and brand effects based on regional resource advantages, which provide regional meaning and value to the products. Moreover, according to Jarossova & řupolova (2015), creating a regional brand also contributes to developing rural tourism in the region. Regional brands are not applied only to tangible products, but recently, the trend of regional brands has received yet another impetus to expand with the addition of tourism, accommodation, and adventure travel. Customers who buy such products are guaranteed quality, origin, originality, and other advantages (Stoklasa & Starzyczna, 2016).

řtensova (2013) states that regional products have the potential to become distinguishable. Each region has its unique character. It is given by the natural and cultural wealth, history and centuries-old traditions of the local inhabitants, which are often unique and typical of the region. Creating a regional brand is connected with benefits. Place branding is also thought to improve a location's reputation and image both inside and outside of it (Ashworth & Kavaratzis, 2010). Additionally, it aids in the growth of society and the economy. Thanks to the products that have received the regional label and their promotion, the region's traditions, crafts, and historical and cultural values are preserved. It also supports the development of agriculture in the region and, thus, its overall economy. Creating a regional brand also contributes to developing rural tourism in the region (Jarossova & řupolova, 2015). According to Stoklasa & Starzyczna (2016), regional brands help local businesses (small farmers, artisans, and micro businesses) by promoting them, diversifying the nation's economy, and reviving regional economies. It strengthens regional links and sparks various business, government, nonprofit, and environmental protection sector collaborations in the area, which benefits the local community. Regarding the environment, regional brands encourage local production and consumption and increase the prospect of sustainable tourism. Through regional branding, cities, counties, nations, and regions can gain a persistent competitive edge. If tourists and locals perceive a place's brand positively, the region may have a competitive edge. The use of sign systems to convey its history and personality is referred to as its brand identity. A strong regional brand identity is a potent tool to outperform rivals and increase its visibility (Song & Jeon, 2017).

The paper examines the communication effect of regional brands of products established in Slovakia. This article aims to fill the research gap by finding out: what the consumer regional brand awareness is, what are the main determinants of purchasing decisions, which regional brands are the most known and how the customers are satisfied with them. The research sample consists of a selection of 6 product brands in Slovakia. The topic of the paper is important and relevant. In 2020, we faced a Covid-19 pandemic. Stoklasa & Matuřinska (2022) state that regional brands were denied their traditional availability and communication channels due to lockdowns. According to Vignali et al. (2008), the interest in buying and consuming local products and supporting domestic tourism will likely continue to grow. Traditional and regional products can contribute to an agritourism product's distinct regional identity and originality. Therefore, stimulating the region's territorial potential, including touristic attractiveness, gastronomy and regional products, can positively impact regional development. Thus, regional products promote tourism in rural areas (Barska & Wojciechowska, 2018). Moreover, This paper is structured into four parts. The study provides insight into regional brands and the advantages of regional branding. The following section deals with the hypothesis and research

framework. The following part is focused on the results and discussion. Finally, the last part of the study is the conclusion.

2. Methods

The study's primary objective is to examine the communication effect of regional brands of products established in western Slovakia - Nitra, Ponižie, Kopanice, Záhorie, Piešťansko and Malodunajsko-Galantsko. The research is based on primary data obtained from an online questionnaire survey via Google Forms. The survey was conducted from April to June 2023. The questionnaire survey included 38 questions divided into 11 sections. The first section contains a selective question about regional brand knowledge. The second section was composed of questions about the barriers and benefits of regional brands, followed by questions about the promotion of regional brands. The following section includes questions related to purchasing habits towards regional brand products. Since the paper is focused on 6 types of regional brands, one section in the questionnaire survey is dedicated to each brand. Finally, the socio-demographic questions were included in the last section. In total, 330 responses were collected, but after applying selective criteria (respondents must be familiar with the concept of regional brands, and purchaser of regional brands, residence in Slovakia), the final research sample included 211 responses.

The socio-demographic profile of the respondents is displayed in Table 1. Based on the results, it is evident that women were predominant. Men represent 37% of the research sample. More than 72% of respondents were employed and living the rural area (58%). Most respondents had a university degree (55%) and were 25 – 34 years (26%).

Table 1. Socio-demographic profile of respondents

Variable	Category	Frequency	Frequency in %
Gender	Female	133	63.03%
	Male	78	36.97%
Age	18 – 24	18	8.53%
	25 – 34	55	26.07%
	35 – 44	46	21.80%
	45 - 54	35	16.58%
	54 – 64	36	17.06%
	More than 65	21	9.95%
Economic activity	Student	23	10.90%
	Employed	151	71.56%
	Unemployed	0	0%
	Entrepreneur	8	3.79%
	Maternity leave	8	3.79%
	Pensioner	21	9.95%
Place of residence	Urban	89	42.18%
	Rural	122	57.82%
	Primary	0	0%
Education	Secondary	95	45.02%
	University degree	116	54.98%

Source: authors (2023)

The study is concentrated on 6 regional brands operating in western Slovakia – Nitra, Ponižie, Piešťansko, Kopanice, Záhorie and Malodunajsko-Galantsko (Figure 1). The uniform appearance of the logo of the type symbolising the sign typical of the region is displayed on each regional label's website. The following criteria have also been accepted for product certification: regional distinctiveness, local raw resources from the region, tradition and manpower, and environmental protection (Jadudová et al., 2018).



Figure 1. Examined regional brands

Source: Regionálny produkt Nitrava (2023)

As mentioned before, the study focuses on measuring the communication effectiveness of regional brands: Nitrava, Ponitrie, Piešťansko, Záhorie, Kopanice and Malodunajsko-Galanstko. According to Matisková (2012), the communication effect follows the induced change in brand awareness, attitudes towards the brand, and brand image. The methods of determining the effectiveness of marketing communication include:

- Recognition test - based on finding correct or incorrect identifications. The customer is shown various materials and must identify which they have seen, read or heard about.
- Memorisation test - customers reconstruct what they saw, heard or read.
- Feedback measurement - the degree of awareness of the product is determined in % - how many % of respondents tried the product, how many tried it and were satisfied.

Respondents were asked to answer questions regarding regional brands, if they know them, purchased them and their overall satisfaction with the brand or product. Therefore, we propose two hypotheses:

H₁: We assume that more than 30% of respondents know the Nitrava, Ponitrie, Piešťansko, Kopanice, Záhorie and Malodunajsko-Galantsko regional brands.

H₂: There is a difference between respondents' age and the regional brands' general awareness.

Furthermore, investigating factors affecting purchasing decisions is a fundamental aspect of marketing and business strategy. It allows businesses to align their products and marketing efforts with consumer needs, ultimately leading to success in the marketplace. By tailoring their messaging, advertising, and promotional efforts to resonate with consumers' motivations and values, producers can increase the effectiveness of their marketing campaigns. Therefore, in this study, we focus on identifying factors affecting purchasing decisions, and the hypothesis is as follows:

H₃: There are statistically significant differences in evaluating the importance of factors that affect consumers when purchasing regional products.

3. Results

At the beginning of the questionnaire survey, respondents were asked to answer a selective question if they knew the concept of regional brands. Based on the data, 64% of respondents are familiar with the regional labels. On the other hand, 36% of respondents do not know the regional brand labelling. For them, this was followed by the end of the questionnaire and the filling in of socio-demographic questions. The relationship between categorical variables was examined by applying the Chi-Square Independence. According to Table 1, it could be concluded that there exists a difference between respondents' age and the regional brands' general awareness. As the computed p-value is lower than the significance level $\alpha=0,05$, one should reject the null hypothesis H_0 and accept the alternative hypothesis H_2 . The general awareness of the regional brand is different in individual age categories. Respondents aged 25 – 34 and 35 – 44 have the highest knowledge about regional brands. However, respondents between 18 – 24 most likely do not know the regional brand concept. According to gender, we found that awareness of regional brands is higher for women than men.

Table 2. The results of tested hypotheses

Characteristics	Chi-Square (Observed value)	Chi-Square (Critical value)	df	p-value	Result
Age	29.528	11.070	5	<0.0001	H ₂ accept
Gender	26.404	3.841	2	<0.0001	H ₂ accept

Source: authors (2023)

The next question was focused on the main barriers and benefits of regional branding. Respondents could choose several options. The majority of respondents (78%) consider the support of local producers as the main benefit of regional branding. Moreover, 73% of participants declared that regional brands help the development of regions. Maintaining values and traditions in the region was evaluated as the primary advantage by 66% of individuals. Assurance for the consumer that the product marked with the regional brand meets specific quality criteria that are regularly checked was the benefit marked by 64% of respondents. Creating a common functioning network of producers and service providers as a benefit was evaluated by 19% of respondents. On the other hand, when discovering the main barriers of regional brands, it could be concluded that higher prices compared to conventional food prices were evaluated as the main barrier by 91% of respondents. Concerning the promotion of regional brands, more than 83% of participants think that regional brands are not promoted enough. Finally, 70% of participants claimed that the main barrier to regional brands was low awareness.

When discovering the sources from which participants know about the regional brand concept, it is evident that more than 35% of respondents stated they knew about the regional brands from the Internet. Moreover, 27% of participants learned about the logo of regional brands directly from the producer. Based on the data, 22% of individuals declared they knew about regional labels from fairs and exhibitions and 9% of respondents from family and acquaintances. Leaflets as a source of knowledge were claimed by 4% of respondents, and tourist information centres by 3% of respondents.

With respect to purchasing behaviour, the study concentrates on finding the main factors which affect buying decisions. In the questionnaire survey, respondents were asked to evaluate different determinants using a 5-point Likert scale ranging from 1 to 5, where 1 represented the least important factor, and 5 represented the most critical factor. The third hypothesis H₃ assumed statistically significant differences in evaluation among selected determinants while purchasing. Using Friedman's test (Table 3) and Nemenyi's method, we discovered three groups of factors according to importance. The findings show statistically significant differences between selected determinants (p-value = <0.001).

Table 3. The results of Friedman's test

Sample	Frequency
Q (Observed value)	602.991
Q (Critical value)	15.507
DF	8
p-value (one-tailed)	<0.0001
alpha	0.05

Source: authors (2023)

The significant differences in groups are also explained by Nemenyi's method (Table 4). Previous experience, the traditional production method and product quality are the three most significant factors represented by Group C. The least significant characteristics, on the other hand, are found in group A and are related to ecological origin, supporting sustainability and supporting tourism in the area. When comparing groups C and A, we discovered that there are substantial variations based on the overall evaluation of the data. Respondents make different decisions when purchasing regional products. The most important factor influencing the purchase of regional products is previous experience. The ecological origin is the least significant factor influencing the purchase of regional products.

Table 4. Results of Nemenyi's method: Differences among examined factors while purchasing

Sample	Frequency	Sum of ranks	Means of ranks	Groups		
Ecological origin	211	600.500	2.846	A		
The purchase supports the sustainability and development of the region	211	634.500	3.007	A		
Support of tourism in the area	211	715.000	3.389	A		
Originality of the product	211	1168.000	5.536		B	
Composition	211	1175.500	5.571		B	
Support of local producers	211	1206.500	5.718		B	
Product quality	211	1271.500	6.026		B	C
The traditional method of production	211	1292.000	6.123			C
Previous experience	211	1431.500	6.784			C

Source: authors (2023)

Furthermore, the next question was focused on where respondents buy regional products. Respondents had the option of choosing several options. According to the results, 76% of respondents declared purchasing directly from the producers. The majority of respondents (87%) buy regional products at fairs and exhibitions. Purchases of regional products directly at the e-shop were stated by 36% of individuals. 47% of respondents buy regional products in specialised stores, and only 9% directly in restaurants and cafes.

The last part of the questionnaire survey dealt with examining individual regional brands. Each section contained 5 questions regarding whether they know the given brand, whether they buy it, what associations they associate with the given brand, what products they buy and how satisfied they are with the products and the brand. Our findings in Figure 2 show that the most-known regional brand is Ponitrie – 68% of respondents. Furthermore, 64% of participants stated that they know the regional brand of Nitrava. The regional brand Piešťansko was known by 57% of respondents and Záhorie by 36%. The lowest level of knowledge was demonstrated for the brands Kopanice (27%) and Malodunajsko-Galantsko (24%). The first hypothesis focuses on the awareness of individual regional brands. We assume that more than 30% of respondents know the regional brands of Ponitrie, Nitrava, Piešťansko, Kopanice, Záhorie and Malodunajsko-Galantsko (Table 5).

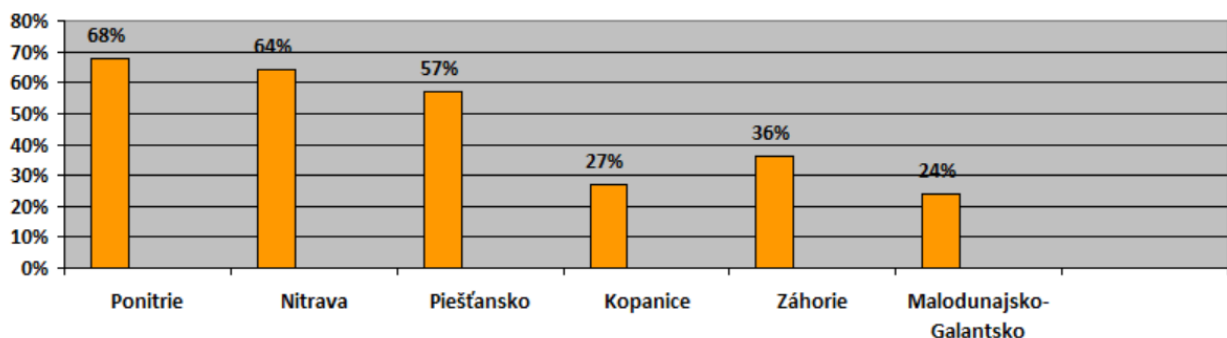


Figure 2. Regional brand knowledge in %
Source: authors (2023)

Table 5 shows the summary of results for tested hypothesis H_1 . Based on the results, it is evident that in the case of Ponitrie, Nitrava, Piešťansko and Záhorie, the value of the Z test is higher than the critical value (1.6449). Therefore, we reject the null hypothesis of knowledge about regional brands. More than 30% of respondents are aware of the regional brands of Ponitrie, Nitrava, Piešťansko and Záhorie. In the case of Kopanice and Malodunajsko-Galantsko, less than 30% of respondents know the brands.

Table 5. Results of Nemenyi's method: Differences among examined factors while purchasing

	Ponitrie	Nitrava	Piešťansko	Kopanice	Záhorie	Malodunajsko-Galanstko
n	211	211	211	211	211	211
x	143	135	120	57	76	51
p	0.6777	0.6398	0.5687	0.2701	0.3602	0.24171
p ₀ (expected share)	0.30	0.30	0.30	0.30	0.30	0.30
Z (Test statistic of one sample proportion test)	11.9731	10.7713	8.5179	-0.9464	1.9079	-1.8478
Critical value	1.6449	1.6449	1.6449	1.6449	1.6449	1.6449
Result	H ₁ accepted	H ₁ accepted	H ₁ accepted	H ₁ rejected	H ₁ accepted	H ₁ rejected

Source: authors (2023)

The next question was focused on the purchases of regional products. Regarding the regional brand Ponitrie, 57% of individuals stated that they purchase products. More than 40% of respondents purchase products from the regional brand of Nitrava and 20% from Záhorie. Only 10% of individuals claimed that they purchase products from Piešťansko. On the contrary, only 2% of the respondents said they buy products from Malodunajsko-Galantsko and only 6% from Kopanice. When investigating which product categories the respondents buy the most, we found that the majority of respondents mostly purchase agricultural and food products – honey, bee products, wine, jams and fruits and vegetables. Moreover, handicraft products were evaluated as the second most purchased, followed by accommodation and catering facilities.

Finally, the last questions of the section examined satisfaction with the brands' purchases. We used a 5-point Likert scale to determine if the respondents were satisfied with the brand. 1 represented "not satisfied at all", and 5 represented "very satisfied with the brand." According to the results, the most satisfied respondents were with the Ponitrie, Piešťansko and Nitrava brands.

Table 6. Satisfaction with the brand

Brand	Mean
Ponitrie	4.075
Nitrava	3.8046
Piešťansko	3.9048
Kopanice	3.6667
Záhorie	3.6905
Malodunajsko-Galantsko	3.4000

Source: authors (2023)

4. Discussion

Our results conclude that women and respondents between the ages of 25 – 34 and 35 – 44 had the highest knowledge about the regional label concept. Similar results were obtained in the study by Jaďud'ová et al. (2018). The results revealed that women had a higher level of knowledge about regional brands. Moreover, the study discovered that the knowledge of regional labelling is present in the case of younger respondents aged 18 - 25. On the other hand, respondents of age 62 and more did not know what the regional brand stands for. Regarding education, respondents with university degrees and with urban residence have higher knowledge about regional brands. Margarisová et al. (2018) identified that the general awareness of regional brands was influenced by respondents' age, education and place of living correlated.

As the primary sources from where respondents encountered regional brands were the Internet, directly from producers and from fairs and exhibitions. Our results also revealed that respondents tend to purchase regional products directly. Respondents in the study of Margarisová et al. (2018) encountered

regional brands directly on the package. More than 36% of participants saw the regional brand label on the promotional materials, and 29% of respondents saw the brand on the producer's website. Furthermore, our results are in line with Henschion & McIntyre (2000), who emphasises the importance of direct sales, especially for regional products. Furthermore, research by Jačud'ová et al. (2023) revealed that respondents living in urban areas (22%) tend to buy regional products at social events and in stores (11%). Contrary, 15% of individuals living in rural areas stated purchases from public events and 9% purchased regional products directly from the producer. According to research done in Hungary by Kiss et al. (2020), supermarkets, discount stores and conventional marketplaces were the most popular places to purchase regional products. On the other hand, online shopping, fairs and festivals, and purchasing at the producers' place or home delivery by producers were evaluated as the least important sales channel.

The results show that the majority of the respondents believed that regional labelling help with supporting regional producers. Furthermore, the development of regions and maintaining traditions were also evaluated as the benefits of regional branding. According to Butoracová Šindleriová & Hoghová (2020), it is evident from the study that the main benefits of regional brands are publicity and raising awareness of the region, promotion of regional development and promotion of local traditions, customs, and culture. It is essential to underline that they are practical tools for boosting local and regional economies, particularly in less developed regions where regional product branding is being applied.

Our study aimed to determine the communication effect of selected regional brands. Applying the Z-test, we confirmed the hypothesis that more than 30% know the brands Nitrava, Ponitrie, Piešťansko and Záhorie. This hypothesis was not confirmed in the case of the Malodunajsko-Galanstko and Kopanice regional brands. Moreover, questions in the survey were also focused on the feedback measurement with the regional brands. According to the results, customers of the Nitrava, Piešťansko and Ponitrie brands were the most satisfied. The study provides valuable information for regions and regional producers. Increasing sales and competitiveness for regional producers requires a comprehensive approach. Regional products represent product quality, uniqueness, and differentiation in the market. We suggest leveraging social media platforms and digital marketing to promote products, engage with customers, and build a loyal following. Furthermore, we believe that influencer partnerships extend the reach of customers. Partnering with local retailers, grocery stores, and restaurants can also help to expand the distribution network. Moreover, attendance at trade shows, fairs, and food festivals to showcase products can connect producers with potential customers and distributors. By understanding consumer behaviour, regional producers can identify gaps in the market and unmet customer needs. Moreover, understanding consumer behaviour allows regional producers to design effective marketing strategies. Producers can craft compelling advertising messages by knowing what influences consumer decisions, and choosing appropriate marketing channels. Satisfied customers are more likely to remain loyal to a brand. By investigating purchasing behaviour, businesses can enhance customer satisfaction, increasing customer retention rates and customer loyalty.

Conclusion

Regional brands refer to products or services specifically associated with a particular geographic area or region. These brands often connect strongly to the local culture, traditions, and preferences of those in that region. Unlike global or national brands, regional brands tend to have a more localised market presence, focusing their efforts on serving and appealing to the unique tastes and needs of the regional population. They often leverage their regional identity to create a sense of authenticity, trust, and loyalty among consumers. Regional brands play a crucial role in promoting local economies and preserving the distinctiveness of various regions, making them an integral part of the diverse consumer landscape.

Our study investigated the communication effect of selected regional brands. Out of 330 respondents, 64% know the concept of regional brands. The findings lead us to the conclusion that female respondents and respondents between the ages of 25 and 34 and 35 and 44 had the most significant knowledge of the regional label concept. The most frequent sources from which respondents learned about regional brands were the Internet, directly from the producer, and from fairs and exhibitions. Applying the Z-test, we confirmed the hypothesis that more than 30% know the brands Nitrava, Ponitrie, Piešťansko and Záhorie. This hypothesis was not confirmed in the case of the Malodunajsko-Galanstko and Kopanice regional brands. Moreover, we found that the most critical determinants influencing the purchases of regional brands were the previous experience and traditional method of production. The study provides valuable information for regions and regional producers. By knowing what influences consumer behaviour, regional producers can adapt marketing tools and increase their sales and competitiveness.

Finally, two limitations are available which provide directions for further future research. First, this study examined only regional brands operating in western Slovakia, suggesting that further research should be focused on all regional brands operating in Slovakia. Second, the study's limitation is the small sample size, only 211 respondents. A representative sample of respondents is needed to generalize the recommendations.

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Capturing Attention: Investigating the Impact of AI-Generated and Photographer-Captured Product Photos through Neuromarketing

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Abstract

Research background: With the advancements in artificial intelligence (AI) technology, AI-generated product photos have emerged as a viable alternative to images captured by real photographers. These AI algorithms are capable of creating visually appealing and realistic representations of food and other products. However, the impact of AI-generated product photos on consumer perception and engagement remains relatively unexplored.

Purpose of the article: The purpose of this article is to examine the differences between AI-generated product photos of food and photos taken by real photographers using neuromarketing techniques, specifically eye tracking and facial recognition. By employing these techniques, we aim to gain insights into the visual attention patterns, emotional responses, and preference for AI-generated versus real photographer's images.

Methods: In this study, a sample of participants was exposed to AI-generated product photos and real photographer's images of food. Eye tracking technology was used to measure participants' visual attention patterns, capturing which elements of the photos attracted their gaze and for how long. Self-report measures were used to collect data on participants' preference.

Findings & Value added: The findings of this study provide valuable insights into the differences between AI-generated product photos and photos from real photographers. Participants reported higher purchase intent and perceived brand quality when exposed to real photographer's images. The value added by this research lies in its contribution to understanding the impact of AI-generated product photos on consumer perception and engagement. The findings can inform marketers about the strengths and limitations of using AI-generated visuals in their marketing strategies.

Keywords: artificial intelligence, AI-generated product photos, eye-tracking, marketing, neuromarketing

JEL classification: M31, M37

1. Introduction

Advertising constitutes an essential aspect of contemporary society's daily existence. Nonetheless, the advertising sector frequently overlooks the reality that individuals might interpret advertisements in varying ways, consequently influencing their actions. Eye movements, durations of fixation, points where gazes rest, and regions of focus within visual images serve as reliable indicators of customer behavior (Liaudanskaite et al., 2019).

The impact of customer satisfaction on purchase intention is highly significant (Dash et al., 2021). That's why brands should care about how their marketing communications impact their customers. Is it attractive and interesting to them? Does it offer them clear enough information? Does it leave them with an emotion? Will they remember the ad? The visual part of the marketing communication is equally important. However, with the advent of artificial intelligence, some brands have started to use simpler and faster ways to create advertising.

Consumer behavior has significantly changed due to technological innovation and ubiquitous adoption of hand-held devices, directly contributing to how we interact and use social commerce to make decisions and shop online (Dwivedi et al., 2021).

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An increasing amount of research on Intelligent Systems/Artificial Intelligence (AI) in marketing has shown that AI is capable of mimicking humans and performing activities in an 'intelligent' manner (Vlačić et al., 2021). That's why we were also interested in whether consumers are able to recognize AI-generated images and whether there is a preference for real, creative photos taken by a photographer.

The rapid advancement of artificial intelligence (AI) offers exciting opportunities for marketing practice, as for example: understanding consumer sentiments, analyzing customer satisfaction, improving market performance, using AI for brand management, measuring and enhancing customer loyalty and trust, and using AI to improve customer relationships (Mustak, et al., 2021). AI has emerged as a transformative force in marketing advertising. Its application goes beyond automation, deeply influencing how firms approach customer engagement and business growth. Organizations adopting AI-driven marketing strategies tend to experience improved performance. This technology enables personalized interactions, refined targeting, and data-driven decision-making, contributing to enhanced outcomes (Wu & Monfort, 2023).

In the marketing, personalization signifies the art of crafting content and products that resonate with individual customer preferences. By tailoring experiences to align with these preferences, personalized marketing can alleviate customer fatigue, streamline decision-making, and reduce cognitive load. Artificial intelligence is nowadays very helpful for companies to implement personalised marketing more efficiently (Chandra et al., 2022).

Artificial intelligence can also help in the field of neuromarketing. On the one hand, it can make it easier for researchers to investigate the emotions consumers experience when viewing a piece of marketing content. There are a number of tools that can capture and then analyse a consumer's emotions when viewing a piece of content via a webcam or smartphone camera. The data is stored and then made available in visual form to the marketer, who can use it to make marketing communications more effective (Filipovic et al., 2019).

Nonetheless, artificial intelligence has found a significant role in content generation within the marketing domain. The growing availability of AI-driven tools empowers marketers to streamline content creation, encompassing both written and visual components. For numerous marketers, artificial intelligence translates into heightened efficiency when addressing specific tasks. However, it also presents potential challenges, potentially leading to the redundancy or underutilization of certain marketing roles. In this article, we undertook a study to determine how AI-generated content affects people. We decided to test visual content, specifically product photos of food and beverages.

The application and sometimes overapplication of neuroscience and psychological research methods have emerged as a prominent topic in consumer research, especially within the context of food product analysis. The realms of neurology and psychology hold the potential to greatly benefit consumer researchers, sensory analysts, and those in the food industry by shedding light on consumers' unconscious motivations and responses. Furthermore, these fields offer insights into product claims and sensory experiences (Niedziela & Ambroze, 2021).

Cutting-edge artificial intelligence technologies and purpose-built software designed for digital communication enable us to juxtapose and correlate bodily responses to external stimuli with the intricacies of neural network processes. With the digitization of marketing communication activities, numerous responsibilities traditionally undertaken by marketing experts are progressively being absorbed by neural network technology-driven software. The refined and efficient promotion of target products is inherently tied to the digitization of communications, coupled with the incorporation of psychophysiological techniques within the realm of neuromarketing (Cheredniakova et al., 2021).

While AI technology has advanced to produce visually compelling product images, the repercussions of using such AI-generated visuals on consumer perception and engagement are yet to be fully comprehended. By employing neuromarketing techniques encompassing eye tracking and facial recognition, this research aims to bridge this knowledge void. The study's methodology involving AI-generated product photos and real photographer's images of food, coupled with the application of eye tracking, promises to offer illuminating insights into visual attention patterns, emotional responses, and preference dynamics. Through these revelations, the study not only contributes to a more profound understanding of the role of AI-generated visuals but also equips marketers with valuable insights to make informed decisions in crafting impactful marketing strategies.

2. Methods

A total of 21 respondents (14 females and 7 males, mean age = 22,8) were recruited from the general population in Trnava, Slovakia during February 2023 to participate in this study.

This research recorded participants' unconscious perceptions through selected consumer neuroscience research techniques. This method of obtaining information about perceptions of marketing communications is based on retrieving and recording implicit responses. Secondly, expressing such information to individuals is difficult, as they are often unaware of these aspects of perception themselves. Much of the information that our brains receive and react to remains only in our subconscious minds. Thus, neuromarketing research techniques bring to light hidden information that individuals are not consciously or unconsciously aware of, do not want to know, or cannot accurately access. The more precise information presented by consumer neuroscience can make management decisions more accurate and objective.

Eye path analysis plays a pivotal role in the realm of eye-tracking research. It encompasses the interpretation of dynamic eye-tracking data recorded within dynamic environments. This paper aims to elucidate the principles underpinning gaze path analysis and its subsequent metrics, including heat maps, Area of Interest (AOI) analysis, fixations, viewpoints, and looking time.

Visual path analysis:

By analyzing the visual pathway, we were able to create heat maps that graphically highlighted the locations on the visuals that were most frequently visited by the participants' eyes. The heat maps complement the results in a way that they point to the specific locations that received the most attention from the research participants. The analysis of the gaze paths helped us to identify more precisely which parts of the photographs, or the photographs as such, were noticed by the participants at first glance, in what order particular elements caught their attention, or, for example, which photographs they repeatedly returned to in order to view them in more detail.

Heat Maps:

Heat maps serve as visualizations that portray the overarching distribution of gaze points. Presented as color-gradient overlays on stimuli, these maps utilize red, yellow, and green hues to signify the density of gaze points directed at different image regions. By swiftly illustrating the focus disparity across elements, temperature maps facilitate the identification of visually salient aspects. Comparisons of heat maps between respondents and participant groups provide insights into how diverse populations perceive stimuli.

We performed an inferential analysis to compare the mean values of different levels of control variables (gaze fixation durations, number of gaze returns). A general linear analysis of variance model was used to capture differences between levels of the relevant variables for each variant.

3. Results

For the scope of this study, we opted for 4 distinct categories of product photos. The initial set showcased coffee, the second illustrated vegetable salad, the third centered on soup, and the concluding series presented images of ice cream. Within each category, a pair of photos originated from a professional product photographer, and another pair emerged from artificial intelligence algorithms. In the case of the AI-generated photos, we intentionally selected those featuring specific imperfections, such as mismatched product shadows, inaccurately rendered utensils like forks, or anomalies with coffee beans or bread. Our curiosity extended to whether these discrepancies would be discerned by research participants, thereby enabling them to unmistakably distinguish AI-generated photos from authentic product images.

The series of individual photographs were presented to participants within a video format, with each series of four photographs allocated an equal observation time of 13 seconds. Utilizing an eye-tracking camera, we monitored the photographs that captured their interest. Analysis of the resulting heatmaps (refer to Figure 1, Figure 2, Figure 3, and Figure 4) distinctly indicates a greater focus on photographs captured by the professional photographer.

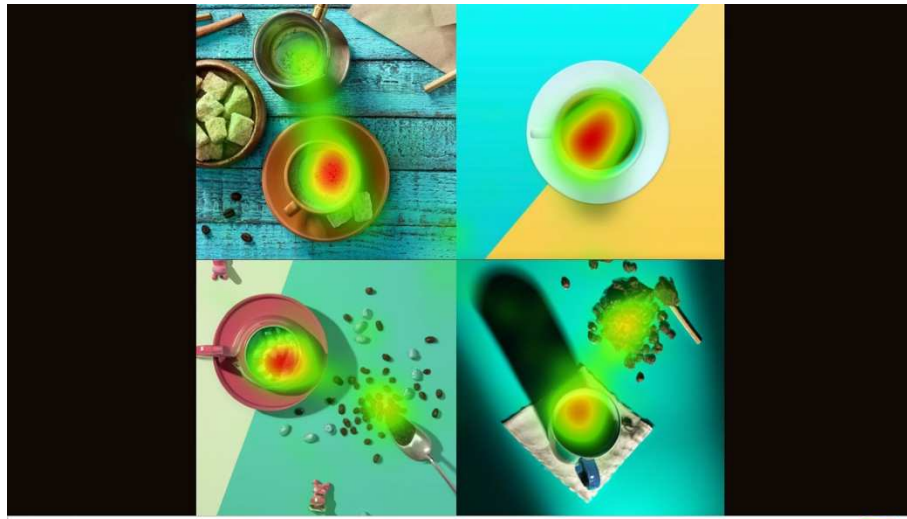


Figure 1. Heat map: AI images - bottom row. Real product photos - top row
Source: iMotions, own processing (2023)



Figure 2. Heat map: AI images - top left and bottom right. Real product photos - top right and bottom left
Source: iMotions, own processing (2023)



Figure 3. Heat map: AI images - top and bottom right. Real product photos - top and bottom left.
Source: iMotions, own processing (2023)



Figure 4. Heat map: AI images - top right and bottom left. Real product photos - top left and bottom right
Source: iMotions, own processing (2023)

The research participants were intentionally kept unaware that the series included images produced through artificial intelligence. This information was also deliberately omitted from the subsequent questionnaire that respondents were asked to complete. In essence, our objective was to ascertain whether, notwithstanding certain technical limitations, participants could discern such AI-generated photographs and evaluate their appeal.

We inquired of participants which photograph from each category they would consider using in an advertising campaign. Across all categories, photographs taken by professional photographers overwhelmingly dominated their choices. Infrequently, participants opted for images generated by artificial intelligence. These AI-generated images were subsequently rated in the questionnaire as lacking creativity, appearing unnatural, suffering from an excessive number of distracting elements, displaying poor composition, execution, contrast, and underexposure.

Numerous individual results exist, yet no pertinent overarching conclusions can be drawn from them. This is because, stemming from a sole stimulus, these findings might be speculative or linked solely to the particular type of food/drink portrayed in the product photograph. Consequently, our primary focus shifted towards the shared measurable attributes of the individual stimuli, leading us to discover that:

Based on the testing results, it becomes evident that the comparative analysis provides noteworthy insights. Notably, the examination reveals a distinct trend: real photographs outshine their AI-generated counterparts in terms of creativity and attractiveness. Participants consistently allocated more time to gaze at real photographer's images, suggesting a higher level of engagement and interest. Strikingly, participants appeared oblivious to any discrepancies or errors in the AI-generated pictures. This observation implies that, despite their appeal, AI-generated visuals may require further refinement to seamlessly replicate the nuanced creative and captivating elements inherent to real photographs. The juxtaposition of these findings underlines the compelling influence of human photography's artistry and its ability to capture and retain viewer attention. Of course, it is important to take into account that AI-assisted image generation programs are constantly improving. It can only be a matter of time before they also have a creative aspect that is natural to consumers and captures their attention enough to encourage them to buy a product or service.

4. Discussion

The findings of this study shed light on several intriguing aspects regarding the perception and preferences of research participants when presented with photographs taken by human photographers compared to those generated by artificial intelligence. Our exploration aimed to uncover whether participants could discern technical imperfections within AI-generated images and how these imperfections influenced their preferences and evaluations.

An essential element of this study was the deliberate omission of information about the presence of AI-generated images within the series presented to participants. This choice aimed to simulate real-world scenarios where viewers may not be aware of the origins of visual content. Remarkably, despite this lack of information, participants exhibited a discernible preference for photographs captured by human

photographers. This implies that certain qualitative nuances within the AI-generated images might have triggered a subconscious bias against them.

The identified technical flaws within AI-generated images proved significant in shaping participants' perceptions and preferences. Images featuring errors such as mismatched product shadows, inaccuracies in utensil representation, and anomalies in product elements were found to be consistently associated with diminished appeal. The participants' characterization of these images as lacking creativity, appearing unnatural, and compromised by multiple distracting elements underscores the critical role that technical accuracy plays in the visual content's aesthetic appeal. The dominance of images captured by human photographers in participants' choices for potential advertising campaigns is an intriguing outcome. This result highlights the enduring value that human-created visuals possess in conveying a sense of authenticity, emotional connection, and artistic prowess that AI-generated content currently struggles to replicate. The participants' preference for professionally captured photographs emphasizes the continued importance of human intuition and creative judgment in crafting compelling visual narratives.

However, we are cautious with this statement, as we know how much the capabilities of software using artificial intelligence to create images that can be used for marketing communication purposes are advancing. It is the increasing availability of such software that offers marketers an easier way to create advertising messages. It is also a less costly route. At the same time, there is no need to involve a photographer, retoucher and other members of a collaborative team in the creation process. Artificial intelligence also just presents vast possibilities in the creation of product photography as well. It's only a matter of time before marketers have tools easily available to them using artificial intelligence that also deliver more visually appealing product photos that may no longer be judged by recipients as unattractive or compositionally distracting. However, it should still be noted that artificial intelligence only draws on the combination of data available to it. The question is therefore whether the role of the creative human photographer, who can translate his or her idea into a product photograph, bring an interesting visual representation of the product in question and thus appeal to the consumer and increase the preference for the product brand, will ever disappear.

Conclusion

In conclusion, this study has illuminated the intricate interplay between technical precision, human perception, and aesthetic appeal in the realm of visual content. The findings emphasize the enduring role of human creativity and intuition in crafting visually resonant content, even in the face of advancing artificial intelligence capabilities. As technology continues to evolve, understanding the delicate balance between technical accuracy and artistic perception will remain a vital consideration for marketers, designers, and content creators seeking to engage and captivate audiences through visual media.

While this study has provided valuable insights, several avenues for future research have emerged. Exploring whether the observed preferences for human-generated content extend to other contexts or visual mediums could offer a more comprehensive understanding of the dynamics at play. Additionally, investigating how advancements in AI-generated imagery, particularly in addressing technical shortcomings, might impact participant perceptions is an area ripe for exploration. For marketers and designers, this underscores the importance of understanding and harnessing the emotive and intuitive aspects of human-created visuals, which hold a unique power to resonate with audiences.

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Exploring Information Sources in Consumer Purchase Decision-Making: An Empirical Analysis in the Slovak Market

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Abstract

Research background: Understanding consumer behavior and the sources of information individuals utilize before making purchase decisions is crucial for businesses to develop effective marketing strategies.

Purpose of the article: This article is dedicated to a comprehensive exploration of the diverse sources of information that Slovak consumers rely upon when making purchase decisions. By shedding light on this aspect, businesses can refine their marketing tactics for better alignment with consumer preferences.

Methods: To achieve a robust understanding of this phenomenon, the research draws upon a representative sample of 1000 participants. Data collection was carried out through a well-structured survey, ensuring a reliable and comprehensive dataset.

Findings & Value added: The findings reveal that personal recommendations and online reviews were the most influential sources, highlighting the significance of social connections and collective opinions. Additionally, company websites and social media platforms emerged as important digital sources. The study also identified the influence of demographics, with younger participants and those with higher educational levels exhibiting distinct information-seeking behaviors. Based on these findings, practical recommendations for businesses in the Slovak market include harnessing the power of personal recommendations, optimizing their digital presence, and tailoring marketing strategies to demographic preferences. By understanding and leveraging these insights, businesses can effectively engage with Slovak consumers, build trust, and enhance their competitiveness in the marketplace. In conclusion, this study's contribution lies in its illumination of the intricate web of information sources that influence Slovak consumers' purchase decisions. By capitalizing on these insights, businesses can bolster their engagement with consumers, cultivate trust, and fortify their competitive stance in the dynamic marketplace.

Keywords: Slovak consumer, consumer behavior, sources of information

JEL classification: M30, M31

1. Introduction

Consumer behavior plays a crucial role in understanding purchase decision-making, as individuals engage in a complex process of information search, evaluation, and choice. The study of consumer behavior provides valuable insights into the factors that influence consumers' purchase decisions and helps businesses tailor their marketing strategies accordingly. In the context of the Slovak market, understanding consumer behavior becomes even more significant due to its unique characteristics and dynamics.

Several theoretical frameworks have been developed to explain consumer behavior. The Theory of Planned Behavior posits that individuals' intentions to engage in a particular behavior are influenced by their attitudes, subjective norms, and perceived behavioral control. (Ajzen, 1991)

The Information Processing Model suggests that consumers go through a cognitive process purchasing. These theories, among others, provide a foundation for understanding the complex nature of consumer decision-making. (Blackwell et al., 2006)

Existing literature on consumer behavior has extensively explored the various sources of information that consumers rely on before making purchase decisions. Scholars have investigated the impact of

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traditional sources such as personal recommendations (Cheung et al., 2008), print media (Moriarty et al., 2011), and television advertisements (Fam and Waller, 2006). Moreover, the advent of digital technology has introduced new information sources such as online reviews (Kanwal et al., 2022), social media (Muntinga et al., 2011), and company websites (Dwivedi et al., 2019).

Ajzen (1991) proposes that individuals' intentions to engage in a specific behavior, such as making a purchase, are shaped by their attitudes, subjective norms, and perceived behavioral control. Attitudes reflect consumers' evaluations of the product or service, subjective norms involve social influences and norms, while perceived behavioral control represents consumers' perceptions of their ability to perform the behavior. (Miklosik, A., Jantova, M., & Starchon, P. 2022)

The Information Processing Model provides a comprehensive framework for understanding the cognitive process consumers go through when making purchase decisions. (Blackwell et al., 2006) This model consists of five stages: problem recognition, information search, evaluation of alternatives, purchase decision, and post-purchase evaluation. These stages highlight the importance of information sources in shaping consumer decision-making.

Information sources play a vital role in shaping consumer purchase decisions. As defined by Engel et al. (1995), information sources refer to "any stimuli that an individual uses to understand and respond to a marketing message". (p. 242) Consumers rely on different types of information sources, including personal, interpersonal, and impersonal sources, to gather information about products or services. (Goldsmith et al., 2000; Katz & Lazarsfeld, 1955)

Personal information sources consist of the consumer's own experience and knowledge. Past experiences with a product or brand significantly influence consumer decision-making. (Bettman, 1979) Furthermore, personal opinions and beliefs play a critical role in evaluating and selecting products. (Goldsmith et al., 2000)

Interpersonal information sources involve interactions with family, friends, and acquaintances. Word-of-mouth (WOM) communication is a widely recognized interpersonal information source. (Brown & Reingen, 1987) WOM communication is highly influential due to its perceived credibility and trustworthiness. (Hennig-Thurau et al., 2004) Social media platforms have further amplified the impact of interpersonal information sources by facilitating online conversations and recommendations. (Chu & Kim, 2011)

Impersonal information sources encompass a range of external stimuli, such as advertising, product reviews, and expert opinions. Advertising, as a mass communication tool, plays a significant role in influencing consumer purchase decisions. (Aaker & Bagozzi, 1981) Product reviews and ratings have gained importance in the digital era, as consumers actively seek online reviews to inform their decisions. (Cheung & Thadani, 2012)

Various factors influence consumers' selection of information sources. The perceived credibility, expertise, and relevance of the source significantly impacts its influence on consumer decision-making (Goldsmith et al., 2000). Individual characteristics, such as the consumer's level of involvement, knowledge, and socio-demographic factors, also affect the choice of information sources. (Engel et al., 1995)

A number of studies have investigated the role of information sources in consumer purchase decision-making. (Ganobčik, J. et al 2022) These studies have found that the importance of different information sources can vary depending on the product or service being considered, the consumer's level of involvement in the purchase decision, and the consumer's personal characteristics.

For example, a study by Yoo et al. (2015) found that online consumer reviews were an important source of information for consumers making travel purchase decisions. However, a study by Broilo et al. (2016) found that word-of-mouth was a more important source of information for consumers making car purchase decisions.

The level of consumer involvement in the purchase decision can also affect the importance of different information sources. A study by Ward and Lee (2000) found that consumers who were highly involved in the purchase decision were more likely to use a variety of information sources, including advertising, consumer reports, and word-of-mouth.

Finally, the consumer's personal characteristics can also affect the importance of different information sources. A study by Du and Xie (2021) found that consumers who were more price-sensitive were more likely to use online price comparison tools when making purchase decisions.

Social media platforms have become influential channels for information exchange and product recommendations, as consumers seek peer opinions and engage in conversations related to products and

services. (Štefko et al., 2023) Company websites also serve as important sources of information, allowing consumers to access product details, specifications, and customer reviews. (Dwivedi et al., 2019)

However, while much research has been conducted in global contexts, there is a dearth of studies specifically focused on the Slovak market. Therefore, this paper aims to fill this research gap by exploring the information sources that Slovak consumers utilize before making purchase decisions. By focusing on the Slovak market, this study takes into account the unique cultural, social, and economic factors that may influence consumer behavior in this context. Understanding the information sources preferred by Slovak consumers can provide valuable insights for businesses operating in the market, enabling them to effectively target their marketing efforts.

2. Methods

While previous studies have investigated information sources in consumer decision-making, there is a notable research gap specific to the Slovak market. The cultural, social, and economic factors that characterize the Slovak market may influence consumer behavior and their preferred sources of information. Therefore, there is a need for empirical research that focuses specifically on the Slovak market to provide insights into the information sources utilized by Slovak consumers and their implications for businesses operating in this context.

The objectives of this empirical analysis are to (1) identify the specific information sources that Slovak consumers rely on, (2) examine the factors influencing their choice of information sources, and (3) explore the implications for businesses operating in the Slovak market.

To achieve the objectives of this study, an empirical research approach was adopted. This approach allowed for the collection of primary data directly from Slovak consumers, providing valuable insights into their information-seeking behaviors and preferences.

A purposive sampling technique was utilized to select a representative sample of Slovak consumers. The sample consisted of individuals aged 18+ years residing in various regions of Slovakia. Efforts were made to include participants from diverse demographic backgrounds to ensure a comprehensive understanding of information sources across different segments of the population. A total of 1000 participants were recruited for the study.

Primary data were collected through a structured survey. The survey instrument was designed to capture information regarding participants' demographic characteristics, purchase decision-making processes, and the sources of information they relied on before making a purchase.

The survey included a combination of closed-ended questions, such as Likert scale items and multiple-choice questions. The questionnaire was pilot-tested with a small group of respondents to ensure clarity and validity of the questions before the main data collection phase. The survey was conducted as a part of VEGA Project 1/0737/20 on Consumer behavior and Consumer Literacy in 2022.

Ethical guidelines were followed throughout the research process. Participants were provided with informed consent forms that outlined the purpose of the study, their rights as participants, and the confidentiality and anonymity of their responses. Participation was voluntary, and participants had the option to withdraw from the study at any time without penalty.

Descriptive statistical analysis was conducted to summarize the demographic characteristics of the participants. To analyze the information sources utilized by Slovak consumers, frequency analysis was performed to identify the most commonly used sources. Cross-tabulations and chi-square tests were employed to examine the relationship between demographic variables and the choice of information sources. The significance level for statistical tests was set at $\alpha = 0.05$. The research question was whether there is a difference between individual age groups of consumers in which information sources they use before they make a purchase decision. This led to the following hypotheses:

H0: there is no statistically significant difference between age groups and information sources

H1: there is statistically significant difference between age groups and information sources

The null hypothesis assumes the independence of the two investigated variables, the alternative, on the other hand, assumes the variables are dependent. We verified all hypotheses at the level of significance $\alpha = 0.05$. In order to use the chi-square test of independence, two conditions must be met:

1. The individual observations in the contingency table are unenviable,
2. At least 80% of the cells of the contingency table must have an expected frequencies higher than 5.

The first condition is automatically fulfilled by the fact that each respondent could choose only one answer to each question and at the same time the questions were mandatory. The second condition was also fulfilled due to the size of the sample and the distribution of the response

3. Results

This chapter presents the findings derived from the analysis of the data collected on the information sources utilized by Slovak consumers in their purchase decision-making process. The section begins with an overview of the demographic characteristics of the participants and proceeds to explore the various sources of information that participants relied on.

The sample consisted of 1000 Slovak consumers of all age groups. The participants were diverse in terms of age, gender, educational background, and geographical location within Slovakia. Figure 1 provides an overview of the demographic characteristics of the participants.

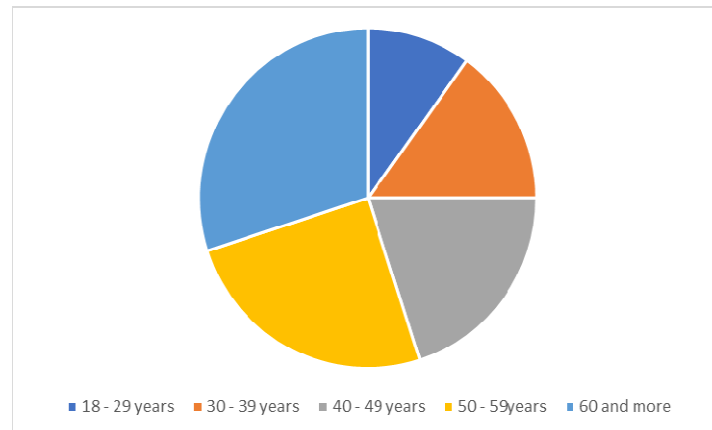


Figure 1. Demographic Characteristics of Participants
Source: own processing (2023)

The total number of respondents in the table is 1000, with each age group represented by a different number of respondents and a corresponding percentage in the total sample. The age group of 18 to 29 years represents 18% of the total sample and includes 180 respondents. The age group of 30 to 39 years accounts for 20% of the total sample and includes 199 respondents. The age group of 40 to 49 years represents 19% of the total sample and includes 192 respondents. The age group of 50 to 59 years constitutes 16% of the total sample and includes 158 respondents. The largest age group is 60 and above, which comprises 27% of the total sample and includes 271 respondents.

Participants were asked to indicate the sources of information they utilized before making a purchase decision. Figure 2 illustrates the frequency distribution of the information sources reported by the participants.

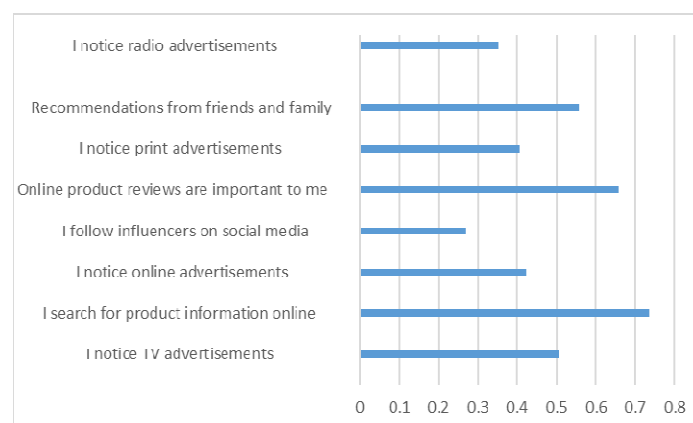


Figure 2. Frequency Distribution of Information Sources
Source: own processing (2023)

73.60% of respondents stated that they search for product information online. 65.90% of respondents stated that online product reviews are important to them. 55.80% of respondents consider recommendations from friends and family as an influential factor. 50.50% of respondents reported noticing advertisements on television. 42.40% of respondents mentioned noticing advertisements online. 40.60% of respondents noticed advertisements in print media. 35.30% of respondents noticed

advertisements on the radio. 27.10% of respondents reported following influencers on social media platforms. Participants emphasized the significance of personal recommendations due to the trust they placed in the opinions of people they knew. Online reviews were valued for their transparency and the ability to access a wide range of perspectives. Company websites were seen as reliable sources of detailed product information. Social media platforms were appreciated for their convenience and the ability to interact with brands and seek opinions from peers.

To examine the relationship between demographic variables and the choice of information sources, cross-tabulations and chi-square tests were conducted. The chi-square tests were performed with a significance level of $p < .05$.

The results indicate that age had a significant association with the choice of information sources, $\chi^2(2) p = .027$. Younger participants (18-29 years) were more likely to rely on social media platforms compared to older participants. The chi square tests also showed that personal recommendations are the most influential source for older generation $\chi^2(2) p = .038$. Online reviews were also highly utilized in younger age groups in comparison to the older generations $\chi^2(2) p = .013$.

4. Discussion

The findings indicate that Slovak consumers rely on a mix of traditional and digital information sources in their purchase decision-making process. Personal recommendations and online reviews play a crucial role in shaping their perceptions and choices. The influence of digital platforms, such as social media and company websites, is also notable. The findings align with previous research conducted in other contexts but provide specific insights into the preferences and behaviors of Slovak consumers.

The results further reveal the growing influence of digital platforms in the Slovak market. Company websites and social media platforms were valued by consumers for their convenience, accessibility, and ability to interact with brands and peers. These findings highlight the need for businesses to have a strong online presence and to actively engage with consumers through these digital channels.

The relationship between demographics and information sources suggests that age plays a role in shaping consumer preferences. Younger participants exhibited a stronger reliance on social media platforms, reflecting their digital-native tendencies.

Based on the research findings, several implications can be drawn for businesses operating in the Slovak market:

- **Harness the power of personal recommendations:** Businesses should focus on fostering positive word-of-mouth through providing excellent products, services, and customer experiences. Encouraging satisfied customers to share their positive experiences with others can greatly influence potential customers' purchase decisions.
- **Emphasize online reputation management:** Online reviews hold significant influence over consumer decisions. Businesses should actively manage and respond to online reviews to maintain a positive brand image. Encouraging satisfied customers to leave reviews and addressing negative feedback promptly can enhance trust and credibility.
- **Optimize digital presence:** A well-designed and user-friendly company website is essential for providing detailed product information and facilitating consumer decision-making. Social media platforms should be leveraged to engage with consumers, build relationships, and provide valuable content that aligns with their interests and needs.
- **Consider demographic preferences:** Understanding the information-seeking behaviors of different demographic segments is crucial. Tailor marketing strategies to target specific age groups and educational backgrounds. For younger consumers, invest in social media marketing and influencer collaborations. For educated consumers, emphasize the availability of in-depth product information and expert reviews on company websites.

Conclusion

This study explored the information sources utilized by Slovak consumers in their purchase decision-making process. The findings highlight the importance of personal recommendations, online reviews, company websites, and social media platforms as influential sources of information. Businesses operating in the Slovak market can benefit from understanding these preferences and adapt their marketing strategies accordingly.

It is important to note that consumer behavior is a dynamic field, and preferences may evolve over time. Therefore, businesses should continuously monitor consumer trends and adapt their strategies to align with changing consumer behaviors and preferences.

By leveraging the insights gained from this study, businesses in the Slovak market can effectively engage with consumers, build trust, and enhance their competitiveness in the marketplace.

This study provides valuable insights into the information sources utilized by Slovak consumers. However, further research is needed to delve deeper into specific product categories or industries within the Slovak market. Additionally, exploring the influence of cultural and social factors on consumer behavior would provide a more comprehensive understanding of purchase decision-making processes in Slovakia.

Further investigation into the impact of emerging technologies, such as artificial intelligence and virtual reality, on consumer information-seeking behaviors would also be worthwhile. These technologies have the potential to reshape the landscape of consumer decision-making and warrant exploration in future research studies.

In conclusion, understanding the information sources utilized by consumers in the Slovak market can enable businesses to develop effective marketing strategies that resonate with their target audience. By adapting to changing consumer behaviors and preferences, businesses can build stronger connections, increase customer satisfaction, and ultimately drive business growth.

It is important to acknowledge the limitations of this study. The findings are based on self-reported data and may be subject to response biases. The sample primarily consists of internet users, which may not fully represent the entire population of Slovak consumers. Generalizability to the broader population should be interpreted with caution.

Resources

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Willing to Pay More to Support the Local Economy and Protect the Environment: How Slovak Consumers Prefer Domestic Products

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Abstract

Research background: Apart from traditional decision-making factors such as brand or quality, consumers have certain purchasing preferences regarding the origin of products. Previous research produced conflicting results in terms of preferences of Slovak consumers for domestic products.

Purpose of the article: The aim of the research presented in the paper was to provide insights into the attitudes of Slovak consumers towards purchasing domestic products and examine how demographic attributes affect these attitudes.

Methods: To investigate described conflict, we conducted quantitative research in the form of a survey on a representative sample of 1,000 Slovak consumers over 18. Our research also aimed to identify whether the attitudes of Slovak consumers towards purchasing domestic products changes according to their demographics. We were interested in determining whether consumers' opinions statistically significantly differ based on their gender, age, and education.

Findings & Value added: The data shows that 75% of Slovak consumers prefer domestic products and 63% of consumers are even willing to pay more for them. The support for Slovak products is stronger by consumers with higher education. We also investigated the reasons for this preference and found that 89% of Slovak consumers believe that they support the local economy by purchasing Slovak products. The results prove that environmental friendliness is also a significant factor contributing to the Slovak consumers' preference for purchasing domestic products.

Keywords: consumer attitudes, country of origin, local brands, Slovak consumers

JEL classification: M31

1. Introduction

Consumer demands for products are constantly increasing. Apart from traditional decision-making factors such as brand or quality, consumers are now also looking at the origin of products. The importance of country of origin has been studied intensely, revealing what factors are essential to consumers when assessing the origin of products. A previous study, based on about 2500 country pairs, indicated that consumer evaluations in a country (the 'rating country') of products made in another country (the 'rated' country) are directly related to the GDP of the rated country and inversely related to the GDP of the rating country (Bhat, 2019). Consumers perceive certain countries of origin as attractive, neutral or unattractive (Pileliene & Sontaite-Petkeviciene, 2014). For example, in developing countries such as Ghana, domestic products are not perceived favourably, and consumers prefer products from developed countries (Opoku & Akorli, 2009).

This research on supporting Slovak produce is significant, especially to the Slovakian government, as they encourage the purchasing of quality Slovak products through e.g. the National Program for the Support of Domestic Agricultural Products and Groceries (Dudekova, 2015). Furthermore, the information published by researchers and research agencies is contradictory. Some state that the volume of products made in Slovakia is increasing (Podnikam, 2015), while others claim that factors such as the price of the product, are more important in purchasing decisions than whether it has been locally produced (GFK, 2016). The preferences also shift over time, and therefore it is of utmost importance to

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get up-to-date data showing the preferences of Slovak consumers regarding the purchasing of domestic or foreign products.

The main goal of the research presented in this paper is therefore to determine the attitudes of Slovak consumers towards purchasing domestic products. Based on a research model consisting of seven key components, we identify their relationship to domestic products and determine whether such products are important to Slovak consumers. Also, the research evaluates whether consumers are willing to pay extra for this type of product and whether they perceive the supply of such products as sufficient. The role of demographic attributes in consumer attitudes of Slovak consumers towards purchasing domestic products is also determined and discussed.

2. Literature Review

2.1 Consumer preferences for domestic products

Previous studies revealed that in certain countries, consumers prefer domestically manufactured goods (Knight, 1999; Kalicharan, 2014) and are often willing to pay a higher price for them (Knight, 1999). The willingness to buy domestic products is moderated by the level of consumer ethnocentrism (Wu et al., 2010; Yen, 2018). Researchers have analysed the psychological processes involved and found that ethnocentric consumers experience a greater degree of activation in brain regions linked to self-reference and reward when considering purchasing domestic products (Casado-Aranda et al., 2020), and that domestic goods convey neural rewarding sensations (Luis-Alberto, Angelika & Juan, 2021).

It has been proven that consumers regard products produced in developed countries to be of higher quality than locally produced products (Kalicharan, 2014). Quality is also perceived to be lower when a brand from a developed country is manufactured in a developing country (Wu et al., 2012). However, research has also shown that the result of continuing globalisation is that country of origin would have a lower effect on consumers' perception of product quality than other quality attributes (Kalicharan, 2014). Also, brand origin is more related to quality perceptions and influences purchase intention more prominently than where the product is made (Wu et al., 2012).

2.2 Consumer preferences for local food

As the distances between the places of production and consumption have increased, consumers also consider the place of origin of the products they purchase (Feldmann & Hamm, 2015). When referring to local food in various studies, country of origin (Wageli & Hamm, 2012), region (Wawrzyniak et al., 2005) or distance (Adams & Adams, 2011) are commonly used as factors influencing purchasing decisions. Consumers prefer local food that has travelled shorter distances (Holloway et al., 2007). Many consumers do not only purchase domestically produced groceries, but they also tend to prefer local food that has been produced within a particular region. Other factors contributing to the preference for local produce include its perceived safety (Nganje, Hughner & Lee, 2011), environmental friendliness of the production process and transportation (Brown, Dury & Holdsworth, 2009), as well as the willingness to support the local economy and community (Dunne et al., 2011).

It has also been confirmed that consumers are willing to pay more for such local produce (Feldmann & Hamm, 2015). In terms of the influence of socio-demographic factors on the preference to buy local food, it was found that their explanatory power is relatively weak (Tregear & Ness, 2005; Cranfield, Henson & Blandon, 2012).

2.3 Slovak consumers and their attitudes towards domestic products

In Slovakia, consumers buy more domestic products than before (Podnikam, 2015). The positive relationship between consumer ethnocentrism and the preference for domestic products was also confirmed in Slovakia (Cvirik, 2021). However, it has also been determined that the level of consumer ethnocentrism is quite low in Slovakia, and Slovak consumers do not perceive foreign products as 'enemies' (Cvirik, 2018). On the other hand, another study revealed that product price is far more critical for Slovak consumers than the fact that the product has been made in Slovakia (GFK, 2016). This is in line with the research performed in the neighbouring Czech Republic, which has revealed that consumers are not really willing to pay more for domestic brands (Weberova & Ližbetinová, 2016). The results were similar to a previous research study published in Slovakia (Smolkova, 2013).

Some issues were detected in the area of product recognition. Although consumers in Slovakia prefer domestic products, it is sometimes difficult for them to identify products that were made in Slovakia (Vilcekova, 2014a). Demographics also affects consumer preferences. For example, young people in Slovakia pay attention to brand origin, because they prefer foreign brands (Vilcekova & Sabo, 2013). Consumer preferences tend to change over time depending on factors such as the current economic situation (Vilcekova, 2014b). Based on the previous research, we identified the research gap, namely whether Slovak consumers from different demographics pay attention to the origin of the products they purchase and what is their attitude towards purchasing products that were made in Slovakia.

3. Methods

To meet the goal of the research, quantitative research in the form of a survey was carried out among a group of Slovak consumers.

3.1 Participants

Respondents in the survey were selected to meet a representative sample for gender, age, education, size of residence, and region. The research involved 1,000 Slovak consumers over 18. A more detailed description of the sample based on socio-demographic factors can be found in Appendix A.

3.2 The survey

The survey was performed between 02 and 07 December 2020. The answers were collected online using a standardised questionnaire containing 30 statements concerning consumer attitudes to the attitudes of consumers to the purchase of domestic and organic products, their attitudes to advertising, and whether they perceive themselves as being informed consumers. In this article, we focus on 7 questions related to the attitudes of Slovak consumers to the analysed topic, which is a partial output of the entire research project.

For each statement, respondents were asked to express a degree of agreement or disagreement on a 5-point Likert scale, which is typically used to measure respondents' level of agreement with various statements (Emerson, 2017). Respondents chose from one of five possible answers: 1) I definitely agree; 2) I somewhat agree; 3) I somewhat disagree; 4) I strongly disagree; v) I do not know.

The questionnaire also included classification questions characterising the respondents based on socio-demographic characteristics. All questions in the questionnaire were mandatory, with respondents being able to choose only one of these options.

3.3 Hypotheses

Based on the literature review and the previous research about Brand and the Slovak customer (2013), we established the following seven hypotheses:

- H1: Slovak consumers are paying attention to the origin of products as purchasing Slovak products is important to them.
- H2: Thanks to paying attention to the country of origin, Slovak consumers have noticed that Slovak products are more expensive.
- H3: When buying domestic products is important for Slovak consumers, they are willing to pay more for such products.
- H4: Even though products produced in Slovakia are more expensive, Slovak consumers are willing to pay the price.
- H5: Environmental friendliness is a significant factor contributing to the importance of purchasing Slovak products
- H6: Supporting local businesses is a significant factor contributing to the importance of purchasing Slovak products
- H7: Slovak consumers who notice the country of origin of purchased products think that the offer of Slovak products is sufficient.

There are seven main components of the research model. They are listed in Table 1.

Table 1. Components of the research model

Recognition	I notice the country of origin of the products I buy.
Importance	Buying Slovak products is important to me.
Priciness	Slovak products are more expensive.
Willingness	I am willing to pay more for Slovak products.
Environmental friendliness	The purchase of Slovak products has a smaller impact on the environment.
Supporting local economy	By purchasing Slovak products, I support our economy.
Sufficient offer	The offer of Slovak products is sufficient for me.

Source: own processing

The research model is visualised in Figure 1.

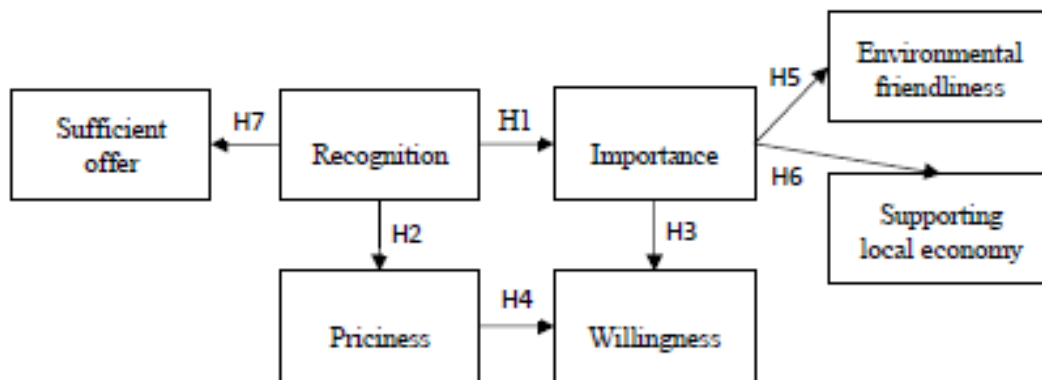


Figure 1. Research model

Source: own processing

Our research also aimed to identify whether the attitudes of Slovak consumers towards purchasing domestic products changes according to their demographics. We were interested in determining whether consumers' opinions statistically significantly differ based on their gender, age, and education. Null and alternative hypotheses were defined:

H0: There is no statistically significant relationship between demographic indicators and the opinions of Slovak consumers regarding the purchase of domestic products.

H1: There is a statistically significant relationship between demographic indicators and the opinions of Slovak consumers regarding the purchase of domestic products.

3.4 Data analysis

The results were evaluated using descriptive statistics, specifically frequency tables and Pearson's chi-square test of independence to verify the hypotheses. The null hypothesis assumes the independence of two random variables. The alternative hypothesis states the opposite and assumes a dependence of two random variables. The null hypothesis H0 is rejected if the p-value is less than or equal to the significance level α . The p-value indicates the probability that we obtain a value of test statistics that is greater than or equal to the value actually obtained, provided that the null hypothesis holds (Yarandi, 1996).

We verified all hypotheses at the significance level $\alpha = 0.05$. To use the Chi-square test of independence, two conditions must be met: 1) The individual observations summarised in the PivotTable are independent, so each element of the sample is included in only one cell of the PivotTable; 2) At least 80% of the PivotTable cells have an expected frequency greater than 5 (Kent State University, 2020). Both assumptions were met when testing all hypotheses. The first condition is automatically satisfied by the fact that each respondent could choose only one answer to each question, and at the same time, the questions were mandatory. The second assumption was verified by testing the hypotheses in SPSS at the end of each Chi-square table listed for each hypothesis.

4. Results

The research focused on the attitudes of Slovak consumers towards purchasing domestic products. The research results describe the relationship between respondents' attitudes to domestic products and selected demographic factors and describe the relationships in the research model.

4.1 Attitudes of Slovak consumers towards purchasing domestic products

The attitude of Slovak consumers towards purchasing domestic products can generally be considered positive. 75% of respondents consider the purchase of domestic products to be important (answers “strongly agree” and “somewhat agree”) and 74% of respondents expressed the opinion that they also pay attention to the country of origin of the purchased products. Almost 25% of respondents consider the offer of Slovak products insufficient. Although 74% of respondents state that they consider Slovak products more expensive, 63% are willing to pay more for domestic products. When asked whether Slovaks think they support the Slovak economy by buying domestic products, we recorded the highest number of positive answers. 89% of respondents agreed with the statement. On the contrary, we recorded the least positive answers in the statement whether the purchase of Slovak products has a lower impact on the environment, less than 60%. An interesting finding in this question is that as many as 16% of respondents do not have an opinion about the impact of buying domestic products on the Slovak economy. Figure 2 presents an overview of the answers.

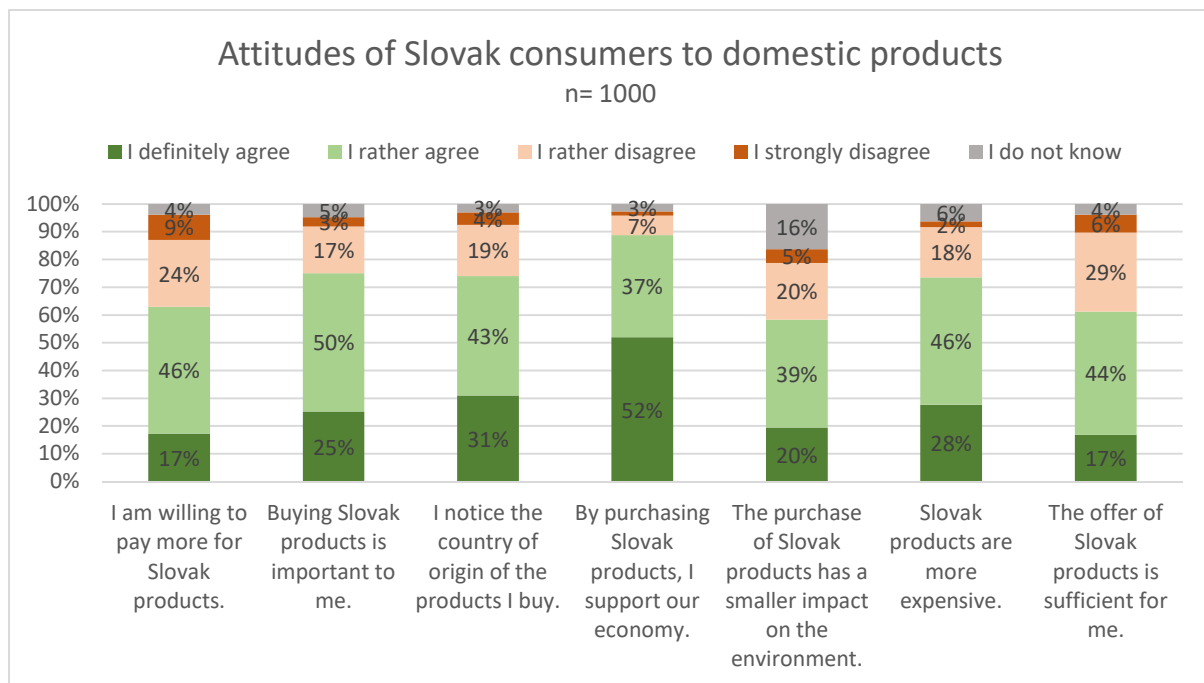


Figure 2. Attitudes of Slovak consumers to domestic products

Source: own processing

We used Pearson's Chi-square test of independence to evaluate the hypotheses in the research model. Hypotheses with p-value below 0.05 were accepted at a significance level of $\alpha=5\%$. Table 2 shows that for all seven hypotheses, the p-value was lower than 0.001.

Table 2. Evaluation of hypotheses

Hypothesis	p-value	Supported
H1: Slovak consumers are paying attention to the origin of products as purchasing Slovak products is important to them.	<0.001	Yes
H2: Thanks to paying attention to the country of origin, Slovak consumers have noticed that Slovak products are more expensive.	<0.001	Yes
H3: When buying domestic products is important for Slovak consumers, they are willing to pay more for such products.	<0.001	Yes
H4: Even though products produced in Slovakia are more expensive, Slovak consumers are willing to pay the price.	<0.001	Yes
H5: Environmental friendliness is a significant factor contributing to the importance of purchasing Slovak products	<0.001	Yes
H6: Supporting local businesses is a significant factor contributing to the importance of purchasing Slovak products	<0.001	Yes
H7: Slovak consumers who notice the country of origin of purchased products think that the offer of Slovak products is sufficient.	<0.001	Yes

Source: own processing

The updated research model with the p values is shown in Figure 3.

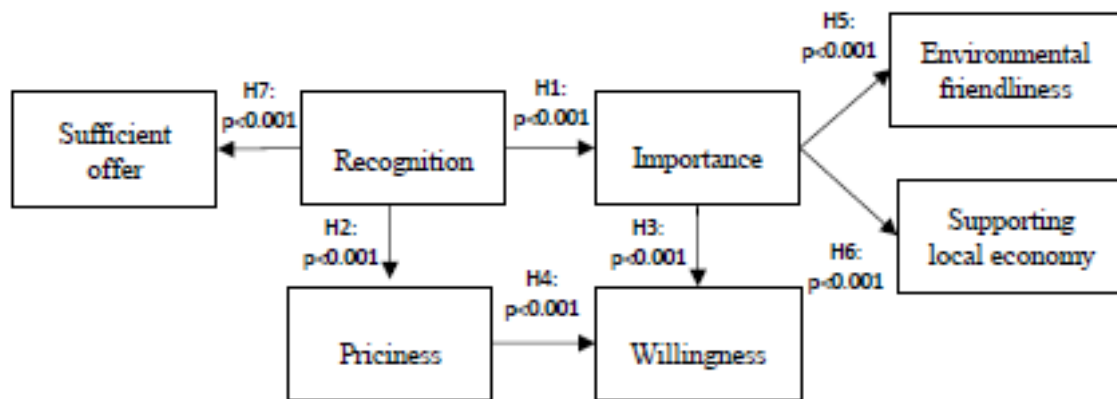


Figure 3. Research model after validation hypotheses

Source: own processing

Regarding the relationship between the recognition Slovak products and importance, it was found that the p-value is less than 0.001; therefore, H1 is accepted: Slovak consumers are paying attention to the origin of products as purchasing Slovak products is important to them. The findings of this study showed that the relationship between the recognition and priciness is significant ($p < 0.001$), therefore, H2 is also accepted. Consumers who pay attention to the country of origin of products also noticed that Slovak products are more expensive. Testing of the third hypothesis (H3) with a $p < 0.001$ confirmed a statistically significant relationship between the importance of purchasing domestic products and the willingness to pay the higher price. Also, in H4, based on the p-value, the relationship between priciness and willingness proved to be significant. This means that despite the higher price, consumers are still willing to pay more for domestic products. Confirmation of hypotheses H6 and H7 showed that the perception of environmental friendliness and the support of local businesses has a significant impact on how Slovak consumers perceive the importance of purchasing Slovak products. The relationship between recognition and sufficient offer with a $p\text{-value} < 0.001$ is also significant, which resulted into accepting H7.

4.2 The influence of demographic parameters on the attitudes of Slovak consumers towards purchasing domestic products

In the next part, we looked at the impact of socio-demographic parameters on the attitudes of Slovak consumers towards purchasing of domestic products. We specifically examined whether age, gender, and education have a statistically significant effect on respondents' responses. Table 3 shows the p-values that resulted from Pearson's Chi-square test for the seven statements.

Table 3. Testing the statements against socio-demographic parameters

Statement	Gender	Age	Education
I am willing to pay more for Slovak products.	0.268	0.106	0.029
Buying Slovak products is important to me.	0.073	0.001	0.045
I notice the country of origin of the products I buy.	0.129	0.001	0.001
By purchasing Slovak products. I support our economy.	0.041	0.095	0.001
The purchase of Slovak products has a smaller impact on the environment.	0.015	0.417	0.019
Slovak products are more expensive.	0.922	0.584	0.059
The offer of Slovak products is sufficient for me.	0.579	0.025	0.004

* p values below 0.05 are highlighted

Source: own processing

Based on the results obtained we reject H_0 and therefore consider the dependence between the responses of respondents who expressed the degree of agreement or disagreement with the product and the demographic factor as statistically significant at the level of significance $\alpha = 5\%$.

The most differentiated answers were identified in the responses of respondents with different education. While respondents with a university degree are more willing to pay extra for Slovak products (72% of the answers indicated 'I definitely agree' and 'I somewhat agree'), respondents with primary (37%) or apprenticeship education (35%) tend to reject the statement. We can see a difference between university-educated respondents and respondents with primary education also in the question of whether the purchase of domestic products is important for them. 61% of respondents with primary education find the purchase of Slovak products important, while it is more than 20 percent more for university-educated respondents. There was an even bigger difference when respondents were asked whether they notice the country of origin of the products they buy. As many as 83% of university-educated respondents notice the country of origin, compared to 75% of high-school graduates and only 55% of those with primary education.

More than three quarters of respondents in each education group agree with the statement that the purchase of domestic products supports the Slovak economy, while this impact is most recognised by university-educated respondents (94%). The fact that 48% of respondents with primary education believe the purchase of Slovak products has a smaller impact on the economy, a large percentage (38%) do not agree with the statement at all. A quarter of respondents with secondary education disagree with the given statement, while for university-educated respondents this number is slightly more than 20%. When we asked the respondents whether the offer of Slovak products was sufficient for them, we recorded the most positive answers among respondents with secondary education (65%) of respondents. The offer seems the least sufficient to respondents with the university education. The summary of findings regarding the attitudes of consumers towards purchasing Slovak products according to their education can be found the Appendix B.

The answers of respondents from different age groups differed significantly in the statement whether respondents pay attention to the country of origin of the products they purchase. While the oldest age category clearly pays the most attention to the country of origin of the products. i.e. respondents aged 60 and over (86% of answers include 'I definitely agree' and 'I somewhat agree'), in the youngest age group only 64% of respondents from 18-29 age pay attention to the country of origin. Similarly, when deciding whether the purchase of domestic products is important for respondents, the older age groups agreed the most - 82% of respondents in the age group of 50 to 59 years and in the oldest age group of respondents over 60 years of age. Even though youngest respondents represent a group for which the purchase of domestic products is least important (only 62%), they are the most critical age category for the supply of domestic products on the market. 42% of respondents in the 18-29 age category consider it insufficient. On the contrary, the offer of Slovak products is sufficient for more than 70% of respondents in the productive age of 30-39 years. Details of the attitudes that significantly differ based on the age of consumers are presented in Appendix C.

The opinions of men and women statistically significantly differed only in relation to whether the purchase of Slovak products has a smaller impact on the environment and whether they support the Slovak economy by purchasing domestic products. In both statements, women expressed a greater degree of

agreement than men. As many as 9 out of 10 women surveyed agreed with the statement that the purchase of Slovak products supports the domestic economy (answers 'I definitely agree' and 'I somewhat agree'). Only 55% of men think that buying domestic products has a lower impact on the environment, while it is 7 percentage points more for women. Details of the attitudes that significantly differ based on the gender of consumers are presented in Appendix D.

5. Discussion

Slovak consumers are paying attention to the origin of products as purchasing Slovak products is important to them. This is in line with the previous research studies e.g. (Cvirik, 2018, 2021). However, contrary to the findings of Vilcekova & Sabo (2013), younger consumers do not notice the country of origin of products more than older consumers. In fact, our research revealed that the older consumers aged 60 year and more pay attention to the product origin the most (86% answered definitely or somewhat agree).

Our results are consistent with the study of Kalicharan (2014) who found out that consumers from developed countries prefer domestic products. This is also the case of Slovakia which is a developed country with high Human Development Index. Analysis of research data also showed that Slovak consumers perceive Slovak brands to be more expensive, but they are willing to pay higher price for them. This has been determined in countries outside Slovakia earlier, e.g. (Knight, 1999), however, in Slovakia it represents a shift from the past where consumers were less willing to pay more for domestic brands (Smolkova, 2013; Weberova & Ližbetinová, 2016). Before, price was far more important to Slovak consumers than the fact that the product was made in Slovakia (GFK, 2016).

In regard to the reasons why consumers prefer Slovak products, environmental friendliness is a significant factor contributing to the importance of purchasing Slovak products, in line with Brown, Dury and Holdsworth (2009). Also, Slovak consumers believe that by purchasing Slovak products they support local economy. This has been identified as a factor contributing to the preference of local produce by Dunne et al. (2011). Slovak consumers also believe that the offer of Slovak products is sufficient.

This study contributes to theory by providing evidence of current attitudes of consumers to locally produced brands and manufactured products in Slovakia. It builds on previous research and either confirms previous findings or reveals changes in preferences and importance of local products to consumers (e.g. the willingness to pay). Thanks to the representativeness of the research with a large research sample used, results reflect the preferences of the Slovak population and differences between age groups, various levels of education, and gender could be analysed.

Conclusion

The results are practically usable by both Slovak and foreign companies and enhance their knowledge of how Slovak consumers deal with product origin and thus can help improve business retailing strategies. Retail, wholesale and distribution companies can use the fact that country of origin is really important to consumers to include more Slovak products in their portfolio. This is further accentuated by the fact that consumers are willing to pay more for such products. Thus, even higher price does not necessarily mean that they will not sell equally or better than similar products manufactured overseas. Manufacturers should also look for more options to make their products environmentally friendly. This starts with the ingredients, continues with the production process, and finished with packaging and distribution. The results of the research presented in this paper are also valuable to government bodies, which are dealing with the support of locally manufactured products through various business support initiatives and communication campaigns.

The use of a unique methodology developed for the purpose of this study also represents its limitation as the results cannot be directly compared with previous research studies.

We see opportunities for further research in applying the same methodology for data collection and analysis in a different country, e.g. the Czech Republic, which has always been the closest market in terms of consumer behaviour. Some of the older studies have provided comparisons between the Czech and Slovak markets and, therefore, it represents an opportunity to use our research model to gain up to date insights on the situation in the Czech Republic or another country within the region.

Acknowledgements

This paper is an output of the scientific project VEGA (S.G.A.) 1/0737/20 Consumer literacy and intergenerational changes in consumer preferences when purchasing Slovak products.

Appendices

Appendix A. Research sample characteristics

Characteristics	Categories	Number	%
Gender	Male	491	49.1%
	Female	509	50.9%
Age	18 - 29 years	180	18%
	30 - 39 years	199	20%
	40 - 49 years	192	19%
	50 - 59 years	158	16%
	60 years and more	271	27%
Region	Bratislava Region	116	12%
	Trnava Region	108	11%
	Trencin Region	112	11%
	Nitra Region	130	13%
	Banska Bystrica Region	122	12%
	Zilina Region	127	13%
	Presov Region	143	14%
Size of residence	Kosice Region	142	14%
	Less than 4,999 inhabitants	457	46%
	5,000 - 19,999 inhabitants	172	17%
	20,000 - 99,999 inhabitants	251	25%
Education	100,000 inhabitants and more	120	12%
	Primary education	82	8%
	Apprenticeship / Secondary vocational without GCSE	387	39%
	Complete secondary education with GCSE	362	36%
Monthly income	Higher education	169	17%
	Less than 200 EUR	17	2%
	201-600 EUR	178	18%
	601-1,000 EUR	237	24%
	1001-1,500 EUR	275	28%
	1,501-2,000 EUR	113	11%
	2,001 EUR and more	106	11%
Number of household members	I do not want to state	74	7%
	1	121	12.1%
	2	318	31.8%
	3	230	23.0%
	4	200	20.0%
	5	81	8.1%
	6	31	3.1%
Employment	7 and more	19	2%
	Full time	399	39.9%
	Part-time	45	4.5%
	Maternity / parental leave	61	6.1%
	In household	12	1.2%
	Student, I work during my studies	33	3.3%

Student, I do not work during my studies	41	4.1%
Retiree	271	27.1%
Entrepreneur / Self-employed person	69	6.9%
Unemployed	69	6.9%

Appendix B. Attitudes of consumers towards purchasing Slovak products that significantly vary based on their education

Statement	Education level	I definitely agree	I somewhat agree	I somewhat disagree	I strongly disagree	I do not know
I am willing to pay more for Slovak products	primary education	18%	41%	30%	6%	4%
	apprenticeship / secondary vocational without GCSE	20%	40%	24%	11%	5%
	complete secondary education with GCSE	15%	47%	24%	9%	4%
	higher education	16%	56%	22%	5%	1%
Buying Slovak products is important to me	primary education	17%	44%	28%	4%	7%
	apprenticeship / secondary vocational without GCSE	25%	50%	16%	4%	6%
	complete secondary education with GCSE	24%	51%	17%	3%	4%
	higher education	33%	50%	14%	2%	2%
I notice the country of origin of the products I buy	primary education	20%	35%	32%	6%	7%
	apprenticeship / secondary vocational without GCSE	28%	44%	18%	7%	3%
	complete secondary education with GCSE	33%	43%	17%	3%	3%
	higher education	40%	43%	15%	1%	1%
By purchasing Slovak products. I support our economy	primary education	45%	32%	20%	1%	2%
	apprenticeship / secondary vocational without GCSE	51%	36%	7%	2%	5%
	complete secondary education with GCSE	52%	40%	5%	2%	1%
	higher education	59%	35%	5%	1%	0%
The purchase of Slovak products has a smaller impact on the environment	primary education	15%	33%	28%	10%	15%
	apprenticeship / secondary vocational without GCSE	20%	37%	18%	7%	18%
	complete secondary education with GCSE	19%	39%	23%	2%	17%
	higher education	21%	44%	17%	4%	13%
The offer of Slovak products is sufficient for me	primary education	15%	46%	32%	4%	4%
	apprenticeship / secondary vocational without GCSE	20%	44%	22%	7%	5%
	complete secondary education with GCSE	17%	44%	30%	5%	4%
	higher education	9%	45%	37%	8%	1%

Appendix C. Attitudes of consumers towards purchasing Slovak products that significantly vary based on their age

Statement	Age	I definitely agree	I somewhat agree	I somewhat disagree	I strongly disagree	I do not know
Buying Slovak products is important to me	18-29	21%	41%	26%	7%	6%
	30-39	26%	48%	18%	4%	5%
	40-49	19%	56%	16%	3%	6%
	50-59	27%	54%	11%	1%	6%
	60 and more	31%	50%	15%	2%	3%
I notice the country of origin of the products I buy	18-29	27%	37%	24%	6%	6%
	30-39	33%	35%	23%	6%	4%
	40-49	22%	49%	23%	4%	3%
	50-59	27%	50%	15%	3%	5%
	60 and more	41%	45%	11%	3%	0%
The offer of Slovak products is sufficient for me	18-29	17%	36%	34%	7%	6%
	30-39	18%	53%	23%	2%	4%
	40-49	18%	44%	28%	6%	4%
	50-59	20%	44%	25%	6%	4%
	60 and more	13%	44%	31%	10%	2%

Appendix D. Attitudes of consumers towards purchasing Slovak products that significantly vary based on their gender

Statement	Gender	I definitely agree	I somewhat agree	I somewhat disagree	I strongly disagree	I do not know
By purchasing Slovak products. I support our economy	Male	49%	38%	9%	2%	2%
	Female	55%	35%	5%	1%	3%
The purchase of Slovak products has a smaller impact on the environment	Male	16%	39%	23%	6%	15%
	Female	23%	39%	17%	4%	17%

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Media Behaviour of Generation Z: The Way to Optimise Communication Strategies on Social Networks

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Abstract

Research background: Generation Z is the first generation to have been exposed to digital technologies since birth. This has fundamentally influenced their lifestyles, abilities and skills, but also the way they search for information or consume specific media.

Purpose of the article: the aim of the paper is to find out what is the media behaviour of the generation and to identify the basic stereotypes of its media behaviour.

Methods: In our paper, we analyzed data from two surveys that allowed us to gain a deeper understanding of Generation Z's media behavior when developing a communication strategy. The first research was qualitative, in which we used the media diary method. Our research consisted of asking Generation Z respondents, specifically those aged between 19 and 23, to create essays on the topic 'My Day with the Media'. The second research was quantitative on a sample of 182 respondents, in which we focused on young people's social activity on various social media sites.

Findings & Value added: Together, these two research approaches have provided a comprehensive view of Generation Z's media behaviour that allows us to better understand how this generation interacts with the media and social networks in their everyday lives, thus providing valuable insights for developing a communication strategy to reach this generation.

Keywords: generation Z, social media, digital technology, mobile phone, communication strategy

JEL classification: M03

1. Introduction

The rise of digital technologies has led to the emergence of a generation that has specific skills and abilities to work with modern digital technologies. They are referred to as 'digital natives'. The term was first used by Mark Prensky in 2001 (Prensky, 2001) in his work "Digital Natives, Digital Immigrants". The author categorizes a group of young people who are proficient with computer work with ease, understanding digital media, video games and various software programs because they were born in the era of information technology. In current discussions, this demographic is often referred to with terms such as "Generation Z" or "Net Generation".

It is the first generation for whom technology has been available since childhood (Seemiller, 2016). Technological advances in multimedia, including tablets, smartphones (which integrate a mobile phone, media player, camera, and internet into one device), social media, and other platforms, have made access easier. (Prensky, 2010). Social media platforms have drastically changed the way people socialize, share information, present themselves, perceive others, and work (Gil-Or, 2015) Generation Z is constantly online and connected to social media. These are their main source of information and have a great influence on their decision making. (Djafarova and Bowes, 2021). At the same time Generation Z is preferring to enjoy more choice, variation and autonomy in selecting content types and channels of communication. They claim to choose Spotify over radio, Netflix over TV because it gives the user an illusion of more control. This motivation, however, plays out in mostly entertainment content used and foregrounds the individual, not the society as collective (Čábyová et. al, 2023)

Globally, the highest percentage of Gen Z mobile internet users who visit social apps is on YouTube - 84%. This is followed by TikTok at 61%, Snapchat at 58% and Instagram at 56%. Other platforms still see

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a significant share of this age group, with Facebook and Twitter reaching one in three mobile internet users, Pinterest and Reddit reaching one in four, and LinkedIn and Twitch reaching one in ten. Even earlier studies from 2017 claim that Generation Z spends on average more than 10 hours a day online (ParashYadav, Jay, 2017) Most of the time spent online is on mobile phones, which are the most used device for members of Generation Z ahead of others such as laptops, gaming consoles or TVs (Edison research, 2022). Media use starts as soon as they open their eyes after a night out, with 44% saying they check their phones as soon as they wake up (Comscore, 2023). The Go4insight agency (2022) presents the results of the Slovak Generation Z. 81% of young people under 26 connect to social networks several times a day, 9% once a day, 8% several times a week, 2% once a week.

2. Methodology

For the purposes of this paper, we analyzed data from two different studies. The first one was a qualitative research, which we carried out using the method called media diary. The second was quantitative research, which we conducted through written inquiries of respondents.

Qualitative research

Respondents belonging to Generation Z were asked to write essays on the topic "My day with the media". According to Hyers, media diaries provide a subjective contextual understanding of users' habits, behaviours, experiences and engagement with digital media in order to understand social and personal changes in young people's lives. (Hyers, 2018) MaxQDA software was used to process the research results. This is a specialist qualitative data analysis software that is used to process and analyse text, audio, image and video data. The software has many features and tools that enable researchers and analysts to work effectively with qualitative data. Using it, the responses of the respondents were coded and then evaluated. This was an extensive research on Generation Z's media behavior, for the purpose of this study we worked with essay sections that addressed the topic of how Generation Z uses media in their daily lives. 113 respondents between the ages of 19-23 participated in the research.

Quantitative research

The results of the quantitative research were complementary to the results of the qualitative research, which focused on exploring young people's social activity on different social networks. The aim of this quantitative research was to gather data on the extent and specific forms of young people's activity on these platforms.

Due to the comprehensiveness of the social activity information, several areas were included. The first was the identification of the preferred social networks of the young respondents, whereby we sought to uncover which platforms they engaged on most frequently and were therefore considered to be the most active.

Another area was the analysis of the specific ways in which their activity manifested itself on social networks. These ways included creating their own posts, commenting on other users' content, regularly sharing stories, creating blogs and vlogs, or just expressing their opinions through emoticons and reactions to content. This analysis aimed to more accurately capture the variety of interactions and expressions that young people engage in on social media. The quantitative research also included an analysis of the frequency and intensity of these activities in order to better understand how young people use social networks in their daily lives. The results of this quantitative research provided us with a numerical and statistical view of young people's social activity on these platforms, allowing us to better understand and contextualise the findings from the qualitative research.

For the purpose of research evaluation, the following research questions were formulated:

Q1: How does Generation Z use digital media in their daily lives?

Q2: What are the main behavioural patterns, habits and interests of Generation Z in relation to digital media?

Q3: What specific forms of activity do young people carry out on social networks?

3. Results and discussion

Qualitative research shows that young Generation Z participants are in contact with the media almost all day. Unsurprisingly, they are online almost all day and the main device through which they consume media is their mobile phone. This fact was confirmed by all respondents. With a mobile phone they

connect to friends, follow current events, music, podcasts, and entertaining videos. *"I spend most of my time on my phone during the day."* (EN, 74)

The majority of respondents immediately focus on their mobile phone when they wake up in the morning (82.93%). Only a very small proportion of respondents make a conscious effort to avoid using their mobile phone immediately after waking up (8%). The most common reason is that they prefer to sleep longer. During the day, they follow messages from friends and keep up with world news. Their mobile phone accompanies them on the way to school, where they listen to music or podcasts. During breaks at school, they watch funny videos and soc. networks. After school, they go back to their mobile phones to watch more content, especially on YouTube or Tik-Tok. Evenings are spent watching movies on streaming platforms like Netflix. *"As soon as I open my eyes in the morning, I reach down to the carpet, still half asleep, where I pick up my mobile phone."* (F105) *"Instagram accompanies me through my daily routine of waking up. It is a kind of alarm clock for me in the media world. After viewing almost the entire message board and stories from friends on Instagram, I switch to the Whatsapp and Messenger platform where I reply to messages from friends."* (F, Sk, 99) *"Every morning when I get up the first thing I do is open my mobile phone and check Instagram and Messenger, I reply to messages from friends on these social media platforms. Then I check what's new on Instagram and Facebook."* (F, SK91)

Other social networks they like to use to communicate with their friends and family are WhatsApp and Messenger. They also follow social media, with Instagram being their most popular platform. As many as 88.62% of the respondents ranked Instagram as the network they use the most. Some of them even claim that they have a Facebook account just because of Messenger, so that they can communicate with older generations (parents and other family). Interestingly, as many as 4.88% of the respondents said that they actively refuse to use Facebook. *"My most used and followed social networks are mainly Messenger and Instagram, so I check those first. During the day, apart from Messenger, I also use Whatsapp to communicate with loved ones."* (SK81) Music listening apps, especially Spotify, are very popular for students.

They listen to music throughout the day, especially when travelling and at leisure. *"It's a long journey to school and I like to cut it short by listening to the streaming service Spotify."* (SK105)

As for watching media together with the rest of the family, a large proportion of this time is spent with their parents or friends (43.09%). The preferred forms are television and the streaming platform Netflix. However, more than half of the students (56.91%) did not comment on this activity.

"Sometimes we'll find a night where we all get together in the living room and we'll put Netflix on the TV, find a movie we all agree on and watch it." (SK1) *I watch media with my family minimally. Usually when we do watch something together it's TV.* (SK84) *When I had more time before the exam period, I used to watch movies or series from Netflix or TV stations' programs with my parents in the evening.* (SK106). In the early evening at dinner, my mother and I traditionally turned on the television, specifically the TV station Joj, because at 6:00 p.m. we watched the daily show No Napkins together. It was a relaxing time for us. (SK6)

Television and radio are often used as a medium of communication. Television is watched while doing household chores, cooking, but also while eating. The radio is turned on while travelling in the car, some while playing sports or studying. *In our household, probably all media are on right from the morning. While there is music in our children's room, the TV in the living room is on Telerano* (SK). In the background, we have music playing that my brother picks out. He uses the YouTube platform for this. (SK15)

Interestingly, more than half of Generation Z respondents refuse to watch television (51.22%), due to excessive advertisements and lack of attractive content. They also reject printed newspapers and magazines (40.65%), as they can quickly find the information they need online. Radio is listened to by only a minority of respondents, while those who use it prefer stations such as Radio Express, Fun radio and Radio Europa 2." The medium that I do not use at all is printed newspapers and magazines. I have never bought them, I have never read them and I don't plan to. All the information that I find in these newspapers is also available on the Internet, on various news portals. You have to pay for newspapers, you have to spend a lot of paper to produce them, and I get to read the same things online and I don't have to spend the money to use them - as long as they're free. (Sk25)

Compared to their parents, they also follow traditional media, but social media is also popular. *As for my family members, my sister uses the same media as me (i.e. social media in particular) and generally follows the media and gets her information from the same or similar media as me. However, my parents, in contrast to me, often watch television as they have access to it. Likewise, they are also active on social*

media, which is sometimes a detriment as they cannot distinguish misinformation from all content well enough. (EN122) My family and I occasionally watch, a couple of times a month, a film in the evening at the weekend, which I choose myself as I know everyone's tastes and can find a match. (SK89)

If I'm with my family on the weekend or in my free time we either watch TV together or listen to the radio. (SK24) Television newspapers are still his primary source of information, it's "old school" after all and teaching him to watch something more modern is not that easy. (SK112)

The results of the quantitative research also confirm that Generation Z is very active on social media, with up to 95% of respondents confirming that they add their own content to social media in the form of their own posts, photos, videos, blogs, comments, etc. (Figure 1). Their active participation in social networking sites is a clear reflection of their involvement in the online community and their ability to express themselves through the digital medium. This generation has become not only consumers of content, but also creators of content, contributing to the constant flow of information and interactions on social media.

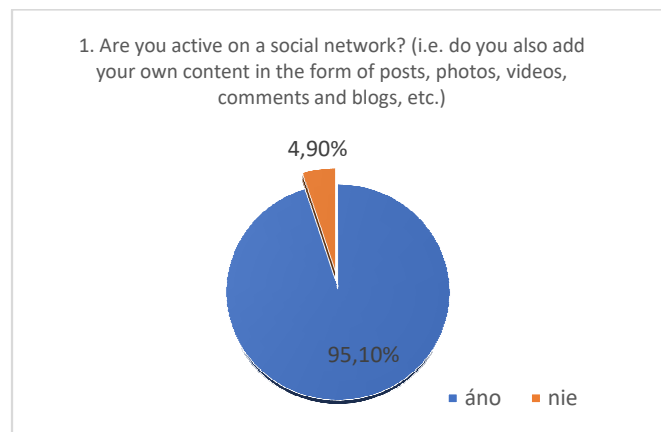


Figure 1. Activity on social network
Source: own processing (2023)

In Figure 2, we see the distribution of Generation Z activity among the different social networks. From the data shown, it is clear that the social network Instagram dominates, with 96.7% of respondents being active on it. Instagram is followed by Facebook with 49.5%, Snapchat with 41.2%, TikTok with 38.5% and Pinterest with 33% of users. These numbers show that Instagram is incomparably more popular than other social networks for Generation Z. However, it is interesting to note that the results for this generation differ significantly from the global survey, which is dominated by YouTube, which is identified as the most popular social network (84%), followed by TikTok (61%), Snapchat (58%) and Instagram (56%) (see Comscore, 2023). These distinct preferences of Generation Z suggest that this generation has its own unique preferences when it comes to social networking, and that these preferences can be influenced by a variety of factors, including age, interests, and cultural context.

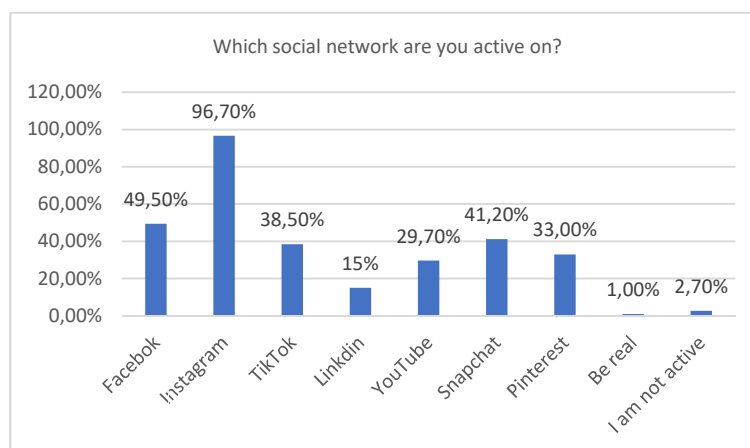


Figure 2. Networks where you are active
Source: own processing (2023)

Table 3 gives us a glimpse of respondents' preferences regarding social media activity. For this question, respondents were only allowed to indicate one social network, which allowed us to get clear and unambiguous data on which platform was most important to them. We cannot overlook the result, which shows us that Instagram is the social network on which 83.5% of them are most active. This finding gives us a deeper insight into the social behaviour of Generation Z and their preferences, as Instagram becomes a key platform for content sharing and communication among its members. It is clear that Instagram plays a significant role in the digital lives of this generation and remains the main means for them to express and interact online.

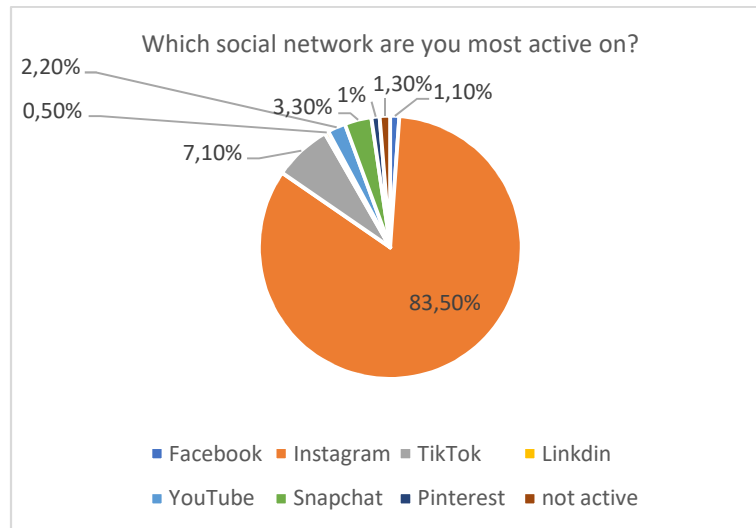


Figure 3. Networks where you are the most active
Source: own processing (2023)

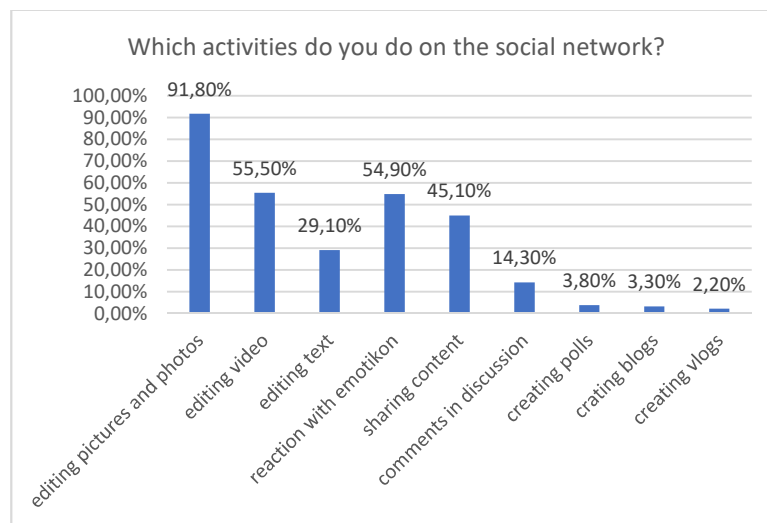


Figure 4. Activity on social network
Source: own processing (2023)

Individual social networks provide a multitude of activities through which Generation Z can interact with their surroundings. Respondents make the most use of posting photos and pictures (91.8%), followed by videos (55.5%) reacting through (54.9%) and sharing content (45.10%). Surprisingly, only 14.3% engage in discussions in comments. The answer may lie in the fact that Generation Z may prefer faster, visual and audiovisual forms of expression (e.g., images, videos, emoticons) to writing long comments. Many people, including members of Generation Z, may be afraid of exposing themselves to negative reactions in comments, so they prefer not to communicate or limit themselves to passive interactions.

In the case of dissatisfaction with the product, this situation is even more visible. Only 17% of respondents actively initiate communication on social networks in case of dissatisfaction with a product. Each Gen Z has their own personal style and preferences when it comes to problem solving. Some may

prefer face-to-face contact, phone contact or email communication over publicly expressing themselves on social media. Answers to their inactivity can also be found in the results of qualitative research. Almost all respondents use the time spent on social networks mainly for rest, relaxation, distraction or to get up-to-date information.

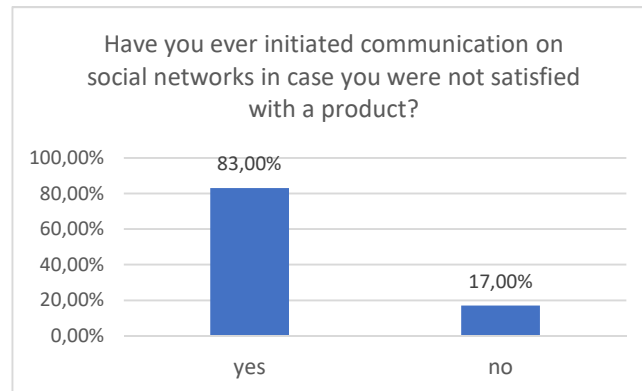


Figure 5. Communication in case of dissatisfaction
Source: own processing (2023)

Conclusion

The results of this research point to a significant shift in the way young people from Generation Z interact with the media in today's digital age. They are almost constantly online and their main device for consuming media is their mobile phone, which was confirmed by all respondents. Mobile phones are used to connect to friends, follow current events, listen to music, podcasts and entertainment videos. The majority of respondents focus on their mobile phone immediately upon waking up, with only a small proportion making a conscious attempt to avoid it immediately upon waking up. This is often due to a desire to stay in bed longer. During the day, they follow news from friends and world events. Their mobile phone accompanies them on the way to school, where they listen to music or podcasts. During breaks at school, they watch entertaining videos and social media. After school, they go back to their mobile phone again to watch more content, especially on platforms like YouTube or TikTok. Evenings are spent watching movies on streaming platforms like Netflix. Instagram and Messenger are other social networks that young people like to use to communicate with friends and family, with Instagram being their favourite platform. Interestingly, some of them have a Facebook account only because of Messenger so that they can communicate with older generations, especially parents and other family members. When it comes to media consumption, music plays a significant role, Spotify is a very popular app among young students. They listen to music throughout the day, especially when travelling and in their free time. Television and the streaming platform Netflix are the preferred forms of watching media together with the family.

In a study conducted by Kalogeropoulos (2019), he stated that members of this generation are very dependent on their electronic devices. In our research, we can confirm his findings that they use electronic devices almost constantly, for communication, for entertainment and relaxation, for playing games, for socializing and for getting news.

More than half of Generation Z respondents refuse to watch TV and print media, often because of excessive advertising and unappealing content. Only a minority of respondents listen to the radio, with those who do using it preferring stations such as Radio Express, Fun radio and Radio Europa 2. This shift in young people's media consumption shows that we are moving from traditional media to digital formats where young people have more control over content and its timing. It also shows that mobile phones have become indispensable tools for communication, information and entertainment. (Dolot, 2018) Young people tend to seek out content that matches their interests and have moved from passive consumption to active interaction with media. This change has significant implications for media and advertising, which must adapt to new ways of media consumption and communication with this generation.

Generation Z is highly active on social media, with up to 95% of them actively contributing content to these platforms. This confirms their ability to express themselves and actively participate in the online community. The clear favourite among social networks for this generation is Instagram, where up to 96.7% of respondents actively participate. This fact underlines the importance of Instagram in the digital life of Generation Z.

Generation Z's preferences differ from global trends. Unlike the global survey, which is dominated by YouTube, Instagram is the number one social network for Generation Z in Slovakia. This difference highlights the unique preferences of this generation, which can be influenced by a variety of factors.

Generation Z is mainly interested in sharing photos and images, followed by videos, reactions and sharing content. This clearly shows their interest in visual and audiovisual forms of expression. These activities show that the visual aspect of social media content is important to them.

If they are dissatisfied with the product, only a very small proportion of them actively start communicating on social media. This low activity may be due to fears of negative reactions or personal preferences in solving problems.

Overall, these results point to the strong presence of Generation Z on social media, but also to their unique behaviors and preferences in the online environment. This generation has become active content creators and has a significant impact on the digital world.

Generation Z, which has grown up in the digital age, displays its own distinctive behavioural patterns, habits and interests in relation to digital media. These patterns distinguish this generation from its predecessors and are important for a better understanding of how young people integrate media into their daily lives.

Generation Z is virtually always connected to the internet via their smartphones and other digital devices. Regularly checking social networks, emails and other online applications is part of their daily lives. They consume a lot of content on social media, where they follow content from influencers, YouTubers and other content creators, with video content being particularly attractive to them.

But Generation Z are not just passive consumers of media. Many of them are actively contributing content on social media, sharing their own videos, photos, posts and opinions. In this way, they build their personal brands and interact with their peers.

With the fast flow of information on the internet, they tend to flip between content quickly because they have a short attention span. This means that content creators are forced to engage them right from the start of their videos or articles.

Generation Z is very visual and photos, images and videos have a significant place in their communication and self-expression. Apps like Instagram and Snapchat that focus on visual content are popular for them.

In addition to consuming entertaining content, they are also interested in current events and social issues. They express their opinions on these topics online and participate in discussions.

Generation Z youth prefer to watch TV and movies on streaming services like Netflix, Hulu and YouTube instead of traditional broadcast TV.

These patterns of behaviour, habits and interests of Generation Z are influencing the way they communicate, consume information and build their online identity. They are important for marketers, companies and researchers trying to communicate effectively with this young generation in the digital environment.

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Exploring Consumer Online Grocery Shopping Behavior Dynamics: Insights from the Slovak Republic

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Abstract

Research background: The covid-19 pandemic has changed the consumers' shopping behavior forever because of lockdown. These restrictions affected brick-and-mortar stores the most, which had to close their business overnight. The only stores in Slovakia that could actively operate during the lockdown were groceries. Despite of this, their position in e-commerce sales was strengthened. This study is dedicated to the revealing of the drivers of groceries online shopping and relationships between them.

Purpose of the article: The aim of the paper is to assess the relationships and effects of the individual drivers of online food consumer shopping behavior on the consumers' intention to the groceries online shopping.

Methods: The methods of correlation analysis (Spearman ρ) were applied in order to define the relationships and effects of the drivers on the consumers' intention to the groceries online shopping. The sample consisted of the 635 online shopping consumers and the research was conducted in Slovak republic reflecting the conditions of the local e-commerce market.

Findings & Value added: The study represents a pilot study in the field of the groceries online shopping in the Slovak republic. The contribution of the pilot study lies on the identification of the drivers influences the consumers' intention to the groceries online shopping. The most significant drivers affecting the intention of groceries shopping online were online advertising, e-commerce and digital trust factors and sellers involvement in CSR activities.

Keywords: online shopping behavior, e-commerce, groceries, CSR

JEL classification: H8, M0, M14

1. Introduction

The food sector is a relevant context in many countries because of its impact in terms of company revenues and employment (Giacosa et al. 2017). Food consumption and shopping behaviour shifted massively because of Covid-19. It caused the increment mainly of the online orders because of Covid-19 restrictions. With more people ordering their groceries online, retailers found themselves challenged to fulfil orders. Online grocery shopping is the purchase of food or personal use items via a food retail company's internet-based portal or application, with delivery to the consumer's home or designated delivery area or preparation for in-store pickup (Thomas-Francois and Somogyi 2021; Pavlou, Georgiou 2021). Even though the threat of the covid-19 pandemic is on the wane, online food shopping by consumers is still growing in 2023, which can be caused by several factors. According to the mentioned knowledges in this field of problematic, our research question was formulated: Which factors drives the consumers to shop the groceries online in the area of Slovak republic?

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2. Literature review

Singh and Soderlund (2019) conducted the research on the factors affecting the groceries online shopping, where in the conceptual framework the five factors were predicted in order to affect the online grocery shopping experience: 1. Customer service; 2. Website experience; 3. Product Experience; 4. Delivery Experience; 5. Brand experience. The satisfaction within these areas leads to repurchase intention and Word-of-mouth recommendation to the customers' relatives. According to their results the customer satisfaction and customer service are key drivers of the online customers experience. The research in the field of this problematic was conducted also in 2020 in China by Zheng et al. In their research they focused on the investigation of consumers' online grocery shopping preferences and behavior and identified several factors in which online food markets work differently from offline markets: 1. the product's origin was an important factor for the customers which are more likely to shop online; 2. the price advantage in shopping fresh food comparison to physical shops; 3. the importance of freshness and quality of the delivered food; 4. E-vendors characteristics (ratings, reviews, sales volume, history etc.) which are not available for physical stores (Zheng et al. 2020). Vasudevan et al. (2022) examined the relationships between three factors (convenience, service quality and social factors) and online grocery shopping behavior where convenience and service quality showed as the most influential.

The COVID-19 pandemic caused that the customers have become more oriented to sustainability, buying local products and embracing digital commerce and this has made the need for more environmentally sustainable offers even more evident (Sorrentino et al. 2022). Calza et al. (2023) conducted research on the potential of the fusion of corporate environmental sustainability and customer experience management. They offered the first attempt to combine these two approaches to deliver an integrated model helping managers and companies to reshape their corporate decisions. Their integrated model represents the first step to incorporate both the environmental challenges and the customer experience in decision-making. O'Neill et al. (2023) in their study focused on the profile of the sustainable food consumer. Based on their results we can conclude that sustainability-related food behaviours referred to: 1. quality attributes (e.g., purchasing local food); 2. food responsibility (e.g., using a shopping list); 3. dietary choices (e.g., adopting vegetarianism); 4. food organisation and management within the home (e.g., avoiding food waste).

The frequency of online food shopping is dependent on various factors. COVID-19 restrictions caused exponential increase in the field of using online and mobile devices in order to online shopping (Purohit et al. 2022). The attitude, subjective norms, perceived behavioural control and trust are according to Wen et al. (2022) the driving factors which positively predicted consumers' intentions to continue shopping food online. On the other side there are opposing factors like: high perceived threat (linked to Digital trust), low product involvement, low perceived benefits of online food shopping and low frequency of online food orders causing the less likeliness of consumers to order food online (Mehroli et al. 2021). Online customers' intention to buy groceries online are strongly affected by perceived risk. Hong et al. (2021) in their study revealed that perceived trust, ease of use usefulness, price-saving benefit aspect, time-saving benefit aspect are the most important predictors which affected online food delivery usage intention of customers. The findings of their study also highlighted that during the COVID-19 pandemic, generations Y and Z were more willing to use online food delivery compared to older generations. In contrary, the study of Horváth et al. (2021) on the Generation Y consumers in Slovakia proved, that 62.50 % of them never shopped food or groceries online. Only 8 % of respondents declared they do online shopping of groceries frequently.

The pandemic also accelerated new services, but mainly increased people's need to buy more and more goods and immediately. Such routing is referred to as so-called quick commerce, in short q-commerce, or immediate delivery. During COVID-19 pandemic consumers did not have the opportunity to make their usual purchases in brick-and-mortar stores and a large part of purchases moved to the online space, but only 14.12 % of Slovak consumers have started regularly using food delivery (Veselovská and Bartková 2022). According to experts, this is the future of shopping. Online supermarkets, which focus primarily on fast delivery, following the model of gastronomic establishments, are developing most actively in this area. Quick commerce responds to current changes in customer behavior. In the last few years, people have learned to value their time more and do not want to spend it in stores on long purchases. They start shopping on a smaller or medium scale and the quick availability of goods that they consume immediately is important to them. Q-commerce goes against them in this direction (Fingl, 2022). According to Bakoš (2022), the biggest representatives of q-commerce in Slovakia are Wolt market, Food

Panda and Lunys. Another important player on the market was the company Bolt with its Market, but in September 2022 it stopped operating this service and announced that it would continue only with the delivery of food. Bolt Market is the online marketplace accessed through the application, from which the user could order by clicking on the icon of the desired product, while the estimated delivery time of the order was also shown in the application.

The failure of Bolt is offset by the success of Wolt Market, which seems to have been better adopted by consumers and used more often. Since the beginning of the operation, sales have doubled in the Slovak Wolt Market. Since the first purchases, the average price of the shopping basket has increased to 20-30 eur. For customers of this platform, the most important factors when shopping online are convenience, time saving, or a clearer and simpler choice when purchasing. According to Wolt, the reason for the rising sales is a more rational expansion, as well as the fact that quick commerce is still establishing itself in Slovakia. This represents advantages in the form of further growth potential, but at the same time it requires informing and educating customers and breaking down prejudices and myths that prevail about purchasing behavior. According to this company, food delivery is mainly used by younger generations between 15 and 34 years old, while customers between 15 and 34 years old emphasize financial benefits, consumers of the older generation over 55 years especially valued convenience and comfort. Also Foodpanda offers the purchase of FCMG. As part of its services, it offers customers the delivery of food from restaurants, but also the increasingly popular delivery of various goods, namely from its own panda markets, as well as from the network of partner establishments Tesco Express, Žabka, and Hiva (Bakoš 2022; Ecommercebridge 2022).

3. Methodology

The aim of the paper is identify the individual drivers of online groceries consumer shopping behavior and assess the relationships between them. The data were collected within Slovak republic by online self-administered questionnaire in April 2022. The 635 respondents participated in this research. All variables were measured on a 5-point Likert scale. The variables suitable for this research were derived from the literature review of the previous research dedicated to this problematic (Sundararajan 2019; Pham et al. 2019; Ali Taha et al. 2019; Pencarelli et al. 2018) and divided into 8 latent variables-drivers, in order to examine the relationships between them. Descriptive analysis was used in order to analytical data processing, which was carried out based on statistical characteristics such as Mean, Median, Standard Deviation, Minimum and Maximum. A non-parametric correlation analysis (Spearman ρ) was applied in order to describe the relationships between factors of online food consumer shopping behavior. The data were processed by programming language R (version 4.1.0.).

4. Results

The following part was focused on the presentation of the results, and it was divided into two chronologically connected sections. The first section was devoted to the conceptualization of the model of consumers online groceries shopping behavior, its reliability, validity and description of the model in holistic way. The second part was devoted to the relationships between the selected factors.

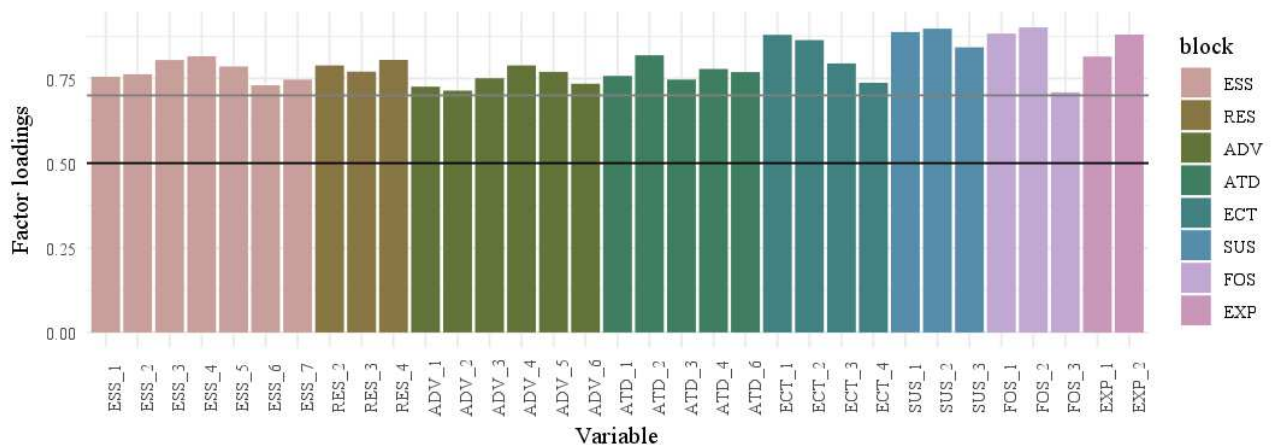


Figure 1. Factor loadings
Source: own elaboration (2023)

Figure 1 presents the basic value of the validity of the model and thus a sufficient level of loadings factors. It is important to emphasize that all variables acquired the value of loadings factors higher than 0.7, which is important for the further construction of the model.

Table 1. Model characteristics

Variable	Mode	MVs	Cr. alpha	DG.rho	eig.1st	eig.2nd
ESS	Reflective	7	0.887	0.912	4.177	0.864
RES	Reflective	3	0.694	0.831	1.863	0.617
ADV	Reflective	6	0.842	0.884	3.356	0.870
ATD	Reflective	5	0.835	0.883	3.016	0.730
ECT	Reflective	4	0.836	0.892	2.704	0.654
SUS	Reflective	3	0.848	0.908	2.301	0.438
FOS	Reflective	3	0.781	0.874	2.097	0.624
EXP	Reflective	2	0.612	0.837	1.441	0.559

Source: own elaboration (2023)

The results of the model's reliability are presented in Table 1. All latent variables fulfill the character of reflective mode, where the MVs column presents the number of manifest variables creating each individual factor (latent variables). As it is showed, the model consisted of eight reflective variables namely: 1. E-shop services (ESS); 2. Reputation (RES); 3. Advertising (ADV); 4. Attitude (ATT); 5. E-commerce and Digital trust (ECT); 6. Sustainability (SUS); 7. Frequency of online shopping (FOS); 8. Expenditures (EXP). The reflective variables were constructed from 33 manifest variables obtained by self-administered questionnaire. Cronbach's α as well as Dillon-Goldstein ρ showed acceptable reliability results in all cases. The only small deviation was detected within the EXP factor, where the outputs was at the limit of acceptability, which could be explained by the low number of manifest variables shaping this factor. The first and second eigenvalues have acquired acceptable values in all cases, where no output is lower than 1 in the first eigenvalue, and in the second one, on the contrary, all outputs are below the limit of 1. Based on the given information, the model can be considered as sufficient and suitable for further processing.

Table 2. Descriptive analysis of all variables

Var	Manifest Variables					Latent Variable (mean)		
	Mean	Med	SD	Min	Max	Mean	Med	SD
ESS_1	2.694	3	1.291	1	5	3.145	3.286	1.022
ESS_2	3.482	4	1.289	1	5			
ESS_3	3.445	4	1.349	1	5			
ESS_4	3.246	3	1.357	1	5			
ESS_5	3.494	4	1.325	1	5			
ESS_6	2.570	3	1.270	1	5			
ESS_7	3.082	3	1.388	1	5			
RES_2	3.289	4	1.365	1	5	3.046	3.333	1.051
RES_3	2.716	3	1.292	1	5			
RES_4	3.134	3	1.344	1	5			
ADV_1	3.559	4	1.296	1	5			
ADV_2	3.472	4	1.326	1	5	3.122	3.167	1.009
ADV_3	3.036	3	1.399	1	5			
ADV_4	2.747	3	1.359	1	5			
ADV_5	2.660	3	1.354	1	5			
ADV_6	3.254	3	1.366	1	5			
ATD_1	3.720	4	1.204	1	5				3.832	4.000	0.891
ATD_2	4.008	4	1.144	1	5			
ATD_3	4.148	4	1.030	1	5			
ATD_4	3.667	4	1.157	1	5			
ATD_5	3.615	4	1.213	1	5			
ATD_6	3.615	4	1.213	1	5			

ECT_1	2.600	3	1.370	1	5	2.592	2.750	1.108
ECT_2	2.602	3	1.341	1	5			
ECT_3	2.231	2	1.325	1	5			
ECT_4	2.935	3	1.379	1	5			
SUS_1	2.915	3	1.325	1	5	2.745	3.000	1.146
SUS_2	2.801	3	1.327	1	5			
SUS_3	2.520	3	1.272	1	5			
FOS_1	3.575	4	2.160	1	5	2.879	3.000	1.597
FOS_2	2.761	2	1.870	1	5			
FOS_3	2.300	1	1.677	1	5			
EXP_1	3.622	4	0.852	1	5	3.419	3.500	0.697
EXP_2	3.216	3	0.791	1	5			

Source: own elaboration (2023)

Based on a sufficient degree of reliability, average factors were created for the purpose of factor approximation analysis through descriptive help with the help of arithmetic mean. Selected characteristics of the descriptive analysis are presented in Table 2. As it is showed from these results the most important factors for consumers were E-shop services (ESS); Advertising (ADV) and Attitudes of consumers (ATT). The E-commerce and Digital trust factor (ECT) or Sustainable (SUS) approach of merchant weren't as important for them while shopping the groceries online.

Table 3. Correlation matrix – Spearman's ρ

ρ	ESS	RES	ADV	ATD	ECT	SUS	FOS	EXP
ESS	1	0.771	0.753	0.48	0.387	0.72	0.319	0.137
RES	<0.001	1	0.686	0.402	0.364	0.641	0.293	0.138
ADV	<0.001	<0.001	1	0.482	0.406	0.675	0.306	0.131
ATD	<0.001	<0.001	<0.001	1	0.216	0.34	0.141	0.134
ECT	<0.001	<0.001	<0.001	<0.001	1	0.445	0.251	0.187
SUS	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.332	0.137
FOS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.221
EXP	0.001	<0.001	0.001	0.001	<0.001	0.001	<0.001	1

Source: own elaboration (2023)

Table 3 presents the output of the correlation analysis, above the diagonal line are showed the tightness measures and below the diagonal line the significance measures presented by p value. None of the p values acquired a value higher than 0.05, so we can conduct that all the considered and tested relationships between factors are statistically significant. From the point of view of the closeness of the relationships, it is possible to observe them from low to strong ones and in all cases, with positive coefficients. In general, the highest rate of coefficients was recorded in relation to the ESS factor. This factor presented a strong relationship with the RES, ADV and SUS factors. Interestingly, the relationship with the EXP factor can only be perceived in the low to medium range.

Conclusion

After the analysis of our results, it can be concluded that eight factors showed as significant in driving the consumers to shop the groceries online in the area of Slovak republic. The aim of the paper was to assess the relationships between the individual drivers of online groceries consumer shopping behavior

where it can be stated that the strongest relationship was observed between E-shop services and Reputation of an e-shop; between E-shop services and Advertising of an e-shop; and between E-shop services and Sustainable approach of an e-shop. These results showed that for online grocery consumer it is still the most important the E-shop services. The confirmation of these relationships would deserve deeper understanding through further testing.

As every research, also this has its limitations like the size of research sample or geographically limited area of research. The future research orientation in the field of this problematic could be enlarged by examining how individual factors affects frequency of online grocery shopping or the spent number of expenditures on the online grocery shopping.

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Will Volunteering Drive Social Entrepreneurship in Ukraine?

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Abstract

Research background: UN Volunteers identify the financial value of volunteer work to reach \$287.6 million in 2022. Ukrainian statistical data from the Labour Force Survey reveals that approximately 7.1% of the population aged 15 and over, equivalent to 2,260,800 individuals, were identified as volunteers in January-June 2021. Nonetheless, the literature lacks grounded research on volunteer and social entrepreneurship ecosystems and their cooperation.

Purpose of the article: This article explores volunteering as a prerequisite to social entrepreneurship in Ukraine. Namely, the research describes volunteering as part of a larger ecosystem that supports social innovation and entrepreneurship development.

Methods: We analyse a selection of articles to identify the structure and interaction between the Volunteering Ecosystem (VE) elements and the input it can provide for the Social Entrepreneurship Ecosystem (SEE). We use desk research to map the VE and secondary data analysis to identify the portrait and the dynamics of volunteering in Ukraine.

Findings & Value added: During the war, there are two main directions of volunteering in Ukraine: (1) rear support directly related to combat operations, and (2) organisations that resemble social entrepreneurship, operating with the support of international organisations and state cooperation. The article defines the ways in which the volunteering ecosystem can contribute to social entrepreneurship development: skills formation, networking, and collaboration, identifying social needs, testing ideas and models, inspiration, and motivation. The paper also offers recommendations to stimulate social entrepreneurship through volunteering.

Keywords: volunteering, social entrepreneurship, volunteering ecosystem

JEL classification: D64, O35, D71

1. Introduction

When a crisis occurs, governance or local authority do not always have time to respond. Also, there are a lot of tasks to solve with limited resources, so there are gaps where volunteers are very important. Volunteers play a crucial role in filling gaps and meeting needs that may not be adequately addressed by formal institutions or systems.

Volunteering refers to the act of offering one's time, skills, or resources for a cause, organisation, or community without expecting financial compensation. It is a selfless and altruistic activity undertaken to make a positive impact, address social issues, or contribute to the welfare of others and the overall betterment of society. They contribute their time, expertise, and enthusiasm to various causes, often bringing about positive change and making a difference in the lives of individuals or communities they serve. It offers a pathway for individuals to translate their passion for social change into entrepreneurial action, ultimately driving innovation and sustainable solutions to address pressing social and environmental issues.

Since 2011, volunteer activity in Ukraine has been defined at the legislative level (the law “On Volunteering”, 2011) as a voluntary, socially oriented, non-profit activity carried out by volunteers through the provision of volunteer assistance. At the same time, after the Russian full-scale aggression, the volunteer activity in Ukraine had acquired immense proportions. Regions in which active hostilities are not taking place work tirelessly, aiding in various directions: support for displaced persons; support of

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hospitals; support of the Ukraine Armed Forces and the National Guard; protection of animals; support for people who need help due to various circumstances (loss of job, for example); psychological support; legal support; cultural and social development.

Directing efforts to create benefits for society is related to the idea of social entrepreneurship, which is looking for innovative solutions to environmental, social, or cultural problems. Therefore, we plan to investigate what exactly can transform the volunteer movement into social entrepreneurship. Volunteering can catalyse social entrepreneurship by fostering inspiration, understanding, networks, skills, and practical experience.

Social entrepreneurship has gained significant attention as a tool to address social issues and foster economic development. On the other hand, volunteering involves individuals dedicating their time and skills to serve their communities without financial compensation. By examining existing literature on the subject, this review seeks to shed light on whether volunteering can drive social entrepreneurship in Ukraine. The transformation of volunteering into social entrepreneurship is a catalyst for sustainable post-war recovery for Ukraine. It can also serve as an example of such a transformation for other regions with ongoing armed conflicts.

1.1 Volunteering as a social phenomenon

Scientific interest in volunteering gradually grew. If in 1995, the Scopus database had only one scientific article, then in 2010, there were 43 such articles, and in 2021 there are already 152 scientific publications. Scientists have a more considerable interest in social entrepreneurship than volunteering. A keyword search in the Scopus database shows 106 articles in 2010 and 685 scientific papers in 2021. However, the relationship between volunteering and social entrepreneurship is not well understood. For example, the Scopus database search for “volunteering” and “social entrepreneurship” found limited publications from 2013 to 2022.

Scientists have been interested in the motives and motivations of volunteer activity for a long time, so many scientific works are devoted to this topic. Scientists believe that individual characteristics are decisive for volunteers. (Howarth, 1976). Later, scientists proposed an integrated approach to understanding volunteering: social theories that stress the importance of context, roles, and integration; individual characteristic theories that emphasise values, traits, and motivations; and resource theories that focus on skills and free time. (Einolf & Chambre, 2011). Researchers (Dury et al., 2015) were interested in individual characteristics that motivate people to volunteer. A two-year study (Hovard & Burnds, 2015) of volunteering in Kenya, Mozambique, Nepal, and the Philippines showed the importance of volunteering for achieving the Sustainable Development Goals (SDGs), as well as a call for a better understanding of indigenous informal volunteering and how ‘outsider’ volunteers can support it.

Volunteers are those who, during a short reference period (four weeks or one calendar month), perform any unpaid, non-compulsory activity to produce goods or provide services for others. Therefore, community engagement and social impact is critical for volunteer.

“Any activity” means work performed for at least one hour.

The term “unpaid” refers to the absence of remuneration in cash or in-kind for work done or hours worked. Volunteer workers may receive some small form of support or stipend in cash when below one-third of local market wages (e.g., for out-of-pocket expenses or to cover living expenses incurred for the activity) or in kind (e.g., meals, transportation, symbolic gifts).

“Non-compulsory” is interpreted as work carried out without civil, legal, or administrative requirements, different from the fulfilment of communal, cultural, or religious social responsibilities.

The production “for others” refers to work performed:

- Through or for organisations comprising market and non-market units (i.e., organisation-based volunteering), including through or for self-help, mutual aid, or community-based groups of which the volunteer is a member.
- For households other than the household of the volunteer worker or of related family members.
- Excluded from volunteer work:
- Community service and work by prisoners ordered by a court or similar authority, compulsory military, or alternative civilian service.
- Work for the benefit of others during working time.

In October 2013, the 19th International Conference of Labour Statisticians identified volunteering as one of the primary forms of work. It recommended that countries regularly measure the phenomenon to assess its contribution to household well-being and development of countries.

These are referred to as equal to own-use production work, employment work and volunteer work. It is also acknowledged that other forms of work exist, such as unpaid compulsory work for others, but the proposals in the draft resolution deal only with the three forms of work identified here.

No priority is assigned between the three forms of work. Rather, they are introduced to enable the production of separate sets of statistics on each, providing measurement flexibility to meet different policy needs better. Underlying this feature of the proposals is the recognition that persons may engage in various forms of work during a given reference period. Persons may hold one or several income-generating jobs and may also engage in the own-use production of goods and/or work as volunteers for an organisation or the community. At the same time, they may provide services for their own use by the household. The benefit of this is that the labour input into each form of work is measured exhaustively within the specified period. It is also possible to examine how persons allocate their time to different productive activities and how participation in one form of work may impact participation in others (see Fig. 1).

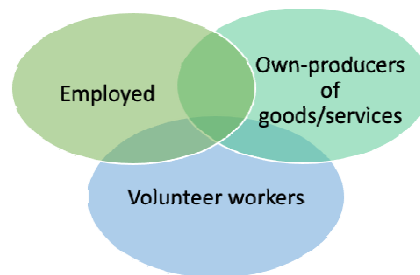


Figure 1. Participation in different forms of work
Source: own processing (2023)

1.2 Volunteering ecosystem

There is no standard term to refer to the participants of the volunteering process in the literature and the expert community. Most papers and industry reports use the term “sector” to name the organisations dealing with voluntary work and having a social impact as their primary purpose. Other stakeholders are not considered in this case, and cross-collaboration opportunities are often overlooked.

In Europe, the term “voluntary infrastructure” includes supporting tools and organisations in sector analysis. The Centre for European Volunteering (Rusteki, Bal, & Czerwińska, 2012) uses the term “volunteering infrastructure” to refer to the system for supporting volunteering and its development, but its elements slightly differ across countries. In the UK, this infrastructure was defined for the Volunteering strategy, developed in 2004 and included “the physical facilities, structures, systems, relationships, people, knowledge and skills that exist to support and develop, coordinate, represent and promote frontline organisations thus enabling them to deliver their missions more effectively.” (Penberthy & Forster, 2004)

Polish experts, in turn, include volunteering organisations of all types into the infrastructure definition (Rusteki, Bal & Czerwińska, 2012): organisations active specifically in the field of volunteering, organisations involving volunteers but having other aims, public administration at all levels, business supporting volunteering, media specialised in civil society/volunteering issues, academic institutions active in the field of volunteering and social research, governmental agencies. In addition, Political, Legal, Educational and Economic framework; Research and analysis; Supporting tools & matching systems are also considered to constitute the voluntary infrastructure of the country.

Australian National Strategy for Volunteering (Volunteering Australia, 2023) defines the volunteering ecosystem as “a network of people, organisations, institutions, and agencies all working for the collective viability and recognition of volunteering”. Its elements include Volunteers, Volunteer Involving Organisations, Volunteering Support Services, national and local administration bodies, national and local volunteering associations, industry associations, Community Organisations/Groups, Philanthropy, Business community and Research community, supporting volunteering or having an interest in volunteering, Enabling Organisations.

1.3 Volunteering as a driver for social entrepreneurship

Social entrepreneurs are individuals who harness the principles of business and innovation to address pressing social issues. Their ventures aim to create sustainable solutions that benefit society as a whole.

Social entrepreneurship applies the principles and guidance start-up founders and entrepreneurs use to a business that directly generates social change or impacts a social cause. A social entrepreneur is primarily motivated by a desire to alleviate systemic social or cultural problems. Social entrepreneurship is well-researched and systematised. There is a fundamental bibliographic analysis of social entrepreneurship research (Trabskaia et al., 2023). The authors of this analysis said that social enterprises are embedded in their social and cultural communities, orientated to create both social and economic value. Social enterprises are built on an understanding of a community’s needs. Research on social entrepreneurship from an ecosystem perspective has increased in the past 13 years (Thomas, 2023).

Researchers from New Zealand and the UK (de Bruin et al., 2022) proposed the conceptual framework advances understanding of social entrepreneurship ecosystem by demonstrating the intrinsic inter reliability of social entrepreneurship ecosystem dimensions, envisaging the ecosystem itself as a complex context linking communities of interdependent actors engaged in both dyadic interactions and collective processes of social value creation (Fig. 2).

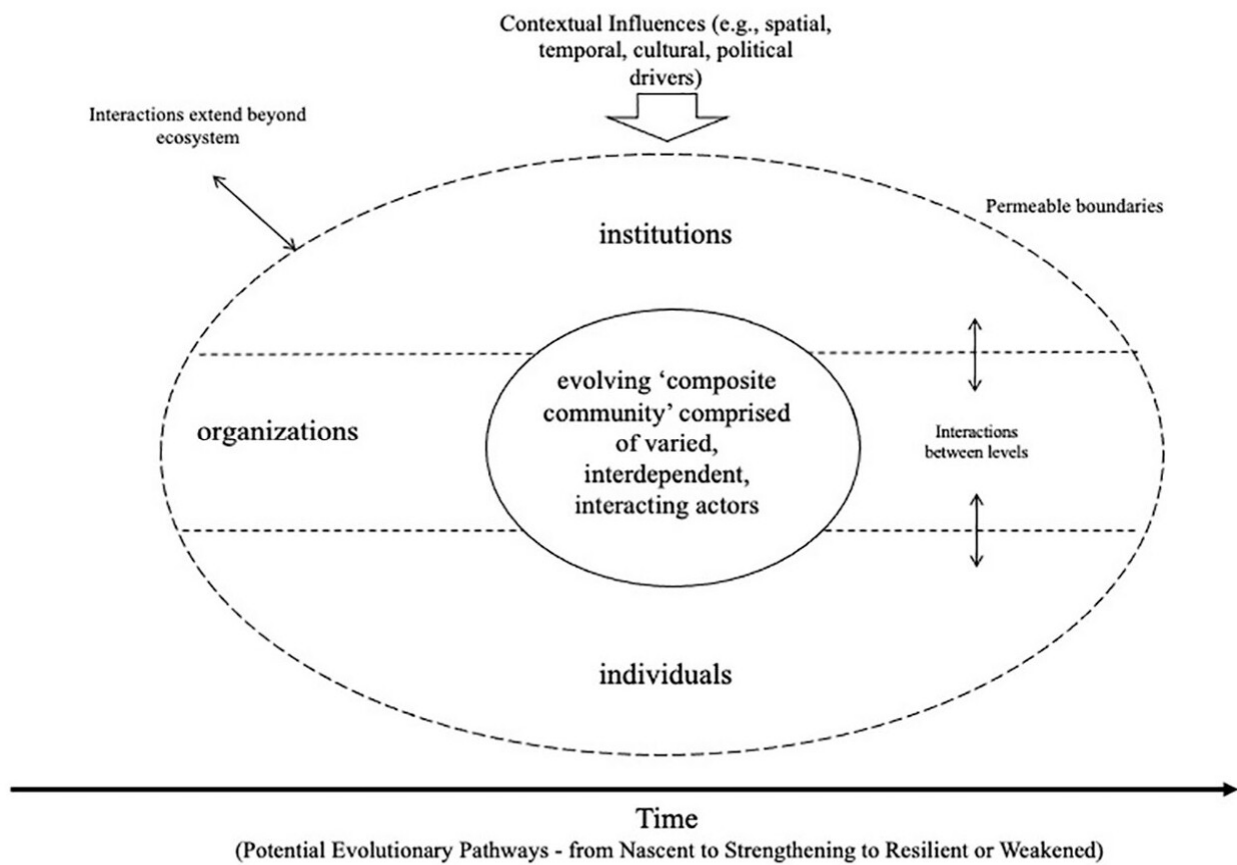


Figure 2. Social entrepreneurial ecosystem framework
Source: Bruin et al. (2023)

It is interesting to study the experience of university volunteer programs in Argentina (Raimondo et al., 2017), which encourage entrepreneurship culture by developing innovative socio-environmental projects that promote a joint effort between the different administrations of the state, the universities, and regional social organisations. The program includes a training phase for the university volunteers, an action plan addressed to the social agents and an evaluation of the results.

The choice experiment survey in Chicago, Illinois and Portland, Oregon (Ando et al., 2020) shows that people are willing to spend free of their own time (volunteering) to solve critical social problems, including environmental issues and water purification, which is shown in the study. Researchers believe that local authorities can effectively use volunteering during decentralisation. At the same time, they recommend further research to elicit a true marginal monetary value of time independent of any utility or disutility of volunteer activity.

Social entrepreneurs often operate within tight budgets and limited resources. Engaging with social entrepreneurs provides a unique learning opportunity for volunteers. These individuals possess a deep understanding of social issues and a relentless drive to address them. Volunteers gain valuable insights into the challenges faced by marginalised communities and the strategies employed to effect change by spending time with them. They witness first-hand the innovation, resourcefulness, and determination required to create sustainable solutions.

So, we can see that the motivation and activity of volunteers are similar to social entrepreneurs, but they differ in the way and methods of its implementation. (1) The activity of volunteers and social entrepreneurs is aimed at solving social problems. (2) Work in conditions of limited resources. Volunteers offer their time, skills, and resources without seeking financial gain. Social entrepreneurship combines business principles with a social mission. Social entrepreneurs are driven by a desire to address social and environmental problems through innovative solutions. They create sustainable ventures that aim to bring about systemic change while generating revenue to support their mission. (3) Institutional organisation of work. Volunteering typically involves working within an established organisation or program. Volunteers often join existing initiatives and assist with specific tasks or projects. Social entrepreneurs create their ventures or organisations. They take the initiative to identify a social problem, develop an innovative solution, and build a business model around it. (4) Financial sustainability. Volunteering is typically a non-monetary contribution. Volunteers offer their time, skills, and resources without expecting financial compensation. Their involvement is based on altruism and the desire to give back. In contrast, social entrepreneurship involves creating financially sustainable models. Social entrepreneurs develop revenue-generating strategies that support their social mission. They often use business principles to generate income through products, services, or partnerships. This financial sustainability allows social entrepreneurs to sustain and expand their impact over time. Therefore, we believe that transforming volunteers into social entrepreneurs is a driving force for solving social problems and should be stimulated.

2. Methods

This study explores volunteering as a prerequisite to social entrepreneurship in Ukraine. The research's exploratory nature and the subject's relative novelty define the case study as the most appropriate research method. The primary objective of our study was to analyse the structure and dynamics of the VE in Ukraine and determine the extent to which it can contribute to the development of the SEE. Ukraine was chosen as a case country intentionally for several reasons. Firstly, the current situation in Ukraine has boosted volunteering to a nationwide phenomenon. Secondly, due to the war and the deteriorating economic conditions, social issues will become a real challenge for policymakers and society. Thirdly, the accumulated volunteering experience and the thrive for quick solutions can make Ukraine a perfect market for testing social innovations. The volunteering phenomenon under study is complex in nature and involves multiple actors in a relatively complicated social context. Therefore, in-depth data from multiple sources is needed to draw relevant conclusions (Caridà et al., 2022). The literature analysis served as a foundational step in understanding the conceptual framework and key components of the VE. We analysed sector reports and research publications on volunteering published between 1995 and 2023.

We employed a desk research methodology to gain a comprehensive understanding of the VE within the context of Ukraine. This involved collecting and analysing existing reports, surveys, and data sources related to volunteering in Ukraine. We collected secondary data from 2019-2022 using Ukrainian State Statistics, UN Volunteers reports, online publications, and reports of voluntary organisations in Ukraine. Through this process, we aimed to map out the landscape of volunteering activities in the country, discern the prevailing trends and patterns, and identify any challenges or opportunities that exist within the VE.

By examining secondary data sources, such as national surveys and organisational reports, we were able to develop a detailed portrait of volunteering dynamics in Ukraine. By integrating desk research, literature analysis, and secondary data analysis, our study aimed to provide a comprehensive description of the VE in Ukraine and its potential contributions to the SEE. We described the elements of the VE based on the VE structure suggested by the National Strategy for Volunteering 2023-2033 (Volunteering Australia, 2023).

We paid specific attention to the ways in which the insights generated from this research endeavour can inform policymakers, social entrepreneurs, and volunteer organisations in developing strategies to

foster collaboration, leverage the strengths of the VE, and maximise the positive social impact achieved through the synergistic relationship between volunteering and social entrepreneurship..

3. Results

3.1 The elements of the volunteering ecosystem in Ukraine

Volunteers and Volunteer-Involving Organisations: The total number of volunteers in Ukraine account for almost 2,7mln people, volunteering both individually and through organisations. This number has increased gradually since 2021 (see Fig. 3). The register (National social service office of Ukraine) of the Ukrainian Ministry of Social Policy as of July 12th, 2023, contains 1505 entries of the organisations involving voluntary workers or doing voluntary work themselves.

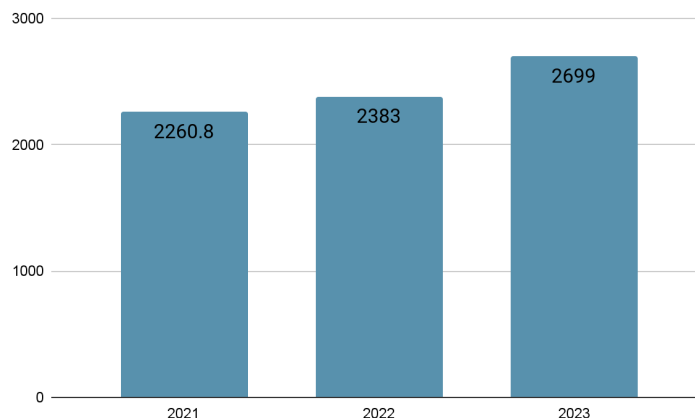


Figure 3. Number of volunteers in Ukraine, thousands of people

Source: The State Statistics Service of Ukraine (2021)

Governments. The law “On Volunteering” (2011) and the Resolution of the Cabinet of Ministers of Ukraine on “Some issues of the National Social Service of Ukraine” (2020) define the legal framework for volunteering in Ukraine and the National Social Service of the Ministry of Social Policy in Ukraine as the body, responsible for volunteering-related policies within the Ukrainian Government. Voluntary organisations and individual volunteers in Ukraine are also actively supported by the representatives of local authorities and the ministries - the Ministry of Defence, and the Ministry of Social Policy. According to most of the civil society and voluntary experts in Ukraine, the issue which needs to be resolved is that volunteering is not well distinguished from charity.

National and local volunteering associations. Volunteers and their interests are advocated for and protected by four volunteering associations: e.g., NGO “Association of People’s Volunteers of Ukraine”, Ukrainian Voluntary Service, NGO “FOR the Association of Veterans, War Disabled and ATO Volunteers”, NGO “International Volunteer Association”, and NGO “Association of Volunteers of Ukraine”.

National Associations. The list of national associations involved in volunteering in Ukraine contains 44 international, national, and local level associations, mainly representing communities. There are only a few industry associations on the list, e.g., NG “Ukrainian Association of Artificial Intelligence” (“UASHI”) and NGO “Ukrainian Association of Certified Accountants and Auditors”.

Community Organisations/Groups. Civil society organisations and volunteers are increasingly uniting to tackle complex challenges that small, fragmented organisations alone cannot handle. In the Ukrainian civil society landscape, we witness the emergence of digital platforms, hubs, and other institutional mechanisms that provide support to volunteers. One prominent example is UAREforms, a platform that brings together active citizens, public organisations, businesses, and other stakeholders to discuss the implementation of necessary reforms in Ukraine.

Philanthropy. Ukrainian volunteers have three main sources to finance their operations. Most of the funding is collected from individual donors through crowdfunding platforms and social media. In addition, they raise business donations and grant funding from international organisations. Despite this diversification and the fact that Ukrainian volunteers got extensive access to funding during the war, the lack of financial resources is mentioned by experts as the most important problem volunteers face due to the unfavourable economic situation and the military risks Ukraine continues to experience.

Business community. The Ukrainian business community is helping volunteers in managing processes related to military volunteering (evacuation, logistics etc.), creating digital platforms for volunteer networking, providing catering services for those in need and volunteering to organise food delivery etc.

Research community. As volunteering in Ukraine is a relatively new and rapidly developing phenomenon, it becomes pertinent to explore the motivations behind volunteering and assess the sustainability of this trend. We can recall such research papers from the KSE Foundation, Ilko Kucheriv Foundation “Democratic Initiatives” (2016), GfK Ukraine, National Institute for Strategic Studies (Potapenko & Dvignun, 2022). Notably, the National Institute of Strategic Studies of Ukraine identifies it as a new social movement that took clear shape after 2014. Ukraine’s mass social volunteer movement operates as a network comprising sympathisers rather than formal members. It relies on diverse funding sources, creating a mosaic of financial support. Despite certain shortcomings, this movement reflects genuine democratic processes, aiming to ensure stability at the rear to achieve success on the frontlines.

Additionally, some volunteer organisations are evolving to take on social entrepreneurship functions. These organisations primarily rely on funds from international organisations, joint participation budgets, and membership fees to sustain their operations. This blending of volunteerism and entrepreneurship highlights the dynamic nature of the civil society landscape in Ukraine.

Enabling Organisations. Monobank made fundraising for volunteers easier through their “Banka” tool.

Currently, key elements such as community organisations and enabling organisations are undergoing significant development, leading to the maturation of the volunteer ecosystem in Ukraine. The presence of war has acted as a catalyst, accelerating this process. We can confidently assert that the volunteer ecosystem in Ukraine has evolved and expanded, with various actors coming together to address pressing challenges.

The results of the survey (Povrar et al., 2023) indicate the existence of a request to strengthen the volunteer ecosystem for more effective work of volunteers, in particular noting the need for (1) increased transparency and ease of cooperation with state and local authorities; (2) creation of educational programs of civil society and volunteer management; (3) consultations on tax legislation.

The awareness of Ukrainian volunteers with international volunteering practices is low, which indicates a weak integration of Ukrainian volunteering into the global volunteer ecosystem. In the same survey (Povrar et al. 2023), to the question of whether the respondents are aware of effective mechanisms for supporting volunteer initiatives in foreign countries, they provided only single answers about the USA, Moldova, Poland, and the Czech Republic. For its part, the international community recognises the need to expand support for volunteers in Ukraine. In particular, UN Volunteers mentions that it will “strengthen its support to volunteer-led and community-based initiatives” (UN, 2022).

3.2 The portrait of volunteering in Ukraine

In January-June 2021, the state statistics bodies, for the first time, conducted a module of the Labour Force Survey on the work of volunteers (the module). The module program was developed with the methodological support of the senior statistician of the Department of Statistics of the International Labour Organization, Volodymyr Ganta.

Based on the data in Figure 4, we can determine the portrait of a typical Ukrainian volunteer. They are educated people between the ages of 25 and 64 with permanent jobs. These are mostly city dwellers who are personally involved in volunteering. According to the results of the study “Resilience during the war and in the post-war period: what Ukrainians rely on” conducted by the sociological group “Rating” on June 6-11, 2023. A survey of 1,200 respondents over 18 throughout Ukraine showed that 6% of respondents are constantly engaged in volunteering and another 43% - from time to time. (Sociological Group Rating, 2023)

Among the main reasons why people volunteer:

- The main reasons people volunteer include:
- Invaluable experience that can be useful in everyday life.
- The opportunity to change something in your life and other people’s lives.
- Desire to do good.
- Teamwork, communication with like-minded people, new acquaintances, and constant contact with interesting people.
- Application of one’s talents, strengths, and abilities.
- To see the country by travelling with volunteer units.

The volunteer movement in Ukraine began to form in 2014. Still, with the beginning of the full-scale invasion of Russia, almost immediately, Ukrainians began to unite their volunteer initiatives to help each other and the state, first - through personal connections (friends, relatives, colleagues, neighbours, previous acquaintances). However, very soon, special platforms appeared where citizens could unite and coordinate their efforts, such as <https://platforma.volunteer.country/>, <https://palyanytsya.info/>, <https://spivdiia.org.ua/> and others. So, volunteering in Ukraine has become more systematic and effective.

High self-organisation contributed to the fact that volunteers and volunteer organisations, to a large extent, began to specialise and compensate for the incomplete institutional capacity of the state in various areas. Their focus includes the material and technical support of fighters at the front, the provision of medical assistance to the wounded and injured, psychological service to internally displaced persons in the rear, and the provision of shelter for pets that lost their owners during hostilities. Such specialisation enables volunteers to be more effective in a specific direction and to develop permanent connections to solve particular tasks — for example, some supply military equipment, additional products and clothing, etc.



Figure 4. Characteristics and number of volunteers in Ukraine, thousands of people
 Source: Own processing, based on The State Statistics Service of Ukraine (2023)

Thus, we can observe that the volunteer movement has turned from a chaotic solution of minor problems into a powerful social force. It is confirmed by the results of the study, which showed that 59% of respondents consider the volunteer movement to be one of the most effective public institutions in the country today. Of the 49% of respondents who are volunteers, 82% are ready to personally participate in solving community or city issues in the future. (Sociological Group Rating, 2023). These numbers show

that volunteers are willing to solve social problems within their communities actively and can form sufficient human capital to develop the social economy and social entrepreneurship.

3.3 Interconnection between the VE and the SEE: using volunteering capacity to drive social entrepreneurship

OECD (2018) suggests evaluating the efficiency of the existing SEE through 7 dimensions: social entrepreneurship culture, institutional framework, legal and regulatory framework, access to finance, access to markets, skills and business development support, and the way the system manages, measures and reports impact.

Volunteers can support the ecosystem in at least three of the mentioned above dimensions see Fig. 5):

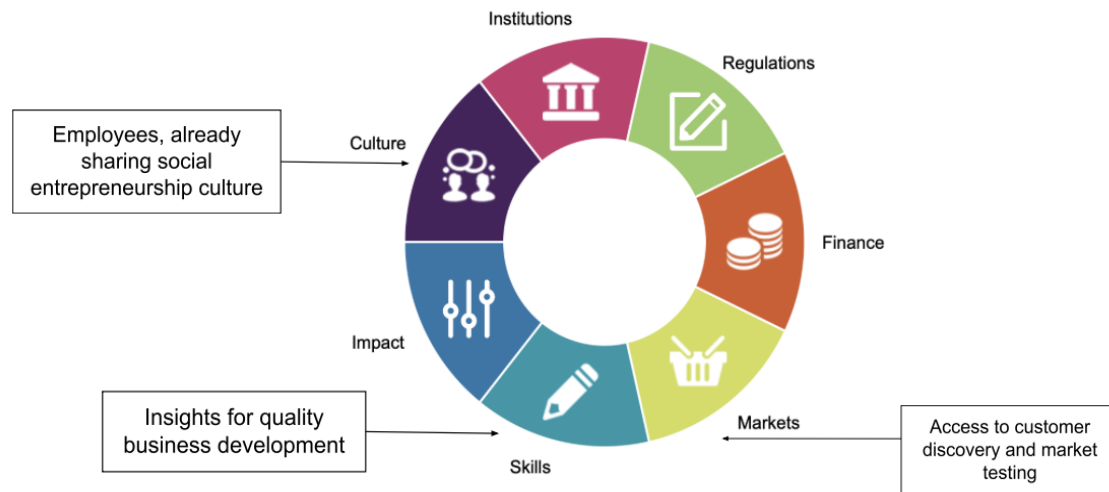


Figure 5. Participation in different forms of work

Source: own processing based on The Better entrepreneurship policy tool (2023)

- *Social entrepreneurship culture:* an active civil society is a prerequisite for a healthy social entrepreneurship culture. Volunteers representing this part of the society engaging with them gives SEE an opportunity to demonstrate to volunteers the potential path for further development beyond voluntary activity and from the necessary human capacity reserves for the ecosystem. These reserves will already obtain the energy and thrive for solving social issues and the appropriate skills and knowledge about the challenges of their communities. This experience can be essential for aspiring social entrepreneurs in Ukraine who want to impact society through their ventures positively.

- *Access to markets:* volunteers in Ukraine are engaged in solving urgent issues and working at the forefront of emerging social challenges from a vast network of contacts from the public and private sectors who are the most in need of solving these challenges. Cooperating with VE will provide SEE with easier and more trustful access to potential markets. Moreover, social enterprises can get access to market testing of their innovative ideas and models on a smaller scale at lower technology readiness and market readiness levels (TRL and MRL). By engaging with communities and beneficiaries, volunteers can gather feedback and assess the viability and impact of social innovations.

- *Skills and business development support:* volunteers can provide insights for identifying customer needs and developing appropriate business models for social enterprises, as well as information about the target audience’s characteristics. Through volunteering, individuals can gain first-hand insights into their communities’ pressing social issues and needs. This direct exposure allows them to identify specific problems that can be addressed through innovative and entrepreneurial approaches. By understanding these needs, volunteers can develop ideas and solutions that can later be transformed into sustainable social enterprises. Having participated in solving the aroused issues, they better understood the puzzle’s missing particles, the community’s real needs, and the skills needed to approach the target audience successfully. In addition, volunteers are good at networking. By interacting with fellow volunteers, community leaders, and non-profit organisations, aspiring social entrepreneurs can build a strong network of like-minded individuals who share similar goals and values necessary for further business development.

To ensure that the capacity of volunteers and their experience is used for the good of social entrepreneurship, it is essential to build relations between these two ecosystems and arrange joint initiatives, learning programs, networking events, etc. In Ukraine, this process has already started and has several forms:

- Training for volunteers on social entrepreneurship, e.g., “Social entrepreneurship: opportunities for volunteers” by the Future Development Agency (Public space, 2022), educational programs of the Ukrainian Social Academy (Ukrainian Social Academy, 2020) “Help once. Or once and for all. Social entrepreneurship for public and charity organisations”.
- Involvement of volunteers as social enterprise workers. In 2017, out of 150 self-reported social enterprises in Ukraine, 44 had volunteers among their staff (The Catalogue of Social Enterprises of Ukraine, 2016-2017, 2017). But we should be careful with stimulating such processes. They need to be temporary, and volunteers should not replace all social enterprise workers. Otherwise, it will rather demotivate volunteers from future social entrepreneurial activities.

Volunteering allows individuals to make a positive difference in their communities. By contributing their time, skills, and energy, volunteers can address social issues, support vulnerable populations, and contribute to the betterment of society. Volunteering strengthens the social fabric of communities. Volunteering brings together individuals from diverse backgrounds, experiences, and perspectives. This diversity fuels innovation by providing a range of ideas, insights, and approaches to addressing social issues. When people with different perspectives collaborate, they can generate new and innovative solutions to complex social problems. Volunteering contributes to the development of social capital, which refers to the networks, relationships, and trust within a community. Volunteering can help tackle poverty, inequality, environmental degradation, and access to education and healthcare. It is very important during the war.

Now Ukraine has an extensive network of volunteers, which generates trust in society, helps to solve military, social, and health problems during the war and man-made disasters (for example, the explosion of the Kakhovskaya hydroelectric power station). Volunteers solve problems without profit, but social entrepreneurship has a business model to solve social issues. Therefore, the government must create a mechanism for transforming volunteers into social entrepreneurs. Governments can play a crucial role in stimulating the transformation of volunteering into social entrepreneurship. Here are some ways they can support and encourage this transition see Fig. 6.

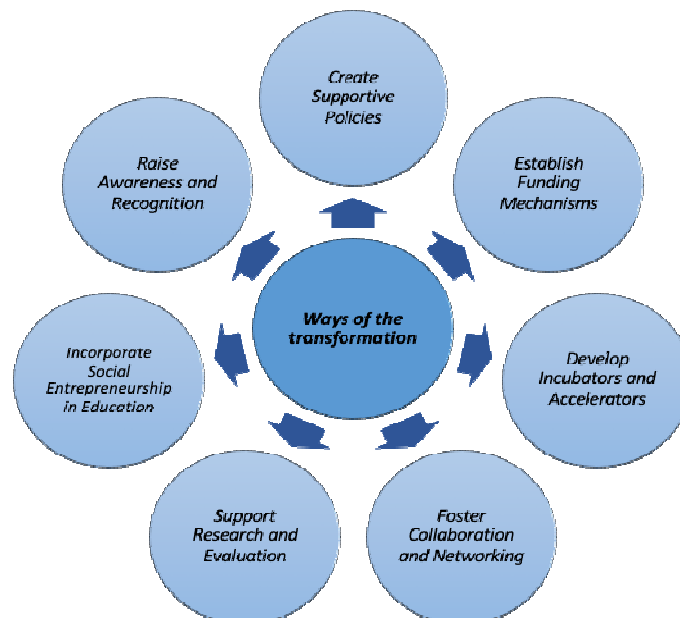


Figure 6. Ways of state support the transformation of volunteering into social entrepreneurship.

Source: own processing (2023)

By implementing these measures, governments can create an enabling environment that encourages the transformation of volunteering into social entrepreneurship. Such an environment, in turn, can stimulate innovations, job creation, and positive social impact within communities. Currently, the

governments of many EU countries have legislated the work of social enterprises in the form of cooperatives, the main feature of which is a democratic form of management and the mandatory distribution of company shares between founders, volunteers, and beneficiaries. In other countries, the form of non-commercial association is predominant. (Kamenko, 2020) Studying and applying such an approach can be very interesting for entrepreneurs in Ukraine.

4. Discussion

The data collection methodology on volunteering in Ukraine differs from the international one, so we cannot compare them. To be able to carry out a comparative analysis, it is necessary to unify Ukrainian approaches with them. In addition, most scientific researchers focus on volunteering among young people, while the “portrait of a volunteer” in Ukraine indicates completely different trends.

Volunteers’ motivation in Ukraine is in line with the reasons volunteers acknowledge across the globe, with “making a difference” and “useful contribution” being the predominant reasons, followed by “learning new skills and gaining new knowledge” (Schech et al., 2020, Kehl et al., 2016). At the same time, when a closer look is taken at voluntary actions taken during crises, additional aspects define the motivation, e.g., individual emotions (Domaradzki et al., 2022) or political preferences (Fleischmann & Steinhilper, 2017). It should be considered when generalising policy approaches and tools to enhance the cooperation of volunteers and social entrepreneurs.

Regarding crisis phenomena, it can be stated that the activation of volunteering took place in different ways. So, for example, volunteer organisations aimed at solving environmental problems have specific characteristics. They act systematically, have a clear organisational structure and work plan. It is quite different - during large-scale disasters like earthquakes and hurricanes. Volunteer activity was short-term and aimed, first, at solving humanitarian problems. During the COVID-19 pandemic, all “offline” volunteer projects were suspended. Instead, many online initiatives appeared, to which everyone was invited. Humanity has not seen a full-scale war taking place in Ukraine for many years, so the experience of Ukrainian volunteer organisations is unique, as it covers a vast range of problems.

Other studies also determine the importance of interaction between volunteers and social entrepreneurs. OECD (2022) recognises civil society’s and all stakeholders’ potential in addressing social and economic challenges. Its latest recommendations include at least two principles, where we can identify volunteers as the input into the social economy and social innovation. Firstly, OECD emphasises that actions should be taken to enable civil society initiatives to be transformed into social economy organisations. Secondly, they outline the necessity for networking building and cross-sector partnership development.

Conclusion

The created foundation of the volunteer ecosystem gives reason to believe that volunteering will become a driving force for developing social entrepreneurship in Ukraine. Volunteers have the most active age, sufficient education, know how to self-organise, have knowledge and skills to solve various types of problems successfully, believe in the values of social responsibility and are ready to participate in solving social issues. But for this, it is important that such elements of the volunteer ecosystem as community organisation and enabling organisation are more clearly formed, as well as to introduce elements of institutional support for transforming volunteerism from pure philanthropy to entrepreneurship.

Also, it is crucial to activate such state support mechanisms as Develop Incubators and Accelerators, Foster Collaboration and Networking, Support Research and Evaluation, Incorporate Social Entrepreneurship in Education, and Raise Awareness and Recognition. These mechanisms can become a basis for volunteering in The Strategy of sustainable development of Ukraine.

The direction of further scientific research can be the study of the transformation of volunteering into social entrepreneurship and the sustainability of this process. Because there are still many upheavals in the world, such a mechanism will compensate for solving social problems where the state cannot react quickly and effectively.

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Examining the Influence of User Motivation and Technology Acceptance on Behavioral Intentions in a FinTech Context

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Abstract

Research background: Financial technology (FinTech) has become increasingly popular, providing users with more applicable and efficient financial services. User motivation and technology acceptance are crucial factors that affect the adoption and usage of FinTech and service solutions. However, the impact of these factors on user behavioural intentions in this context remains to be seen.

Purpose of the article: The study aims to investigate the direct and indirect effects of user motivation on behavioural intentions and the mediating role of user motivation in the relationship between interface usability and behavioural intentions with a modified Technology Acceptance Model (mTAM).

Methods: This study employs a quantitative research design, using a self-administered questionnaire to collect data from LinkAja E-wallet users in Denpasar City, Indonesia. A structural equation modelling (SEM) approach is used to analyze the data and test the proposed research model.

Findings & Value added: The results indicate that user motivations have significant positive effects on behavioural intentions of technology acceptance. Furthermore, user motivation partially mediates the relationship between interface usability and behavioural intentions. Specifically, the study finds that higher levels of user motivation strengthen the relations between presentation, navigation, and behavioural intentions. The results imply that FinTech providers should focus on enhancing consumers' motivation and approval of the technology to promote user adoption and usage, which has practical implications for the development and marketing of FinTech and service solutions.

Keywords: FinTech, user motivation, technology acceptance, behavioral intentions, mediating role

JEL classification: O33, G2, D12, D91

5. Introduction

Have you ever considered how the growing popularity of FinTech is changing how we manage our finances and influencing the future of banking? This question immediately engages the reader and sets the stage for discussing the importance of user motivation and technology acceptance in adopting FinTech. The global FinTech market has expanded by more than 25% per year over the past ten years, upending financial systems and altering how people interact with money (Varma et al., 2022).

FinTech is the application of innovative technologies to improve and automate the delivery and use of financial services (Mention, 2019). Meanwhile, artificial intelligence, machine learning, big data analytics, blockchain, and mobile computing have all laid the groundwork for the development of FinTech solutions over the last decade (Iluba & Phiri, 2021). These advancements have transformed the financial services industry by making financial transactions and services faster, more efficient, and more user-friendly. The popularization of FinTech has significantly impacted the traditional financial services industry (Török,

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2020). Meanwhile, FinTech startups that provide innovative and agile solutions pose a threat to traditional financial institutions. Likewise, FinTech has increased financial inclusion by giving earlier underserved populations access to financial services, allowing them to participate in the formal economy and potentially escape poverty (Lagna & Ravishankar, 2022).

There needs to be more research to understand how user attitudes, perceptions and the influence of financial technology acceptance on behavioural intentions interact. Understanding user motivations can be based on the conceptual framework of a modified Technology Acceptance Model (mTAM) (Ho & Bodoff, 2014; Müller et al., 2021). However, to bridge this gap, more empirical research is required to examine these variables' precise interactions and influences on behaviour while exploring the mediating role of user motivation and other pertinent fields. This study seeks to answer the following research questions: (RQ1) What is the relationship between user motivation and behavioural intentions in the FinTech context? (RQ2) How does technology acceptance affect user behavioural intentions in the FinTech industry?

The purpose of the study is to identify the factors affecting behavioural intentions toward FinTech services. An in-depth understanding of user motivations and perceptions regarding their engagement with FinTech (E-wallet) services will be obtained through quantitative methods. The goal of the study is to investigate the experiences of working as independent contractors in the "gig" economy, especially those under the age of 30. By focusing on the younger generation, the study is expected to capture their unique perspectives and FinTech-related behaviours. The benefits of FinTech services of LinkAja are examined, along with the influence of user motivations, e.g. the ease of use and perceived usefulness, on their convenience-seeking behaviours. Additionally, the study investigates the influence of interface usability of FinTech, including factors such as presentation and navigation to engage with FinTech services.

5.1 Theoretical Framework

The following theoretical framework is a foundation for understanding the relationships between user motivation, technology acceptability, and behavioural intents in the FinTech sector. The widely used TAM, which Davis first suggested in 1989 (Davis, 1989), examines how users embrace and accept new technology. It focuses on technology acceptance by perceived ease and usefulness as crucial determinants of behavioural intentions (Song et al., 2017). The TAM posits that users are more likely to adopt technology if they perceive it as helpful in enhancing their work or achieving their goals and if they find it easy to use (Marangunić & Granić, 2015). Perceived usefulness refers to the extent to which users believe utilizing a particular technology will enhance their job performance or make tasks more manageable. The system's functionality, features, and possible advantages are among its influences. Perceived ease of use refers to the degree to which users perceive technology as free from effort and user-friendly. This perception is affected by system complexity, user support, and learning easiness (Davis, 1993). The TAM contends that consumers' attitudes about adopting technology are directly impacted by their perceptions of its usefulness and ease of use. Positive attitudes raise the chance of intention to use, increasing the possibility that technology will be included (Olushola et al., 2017).

H1: User motivation positively affects behavioural intention, indicating that higher levels of perceived ease of use and usefulness and attitude to use are associated with increased intention to engage in a specific behaviour or use a particular financial technology.

Over time, researchers have expanded and altered the TAM to include additional external variables and contexts, such as the social influence and system design characteristics that affect technology acceptance (Bagozzi, 2007). It has been investigated how the perceived usability perspective and the technology adaption model relate to how users perceive usability and how they respond to technology. A subjective evaluation of a technology's usability is recognized as perceived usability (Lah et al., 2020). Measures of perceived usability and the elements of the modified TAM have been compared in research, focusing on perceived usefulness and usability. The successful integration and use of technology by users are referred to as technology adaption, and it is frequently influenced by elements including hardware and software compatibility, self-efficacy, and supportive environments (Alamsyah et al., 2022; Mokhtar et al., 2020). Perceived usability, which encompasses elements like ease of use, user interface design, and user experience, has been shown via research in various fields to significantly impact people's acceptance and adoption of technology (Kusumadewi et al., 2021). The intention of users to utilize FinTech services is strongly influenced by perceived usefulness and ease of use, with a considerable positive impact (Singh et al., 2020). In order to encourage E-wallet customers to adopt and customize their FinTech, businesses can concentrate on improving the perceived usability of their platforms, providing enhanced user experience, and effectively explaining the advantages and ease of use. The proposed conceptual framework is depicted in Figure 1.

H2: User motivation intervenes in the positive impact of interface usability on behavioural intention, indicating that the strength or direction of the relationship between FinTech adoption and behavioural intention varies depending on the level of user motivation.

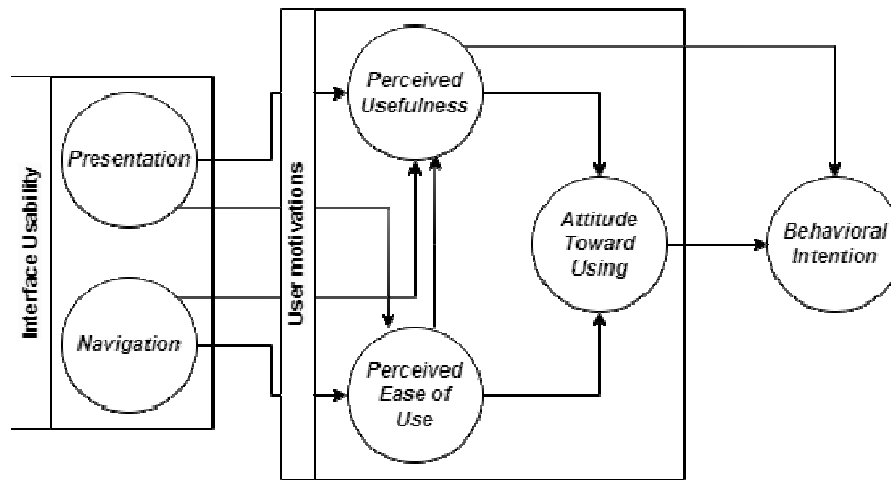


Figure 1. Proposed conceptual framework of mTAM
Source: author’s processing

6. Materials and methods

This study employs a quantitative research approach to examine how user motivation and interface usability impact behavioural intentions in a FinTech environment. The LinkAja E-wallet customers in Denpasar, Indonesia, are surveyed using a self-administered survey to gather information. User motivation, technological acceptance, interface usability, and behavioural goals are all included in the questionnaire.

For this study, 120 individuals were chosen using a non-probability sampling technique called convenience sampling. Users of LinkAja E-wallets in Denpasar City were approached to participate by adhering to the required ethical principles of voluntary participation, anonymity and ensuring respondent confidentiality. The self-administered questionnaires are distributed to the participants as part of the data-gathering procedure. Depending on the participants' accessibility and choices, the surveys are provided personally or online. The participants receive explicit instructions on completing it and are guaranteed that their answers will be kept private and anonymous.

The questionnaire includes validated (Five-Point Likert) scales to measure the constructs of interest, where 5 indicates the most decisive agreements. Technology acceptance is assessed using a modified version of the TAM, including constructs such as perceived usefulness and ease of use, attitude toward using and interface usability measured through presentation and navigation items. Behavioural intentions are assessed using items that capture the participants' intention to adopt and continue using the LinkAja E-wallet. The descriptions and sources of items are shown in Table 1.

Table 1. Sources and abbreviations of a FinTech (E-wallet) interface usability and the users' motivation items and behavioural intention indicators

Factors/Items	Descriptions	Abbr.	Sources
Interface Usability			
Presentation (PRES)	I like the outline of the LinkAja page	PRES1	(Scholtz et al., 2016)
	I feel the information provided by LinkAja is complete	PRES2	
	I feel the information provided by LinkAja is clear	PRES3	
	I feel the information provided by LinkAja is accurate	PRES4	
	I feel the information provided by LinkAja can be easily understood	PRES5	
	I feel the arrangement of the menu displayed by LinkAja is well structured	PRES6	

Navigation (NAV)	I can easily access the information I need on LinkAja	NAV1	(Scholtz et al., 2016)
	I can find the LinkAja feature that I will use quickly and easily	NAV2	
	I feel the displayed icon on the LinkAja already explains the functions	NAV3	
User Motivations			
Perceived Usefulness (PUS)	I feel that the payment process is becoming easier when using LinkAja	PUS1	(Davis, 1989)
	By using LinkAja, I can process transactions through mobile applications faster.	PUS2	
	I feel that using LinkAja can speed up the payment process	PUS3	
Perceived Ease of Use (PE)	Learning to operate LinkAja was easy for me	PE1	(Davis, 1989)
	I find it easy to use LinkAja to do what I want	PE2	
	My interactions with the LinkAja system are straightforward for me to understand	PE3	
	It is easy for me to become skilled in using LinkAja	PE4	
	LinkAja system is flexible for transactions.	PE5	
Attitude toward Using (ATT)	I feel comfortable when interacting with the LinkAja E-wallet.	ATT1	(Suh & Han, 2002)
	I feel happy to download E-wallet LinkAja.	ATT2	
	I prefer using LinkAja E-wallet over other E-wallets.	ATT3	
Behaviour Intentions			
Behavioural Intention (INT)	I always intend to use LinkAja	INT1	(Suh & Han, 2002)
	I intend to continue using LinkAja in the future	INT2	
	I intend to use LinkAja as much as possible.	INT3	

Source: author's compilation

A Structural Equation Modeling (SEM) method examines the data. By incorporating user motivation as a mediator in the relationship between interface usability and behavioural intentions, SEM enables the analysis of both the direct and indirect effects of the variables in the proposed research model. This relationship is then tested using the appropriate statistical techniques. The SEM analysis sheds light on the potency and importance of the assumed connections between the examined factors. This research used a reflective modelling approach for the latent constructs.

7. Results

In a preliminary stage, six blocks—presentation, navigation, perceived usefulness, perceived ease of use, attitude toward using, and behavioural intention—were evaluated (Table 3). The Cronbach's Alpha Values for checking the internal consistency of indicators for each latent variable are high and acceptable (>0.7), especially Behavioral Intention (0.864). Following the descriptive statistics, factor loadings before and after exclusions are examined. INT2 and INT3 had the highest values per block, followed by PE2 and PE3, ATT1 and ATT2, PUS1 and PUS3, NAV1 and NAV2, and PRES5 and PRES6. These factors were only preserved if they were 0.7 or higher. As a result, PRES1, PRES3, PRES4, and PE5 were excluded from the Final Path Model. PE1 should also be removed from the model to get the best Saturated Model (Model Fit) result with an acceptable SRMS value (<0.08). After exclusion, almost all other loads in the final model improved. The best way to describe navigation (NAV2) is with "feature" items (0.889). Information that is simple to understand is mostly connected with the latent presentation variable (PRES5) (0.819). "Faster transaction procedure" is how perceived usefulness (PUS2) might be summed up (0.841). Perceived ease of use (PE4) is best explained by "easy to become skilled" (0.865). Attitude toward using (ATT2) is best described as "happy to download" (0.856). Moreover, the latent behavioural intention variable (INT3) is mainly correlated with "intend to use as much as possible" (0.913). Variance Inflation Factor (VIF) is used to assess multicollinearity in a multiple regression analysis. Each is less than threshold 3 (Johnston et al., 2018).

Table 2. Descriptive statistics, loadings, and collinearity statistics of the items.

Latent variables (Cronbach's alpha)	Manifest variables	Mean/median	Factor loading before exclusion*	Factor loading after exclusion*	VIF
Presentation (PRES) (0.748)	PRES1	3.892/4	0.649	0.809	1.395
	PRES2	3.750/4	0.775		
	PRES3	3.800/4	0.694		
	PRES4	3.675/4	0.622		
	PRES5	3.875/4	0.762		
	PRES6	3.867/4	0.756		
Navigation (NAV) (0.790)	NAV1	3.900/4	0.813	0.816	1.688
	NAV2	3.875/4	0.891	0.889	1.913
	NAV3	3.867/4	0.809	0.809	1.537
Perceived Usefulness (PUS) (0.751)	PUS1	4.000/4	0.842	0.777	1.526
	PUS2	4.008/4	0.825	0.841	1.808
	PUS3	4.092/4	0.779	0.827	1.418
Perceived Ease of Use (PE) (0.789)	PE1	3.992/4	0.789	0.826	1.617
	PE2	4.025/4	0.838		
	PE3	3.908/4	0.784		
	PE4	3.925/4	0.841		
	PE5	3.233/3	0.208		
Attitude toward Using (ATT) (0.766)	ATT1	3.842/4	0.794	0.794	1.401
	ATT2	3.700/4	0.855	0.856	1.917
	ATT3	3.308/3	0.827	0.825	1.678
Behavioral Intention (INT) (0.864)	INT1	3.617/4	0.848	0.848	1.922
	INT2	3.683/4	0.898	0.898	2.471
	INT3	3.650/4	0.913	0.913	2.558

Source: author's estimations

Table 3 displays the results of the Fornell-Lacker criterion's calculations for discriminant validity. The correlation of latent constructs is compared with the square root of the average variance extracted (AVE). AVE values met the requirements and were more significant than 0.5. In contrast to the variance of other latent constructs, its indicator should better explain the variance of a latent construct. The results indicate that all latent constructs (AVE) have more excellent value than correlations with other latent constructs. The highest correlation value among the latent variables is 0.887 for the behavioural intention variable (INT).

Table 3. Fornell-Larcker Criterion measures discriminant validity

Latent variable	ATT	INT	NAV	PE	PUS	PRES
ATT	0.825					
INT	0.663	0.887				
NAV	0.329	0.315	0.839			
PE	0.594	0.674	0.452	0.839		
PUS	0.528	0.489	0.412	0.602	0.815	
PRES	0.276	0.333	0.653	0.403	0.494	0.815

Source: Authors' estimations. The primary diagonal of the matrix's numbered columns is highlighted in bold.

The parameter estimations for the models are displayed in Figure 2. The parameters obtained using the mean and standard errors of the path coefficients were verified using a bootstrap simulation. The main benefit of PLS-PM, i.e., is the ability to differentiate between direct, indirect, and aggregate (total) impacts on behavioural intention (Table 4). After looking at the direct and indirect correlations, it was determined that the direct effect of ATT was significant (total=0.562; SE=0.077; t=7.257; p<0.001). PE's indirect effect on INT (0.408; SE=0.067; t=6.105; p<0.001) is positive and significant. PUS direct (0.192) and indirect (0.151) and total effect (0.343) on INT is significant (SE= 0.095; t=3.594; p<0.001) and positive. PRES's indirect effect on INT (0.180; SE=0.073; t=2.455; p=0.014) is positive and significant. However, NAV indirectly affects INT (0.133; SE=0.072; t=1.839; p=0.067), but insignificant. The strongest

correlation between the ATT and INTT was discovered (total=0.562; SE=0.077; t=7.257; p<0.001), and PE and PUS (total=0.481; SE=0.077; t=6.273; p<0.001).

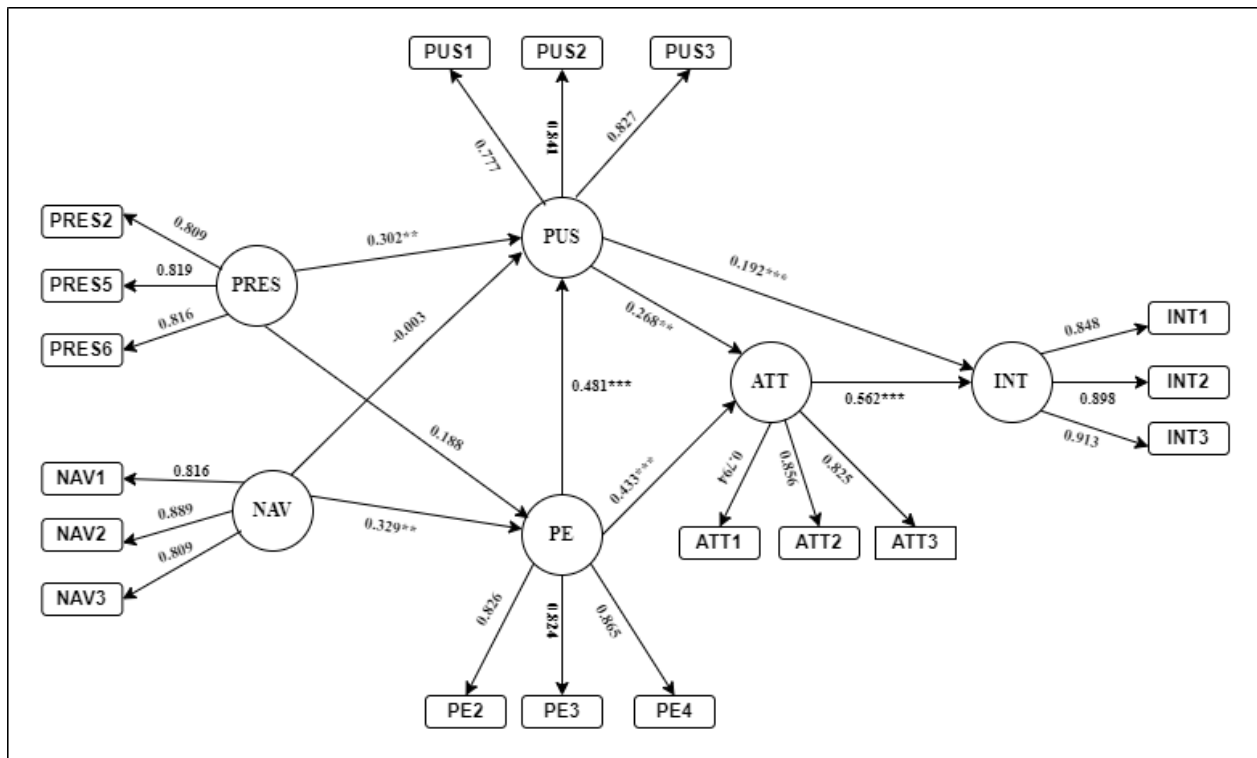


Figure 2. The final path model and coefficient estimates. **: p < 0.05. ***: p < 0.001. Source: authors' estimation

Table 6. Total, direct, and indirect effects of the path models

Relationship	Direct path coefficient	Indirect path coefficient	Total effects	Std. error	t statistic	p-value
ATT->INT	0.562***		0.562***	0.077	7.257	<0.001
NAV->ATT		0.184**	0.184**	0.082	2.235	0.026
NAV->INT		0.133	0.133	0.072	1.839	0.067
NAV->PE	0.329**		0.329**	0.118	2.781	0.006
NAV->PUS	-0.003	0.158	0.155	0.142	1.095	0.274
PE->ATT	0.433***	0.129***	0.562***	0.072	7.857	<0.001
PE->INT		0.408***	0.408***	0.067	6.105	<0.001
PE->PUS	0.481***		0.481***	0.077	6.273	<0.001
PUS->ATT	0.268**		0.268**	0.096	2.786	0.006
PUS->INT	0.192***	0.151***	0.343***	0.095	3.594	<0.001
PRES->ATT		0.187**	0.187**	0.073	2.551	0.011
PRES->INT		0.180**	0.180**	0.073	2.455	0.014
PRES->PE	0.188		0.188	0.108	1.748	0.081
PRES->PUS	0.302**	0.091**	0.393**	0.123	3.192	0.002

Notes: **p < 0.001; *p < 0.05. Std. Errors were estimated using the bootstrap validation. Source: authors' estimation

8. Discussion

The study's findings significantly impact researchers, FinTech professionals, and politicians. First, the results imply that FinTech businesses should prioritize user motivation when creating and promoting their products (Meyer et al., 2022). It is accomplished by highlighting the technology's usage and simplicity and cultivating a favourable attitude toward utilizing it. FinTech businesses may raise the probability that

customers will adopt their technology and engage in the desired behaviour, ultimately resulting in higher usage and fruitful commercial outcomes.

Secondly, the study stresses the significance of considering user motivation as a potential mediator of the association between interface usability and behavioural intention. The strength or weakness of the impact of interface usability on behavioural intention may depend on the degree of user motivation. As a result, FinTech businesses should adjust their marketing strategies and design their user interfaces to cater for the various levels of customer incentives (Barbu et al., 2021).

Thirdly, the results have practical implications for policymakers interested in promoting the adoption of FinTech. By understanding the factors that influence users' behavioural intentions, policymakers can implement policies and initiatives that incentivize the development and adoption of FinTech that is user-friendly, useful, and positively perceived.

Finally, the study also adds empirical support for the significance of user motivation in the context of FinTech adoption, which further advances the academic literature. The study contributes to the body of research that aims to comprehend the elements that drive the adoption and usage of FinTech by evaluating the influence of user motivation and technology acceptance on behavioural intentions.

The study acknowledges certain limitations, such as convenience sampling, which may limit the generalizability of the findings. Additionally, the study focuses on a specific FinTech context (LinkAja E-wallet) and geographical area (Denpasar City, Indonesia), which may restrict the generalizability of the results to other FinTech platforms or regions.

Conclusion

In conclusion, this study provides evidence that user motivation and technology acceptance are crucial factors that affect the adoption and usage of FinTech solutions. The results show that higher perceived usability, usefulness, and attitude toward utilizing Fintech influence user motivation, enhancing the probability of engaging in particular behaviours or using an E-wallet Fintech solution. Moreover, user motivation partially mediates the relationship between technology acceptance and behavioural intentions. In order to encourage user acceptance and usage, the study emphasizes the significance of FinTech providers increasing customer motivation and acceptability of the technology. Overall, these findings exploring additional mediating factors that influence the relationship between user motivation, technology acceptance, and behavioral intentions can provide a more comprehensive understanding of the underlying mechanisms. Trust, perceived risk, and social influence could be examined to assess their role in shaping users' behavioral intentions in the FinTech context.

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Identification of Web Users through Web Content Mining: Current State and Challenges

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Abstract

Research background: This article delves into the importance of analyzing and comprehending web user behavior, especially with the vast amount of digital content being generated and circulated online. The article emphasizes the significance of web content analysis and identifying web users based on their online activities. Furthermore, it suggests that understanding a web user's socio-demographic characteristics interests various disciplines, particularly those studying social interactions on the web.

Purpose of the article: The purpose of this study is to examine web content analysis and its possible applications, to enhance our comprehension of the capabilities and constraints of this technology. It also aims to investigate the role of web content analysis in shaping our digital future.

Methods: This writing delves into the extensive research and publications on web content analysis and web data mining. The users have carefully examined various types of web analytics and their practical applications. Additionally, users have provided real-life examples of how web analytics techniques are employed in diverse industries such as e-commerce, marketing, and healthcare.

Findings & Value added: This article delves into the significance of web content analysis and how it benefits various industries like marketing, psychology, and law enforcement. However, the article also highlights the challenges faced when conducting web content analysis such as safeguarding the privacy and security of web user data and ensuring the accuracy and reliability of the analysis tools used. The authors stress the importance of taking a multidisciplinary approach when studying virtual identity and self-presentation in online communities. By providing an overview of the current state of web content analysis and its potential applications, this article aids researchers and practitioners in selecting the appropriate methods for a specific task.

Keywords: web mining, user, identification, online community, web content, user behavior, analytics

JEL classification: M3, O350

1. Introduction

The rapid development of social media has created an unprecedented amount of digital content that is generated and distributed online. With billions of people accessing and interacting with this content, there is a growing need to analyze and understand web user behavior. One of the most effective ways to gain insight into the characteristics of a web user's social and digital identity and their likely behavior and predict their actions is to analyze web content (Krippendorff, 2019; Herring, 2009). Web content analysis is the process of studying and extracting valuable information from the content of online communities, including websites (Tiurmenko, 2022), social media platforms, and other digital sources. By analyzing this content, researchers better web users' interests, preferences, and behavior understand the interests, preferences, and behavior of web users (Loyola, Roman, & Velasquez, 2012; Fedushko & Davidekova, 2019; Fedushko & Ustyianovych, 2022). In addition, web content analysis is used to identify web users (Yang, 2010) based on their online activity and content consumption habits. The combination of socio-demographic characteristics and digital behaviors and traces that are unique to a person in the context of their online presence and activities form a socio-digital identity.

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Identifying web users based on their online behavior is crucial for multiple industries like marketing, psychology, and law enforcement. Web content analysis is used by marketers to create targeted advertising campaigns, psychologists to study the association between online behavior and mental health, and law enforcement to identify individuals who can be a threat to public safety. However, this approach faces challenges such as ensuring data privacy and security of users (Gautam & Bansal, 2023; Hu, et al., 2021; Hu, et al., 2020) and assessing the reliability and accuracy of web content analysis tools. This article gives an overview of the importance of web content analysis and the identification of users based on the analysis of their web content.

The purpose of the article is to review the current state of web content analysis, discuss the challenges associated with this approach, and explore the potential applications of this technology in various fields, which will contribute to a better understanding of the potential and limitations of web content analysis and its role in shaping our digital future.

A wide range of academic disciplines, including but not limited to sociology, political science, psychology, cultural studies, management, ethnology, forensics, rhetoric, and economics, are interested in the socio-demographic traits of the web personality (Cantuaria & Blanes-Vidal, 2019) who interacts with others online. In light of this, an interdisciplinary approach is necessary for a thorough investigation of virtual identity and self-presentation in online communities. To analyze the many identities, self-presentation strategies, and web-personality protection employed by network users in the virtual world, such an approach is required.

The field of web data mining (Sharma & Sharma, 2021) is experiencing fast-paced growth. The main focus of this field is to extract valuable information and knowledge from web sources. The volume and complexity of web data in recent years have dramatically increased, resulting in the urgent need for more efficient and effective mining methods. Web data mining, as defined by Fiet (2007), refers to the process of collecting, analyzing, and using information from web resources, such as machine learning, statistical analysis, natural language processing, and other technologies that extract knowledge from web data. Web data mining is beneficial for various purposes, such as information retrieval, trend prediction, user behavior analysis, sentiment analysis, and enhancing business strategies. (Dadhich & Thankachan, 2021; Rahman, et al., 2021; Fadhli, et al., 2022). This tool is used for various purposes, including researching social media content, e-commerce, marketing, and other fields. The discipline of web data mining is rapidly evolving, with novel techniques and applications emerging frequently.

Web analytics entails extracting useful data from internet sources. There exist various types of web mining, each concentrating on different web data features. Web content mining (Ibrahim & Obaid, 2021) is among the most crucial research areas in web analytics, involving extracting relevant insights from internet pages.

Extracting structured data from web pages is made possible by the use of web content mining techniques. In addition, this method is also useful in extracting unstructured data such as text and images, which is beneficial in fields like sentiment analysis and topic modeling. Another important area of research in web analytics is web structure analysis, which focuses on analyzing hyperlinks on the internet. This type of analysis is used in studying the relationships between web pages, identifying communities of web pages, and detecting inconsistencies in hyperlink structures found online. The analysis of web page usage is another important area of research in the field of web analysis (Norguet, Zimanyi, & Steinberger, 2009; Pujar & Mundada, 2021). This field focuses on analyzing Internet usage data, such as web server logs, to extract patterns and trends in the behavior of web users. This approach identifies popular web pages, user navigation patterns, and potential security threats. Multiple types of web analytics exist, each of which offers valuable insights into web data. Comprehending these analytics and their applications allows researchers and practitioners to make informed decisions regarding which methods to use for a specific task.

The field of social media data mining is expanding rapidly, as it focuses on uncovering valuable insights from popular platforms such as Twitter, Facebook, Reddit, and Instagram. By examining content created by users, techniques employed in social media data mining can pinpoint trending subjects and analyze how information is disseminated across these platforms.

Web data mining finds essential use in various fields, such as e-commerce, marketing, and healthcare. Web analytics techniques, for instance, are utilized to investigate the conduct of online customers, to create advertising campaigns targeting specific online crowds, and to identify possible health threats by analyzing online content.

Web content mining involves obtaining valuable information from web pages, including both structured and unstructured data. Structured data comprises names, addresses, and phone numbers, whereas unstructured data pertains to text, images, and videos. To serve various purposes such as sentiment analysis, topic modeling, and content recommendations, data extraction techniques of content intelligence are applied. The analysis of hyperlink structure on the Internet is the primary focus of web structure analysis. Patterns in the interlinking of web pages, communities of web pages, and anomalies in hyperlink structure are identified using this analysis. The techniques of web structure analysis are extensively utilized for web page ranking and search engine optimization.

User behavior patterns can be identified through the analysis of web server logs. Data mining helps in identifying popular pages, user navigation patterns, and security threats. Social media data mining is useful in extracting trending topics and information spread, among other things. Web opinion mining extracts the opinions and sentiments expressed in web content. These types of analyses are widely used in e-commerce, website design, social media marketing and analytics, market research, and product development.

Web content mining retrieves valuable information from online sources. The sheer volume and complexity of online data have significantly increased, calling for more effective mining techniques. One of the critical areas of research aims at extracting structured information, including names, addresses, and contact numbers, from web pages. This technique is commonly used in data integration and web search and has been the subject of extensive research.

The gaps still exist in current research, including the requirement for more efficient and accurate methods of data extraction. Research on web content mining also aims to extract unstructured data, like text and images, that are frequently used in sentiment analysis, topic modeling, and content recommendation. Despite significant progress, gaps still exist, including the need for more accurate and efficient analysis methods and addressing issues related to language and cultural differences.

Web content analysis techniques assist organizations and individuals in making informed decisions based on the information obtained from web data. Businesses analyze web content to identify customer preferences, novel trends, and patterns, which enables them to devise focused advertising campaigns and gain a competitive edge over others. Web content mining is a rapidly advancing field that is being enriched with innovative techniques and applications. The literature review reveals trends, research gaps, and benefits of web content mining techniques. Making use of these benefits and addressing research gaps can lead to significant advancements in the field. Web content mining involves deriving valuable knowledge and information from the vast amount of content that is accessible on the internet. As the volume of online data rapidly expands, web content mining has become a crucial tool for individuals and organizations seeking to comprehend the abundance of information available on the web.

Table 1. Web content mining methods

Method	Description	Example
Web Scraping	Extracting data from web pages by parsing the HTML structure and retrieving specific elements or patterns of content (Bradley & James, 2019; Chaulagain et al, 2017).	Scraping product information from an e-commerce website.
Text Extraction	Extracting relevant text content from web pages, excluding HTML tags and other non-textual elements.	Extracting the text of an article from news websites.
Sentiment Analysis	Analyzing text data to determine the sentiment expressed, such as positive, negative, or neutral.	Analyzing social media posts for customer sentiment towards a product.
Named Entity Recognition	Identifying and classifying named entities, such as names, organizations, locations, and dates, in text data.	Identifying individuals, locations, and institutions referred to within news articles.
Topic Modeling	Identifying hidden topics or themes within a document collection can assist in arranging and comprehending the material.	The grouping of news articles into categories such as politics, sports, and entertainment.
Image Recognition	Examining images on web pages to recognize and classify objects, scenes, or patterns featured within them.	Identification and labeling of objects in product images on an e-commerce platform.

Method	Description	Example
Link Analysis	Analyzing the relationships between web pages based on hyperlinks to determine popularity or relevance (Carullo & Binaghi, 2010).	Page ranks are calculated to determine the most influential web pages in a network.
Social Network Analysis	Analyzing relationships and interactions between individuals or entities within a social network (Lappas, 2011).	Analyzing social media connections and influence among users.
Web Usage Mining	The analysis of user behavior and interaction on a website helps understand patterns, preferences, and trends (Ehikioya & Zeng, 2021).	Tracking and analyzing user clicks and navigation paths on an e-commerce website.

Source: own processing (2023)

Web content mining encompasses a variety of techniques and approaches that facilitate the extraction, analysis, and interpretation of information from online resources such as web pages, documents, and images. With the help of these methods, individuals, businesses, and researchers gain valuable insights, identify patterns, and acquire knowledge from web-based content. Among the many methods used in web content mining, web scraping is a primary technique that involves parsing the HTML structure of web pages to extract precise data. This technique is useful for retrieving publicly available data such as product details from e-commerce sites, news articles from online publications, and other relevant information on the internet. When it comes to analyzing web content, text extraction is a vital technique that involves extracting relevant textual content from web pages while leaving out HTML tags and non-textual elements. This technique is crucial, especially when dealing with large volumes of textual data. It helps gather customer reviews from online forums and extract article text from news websites, thus making it a valuable tool in web content analysis. Sentiment analysis is another popular application of web content mining that involves analyzing text data to determine the sentiment expressed, such as positive, negative, or neutral.

This method is useful when it comes to understanding customer sentiment towards products or services by analyzing social media posts, online reviews, or comments on discussion forums. In addition to standard web mining techniques, web content mining involves utilizing strategies such as topic modeling, image recognition, link analysis, social network analysis, and web usage mining. These methods allow researchers and companies to uncover hidden themes within document collections, identify objects or scenes within images, examine the connections between web pages or social network entities, and gain insight into user behavior on websites. The extraction, analysis, and interpretation of information from the vast and diverse web-based content available today are made possible through the powerful tools and techniques of web content mining. Individuals and organizations make informed decisions, gain valuable insights, and leverage the wealth of knowledge present on the WWW by utilizing these methods.

2. Methods

The socio-demographic traits of a web user's socio-digital identity are mirrored in their online behavior, online activity, and digital footprint. The phrase acknowledges the reality that a person's online interactions and presence disclose significant facets of their social and personal identity that may not be obvious in interactions with others in the real world. The term "socio-digital identity" refers to a variety of socio-demographic traits that may be deduced from a person's online activities, including age, gender, place of residence, education, occupation, hobbies, preferences, and beliefs. Researchers may learn about how people engage with online communities and material as well as how socio-demographic factors affect this behavior by examining socio-digital identity.

The practice of web content mining is prevalent in multiple industries, including e-commerce, education, healthcare, and social media analysis. A significant advantage of web content mining is the ability for organizations to obtain valuable insights and knowledge from the vast amounts of data accessible on the internet. Through the analysis of web content, organizations can gain a better understanding of their customers' needs, preferences, and behaviors. For instance, e-commerce businesses use customer feedback analysis to recognize patterns and trends that can aid in enhancing their products and services. Similarly, educational institutions analyze student feedback to improve their teaching methods and curricula. Another reason for the popularity of web content mining is its ability to help

organizations make data-driven decisions. By analyzing web content, organizations identify patterns and trends that are used in the decision-making process. For example, financial institutions use web content analysis to detect potential fraud or to assess the creditworthiness of customers. Healthcare providers use web content mining to identify patterns in patient data that help them improve their treatment methods.

Web content mining is utilized for conducting sentiment analysis, which involves determining the sentiment or emotional tone conveyed in a given text. This is useful for analyzing customer reviews, social media posts, and news articles. By analyzing web content sentiment, organizations better understand how their customers or the general public feel about a particular product, service, or event. The benefits of web content mining are many and varied, making it an important area of research and development in data science.

It's crucial to compile a dictionary of the linguistic and communicative characteristics used in online communication to comprehend the socio-digital identities of web community members. In the virtual environment, this gets accomplished by examining phonetic and visual markers, word construction, and lexical and semantic elements in their speech (see Figure 1).

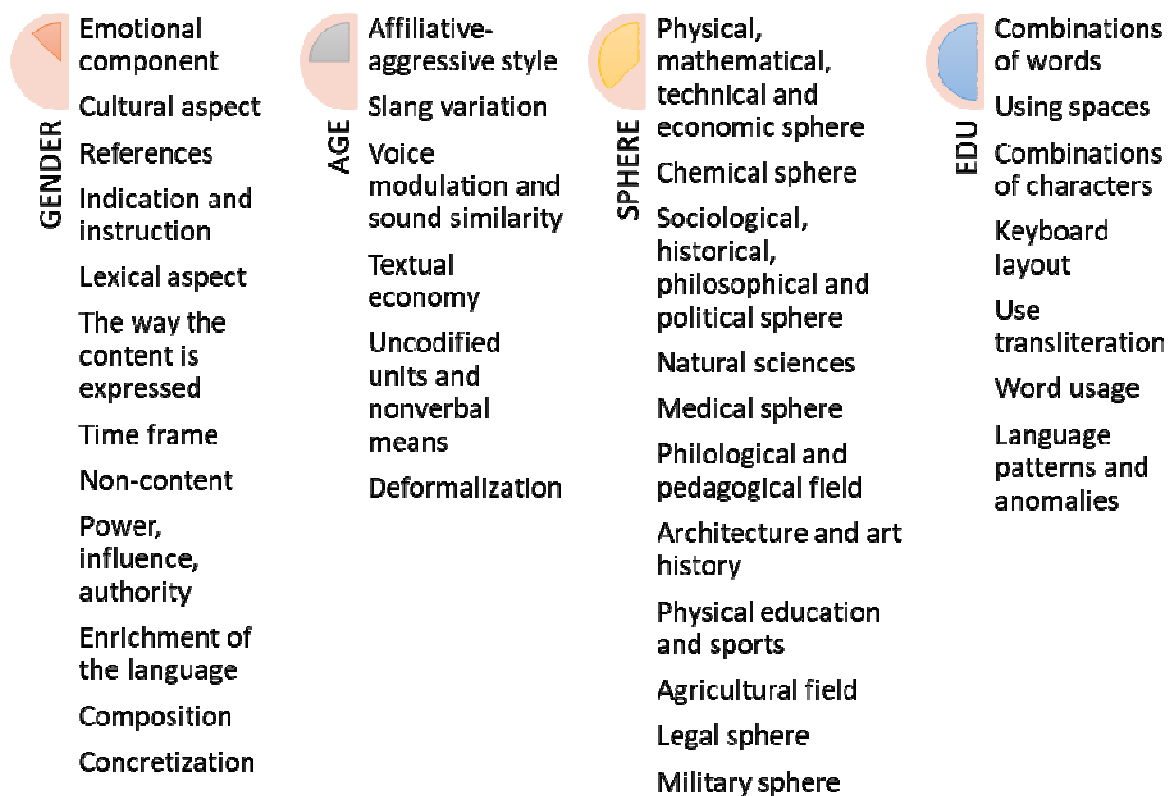


Figure 1. Classification scheme of linguistic and communicative indicators of web user characteristics
Source: own processing (2022)

The automated search for markers of socio-digital identity characteristics is carried out using the developed specialized software. The marker scissors determine the affiliation of a web forum participant to a certain value of socio-digital identity characteristics. Given the complexity and time-consuming nature of analyzing the information traces of web community members, this process requires automation, which greatly simplifies the work and increases the reliability of the results.

Based on typical grammatical, lexical-semantic, and lexical-syntactic indicators used in online communication, experts have created indicative characteristics for users of web communities. Age, gender, line of work, and educational background have all been used to collect linguistic information that may be used to categorize people according to their traits. The research, scientific ideas, and ideologies of eminent researchers in the domains of philology, sociology, linguistics, psychology, and computer science have been used to develop these qualities. In addition, specialist dictionaries covering terminology used in the workplace, youth slang, and computer and network jargon have been reviewed. In order to compile these elements, the material of Ukrainian-language web communities has also been examined.

Common errors in online communication are linguistic characteristics of a web community member that reveal their degree of knowledge. Scientists have created several algorithms for both English and Ukrainian to look for and rectify this collection of faults, but not as completely. Given this, it is not essential to create a new automated method for identifying and correlating problems in online material. An automated program that analyzes the text, filters words, picks out words with problems, and corrects them is the best way to handle this issue. Combining the linguistic and communicative aspects of online communication is the method's primary goal.

To do this, sets of linguistic and communicative indicators are formed by classifying the indicative traits into intuitive semantic groupings. The categorization of linguistic and communicative markers for each characteristic value is then used to illustrate the findings.

Through computer-linguistic analysis of the information content of web communities, experts employ these sets of linguistic and communicative indicators to develop a matrix of indicators. For each value of social and digital identity, this matrix was created.

At the conclusion, we are given a matrix of linguistic and communicative indicators for each value of specific socio-digital identification attributes.

$$LCI^{(SDI,VC)} = \begin{pmatrix} I_{1,1}^{(SDI,VC)} & \dots & I_{1,j}^{(SDI,VC)} & \dots & I_{1,N_{VI}(SdCh,VC)}^{(SDI,VC)} \\ \dots & \dots & \dots & \dots & \dots \\ I_{i,1}^{(SDI,VC)} & \dots & I_{i,j}^{(SDI,VC)} & \dots & I_{i,N_{VI}(SdCh,VC)}^{(SDI,VC)} \\ \dots & \dots & \dots & \dots & \dots \\ I_{N_{Ind}(SDI,VC),1}^{(SDI,VC)} & \dots & I_{N_{Ind}(SDI,VC),j}^{(SDI,VC)} & \dots & I_{N_{Ind}(SDI),N_{VI}(SDI,VC)}^{(SDI,VC)} \end{pmatrix} \quad (1)$$

where N_{Ind} is a function that determines the number of linguistic and communicative indicators of this value of the characteristic of socio-digital identity for each value of the characteristic; N_{VI} is a function that determines the number of values of this characteristic of socio-digital identity for each characteristic.

The matrix is made up of rows with vectors of indicators for language and communication that stand in for many facets of socio-digital identity.

$$I^{(SDI,VC)} = \left(I_{1,1}^{(SDI,VC)} \quad \dots \quad I_{N_{Ind}(SDI,VC),j}^{(SDI,VC)} \quad \dots \quad I_{N_{Ind}(SDI),N_{VI}(SDI,VC)}^{(SDI,VC)} \right) \quad (2)$$

The column of the matrix (3) is a vector of indicators of a certain value of the socio-digital identity characteristic of the studied web community:

$$LCI^{(SDI,VC)} = \begin{pmatrix} I_{1,1}^{(SDI,VC)} \\ I_{i,1}^{(SDI,VC)} \\ I_{N_{Ind}(SDI,VC),1}^{(SDI,VC)} \end{pmatrix} \quad (3)$$

Using this principle, we form a matrix for each web participant. To calculate the distance from the reference value of the socio-digital identity characteristic to each possible value of the socio-digital identity characteristic of the atomic k-th web community member, we use the formula for determining the Euclidean distance (4):

$$\rho_j^{(k)}(Value, User) = \sqrt{\sum_{i=1}^{N_{Ind}(SDI,k)} \left(I_{i,j}^{(SDI,VC)} - I_{i,j}^{(SDI,U)} \right)^2 * w_i^{(SDI)}}, \quad (4)$$

where $k \in 1 \dots N_{VI}(SDI,VC)$; $w_i^{(SDI)}$ is the weight coefficient of a specific linguistic and communicative indicator of a specific value of the socio-digital identity characteristic.

As a result, we choose the value of the socio-digital identity characteristic for which $\rho^* = \min(\rho_k)$ is true. Moreover, the matrix $LCI = (I_{ij})$ is universal for all values of a certain characteristic of the socio-digital identity of a particular web community for which the models are synthesized. Depending on the

topic and type of web community, a model is synthesized for each of the values of socio-digital identity using an automated information and analytical monitoring system (Golub & Avramenko, 2013).

The weights of the linguistic and communicative indicators (5) are presented in the vector:

$$W^{(VI,SDI)} = (w_1^{(VI,SDI)} \quad \dots \quad w_j^{(VI,SDI)} \quad \dots \quad w_{N_{Ind(SDI,VC)}}^{(VI,SDI)}) \quad (5)$$

The vector of weighting coefficients of the indicators of the characteristics of socio-digital identity. The value of the characteristics of socio-digital identity-*VI*, obtained as a result of the work of the automated information and analytical monitoring system.

The importance of linguistic and communicative indicators is determined by weighting coefficients. The results of the analysis differ depending on the specifics of the web community. The larger the coefficient, the more important the linguistic and communicative indicator is for verifying the relevant characteristic of social and digital identity in a particular web community.

Multilevel computer monitoring is an information system that is used to calculate the weighting factors for linguistic and communicative markers of socio-digital identity (Holub & Avramenko, 2013). To find markers that make up sets of linguistic and communicative indicators for a particular community and issue, the procedure starts by gathering and analyzing the information traces of online community members. The multilevel monitoring system's input data needs are then met by organizing these indicators into a matrix. The input data must consist of a matrix of numerical features that are sufficient for the synthesis of models in order for the system to produce a qualitative multidimensional model (Ibrahim & Obaid, 2021). The information trace of a member of an online community should also include the frequency characteristics of the markers of each linguistic and communicative indication. This data collection is often processed using mathematical and statistical techniques. However, this approach has limitations in terms of its capacity to develop a complete information system for confirming the personal information of web community members.

The software tool for verifying the socio-demographic characteristics of a web user helps to establish their social and digital identity. This tool uses linguistic and communicative indicators from online interactions to verify the user's socio-demographic values. By creating an information schema, developers use diagrammatic and structural modeling to build the tool. Advanced web technologies play a crucial role in developing this tool for forming the socio-digital identity of web community members.

3. Results and Discussion

Since it depends on a number of variables and is subject to change over time, it is impossible to pinpoint the gender distribution of an online user's social and digital identity. Furthermore, privacy issues and the voluntary nature of sharing such information make it difficult to get precise data on the gender distribution of internet users' identities. Facebook and Instagram pages are split into male and female sections according to gender.

We have analyzed the age and gender distributions of the Facebook and Instagram pages of the Department of SCIA at Lviv Polytechnic (Figure 2) and IntelliGo - Scientific Cluster (Figure 3).

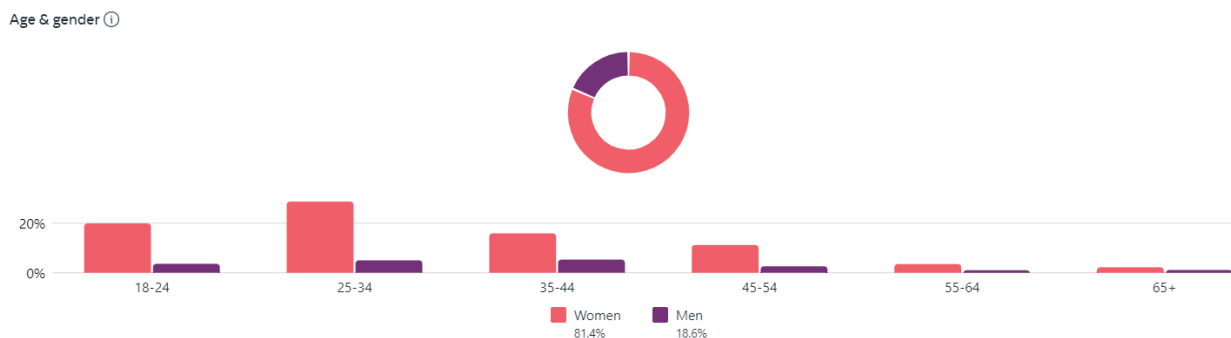


Figure 2. Gender and age distributions of the Facebook page of the Department of SCIA at Lviv Polytechnic

Source: <https://www.facebook.com/SCIADepartment> (2023)

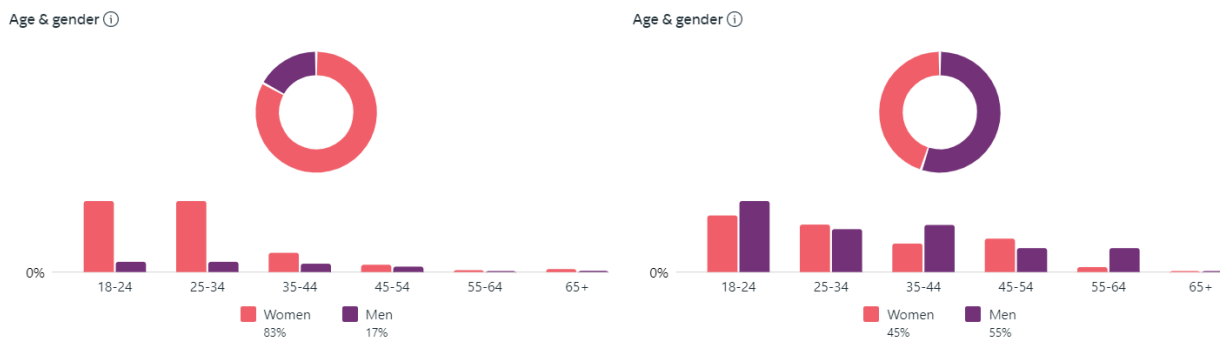


Figure 3. Gender and age distribution of Facebook and Instagram pages of IntelliGo - Scientific Cluster
 Source: <https://www.facebook.com/ScieClusterIntelligo> (2023)

After analyzing the age and gender distributions of the Facebook and Instagram pages of the Department of SCIA at Lviv Polytechnic, the following results were obtained:

- 81.4% of the page's users are women, and 18.6% are men;
- the most active users of the page are participants aged 25 to 34.

In addition, there are noticeable discrepancies in the gender and age distribution of users of the Facebook and Instagram pages of the IntelliGo - Scientific Cluster, according to the profiles of those who use them. Facebook has a far smaller user base, and 83% of its users are women as opposed to 17% of men. And on the Instagram page, 45% of users are women and 55% of users are men. The age range of active users, in terms of age distribution, is 18 to 44.

Accurately identifying the social and digital identity of network participants is important for ensuring reasonable community moderation. This is accomplished using a formal model based on the characteristics of the participant. Two other components provide data to the module responsible for this function: one generates sets of linguistic and communicative indicators, and the other creates an information trail.

The verification component subsequently verifies the reliability of socio-demographic characteristics associated with web community members. A specialized dictionary of markers, which is continuously updated, is used to form sets of linguistic and communicative indicators. The main purpose of identifying social and digital identity is to detect false information in web community member accounts through computer-linguistic analysis of their information track.

Conclusion

Verifying the personal data of web users has become increasingly important in today's digital age due to privacy, security, and regulatory compliance issues. However, it can be a difficult task when users provide false or inaccurate information. To improve verification accuracy and efficiency, this article proposes a web data mining method based on content markers from a web community member's specialized dictionary. This method analyzes consolidated web data related to a user's data, including social media profiles and publicly available information. By using this method, false or inaccurate personal data can be identified. The benefits of this method are two-fold: it reduces the time and resources required for verification, making it more efficient and cost-effective for organizations and individuals, and it provides a more accurate and reliable way to verify personal data, improving privacy and security protection for web users.

Identifying web users' data is an important task that has significant implications for privacy, security, and compliance. The proposed method uses web content analysis techniques to improve the accuracy and efficiency of the verification process, providing a more reliable means of verifying personal data. The method is a valuable tool for organizations and individuals who need accurate and reliable verification of personal web data.

Limitations. Generating and analyzing digital content across various online platforms is challenging due to its sheer volume, diversity, dynamic user behavior, rapidly evolving trends, and constantly changing communication styles. Standardizing methodologies for content analysis is difficult due to the influx of new platforms and languages, which may lead to inconsistent or biased interpretations.

Outlining future research opportunities. An exciting avenue for exploring innovative techniques in data integration begins with this article. With digital ecosystems continuing to grow, future research will

explore the integration of various data sources, including social media, web browsing history, and mobile app interactions, to gain a more extensive understanding of user behavior. Using the power of big data analytics and advanced machine learning algorithms, researchers will uncover complex patterns and correlations within users' online activities. This will bring to light the intricate interplay between individual preferences, socio-demographic factors, and digital content consumption. By using emerging technologies, promoting interdisciplinary collaboration, and combining quantitative and qualitative methodologies, researchers access new dimensions of insight into web user behavior. This approach improves the accuracy of socio-demographic profiling and provides more profound insights into the underlying psychological and sociocultural dimensions that shape virtual identities and online self-presentation.

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Analyzing the Impact of Online Resources on Pet Care

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Abstract

Research background: The article discusses the relationship between humans and pets and the availability of online resources for pet owners in Ukraine and other countries. It also covers laws related to animal welfare and liability for animal cruelty.

Purpose of the article: The aim is to analyze the current state of online resources for pet owners and propose the development of a new information resource to facilitate the search for potential mates for pets.

Methods: The article employs a literature review of scientific and educational sources and an analysis of laws and regulations related to animal welfare. It also examines existing online resources for pet owners, such as websites, blogs, forums, and mobile applications, and compares the trends in the use of such resources in Ukraine and other countries.

Findings & Value added: The article finds that online resources for pet owners are in demand, and their number is increasing every year. The analysis of available information resources reveals a need for a system that would allow pet owners to quickly find potential mates for their pets. The proposed information resource would provide a platform for pet owners to publish information about their pets and to search for a friend for their pet. The article contributes to the development of the field of pet care in Ukraine by proposing a new tool that would be useful for pet owners.

Keywords: mobile application, online resources, pet care, online platform, innovation, internet

JEL classification: M3, O350, O350

1. Introduction

With each passing year, the number of pets in Ukrainian families is growing. A large number of people want to acquire elite breeds of pets and therefore are looking for a suitable match for them. Abroad, it is popular to find a match for your pet using special apps that contain potential pet profiles. In Ukraine, there are no such services, so it was decided to develop an online resource that would help people quickly find a match for their pet. In the contemporary world, pets are viewed as companions (Bowlby, 1970; Mohammed et al, 2022) and have explored the attachment and relationship between animals and humans. Pets play a significant social role in people's lives. Accordingly, people spend a lot of time, effort, and money on communication and appropriate care of their pets (Wicaksono et al., 2019), and therefore, it is necessary to develop various supporting information resources that will simplify the lives of their owners and improve the quality of interaction between them.

Researchers are investigating the benefits of having a pet for physiological, emotional, and psychological health (Hodgson & Darling, 2011; Krause-Parello, 2012). Every year, more and more people around the world have pets. The popularization of pets is evidenced by the following statistics: dogs are the most popular, owned by (33%) of respondents, cats (23%), fish (12%), birds (6%), and other types of pets (6%) are rated much lower (Growth from Knowledge, 2016). Unlike the European experience, mobile apps for pets and their owners have recently become popular in Ukraine. The functions of proper nutrition, medical services, care, and saving significant time for the animal are automated using

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mobile applications (Kumar et al., 2017; Luayon et al., 2019; Akbar&Purnama, 2023), such as AnimalID, 11Pets, Pet Care Diary, Dogo App, Petset, and Petsi. A comparative analysis of the advantages and functionality of mobile applications for animals and their owners is presented in Figure 1.

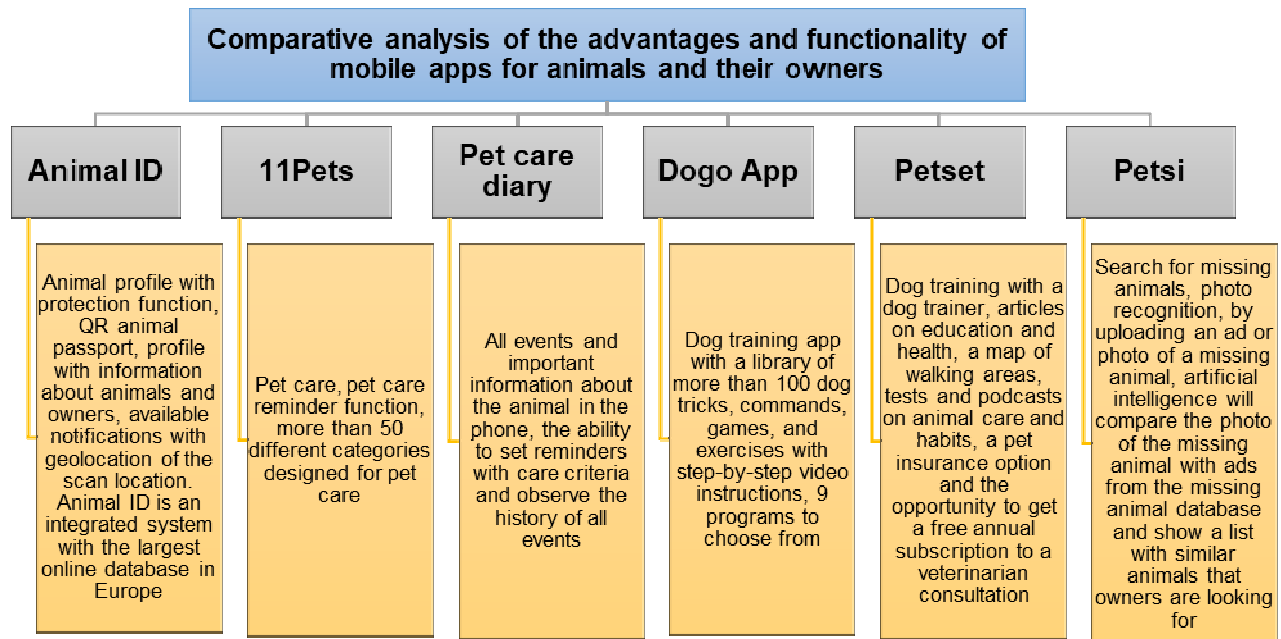


Figure 1. Comparative analysis of mobile applications for pet care
Source: own processing (2023)

To facilitate pet care, owners are presented with a large number of different applications that facilitate and help provide the necessary assistance to the animal in a timely manner. The analysis of applications for pet owners is presented in Table 1.

Table 1. Analyzing apps for pet owners

Apps mane	Number of active users	Evaluation of the app
Animal ID	100 000+	4*
11Pets	500 000+	4,6*
Pet care diary	500 000+	4*3
Dogo	400 000 000	4,8*
Petset	50 000+	3,8*
Petsi	10 000+	4*

Source: own processing (2023)

To protect your pet (dog or cat), you can use the Animal ID app. The apps will help you take care of your pets and keep track of important events related to them: 11Pets and Pet Care Diary. Dog training without a dog trainer is possible with the help of Dogo and Petset apps.

Raenu Kolandaisamy (Kolandaisamy, 2016) studied the issue of reducing the number of stray animals in Malaysia by introducing and creating a mobile application that is convenient and useful for use. The strengths and weaknesses of existing mobile applications for stray animals are described in Table 2.

Table 2. Analysis of the strengths and weaknesses of existing mobile applications for stray animals

Program title	Strengths	Weaknesses
Dogly	an attractive interface; the ability to share and explore, put and receive "likes" from other users; make a donation for the highest total love for the shelter each month	availability of functionality that cannot be shared on social media; some features (e.g., user account) are unstable; too many categories to throw users off their search, they can also upload photos
Doggy Rescue	able to search for animals by breed; ability to show a list of pets for adoption; allow sharing on social media sites	does not provide authorization; some functions (e.g., settings) are unstable; the complex interface, as there are too many elements in one interface; users are not allowed to upload pets for adoption
Dog Finder	able to search by breed is allowed; city selection is allowed; sharing in a social network is allowed	incapable functions that are unable to search, view information about animals, etc.; no permission is granted; confusing interface as there are no categories

Source: own processing (2023)

Each program is adapted for one main goal - to reduce the number of stray animals in the world. In Ukraine, the number of stray animals has decreased over the past 10 years, but their presence can still be found in markets, neighborhoods, and garbage dumps, and this needs to be addressed. Yarlykova (2018) describes Ukrainian organizations involved in animal protection in different cities of Ukraine. The organizations include various charitable foundations and projects, volunteer animal protection societies, and animal shelters. Unfortunately, pets are not protected by Ukrainian law, so cases of animals being thrown out on the street are common. The Internet is a popular source of information for human and animal health (Fernandez et al., 2019; Odeh&Hijazi, 2023; Varshney & Vetter, 2002), but the information it provides is not always completely truthful and verified. Pet owners use the Internet to get information about the health and care of their pets more often than they use information from their veterinarians. It can be said that pet owners most often look for information about the health and medical problems of 61.3% of their pets and the nutrition and diet of 58.5% of their pets. Despite the fact that pet owners often use the Internet to find relevant information about their pet, they also discuss it with their veterinarian, 40.5% compare the information with other websites, 27.3% consult friends and family, and 13% check with another source. Animals are treated responsibly abroad, just like people. 45% of American owners spend the same amount of money as themselves or more on medical care and grooming for their pets. In Ukraine, this trend is present, but unlike in the United States, the figures are quite low. According to statistics from Statista (Bedford, 2022), shown in Figure 2, the annual spending on the pet industry in the United States increased significantly from 2005 to 2021.

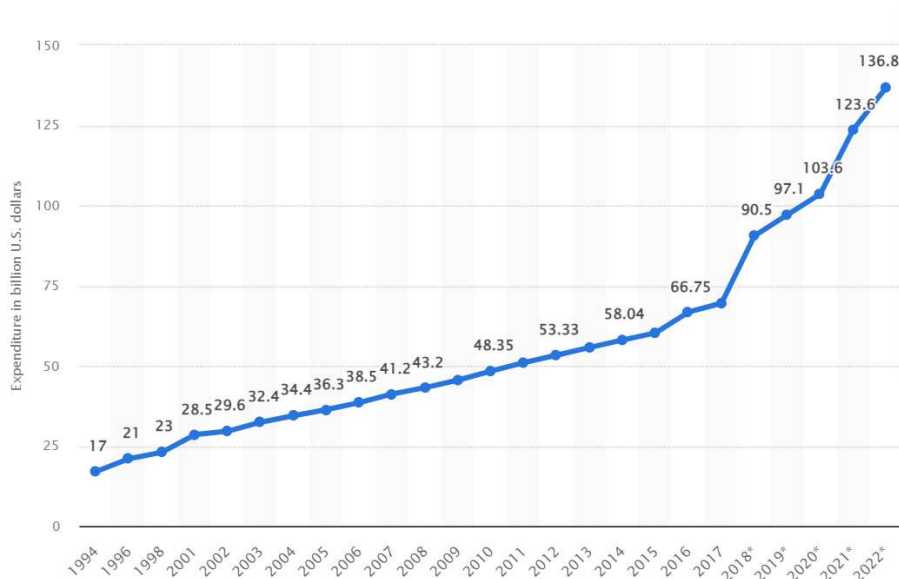


Figure 2. Pet industry expenditure in the United States from 1994 to 2022(in billion U.S. dollars)
Source: Statista (2022)

The increase in pet ownership in the United States has led to a rise in spending on the pet industry in recent years. Over the past decade, the amount of money Americans spend on pets has more than doubled, from \$50.96 billion to \$123.6 billion a year. In 2021, \$50.0 billion of the total amount per year was spent on food and medicine, \$29.8 billion on supplies, pet purchases, and over-the-counter medications, and another \$34.3 billion on veterinary care and sales of products, as well as \$9.5 billion on other services (APPA, 2022). Every year, American citizens spend more and more money on keeping animals, and the popularity of animals is growing there. Given this popularity, owners use web-based pet care applications (Wang et al, 2018; Rafida, Arfyanti, & Hidayat, 2022; Uddin, 2022) and therefore the development of such applications is relevant.

Using mobile applications and websites in pet care services and business perspective.

Pet care businesses can benefit greatly from mobile apps and websites, which provide a direct line of communication to their customers. These platforms offer features such as real-time appointment scheduling, virtual consultations, and personalized pet profiles, all of which help to build stronger relationships and improve customer loyalty. ICT solutions streamline operations through online booking and payment systems, inventory management, and automated appointment and medication reminders. This not only reduces administrative burdens but improves the overall customer experience.

Mobile apps and websites generate valuable data on user behavior, preferences, and trends. By leveraging this information, businesses make informed decisions, tailor their services, and create targeted marketing campaigns. Data analytics also enable businesses to monitor and optimize their performance over time. However, not all pet care businesses have the technical expertise required for app or website development and maintenance. Overcoming these barriers requires investing in skilled personnel or outsourcing to technology partners. Collecting and storing sensitive customer and pet data poses potential risks. Therefore, businesses must prioritize robust cybersecurity measures and comply with data protection regulations to safeguard user information. Encouraging pet owners to adopt new technologies is challenging. Clear communication about the benefits of using mobile apps and websites, along with user-friendly interfaces, is crucial to drive adoption.

Mobile apps and websites offer personalized recommendations, pet health insights, and reminders tailored to individual pets' needs, which enhances the value proposition for pet owners. Integrating e-commerce functionalities expand revenue streams beyond traditional services.











Emerging technologies, such as IoT-enabled devices and wearables, enable pet owners to monitor their pets' health remotely. Businesses capitalize on these trends by offering related services and support. By leveraging enhanced customer engagement, operational efficiency, data-driven insights, and a commitment to addressing challenges, pet care businesses establish a robust digital presence that augments their overall success. Technology plays a pivotal role in fostering growth and enriching the lives of pets and their owners in the digital age.

2. Methods

In Ukraine, there are a large number of information resources for pet owners and pet lovers, including, for example, categorized websites, phone apps, social media communities, blogs, and forums for pet owners.

P2Pforum is a conference for pet owners and pet industry professionals (held once a year). At the conference, specialists from various pet industries (veterinarians, pet behaviorists, caregivers, animal psychologists, and nutritionists) talk and advise owners on the proper maintenance and care of pets, on the behavior and nutrition of cats and dogs, and on their physical education. It is a place of like-minded people and many hours of communication between participants, guests, and speakers of the conference. Its goal is to increase and provide high-quality and relevant information to owners to improve the understanding between them and their pets. For those who love elite animals, there is an online club called Zooclub. This information resource contains a lot of different and useful information on various topics for dog and cat owners. It has sections: All for Dogs, All for Cats, Exotics, and Pet Services. Animal owners and lovers are provided with information on: breeds and sales of cats and dogs, exhibitions, and data on kennels and breeders. There is a forum for people to communicate and interact with each other, which has many different sections for communication, and it is also a great resource for getting the information that pet owners and lovers need. The variety and ranking of websites for pet owners in Ukraine, which are presented in the web service Similarweb (Similarweb, 2021), is shown in Table 3.

Table 3. Rating of websites about pets











Ranking	Website name	Category	Time of visit	Average page traffic	Bounce rate
1	 Masterzoo.ua	Pet store	00:03:33	4,39	57,37%
2	 Fishmarket.org.ua	Goods for fish	00:03:45	5,89	50,91%
3	 Trixie.kiev.ua	Goods for pets	00:09:22	14,23	23,85%
4	 Happypaw.ua	Homeless animals	00:01:34	3,47	69,34%
5	 Optimeal.eu	Pet food	00:01:14	1,75	72,71%
6	 Usnasuperbio.com.ua	Goods for farm animals	00:01:06	1,46	85,48%
7	 Royalcanin.com.ua	Food for dogs and cats	00:01:15	1,70	67,09%
8	 Basalt.net.ua	Veterinary medicines for animals	00:01:55	1,95	59,48%
9	 Club4paws.com	Care for dogs and cats	00:01:08	2,93	47,13%
10	 Zoocomplex.com.ua	Pet store	00:01:16	2,21	75,28%

Source: own processing (2023)

The highest average page traffic on the sites: Masterzoo.ua, Fishmarket.org.ua and Trixie.kiev.ua. The lowest traffic on the sites: Club4paws.com, Usnasuperbio.com.ua and Optimeal.eu.

According to the statistics of the Similarweb web service (Top Websites Ranking, 2022), Tablebws 4 presents a ranking list of websites for pets and other animals in the world.

Table 4. Ranking list of websites for animals in the world

Ranking	Website name	Category	Time of visit	Average page traffic	Bounce rate
1	 Chewy.com	Pet food and supplies	00:04:15	5,86	46,22%
2	 Petfinder.com	Pets	00:05:21	7,69	42,73%
3	 Petco.com	Pet food and supplies	00:03:06	3,86	49,14%
4	 Petsmart.com	Pets	00:03:31	3,76	48,89%
5	 Dopebox.to	Pet food and supplies	00:09:33	4,58	32,56%
6	 Racingpost.com	Pets / horse racing	00:11:59	10,67	31,26%
7	 Wamiz.com	Pets	00:01:05	1,64	55,18%
8	 Ironsourc.mobi	Food and other products	00:00:27	1,24	55,36%
9	 Akc.org	Pets	00:01:59	2,26	71,74%
10	 Kiddl.com	Pets / birds	00:01:38	1,64	71,91%

Source: own processing (2023)

Popular pet websites in 2022 are Chewy.com, Petfinder.com, and Dopebox. The average amount of time a user spends on a website is 4 to 9 minutes, and they see an average of 4.58 to 7.69 pages per visit, and 32.56% to 46.22% of visitors leave the website after viewing only one page. Racingpost.com has the longest visit duration of almost 12 minutes, with an average number of page views of 10.67. It has the lowest abandonment rate of the entire ranking, with 31.26% after viewing the first page. Every year abroad, the tendency to arrange a private life for a pet is increasing through online applications, unlike in Ukraine. The most popular online pet dating apps in Europe are Tindog and Fetchadate, and there was also Pinder, which is now on hold because Tinder closed it for being associated with it or any of its subsidiaries.

Tindog is similar in name and functionality to the human dating app Tinder, but it is designed for dogs only. FetchaDate is an information service that allows you to select a potential match for your pet based on certain criteria. Each of the selected apps is interesting and useful. Their functionality meets the requirements of users and is easy to use, which makes them popular among others.

3. Results

The completed questionnaire on the Pet-dating website is used to generate posts on the Pet Profiles page. The data from this questionnaire is sent to the Crowdsignal.com website, where in the Results menu, in the Overview item, you can see the number of completed surveys - 14, the completion rate - 88%, and the number of incomplete surveys - 2. A world map is shown showing the countries from which the completed questionnaire was sent. The right side of the page shows information about the most recently completed surveys. The page with the overview of completed questionnaires is shown in Figure 3.

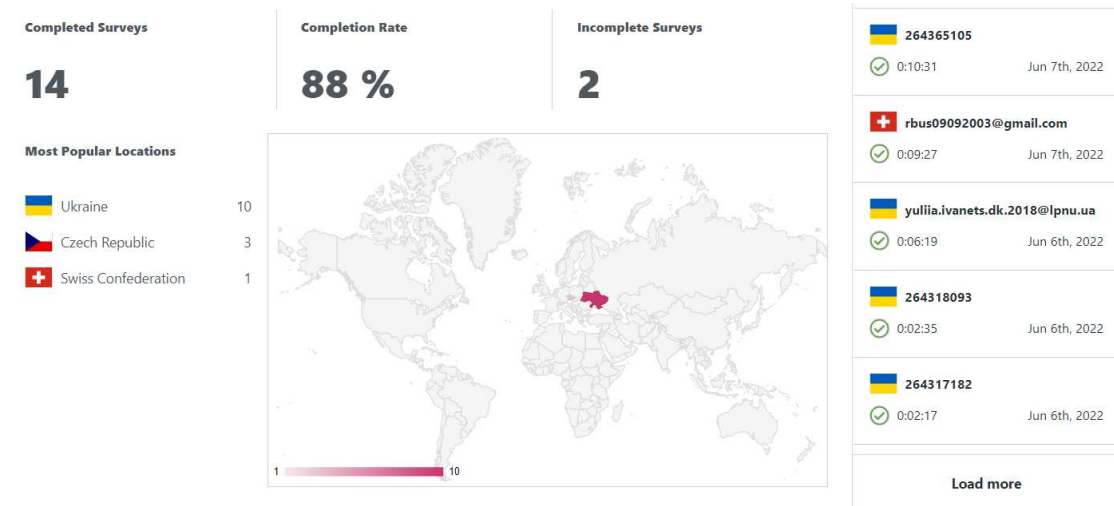


Figure 3. General overview of the survey results
Source: Crowdsignal.com (2023)

To see the data from the questionnaire, go to the Participants section and click View Answer next to the participant's name, where a summary of the answers will open. To ensure high-quality and fast website promotion (Pawade, 2021), you will need to analyze the target audience and choose methods of its popularization. All this will be decided later, not at this stage of work. Analyzing all the data from the questionnaire provided by the owner, you can create a post about this animal on the Animal Profiles page. The Blog page has been selected from the template, to edit it, you need to click on the image, after which the editor will open and you can enter your information. The display of the post template has been changed to Large Tile in the Style section. The created posts with pet profiles that are posted on the Pet-dating website are shown in Figure 4. Using the Nibbler tool to analyze and check the effectiveness of the Pet-dating website, the program generated a report for the site. It showed the overall score of the site in terms of Accessibility and Technology.

Nibbler SEO audit for pet-dating2.webnode.com.ua

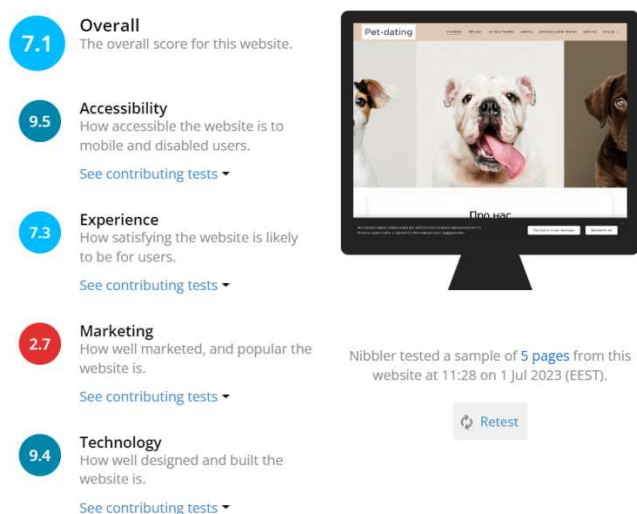


Figure 4. Website accessibility and overall rating according to Nibbler
Source: Nibbler (2023)

The Pet-dating website is perfectly optimized for mobile viewing, but its popularity is still low because it is a newly created website. To improve the site, you can connect to Google Analytics and register a Twitter account, and you need to improve the quality of incoming links to the site. The study presents the implementation of the task of creating a dating site for animals called Pet-dating (<https://pet-dating2.webnode.com.ua>). The results obtained from the questionnaire on the Crowdsignal.com website was analyzed and the effectiveness of the created website was analyzed in the Nibbler program.

To create an online Pet-dating resource, a good technological solution is to use website builders, which are online services that help you create a full-fledged website without knowledge of programming languages. Using ready-made templates, blocks, and elements, users can make their resources unique and develop their own designs by editing elements according to their own requirements. Advantages of using online website builders: speed of development of a software solution, functional simplicity, lower development cost, and availability of support service. Analysis of existing services for creating online resources without programming knowledge. SitePro is a free website builder with more than 200 templates on various topics. The functional part is simple and understandable even for beginners, and thanks to the site's adaptability, the online resource will work both in a browser and on mobile devices. The builder uses the drag-and-drop function. The advantage of SitePro is the use of your own domain name and the ability to transfer the site to your own hosting.

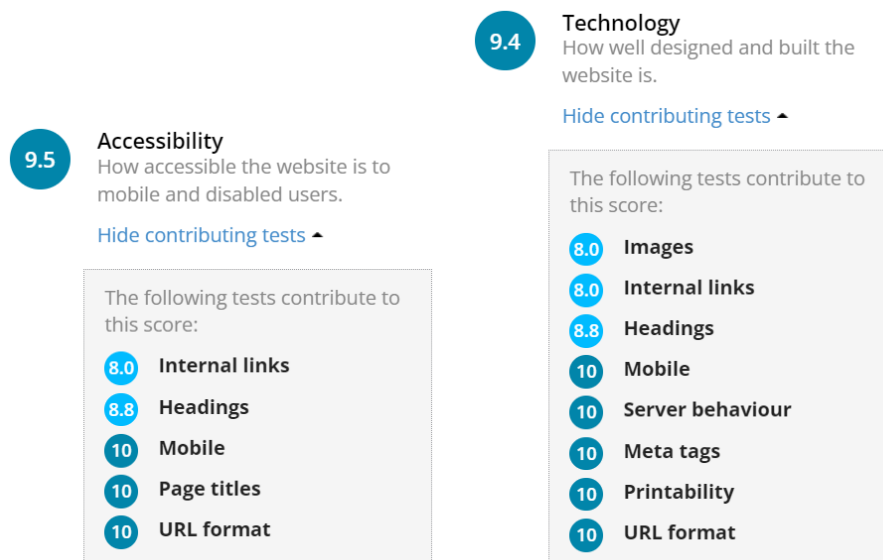


Figure 5. Accessibility and Technology analytics according to Nibbler
Source: Nibbler (2023)

Wix is a professional, popular, and multifunctional website builder that can be used by a person with no experience in web development and an experienced developer (using the Corvid developer mode). The platform has a wide range of tools, it is possible to connect your own databases and choose the way to create a website, using Wix ADI artificial intelligence or using design templates.

Weblium is a classic online platform for creating a website without knowledge of programming languages. The use of templates and artificial intelligence will help to automatically customize the appearance of the website and speed up its creation. The intuitive interface, wide functionality, and speed of creating an online resource are the advantages of Weblium.

Jimdo is another option of a simple and intuitive website builder for creating a free website. The platform has a large number of templates and they are interchangeable, which makes it possible to switch to other templates. Also, not the entire template can be edited, when you select it, you can see which parts can be changed and which cannot. The Jimdo builder is best suited for creating online stores. Its disadvantages are that it is inconvenient to edit small objects and the view of existing templates is poor.

Bloxy is a service for creating websites on the Internet quickly and easily. The website builder pre-designs website pages in sectional blocks that already contain a ready-made set of designs, and you only need to edit the graphic and textual material according to your own requirements. The Bloxy platform uses more than 800 available and accessible sections, which saves time in website development because each of the blocks performs its own task.

Nethouse is a popular website builder that is simple and easy to use and is well-suited for commercial websites. The wide functionality of the builder and a large selection of templates allow users to create any type of website, develop their own design and have their own domain. Webnode is a full-featured free website builder with drag-and-drop capabilities and an available HTML editor. The platform is popular, as evidenced by the fact that they have over 30 million users. The website builder can be used in 20 different languages. The advantages of using the Webnode service are more than 500 templates in the database, not loaded interface, integration with Google Analytics, a user-friendly editor, and integration into social networks.

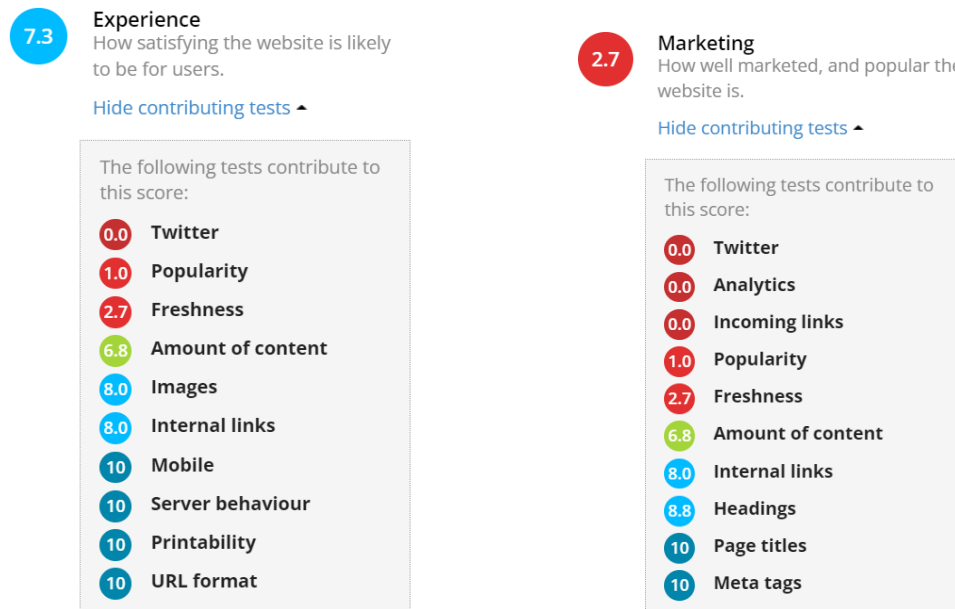


Figure 6. Experience and Marketing analytics according to Nibbler
Source: Nibbler (2023)

Based on the analysis of various website builders, the Webnode platform was chosen to develop the Pet-dating online resource. To fill in the first column, we added text describing the purpose of this application. Next, we uploaded a photo of the application and configured it, setting a link to download it from Google Play and its name. Following similar steps, 5 such publications were created, on different topics, including mobile applications for pet owners.

4. Discussion

Online resources (Nicholas, Crook, & Sargan, 2011) are a powerful tool used to improve pet owner education and positively impact pet welfare. Information on the Internet can positively or negatively influence an owner's decision, so determining its reliability and veracity is crucial. When researching various information resources for pet owners, we can say that they are in demand among owners. The number of such online resources on the Internet is increasing every year (Molnár, Molnár, Kryvinska & Greguš, 2014; Laszig, 2000). Owners can choose from a wide variety of websites, blogs, mobile applications, and forums that provide them with the necessary information and assistance in caring for their pets. Trends in the use of such online resources in Ukraine and abroad differ; it is more popular abroad than in our country, but now such resources are gaining momentum among users in our country. The number of breeders in Ukraine is increasing, and therefore the number of people who want to buy a purebred animal is increasing, but it is difficult and expensive to keep such an animal. Constant communication with the veterinarian can significantly affect the owner's budget. If you are planning to get a purebred dog or cat, it is better to contact a specialist, namely a breeder, who will tell you which breed to choose, tell you how to properly care for the animal, and answer any questions.

Caring owners care about the life of their pets and their future offspring. Searching for a match for your pet on the Internet, among friends, etc. takes a lot of people's time, and these searches may not always be successful. The analysis of available information resources shows that there are many different resources for animal care that help the owner in this, but there are none that could facilitate the search for a future partner

for their pet. A system that will allow the owner to quickly find a potential match for their pet is needed. Animal profiles will be all in one place, with the owner's contact information for further communication, which will be a great solution to the information problem for the pet owner. Users will not only be able to search for a friend for their pet but also provide information for publication about their pet. Such an information resource is needed and useful in Ukraine, and it will be popular among pet owners. Users choose online resources to use based on the principles of reliability, efficiency, security, and integrity. To create such a resource, it is better to develop a website because there are significant advantages, such as complete freedom of action on the site, independence, creation of your own comfortable interface, development of an individual design, and the ability to implement your own rules, rather than agreeing to the rules of a social network. After researching a variety of online information resources for pet owners, it was determined that a website should be developed. As there are no similar analogs in Ukraine, the popularity of animals in Ukrainian families is increasing every year, so people are looking for help and answers to their questions on the Internet. Abroad, most people use mobile applications for animal care.

Conclusion

The result of the work is an analysis of existing mobile applications for pet owners and the development of an online resource that would facilitate the search for a potential match for a pet owner. The developed analytical review showed the general state of the subject area related to animals and information. The online resource Pet-dating is an interesting and original solution for pet owners that will promote their pet on the Internet, communicate with other owners and establish their pet's personal life. This resource will simplify and save search time for the owner, as all pet profiles are in one place. The Pet-dating website contains useful, reliable, and relevant information for pet owners. The Animal Profiles page contains potential publications with data about the animal that came from the questionnaire filled out by the owners. Users will be able to send their suggestions and wishes for improving the site's functioning.

Limitations. The study's focus on online platforms inadvertently excludes segments of the population with limited internet access or technological literacy, that overlook a significant portion of pet owners who rely on alternative means of seeking information and companionship for their pets. The rapidly evolving nature of technology and online trends render the study's results to temporal obsolescence, potentially requiring frequent updates to maintain relevance.

Possibilities for further research in the future. Future research endeavors address understanding the development dynamics between pet owners and online resources. Investigating the potential barriers and opportunities for inclusive access to online resources would contribute to more equitable dissemination of pet care information. Assessing user satisfaction, successful pet pairings, and any unintended consequences would provide a holistic assessment of the resource's effectiveness and implications for the broader pet care landscape.

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Digital Technologies as a University Competitiveness Factor in the 21st Century

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Abstract

Research background: A specific feature of the 21st century is the digitalization of all processes of civilization development. The higher education system is at the centre of these processes, as it plays a key role in the formation of future generations, and the formation of specialists with competencies for the current and future needs of the labour market.

Purpose of the article: The article is devoted to the assessment and analysis of the level of development of digital processes in Slovakia and Ukraine as an external environment for the activities of the university, as well as the development of a model for the transformation of a traditional higher education institution into a digital university.

Methods: Research methods are systematic and conceptual approaches, methods of monographic and comparative analysis, methods of analysis and synthesis, statistical methods, and visualization tools.

Findings & Value added: It is substantiated, that the processes associated with COVID-19 and the total instability of the world development have become a trigger for significant changes in the practice of doing business and social institutions, in particular universities.

The study focused on the evolution of the development of the global higher education system from the aspect of the transformation of a traditional university into a digital one. A conceptual model for the implementation of digital technologies in the areas of the university's activities has been developed, which creates competitive advantages for it. Data from the World Bank and the UNESCO Institute for Statistics (UIS) were applied.

Keywords: global educational system, innovation-active university, digital technology, conceptual model, index

JEL classification: E02, F01, I21, I23, O57

1. Introduction

The modern world is a world of global transformations that take place in all spheres of the life of civilization. These transformations are of global nature, radically changing the methods, approaches, and tools for the functioning and management of all socio-economic systems, bringing to life the effect of fragmentation of the world. As experts of the World Economic Forum in Davos (2023) note, today the world is at the point of a systemic crisis caused by significant technological and technical innovations that provoke immediate and significant changes (WEF Annual Meeting, 2023). The emergence and spread of the digital society phenomenon have created certain challenges that require bold and collective action to adapt modern business and society to the new conditions for the development of civilization.

The global processes of the Covid-19 pandemic and the increase in the level of global political instability, for example, the Russian-Ukrainian military conflict, have become a trigger for the rapid diffusion of digital technological innovations into all areas of socio-economic development. Today, technology has become an important means that connects people with each other and enables effective business interaction by offering hybrid forms of cooperation.

As it was emphasized in the World development report 2016 "Digital Dividends", digital technologies are rapidly spreading in most countries of the world. However, they provoke different consequences (World development report, 2016). In some countries, they stimulate economic growth,

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expand opportunities, and improve the provision of a variety of services (including educational ones), in others, they deepen the unevenness of society and increase the polarization of the labour market and the digital divide, especially in the field of Internet access. We talk about the digital maturity of society and the readiness of the government to create an effective legislative environment and technical capabilities to stimulate and implement digital technologies in all areas of society by adapting the workers' skills to new requirements.

Under these conditions, the global system of higher education plays a key role as it creates specialists with new competencies for the new requirements of the labour market. Higher education systems form the foundations of digital literacy of future specialists; they develop young people's skills when working with digital technologies and science, engineering, and mathematics, and form the ability to apply critical thinking when working with data. This has been confirmed by the labour market requirements. According to the forecasts of the US Department of Labor, the most of the 20 fastest-growing professions in the decade 2016-2026 will require digital knowledge and skills from their workers. The European Centre for the Development of Vocational Training (Cedefop) has determined that in the EU in the next decade (2020-2030) an 11% increase in the employment of workers in professions related to information and communication technologies is to be expected (World Economic Forum, 2023). All this forms a research problem, namely, the search, creation, and implementation of new conceptual frameworks, paradigms, tools, mechanisms, and models for the transformation of a traditional university into a digital, innovatively active university.

To achieve the above goals, a systemic transformation of all types of university activities is required based on the widespread introduction of digital technologies and new ways of interaction between participants in the educational process. Higher education institutions should have an elevated level of sensitivity to digital innovations and should work ahead of labour market demands, considering the lag structure of the educational process. It depends on the level of their readiness for such changes, that is, the possibility of developing new curricula or increasing the relevance of current curricula, introducing pedagogical innovations and new forms of conducting the educational process, including the readiness of teachers to update their personal digital skills and knowledge. Besides, the level of development of the digitalization of society as an external environment for the activities of universities, which creates opportunities for the effective diffusion of digital technologies into all processes of universities, has a significant impact.

The article is devoted to the assessment and analysis of the level of development of digital processes in Slovakia and Ukraine as an external environment for the activities of the university, as well as the development of a model for the transformation of a traditional higher education institution into a digital university.

1.1 Literature review

The analysis of digital trends in the world development and modernization of higher education system is the subject of research and development by both individual researchers and world organizations.

The study (Trier et al., 2023) is dedicated to the analysis of the spread of digital technologies and processes in society. The authors note the deep penetration of digital tools into all spheres of human activity. Researchers (Senyo et al., 2019) are studying the emergence of digital business ecosystems which are a socio-technical network between organizations and technologies and together they create new value for society.

To study new trends in the development of higher education system, Horizon group experts analysed changes in five main areas - social, technological, economic, higher education, and political (EDUCAUSE, 2020). Social trends include Well-being and mental health, Demographic Changes, and Equity and Fair Practices. Technological trends include Artificial Intelligence, Next-Generation Digital Learning Environment, Analytics, and Privacy Questions. Universities that seek to strengthen their competitive advantages in the national and international education markets quickly respond to technological innovations and, therefore, their transformation corresponds to the trends of civilization transformations. Economic trends reflect the modern mission of universities as innovative and active organizations that have a significant impact on the development of the economy, the environment, and the future development of civilization. Within higher education trends, the experts single out "Changes in the student body", "Alternative paths to education", and "Online education". The trends identified in the EDUCAUSE Horizon Report define the specific features of a future model of higher education and highlight the need for new techniques, practices, and teaching and learning tools.

The authors (Bettinson et al., 2023) explore the relationship between the quality of higher education and its value to potential employers and business school graduates. Based on the establishment of an idiosyncratic connection between the definitions, it is determined that quality is the internal side of the activity of the university, and the value of higher education is created in the client area. The values of higher education for individuals, the economy, and society are highlighted in a study (Varblane, 2022). Against the backdrop of significant social transformations, the landscape of higher education is changing significantly and is determined by four main trends - digitalization, internationalization of education, individualization and flexibility of the form, place, and time of education, as well as the increasing role of universities in solving the problems of society development.

The authors (Ferede et al., 2023) investigate the impact of information and communication technologies on the quality of education in developing countries, in particular, in Ethiopia. The results show that the impact is positive but not strong enough to fundamentally change the existing approaches and methods of education in the country.

An important moment in the transformation of a traditional university into a digital one is its readiness for the widespread introduction of digital technologies in all areas of its activity.

The article (Cai et al., 2023) is devoted to the study of the features of a sustainable entrepreneurial university in new innovative ecosystems, highlighting its main roles and advantages over traditional universities. Organizational and administrative changes in the entrepreneurial university are studied by the authors (Tuunainen et al., 2023). The authors analyse the political and economic conditions of society and identify effective managerial methods of communication at universities.

As a result of studying the causes and trends of inequality between countries and within countries, the article (Hill et al., 2018) emphasizes that higher education in the conditions of expansion of digitalization in the educational process (via online / distance education) acts in a new function - as a means of the economic well-being of the population of countries. This thesis is substantiated by the specifics of the current stage of development of the world system of higher education - the digitization and the mass character of higher education.

The authors (Joosten et al., 2020) identified seven major and three secondary trends in digital education innovation. The main trends include Adaptive Learning, Open Education, Gamification and Massive Open, Resources Game-based, Learning Online Courses, Learning Management Systems (LMS), and Interoperability, Mobility, and Design Mobile Devices. Blended learning, dashboards, virtual reality, and artificial intelligence were noted as secondary trends. The trends are based on various digital innovations in the educational process.

The study (Matt et al., 2015) emphasizes that regardless of the type of activity, the organization is characterized by 4 specific elements - the use of technologies, changes in value creation, structural changes, and financial aspects. The financial aspect acts as both a driving force and a limitation of these transformations. In the context of a significant reduction in budget funding, universities are faced with the need to transform into entrepreneurial organizations that must seek their own sources of funding for their functioning. The article (Zhou et al., 2023) is devoted to the main aspects of the adaptation of digital technologies in higher education in the context of the Covid-19 pandemic. It has been proven that the digitalization of the educational process stimulates the skills of teachers and students but has positive and negative consequences. Wahab (2020) concluded that universities around the world are increasingly moving to online learning or e-learning in the new conditions for the functioning of universities. In these conditions, in addition to resources, the readiness of staff, confidence, accessibility, and motivation of students play a vital role.

Thus, a comparative analysis of various sources led to the conclusion that a characteristic feature of the development of the higher education system of the 21st century is the digitalization of all areas of the university, which proves the relevance of the research goal.

2. Methods

To achieve the goal of the study, it is necessary to solve the following tasks:

- a) Form the methodological basis of the study, namely a set of hypotheses and a conceptual model.
- b) Build a portrait of the development of digital processes in Slovakia and Ukraine, conduct a comparative analysis of the ranking places of countries.
- c) Build a tuple model of an integral indicator for assessing the level of digitalization of processes at the university.

As the literature review showed, the process of transforming a traditional university into an entrepreneurial digital university is a complexly structured process that requires diverse research.

The study is based on the following hypotheses:

Hypothesis 1: The world and national systems of higher education should be sensitive to modern trends in the development of civilization and society. This reflects their key role in the process of shaping the future development of the economy and society.

Hypothesis 2: The university is the main component of the higher education system and the competitiveness of the entire higher education system of the country depends on the quality of its activities.

Hypothesis 3: The transformation of a traditional university must comply with global trends in the development of the economy and society, and, with digitalization trends.

Hypothesis 4: The formation of an entrepreneurial-type digital university depends on the digital maturity of society, the readiness of the university to implement digital transformations, and create new digital skills.

Hypothesis 5: The transformation of a traditional university into a modern innovation-active organization requires the development of a change in the management system and effective assessment and analysis instrumentation.

Research methods are systematic and conceptual approaches, methods of monographic and comparative analysis, methods of analysis and synthesis, statistical methods and visualization tools.

The conceptual model of the study is shown in Figure 1. To determine the labour market preferences, the study used the Future of Jobs Report 2023; and international digitalization indices for the period 2013-2021 served as the basis for determination of digitalization trends and digital maturity in Slovakia and Ukraine. To assess trends in the development of the external environment, two indices were utilised - IMD World Digital Competitiveness Ranking, created by the International Institute for Management Development (Switzerland), and The Cisco Digital Readiness Index, developed by Cisco to holistically measure the level of digital readiness of the country. Table 1 includes the characteristics of the indices.

Table 1. Characteristics of the Global Competitiveness Index and The Cisco Digital Readiness Index

Purpose of analysis	Number of countries	Index components
IMD World Digital Competitiveness Ranking		
The index measures the capacity and readiness of countries to adopt and explore digital technologies for economic and social transformation	64	Knowledge, Technology, Future Readiness Uses 52 indicators
The Cisco Digital Readiness Index		
This index assesses the level of readiness of countries for digital transformation and shows a relationship between digital readiness and GDP per capita demonstrating the importance of economic value and digital readiness.	146	Basic needs of the population, Human capital, Favourable environment for doing business, Business and public investment, Environment for start-ups, Technological infrastructure, Technology adoption

Source: compiled by Rayevnyeva based on [IMD World Digital Competitiveness Ranking 2022, Digital Readiness Index, 2023]

Management of digitalization processes at the university is impossible without effective economic and mathematical tools. Therefore, the study proposes to use an integral indicator of the level of digitalization, the calculation of which is based on the level of development method (Плюта, 1989).

The choice of this method is justified by the following considerations. The process of digitalization of the activities of the university is a complexly structured process that includes all types of activities of a higher educational institution. Each activity type is described by a variety of indicators, which, using the method of mathematical convolution, can be represented by one indicator. This indicator, on the one hand, will include the overall influence of a range of factors, and on the other hand, its dynamics can be interpreted as a trend in the development of digital processes at the university. Besides this, integral indicator has a good economic interpretation due to its scaling. The values of this indicator vary between [0 ÷ 1], and the greater the value of the integral indicator tend to 1, the higher is the level of digitalization of the university's activity processes. Formula (1) presents the tuple type of the proposed indicator:

$$I_{digital\ total} = \langle I_{knowledge}, I_{technologies}, I_{readiness} \rangle \quad (1)$$

where $I_{digital\ total}$ - General integral indicator, which reflects the level of development of digitalization processes at the university;

$I_{knowledge}$ - Local integral indicator for assessing the digitalization of the quality of education;

$I_{technologies}$ - Local integral indicator for indicator for level of introduction of digital technologies to the process of university activity;

$I_{readiness}$ - Local integral indicator for evaluating the readiness of the university for digital transformations.

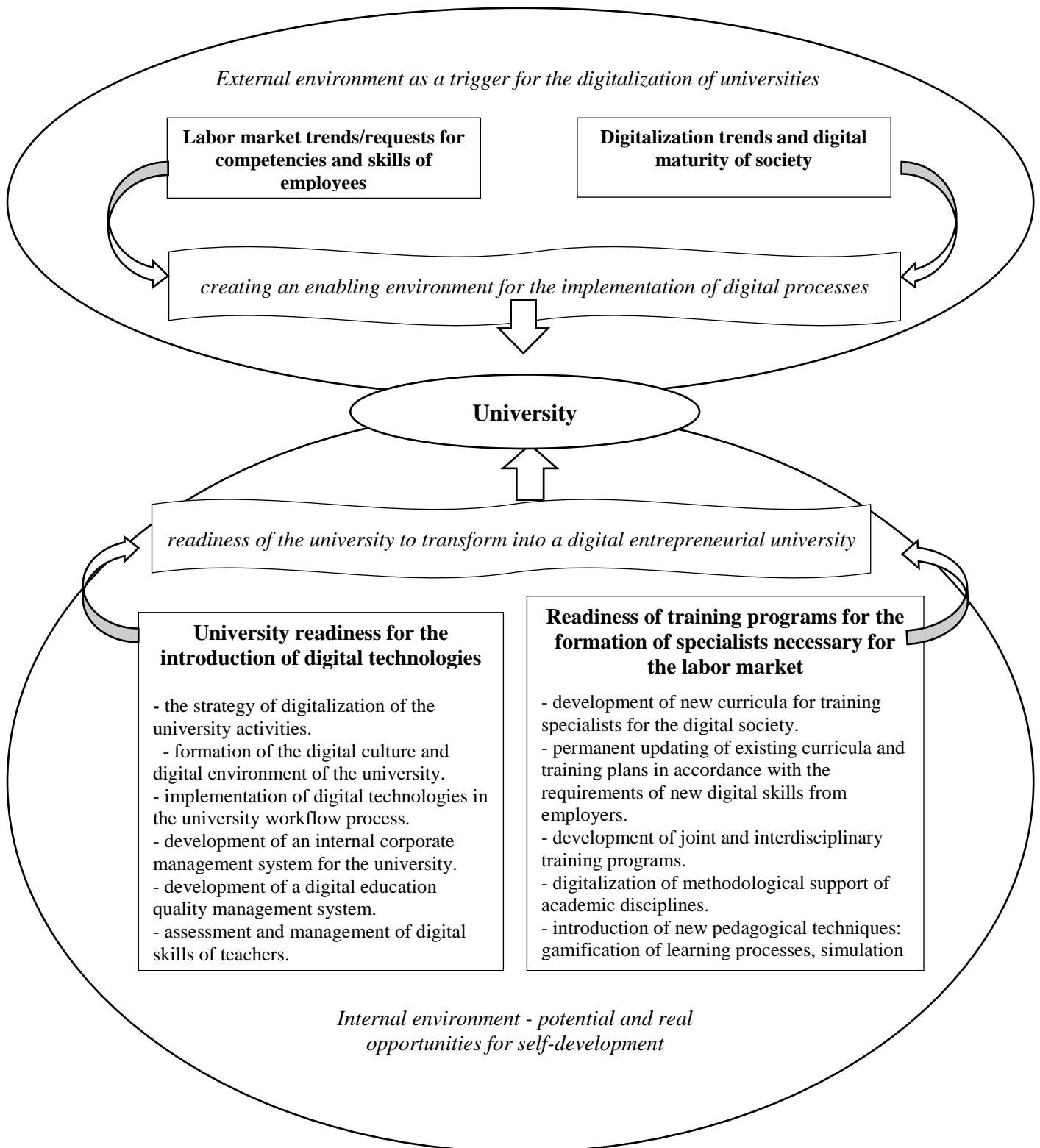


Figure 1. The conceptual model of the study

3. Results

In the context of the global digitalization of all processes, the requirements of the labour market for the necessary professions and skills are changing significantly. Based on a survey of enterprises and organizations, groups of professions with growing, stable, and declining demand from business structures were identified, as well as key skills that future specialists should possess (Table 2).

Table 2. Needs in professions for the next 5 years

Key roles for business transformation		
<i>Roles/Professions</i>	<i>European growth</i>	<i>Global growth</i>
Business Development Professionals	28%	24%
General and Operations Managers	17%	14%
Assembly and Factory Workers	18%	17%
Business Services and Administration Managers	20%	17%
<i>Roles/Professions</i>	<i>European decline</i>	<i>Global decline</i>
Managing Directors and Chief Executives	20%	17%
Accounting, Bookkeeping and Payroll Clerks	32%	29%
Administrative and Executive Secretaries	35%	35%
Core skills		
Self-efficacy	27%	23%
Cognitive skills	25%	26%
Technology skills	14%	16%

Source: compiled by Rayevnyeva, based on [Future of Jobs Report 2023]

Table 2 shows that a specialist who will be in demand on the labour market in the next 5 years should combine soft and hard skills, and technical skills are a priority among hard skills. They are directly related to new digital technologies and means of visualizing business results. In addition, according to the results of a study by experts from the World Economic Forum for 2023, the key role and the 1st place among all skills is occupied by Analytical thinking, which combines a combination of soft and hard skills. 68% of surveyed enterprises indicated that this skill is the core skill of their business employees, 72% of enterprises diagnosed that Analytical thinking increases the value of an employee in the company, and 42% of companies believe that this skill is a priority in employee development programs. Therefore, the university must be prepared to provide students with the acquisition of these skills.

With the aim to build a portrait of the digital maturity of Slovakia and Ukraine, the study used world rankings to assess the digitalization processes of countries. Figure 2 presents a comparative description of the level of development of digitalization processes in Slovakia and Ukraine using the IMD World Digital Competitiveness Ranking for the period 2013-2021.

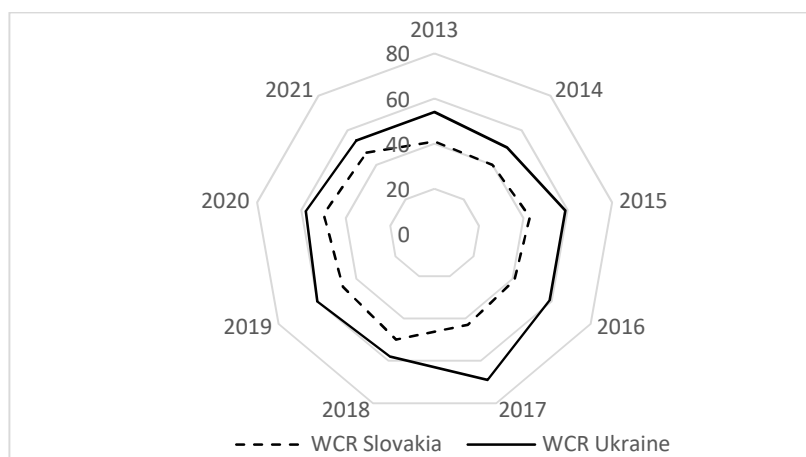


Figure 2. Comparative description of the level of development of digitalization processes in Slovakia and Ukraine

Source: compiled by Rayevnyeva based on [IMD World Digital Competitiveness Ranking. 2017, 2021]

This index is calculated for 63 countries, Slovakia and Ukraine are included in the cluster of countries with a ranking below the average. This means that both countries need to intensify these processes, create favourable conditions for all business entities to introduce digital technologies into their activities.

To determine the strengths and weaknesses of countries, we will analyse the components of this index. Figure 3 shows the situation in Slovakia.

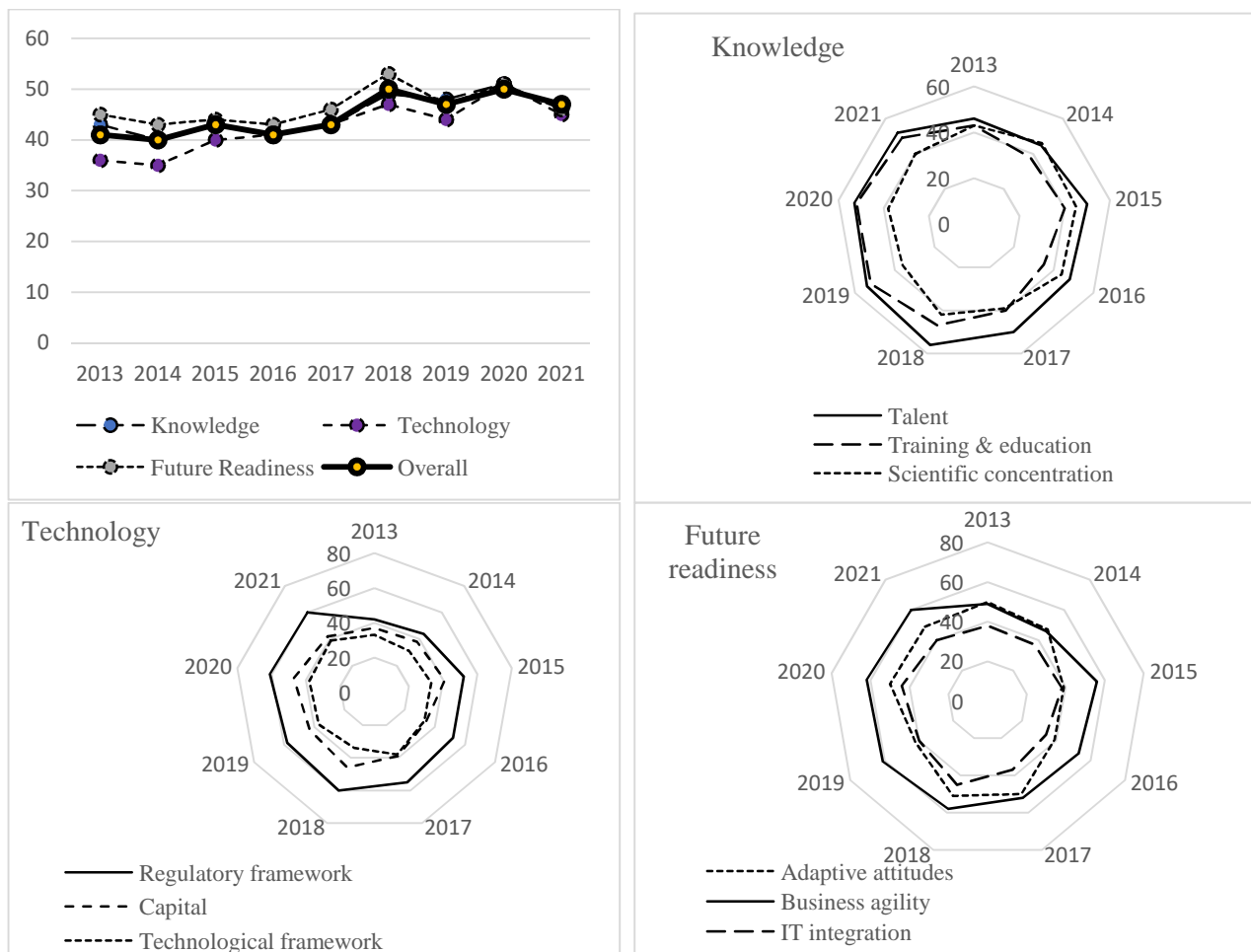


Figure 3. Dynamics of changes in IMD World Digital Competitiveness Ranking Slovakia index components

Source: compiled by Rayevnyeva based on [IMD World Digital Competitiveness Ranking. 2017, 2021]

The analysis of data in Figure 3 led to the following conclusions:

1. The trend of changing the value of the index and its components for the analysed period is unidirectional. Index values fluctuate in the range of 40 - 50 rating places. Since this is below the median value for the analysed group of countries, this means the need to intensify the processes of digitalization of society. In the Knowledge component, it is necessary to increase the indicators Foreign highly skilled personnel, Digital/Technological skills, International experience, Employee training. In the Technology component, attention should be paid to the indicators Development & application of technologies, Scientific research legislation, IT & media stock market capitalization, Funding for technological development, Immigration laws, Intellectual property rights. In the Future readiness component, it is necessary to control the indicators Intellectual property rights, Knowledge transfer, Opportunities and threats, and Cyber security.

2. The strengths of the development of digital maturity in society are represented by several indicators:

In the Knowledge component - Pupil-teacher ratio (tertiary education), Female researchers. In the Technology component - Country credit rating, Internet broadband speed, Investment in Telecommunications. In the Future readiness component - World robots' distribution, and Software piracy.

Figure 4 reflects the situation in Ukraine.

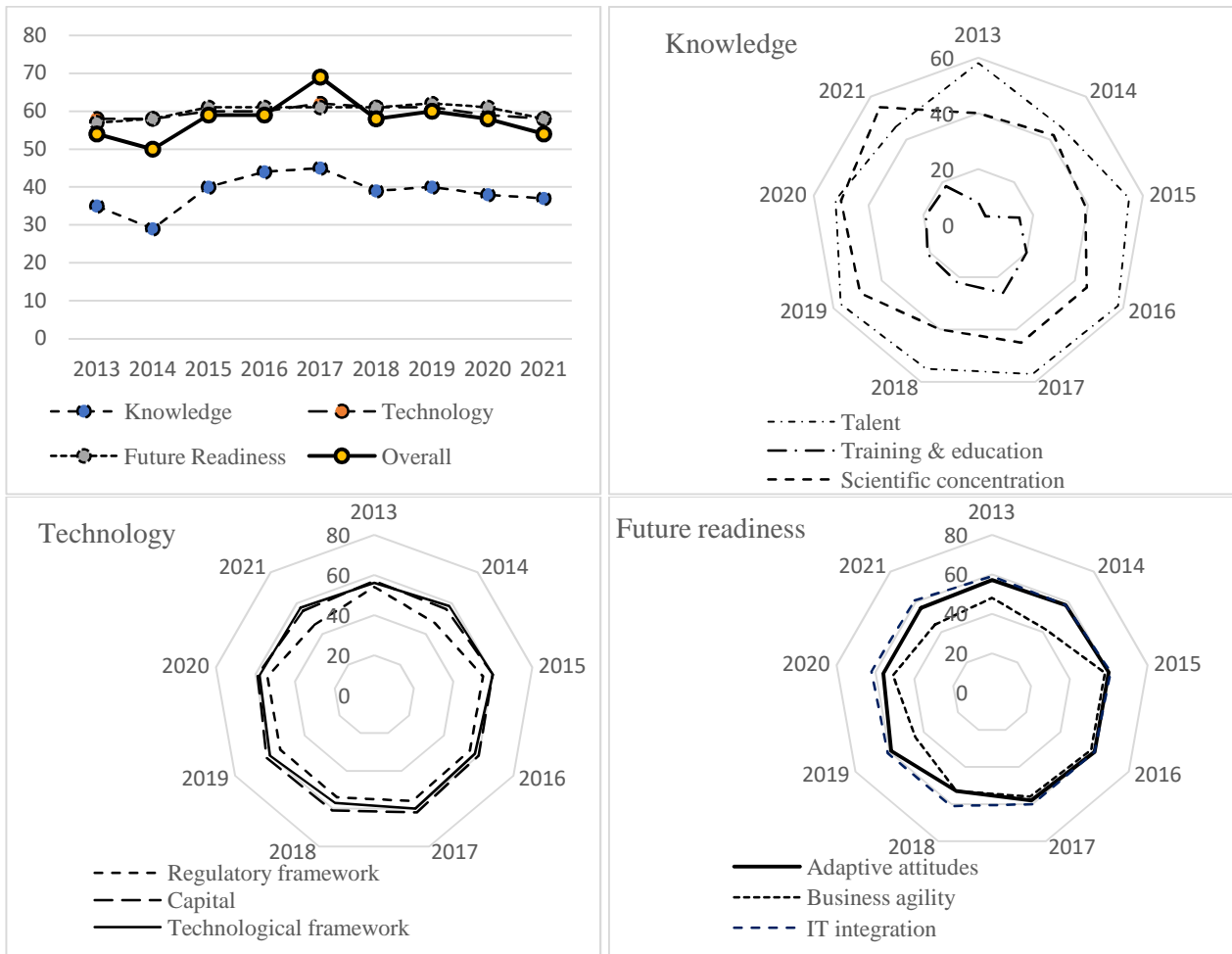


Figure 4. Dynamics of changes in IMD World Digital Competitiveness Ranking Ukraine and index components

Source: compiled by Rayevnyeva based on [IMD World Digital Competitiveness Ranking. 2017, 2021]

The analysis of data in Figure 3 led to the following conclusions:

a) Even though Slovakia and Ukraine are in the group of countries below the median value the index for 2021, the position of Ukraine is worse. The country ranking values for the analysed period of fluctuate within 54-60. Considering that 63 countries are participating in the survey, Ukraine has a lot of work to do to form the digital maturity of society.

b) The Knowledge component has the highest positions among the rating components. Its values vary in the range of 29-45, and among the indicators Training & education occupies the most stable position (ranking places vary in the range of 4-26), so it can be noted that the education system, in particular higher education, is the source of the formation of the country's digital competitiveness. This process is significantly influenced by the indicators as Total public expenditure on education, Pupil-teacher ratio (tertiary education), Higher education achievement, Female researchers.

c) The Technology and Future Readiness components have potential for improvement. The central government needs to pay attention to the indicators as Intellectual property rights, Country credit rating, Venture capital, Mobile Broadband subscribers, Wireless broadband, Knowledge transfer, Public-private partnerships, Software piracy.

The analysis of the external environment of the university allows us to conclude that the level of digital maturity of society in Slovakia is higher than in Ukraine. Slovak universities operate in a more stable digital economy and have wide potential and real opportunities for the digitalization of educational processes and transformation into an entrepreneurial type of organization. The most significant role in Slovak universities is now played by their internal readiness for change.

For Ukrainian universities, the situation is different. The overall level of digital maturity of the

society compared to the world peers is significantly lower than the average level; the country belongs to the group of countries with an emerging digital society. However, the real possibilities of the higher education system in terms of the level of digitalization of processes are approaching the level of developed countries. This indicates that Ukrainian universities are the drivers of the development of the digital society and long-term work in the conditions of crisis and bifurcations (overcoming the challenges of joining the standards of the Bologna Process, the COVID-19 pandemic, Russia's military aggression) have made it possible to form strong competitive advantages based on the widespread introduction of digital technologies in all areas of their activities.

The digital maturity of society is a complex concept and requires a systematic approach. That is why Cisco developers use a variety of factors as a component of the index that reflect the development and implementation of digital technologies in various areas of business and society. Figure 5 presents data related to all components of the Digital Readiness Index for Slovakia and Ukraine.

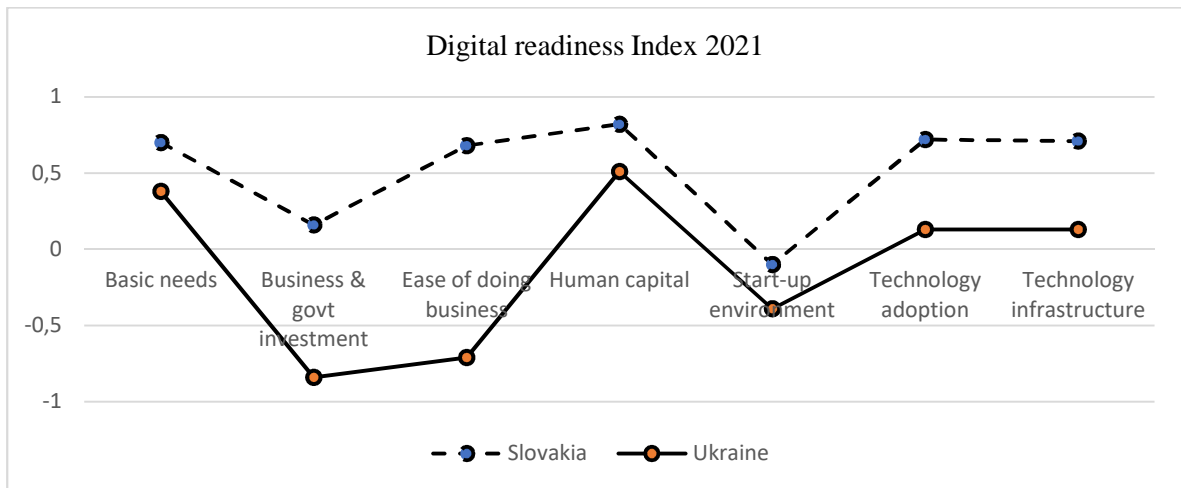


Figure 5. Index component values for Slovakia and Ukraine
 Source: compiled by Rayevnyeva based on [Digital Readiness Index, 2021]

The analysis of data in Figure 5 led to the following conclusions:

- a) The strongest components of the Digital Readiness Index for Slovakia and Ukraine are Basic needs and Human capital. These components are the drivers of the digital development of the countries.
- b) The Technology Adoption and Technology infrastructure components are well developed. As the data shows, Slovakia has a strong position in these components, and Ukraine has the potential to strengthen these components.
- c) These two countries have certain problems with the Start-up environment which fosters innovation within a community component. In this regard, it is necessary to pay state attention to the development of Venture Capital Investment, New Business Density, and Patents Granted & Trademarks Registered.
- d) Ukraine needs to create an environment to stimulate the development of the Business & government investment and Ease of doing business components to strengthen the basic infrastructure and policies needed to support business continuity and stimulate private and public investment in innovation and technology.

In accordance with the Digital Education action Plan 2021-2027, the availability and accessibility of information technology is the basis for digital education. However, these transformations in the university must be conducted systematically. This means that improving the quality of education requires organizational changes, the creation of an infrastructure for the introduction of digital processes, and the formation of a digital culture based on pedagogical principles and values. The key task of digitalization of the educational process is the operational monitoring and reasonable updating of digital technologies, and the formation of a digital strategy for the development of the university. All this relates to the readiness of the university for digital transformations and corresponds with financial readiness.

4. Discussion

The process of transforming a traditional university into a digital university of an innovative and entrepreneurial type is a modern trend in the modernization of the world's higher educational system and corresponds to the global processes of building a digital society. For the HEI to gain new competitive

advantages, systematic work is needed to introduce digital technologies in all areas of its activity, which is based on a combination of the capabilities of the external and internal environment.

The emerging tasks are so diverse that they require constant research, debatable discussion of the results obtained, and diffusion of the experience of leading universities into the practice of universities in different countries.

Based on hypothesis 5 of this study that the effectiveness of the transformational processes of introducing digital technologies requires the development of tools for evaluating and analysing these processes, the authors propose an integral indicator of the level of digitalization of the university's activities. Its construction is based on the method of convolution of indicators. The issue of choosing a convolution method and developing a set of local integral indicators remains debatable. The proposed model for constructing an integral indicator for assessing the level of development of the digital processes of the university is based on the methodological approach of constructing the Digital Readiness Index, and includes three components, namely Knowledge, Technology and Future Readiness. Such a monocausal approach to assessing the level of digitalization of processes deserves interest. However, a polycausal approach can also be used, which involves evaluating the level of digitalization of a university based on an assessment of the level of implementation of digital technologies in each type of university activity - organizational, educational, scientific, financial, etc.

The base of any assessment is a system of indicators. The development of a complexly structured system of indicators, the creation of a system for monitoring the development of internal digital processes at the university, and monitoring changes in the digital maturity of society are also important tasks of scientific discussions and future research.

Conclusion

The conducted research allowed to formulate the following conclusion:

1) Based on a literature review, it has been proved that the transformation of a traditional university into a digital university of an entrepreneurial type is a visible trend in the development of the global higher education system.

2) Elements of the methodology for such a transformation have been developed, namely, hypotheses, a conceptual model and research methods.

3) It has been proven that the construction of a digital university is based on the analysis of the digital maturity of society and the internal readiness of the university for changes.

4) An analysis of the digital maturity of Slovakia and Ukraine showed that Slovakia has a higher level of society's readiness for the implementation of digital technologies. Therefore, a key aspect of the transformation of Slovak universities is their internal readiness for change. Ukraine will have to continue systematic work to form the digital maturity of society. In this process, the key role is played by Ukrainian universities, which already have a high level of digitalization of their activities. The acquisition of these competitive advantages is associated with overcoming the challenges of the Bologna process, operation within the context of the COVID-19 pandemic and Russian military aggression.

Thus, based on the results obtained, Ukrainian and Slovak HEIs will be able to develop effective strategies and tactics for their transformation into innovatively active universities, that correspond to global trends in the development of society and the world higher education system. Assessing the digital maturity of society and the readiness of the external (national) environment for such transformations will allow universities to increase their competitiveness based on the widespread introduction of digital technologies in educational and scientific processes, building a corporate university management system, digital culture and the maturity of teaching and service personnel. The use of the developed integral indicator of the level of digitalization of university processes will make it possible to build a system for monitoring them and developing Key Performance Indicators for the activities of the university.

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Resources

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Incentives for Providers of Cataract Surgery depending on the Payment Mechanisms in the Czech Republic and Slovakia

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Abstract

Research background: Cataract is the second most common cause of visual impairment and the first most common cause of blindness. Cataract development is closely associated with onset at an advanced age. As the population ages, so does the prevalence of cataracts.

Purpose of the article: The aim of this article is to compare the incentives for providers depending on payment mechanisms for cataract surgery in the Czech Republic and Slovakia in the context of quality (e.g. lens choice) and access to care (e.g. waiting lists).

Methods: The research methodology is based on a 10 year datasets from both countries supported by personal interview using a semi-structured questionnaire. The respondents were specialists in the field of ophthalmology, including practicing doctors, representatives of care providers, representatives of health insurers, and representatives of the Ministry of Health.

Findings & Value added: Payment mechanisms in both countries vary considerably providing different incentives for providers in the terms of quality (e.g. lens choice) and access to care (e.g. waiting lists). In the Czech republic, the bundled payment (so called package price where price of the lens is included in the reimbursement) increases the motivation of providers for more „business-like“ decisions and to seek for cheap and available lenses meeting required CE standards. In Slovakia, the reimbursement based on separation of surgery and lens prices leads to using the lenses that are categorized as cost-effective by Ministry of Health and the incentive for providers are more „medical-driven“. In the Czech Republic, the number of cataracts rose from 99 000 to 131 000 in last 10 years, which means 12 476 surgeries per million people in 2020. This is significantly higher than 5 976 surgeries per million in Slovakia (32 268 surgeries in total). Although this was heavily influenced by COVID-19 pandemics. In Slovakia the drop of surgeries between 2019/2020 was -24%, while in the Czech Republic only -6%:

Keywords: cataract, payment mechanisms, number of surgeries, prices, lense choice, waiting lists

JEL classification: I11, I13

1. Introduction

1.1 Cataract

Cataract is the second most common cause of visual impairment and the first most common cause of blindness. Cataract disease has a significant impact on the patient's quality of life. (Kuntorini et al., 2023) Cataract is a progressive eye disease that manifests itself slowly and painlessly. Due to the slow progression, a problem arises with the difficult early diagnosis of the disease since the patient is not aware of vision problems at the beginning or does not attach importance to them. Among the most common problems, Thompson and Lakhani (2015) say blurred vision, double vision, problems with glare during the driving at night, reduced visual acuity, changes in color perception and worsening myopia.

Ang and Afshari (2021) divides the causes of cataracts into uncontrollable and controllable risk factors. Uncontrollable risk factors include age, gender, or race. Among the uncontrollable factors, the authors include debatable factors such as smoking, alcohol and unhealthy diet or the influence of UV radiation. The authors also mention a higher risk of disease in people suffering from diabetes mellitus, hypertension, metabolic syndrome, kidney failure, hepatitis, celiac disease, atopic dermatitis, and other diseases.

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Cataract disease causes, according to Kuntorini et al. (2023), reduction in the patient's quality of life, as due to reduced visual acuity up to blindness, there is a deterioration in the ability to perform normal activities and an increase in dependence on the help of another person, reduced social functioning. Cataracts have a negative effect on the mental health of the patients. Mencucci et al. (2023) draw attention to not only a reduction in the quality of life due to the loss of autonomy, the development of depression and worsening cognitive problems, but also an increase in the risk of falls in connection with cataracts. Cataract is a progressive eye disease that causes partial or complete clouding of the lens. The reduction in visual acuity caused by cataracts causes patients to have poorer orientation and a higher risk of falls. By solving the disease, it is not only possible to improve the state of the direct causes of the disease and improve the quality of life, but also to reduce the risk of subsequent consequences caused by the impact of falls of the diseased.

Cataract is connected not only with health and social consequences, but also with economic consequences. Cataract disease brings direct medical costs to the healthcare system, direct non-medical costs that threaten the budget of the patient and family, as well as indirect costs. Direct non-medical costs include trips to a medical facility, the time of informal caregivers or the acquisition of necessary medical devices and adaptations of the apartment for the needs of the patients with visual impairment. Indirect costs are associated with reduced productivity of both patients and their relatives in the roles of informal caregivers (Magrelli et al., 2020).

Thompson and Lakhani (2015) describe the course of patient care. Cataract is a treatable type of eye disease that can be treated with surgery. Before cataract surgery, patients complete a comprehensive ophthalmological examination, which will help to accurately identify the patient's health condition and rule out other causes of impaired vision. This is followed by a surgical solution under topical anesthesia. Currently, the most widely used method is Phacoemulsification, which represents the least invasive method of surgery, enabling rapid healing. The basic principle of the procedure is emulsification of the opacified lens of the eye with the help of an ultrasonic probe. During surgery, the extracapsular bag is preserved, which allows easy placement of a new synthetic lens. The lenses used can be divided into three basic categories - monofocal, thoric and multifocal. To minimize possible complications, which are very rare when performing phacoemulsification, as a rule, they are operated separately, with an interval of 1 to 4 weeks. The operation is followed by postoperative care, consisting of the application of eye drops containing antibiotic and anti-inflammatory substances, for a period of 3-6 weeks.

Cataract surgery can be performed either in hospitalization mode or in one-day or outpatient surgery mode. Currently, one-day or ambulatory surgery is the most frequently used regime. The shift from hospitalizations to short-term interventions without the need for multi-day hospitalization is demonstrated by Gianino et al. (2018), who describes a decrease in hospitalized cases and a significant increase in one-day and outpatient cataract surgery cases in 20 European countries over the period 2004-2014.

Ginel et al. (2023) deals with the issue of cataract from a cost perspective. Their systematic review shows that the cost of cataract surgery has decreased over the years; however, their cost-effectiveness should be carefully evaluated by country and population. A significant factor in the context of cataract surgery is the waiting time. Since vision loss has a significant impact on society, and at the same time caring for a blind person is more expensive than early surgery, the priority is to focus on early therapy and prevent as many cases of vision loss as possible. And since cataracts represent a treatable type of eye disease, the emphasis is on preventing blindness, early surgery, and at the same time strengthening further research into the treatment of eye diseases. Mencucci reports that while cataracts account for 50% of blindness in middle- and low-income countries, in developed countries, thanks to early intervention by doctors, cataracts account for only 5% of blindness.

1.2 The system of financing and providing health services in the Czech Republic and Slovakia

A compulsory public health insurance system is in the Czech Republic and Slovakia. The national health system, according to Tambor et al. (2021) covers 100% of the population in the Czech Republic and 94–96% in Slovakia. Uncovered individuals in Slovakia mainly include individuals working abroad. The appropriateness of the social health insurance system was discussed by Mikucki and Piotrowka (2021), who use the life expectancy indicator as one of the arguments for supporting the system. Both countries demonstrate an increase in life expectancy, which, according to the authors, indicates that the established care delivery system is working properly. In the Czech Republic, life expectancy increased from 70.0 years in 1970 to 79.1 years in 2017. In Slovakia, life expectancy increased from 70.0 years in 1970 to 77.3 years in 2017.

Most of the income of the public health insurance system consists of mandatory contributions from the wages/income of the insured. In the Czech Republic, levies amount to 13.5% of the assessed wage base, of which the employee pays 4.5% for health insurance. In Slovakia, levies amount to 14 % of the assessment base of wages, of which the employee pays 4% for health insurance. In both countries, a contribution from the public budget is paid for persons unable to pay the contribution (children, seniors, sick, unemployed). (Mikucki and Piotrowska, 2021, Dovera, 2023). Out-of-pocket forms a smaller part of the financing in both countries. Tambor et al. (2021) states that in 2018 the share of out-of-pocket value as % of current health expenditure reached 14.19% in the Czech Republic and 18.91% in Slovakia. In both countries, out-of-pocket is required mainly for dentistry and co-payments for medicines.

Predetermined health services are paid for from public health insurance funds. In the Czech Republic, there is a positive list of services, medicines and medical products that are covered by the public health insurance system. There is also a negative list of services expressly excluded. Services not on the positive list may still be covered based on individual patient needs. There are also exceptional cases where items on the negative list may be reimbursed. In Slovakia, there is a similar system of payment for selected services. A basket of basic health services is specified, which are covered by the public health insurance companies (Mikucki and Piotrowska, 2021).

Healthcare providers are public and private. Regarding availability, Tambor (2021) states that regional differences in the distribution of specialists are a problem in the Czech Republic. Regarding the number of healthcare workers, there are 4.0 doctors and 8.1 nurses per 1,000 inhabitants in the Czech Republic. In Slovakia, he cites problems with the lack of healthcare workers and their uneven distribution. In Slovakia, there are 3.5 doctors and 5.7 nurses per 1000 inhabitants.

The education of workers is also an important factor. Muttuvelu and Andersen (2016) addressed the issue of staff education in their article. The authors state that it is important to focus not only on having enough doctors, but also on the sufficient quality of their education in the specialty of cataract surgery. Young doctors without sufficient experience in the field can cause health complications to patients through unprofessional intervention, so it is necessary to use a sufficient process of acquiring information and new competences, to supplement the required knowledge, experience, and skills. However, the results of the study show that a highly decentralized and heterogeneous educational structure was identified in the selected analyzed European countries. Data for the Czech Republic states that there is no mandatory cataract surgery training in the country, nor are there any health authority regulations regarding training and no mandatory use of assessment tools. Employee training in the Czech Republic is mostly based on the apprenticeship model.

1.3 Prices and payment mechanisms of cataracts

Prices of cataracts surgery vary a lot among countries. As shown by Van C. Lansing et al. (2015) the prices calculated in 2012 USD prices cost from 178 USD in India up to 3557 USD in the USA. The Euro zone average based on prices from Finland, France, Germany, Italy, and Spain stood at 1968 USD. No country from CEE region was part of the study.

Cataract surgery in last decade is mostly performed in ambulatory settings and the payment mechanisms are changing accordingly. For example Medicare in New England started to use bundled payment in ophthalmology in 2014 (Thakore et al., 2015) and the HealthChoiceSelect Initiative started to use bundled payment for cataract removal in 2016 (Struijs et al., 2020).

2. Methods

Data from relevant statistical databases from both countries were gathered. In Slovakia, data from National Center for Health Information were used. In the Czech Republic, data from Center for Health Information and Statistics were used. The data were collected from open and public databases focusing on the years 2010 – 2020 and the latest available data.

In both countries 5 and 5 personal interviews using a semi-structured questionnaire were conducted to assess the incentives for providers based on the payment mechanisms. The personal interviews were conducted between June – October 2022 covering the situation in years 2020 – 2022. These years were also heavily affected by the COVID-19 pandemics.

For a comprehensive view, respondents from different stakeholders were selected, including doctors and representatives of providers, representatives of health insurance companies and funds, representatives of the Ministry of Health and other institutions. The characteristics of the respondents are shown in Table 1.

The results from the interviews were grouped and evaluated by the authors. In the comparison, emphasis was placed on the payment mechanism used, number of surgeries, prices, choice of the lens and waiting times.

Table 1. Information about respondents

Respondent	Info about respondent
CZ 1	Managing ophthalmology clinics for 22 years, since 2008 he is a owner of ophthalmology clinics in CZ and SK.
CZ 2	Payment mechanisms specialist for ambulatory sector in health insurance fund (9 years), last 5 years as leader of the ambulatory payment mechanisms department.
CZ 3	Drug reimbursement specialist in health insurance fund
CZ 4	CEO of international chain of ophthalmological clinics
CZ 5	DRG expert, 8 years at National Institute for Health Statistics
SK 1	Owner of a leading ophthalmologic clinic
SK 2	Reimbursement specialist in a privately owned public health insurance company
SK 3	Drug Reimbursement specialist at the Ministry of Health of the Slovak Republic
SK 4	Medical devices reimbursement specialist at the Ministry of Health of the Slovak Republic
SK 5	Data Analyst at the National Centre for Healthcare Information

Source: own research

3. Results

3.1 Ophthalmology in the Czech Republic

Ophthalmology in the Czech Republic is a mature market with stable market shares, which reflects the general incidence and prevalence of the diseases. Ophthalmological services are generally well accessible, services are provided by outpatient players and state hospitals. Competition is an important element in the ophthalmology market, the patient can choose the care provider. According to the interviewed experts, this competition is the main driver of quality improvement.

Healthcare services are predominantly covered by health insurance funds. Health insurance funds (HIFs) spend 2-4% of their expenses for ophthalmology in the institutional setting. Each year, health insurance funds negotiate their reimbursement prices with providers under the surveillance of the Ministry of Health (MZ ČR). The results of the negotiations are published in the so-called Reimbursement Decree. Since 2020, Association of Ambulatory Providers of Eye Surgery (SAPOCH) plays an important role during these negotiations.

SAPOCH represents the 17 biggest ophthalmological providers with 92% share of the total one-day-surgery volume (cataracts, refractions, vitreoretinal, transplantations) in the negotiations with HIFs and has become a reliable partner in these negotiations with a mandate to negotiate the reimbursement conditions.

There are 7 health insurance companies operating in the Czech Republic, providing public health insurance. In the negotiation process between SAPOCH and the 7 health insurance funds, there is always one health insurance fund acting as the main coordinator. Two agreements need to be negotiated at the same time. The first agreement is with Všeobecní zdravotní pojišťovna (VZP), which is the biggest health insurance fund with 60% market share. The second agreement is negotiated with the Health Insurance Association of the Czech Republic (SZP), which represents the remaining 6 HIFs with 40% market share.

Cataract-related medical services are predominantly paid as a bundled payment on a “package price” principle (so called OKA). The "package price" OKA is negotiated separately, and each health insurance fund negotiates separately with SAPOCH. Most of the treatments and lenses are fully covered by the health insurance funds, but there is still place for co-payments.

3.2 Cataract-related medical services in the Czech Republic

In 2022, there were 148 000 cataract surgeries in the Czech Republic as SAPOCH reported. Compared to 2018, when there was 130902 it is a significant increase. Unlike in Slovakia, the 2020 COVID-19 year did not mean a significant drop, because in 2019 there were 139 000 surgeries and year later 131 000, which is a drop by -6%. In 2020/2019 Slovakia reported a massive decrease of cataract surgeries by 24%.

Additionally, if we add approximately 11000 cataracts for foreigners through cross-border care (paid by another member state from their public resources) and self-payers (approx. 5 000-6 000). This

represents a cumulative growth rate of +3% per year from 2019 to 2022, indicating a mature market in Czech Republic.

Payment mechanism

Cataract surgeries are predominantly provided on an outpatient basis. According to the interview with one of the leading providers, the private sector dominates, because 83% of cataract surgeries are done in the private ambulatory sector as one-day surgeries. Health insurance funds pay the ophthalmological medical facilities with the so-called “package price” OKA. This package price is used by all providers doing cataract surgeries, except for one provider (Gemini – approx. 20% of all cataracts), who is paid by FFS (fee-for-service).

The OKA package price includes: the operation itself, and some elements of the preoperative and postoperative care (lens calculation, autorefractometer, clinical examination and postoperative control). The operation itself is calculated as payment for all care and materials used, including implanted lenses.

The price of the OKA package is the same for all providers who provide cataract-related medical services within the same health insurance. Historically, there have been price differences between health insurance funds. The prices of the eye package were introduced for the first time in 2010, when the first packages for some providers for CZK 8,250. Packages had volume limitations in the form of a maximum number of operations. The rest of the providers and HIFs used FFS.

The years between 2009 and 2019 were a decade of a double-digit point decline (from 1.09 to 0.69 CZK / 1 point). Overall, there was a 56% decrease in OKA "package price" value. From the original point value of CZK 1.09 (in 2009), it fell to the point value of CZK 0.69 (in 2019), which affected all outpatient providers. As a result, the overall HIF spending on cataract was 1.8 billion CZK (in 2009) and fell to 1.2 billion CZK (in 2019). This indicates that during the decade of 2010 – 2019, the cataract providers lost about 603 million CZK.

The situation changed in 2020, when different prices were set for packages with different lenses (hydrophilic, hydrophobic, and thoric). During the negotiations, the structure of the package was unified and price differences between health insurance funds were minimized. In 2020, the main increase in price (+ 21%) was reported in cataracts using thoric lenses, followed by hydrophobic lenses and hydrophilic lenses.

Furthermore, prices were adjusted for the second half of the year due to the COVID-19 pandemic. OKA prices increased by 16% in 2020. In 2019, the average price of OKA was 9906 CZK (413 EUR) and in 2020 it was 12017 CZK (501 EUR). These rapid increases added only in 2020 and + 421 million CZK (16,84 mil EUR) additional annual budget for cataracts. Another increase in first and second half of 2021 brought an additional +242 million CZK (9,68 mil EUR). Table 2 shows the development of the OKA reimbursement price in CZK in VZP, the largest health insurance fund in the Czech Republic.

Table 2. OKA reimbursement prices in CZK in VZP (60% market share)

	2010 - 2015	2016 - 2019	2020 (1H)	2020 (2H) – COVID-19 compensation	2021 (1H)	2021 - (2H) – COVID-19 compensation
Package price for hydrophilic lens	8 250	9 250	9 885	11 565	10 153	10 153
Package price for hydrophobic lens	8 250	9 250	11 230	13 139	11 508	13 004
Package price for thoric lens	8 250	9 250	14 397	16 844	14 655	14 655
Limits on production	Volume limitation	No volume limits	No volume limits	No volume limits	No volume limits	No volume limits

Sources: VZP (2010 – 2020), SAPOCH (2022)

Lens selection

Patient choice of lens is a complex issue. On the one hand, in terms of health insurance, since 2013 (the Constitutional Court ruling), it has been impossible to select the lens when it is reimbursed by public health insurance. Health insurance funds (HIF) declare, that for cataracts, when they are fully paid by the HIF, there is no co-payment. This is a „grey zone “ since co-payments are not banned or legislatively

regulated. Moreover, HIFs tolerate, that patients pay „co-payments”, especially for aspheric, thoric, or multifocal lenses and for presbyopia correcting intra-ocular lenses (PCIOL). This second view is supported by the Constitutional Court ruling from 2013, that co-payment can be charged, when there is substantial difference in the provided care/material. The providers can take any lens on the market (CE certificate is needed), the patient is not engaged. The choice of lens is more of a business decision with minimal quality CE certificate needed. Providers can import the lenses by themselves.

Availability of ophthalmic care

Access to cataracts differs, in large cities, there is a high concentration of eye clinics. In rural areas there are fewer ambulances, fewer clinics, and generally less competition. Officially, waiting times are not measured, but the estimate is about weeks in large cities and months in rural regions. With OKA “package price” as payment mechanism, the availability of cataracts is good, and the providers are not regulated compared to other specializations. There is no limit on cataract production, OKA is excluded from regulatory mechanisms.

Measuring the Quality of care provided

In the Czech Republic, no qualitative parameters are measured or controlled for cataracts. Instead, some sanctions are applied (when reporting to the health insurance fund). Quality is the question of the lens, but there is lack of revisions and controls. The provider has a full freedom to choose which producer or importer to purchase the lens from. It only must fulfil the CE criteria. In the documentation, the provider must provide a code and the origin of the lens. It must be specified what type of lens was used. HIFs expect only high-quality lens to be procured, but it cannot be properly checked. The quality criteria (measured by rehospitalizations) were applied only in one year of 2020, but now it is no longer implemented. Only patient complaints are episodically collected, but there is no other method to measure the quality.

3.3 Ophthalmology in the Slovakia

The Slovak ophthalmology market is mature market with a well-developed private sector. Ophthalmology has the strongest position in one-day surgery performing some 80% of all one-day surgeries. Moreover, 91% of cataract surgeries are already performed by private clinics. In 2019, the biggest 20 private clinics had an overall turnover of EUR 36 million with a cumulative profit of almost EUR 5 million.

Compared to other segments, ophthalmology is financially more stable, as the providers perform surgeries reimbursed both by (1) health insurance companies and by (2) clients' cash payments. The market is highly developed, and reimbursement is based on negotiations between health insurance companies and providers. There are 3 health insurance companies (VšZP, ZP Dôvera, ZP Union) and the negotiate the contracts with each ophthalmic clinic separately. Contracts are transparent and publicly available on the websites of health insurance companies.

Ophthalmology providers face many challenges. They have a persistent problem with a lack of top experts. Private clinics do not have the premises to teach young doctors, and the state hospitals do not have the time capacities. Eye clinics are often family run businesses. This is a very conservative society, closely connected, relations typical of "small Slovakia". The success of the clinic depends on whether it obtains a contract with health insurers or not. According to the legislation, the clinic first procures a location, staff members, and technological support before applying for a license, and finally for a contract with HIC. If the contract is not obtained by the eye clinic, it relies solely on self-payers. There is no dominant player or chain, so the market is fragmented with large number of clinics of various size.

Most services is fully or partially covered by health insurance companies, but sometimes this coverage is not sufficient. The reimbursement from health insurance companies is divided into two components: (1) payments for services performed and (2) payments for medical material, which is usually paid extra. This concept was also highlighted in the interviews, as this is a very good practice for payment mechanisms to separate the labor (human work, surgery) and the material (lens, tissue, etc.).

3.4 Cataract-related medical services in Slovakia

The number of cataracts is rising in cycles, and the COVID-19 pandemics caused a huge 24% drop between 2019/2020. The number of cataracts fell from 42,466 in 2019 to 32,268 in 2020. This is the

lowest number of cataracts since 2013, and since then there has been no change in the payment mechanism, which can be fully attributed to the change of consumers behavior during COVID-19.

Payment mechanism

Approximately 91% of all cataracts are performed on outpatient basis. The cataract treatment is organized very well, since the procedures (pre-op, surgery, post-op) are paid separately from the implant. So, the price of the implant (material) is paid extra and is usually fully reimbursed. This model „surgery” + „material” which works very well in cataracts should be used also in other ophthalmological procedures. Cataracts are reimbursed based on contracted price and follow the formula in Table 3.

Pre-op can be fully reimbursed by the HIC (16 EUR), or if not, the patient pays 40 EUR. The price of surgery and the lens is separated. The surgery is reimbursed around by 400 EUR from HIC. According to the providers, this is not sufficient, and the surgery price should be around 700-750 EUR. Lenses are fully reimbursed for 98% of the patients, according to XF group in categorization, and these people are very satisfied with the lens chosen/recommended by the doctor. Post-op can be fully paid by the HIC (5 controls), or if paid by patients, then 2 are free, and the other 3 are paid (each 50 EUR).

Table 3. Pricing and reimbursement formula in cataracts

	Pre-operation	Surgery	Lens	Lens co-payment	Post-operation
Patient pathway + payment method	covered by HIC (16 EUR) or 40 EUR paid by the patient	Usually a contracted price from HIC, around 380 – 480 EUR	Reimbursed by HIC according to categorization	According to categorization	covered by HIC (5x7 EUR) or by the patient. (2 controls paid by provider then 50 EUR per each control)
Example 1: Intraocular hydrophilic acrylic lens BioLine Yellow	40 EUR (Paid by patients)	396 EUR (Price of surgery, fully covered by HIC)	105,89 EUR (Hydrophilic acrylic lens – fully covered by HIC)	0 EUR (co-payment)	150 EUR (3 controls)
Example 2: Intraocular lens posterior chamber AcrySof® IQ Restor® multifocal 2,5D	40 EUR (Paid by patients)	396 EUR (Price of surgery, fully covered by HIC)	145,01 EUR (Multifocal lens, partial coverage by HIC)	556,79 EUR (co-payment)	150 EUR (3 controls)

Source: own research

Surgery prices are negotiated between HIC and providers - these change once a year. Surgery prices may vary between providers and health insurance companies since every provider is negotiating on its own.

Prices the of lenses are subject to categorization and reference pricing (MoH) and can be changed every quarter (1.1, 1.4, 1.7 and 1.10). The Ministry of Health plays a decision-making role in the categorization process. There are altogether 13 groups of lenses. Typically, only new products are added to existing subgroups (Cost minimalization analysis - CMA is enough). For opening a new subgroup, a Cost effectiveness Analysis (CEA) or Cost utility Analysis (CUA) is needed. The listing of lenses is free, but delisting costs 300 EUR, so out of 120 lenses in XF group, 34 items had 0 consumption in last 24 months (2020 – 2021). To improve the process, the listing payment should be introduced.

In every subgroup there is equal reimbursement for the whole sub-group, and there are lenses with no co-payment and lenses with co-payment. Each sub-category has a subgroup maximum reimbursement limit. The reimbursement from HIC cannot be higher than this maximum limit price. The categorization has the following specific rules according to whether the cataract (special medical material) complies with EU criteria (EC certificate) or not. Regarding the price – the importer needs to provide 3 prices (or at least 2) out of 28 EU countries, these 3 (or at least 2) prices should be the lowest, the choice of countries depends on the importer. There are no open databases of prices of special medical material (either cataract), only two countries have open databases –the Czech Republic and Belgium. The producers (importers) protect their price information.

Lens selection

The choice of lens at the provider level is a dialogue between the patient and the ophthalmologist. Basic lenses have no copayment, above the standard lenses have co-payments. Although, when the lens is fully paid, the decision is usually made by the doctor. The patient's preferences are reflected when there is a co-payment for the lenses.

Availability of ophthalmic care

In last ten years, we have witnessed a dramatic decrease of waiting lists from 1 291 to 54 patients in 2020 and a minimization of the average waiting times from 88 to 18 days. The low waiting times has been confirmed also by providers, according to them, the waiting times are 1-2 months (private providers) and 6 months (state providers). Since 2018 there are no financial limits on production and every cataract is paid. Ophthalmology providers face a persistent problem with a lack of top experts. The low number people on waiting list is a very positive sign, but need to be interpreted in context.

The number of surgeries per million people in Slovakia (5 976 in 2020) is approx. the half compared to the Czech Republic (12 476 in 2020). Moreover, in an international comparison, the highest rate of cataract surgeries is 14 000 surgeries per 1 million (Portugal) and Czechia belongs to TOP 5 European countries (OECD, 2016). Contrary, Slovakia ranks poorly compared to EU countries. Low number of surgeries combined with very short waiting lists in Slovakia may indicate a low diagnostic rate among people suffering on cataracts.

Measuring of quality of care provided

According to the health insurance company Dôvera, since 2019 all cataracts can be performed only as one-day surgeries (Code 1393). Price of the procedure varies according to „quality” criteria: satisfaction, regionality, rehospitalizations (not implemented yet), complexity of cases, FTE of surgeon (must be more than 0,8). These criteria form a MIN – MAX range for providers.

An important role is played by the Healthcare Surveillance Authority (HCSA), which is responsible for oversight over health insurance companies and providers. HCSA is obliged to perform control and oversight over the health insurers and the providers. The HCSA report from 20.12.2022 shows, that one ophthalmic clinic (iClinic group) has very high number of complaints in last 3 years. During 2020 – 2022 there were a total of 91 patients complaints in ophthalmology and 43 were addressed to clinics grouped in iClinic (ÚDZS, 2022). This surveillance function is important in relation to quality improvement.

3.5 Comparison of cataract care in the Czech Republic and Slovakia

The Czech Republic and Slovakia provide services related to cataract mainly in the form of ambulatory care and one-day surgery.

The payment mechanism in the Czech Republic is provided in the form of a package price "OKA", where payment for services and materials is combined in one package. This can lead to the selection of cheap material (lenses) at the expense of quality to reduce the cost of providing care. By introducing package price, the structure of cataract package was unified and the price variations between health insurance funds were minimized.

In Slovakia, the "surgery" + "material" reimbursement system is used, in which services and payments for materials (lenses) are separated. The tendency to use super cheap materials is gone, because the lenses are reimbursed extra in full price. The concept of separation of labor and material is very good practice for payment mechanisms and should be used in other ophthalmic procedures as well.

In both countries, the choice of lens is primarily up to the care provider. In the Czech Republic, the choice is limited only to the minimum quality CE certificate. Choice of lens is rather business decision. In Slovakia, the choice of lenses is limited by the categorization process. Entering the market is more difficult and there are no extra cheap lenses. At the same time, the process of categorization is more complicated since an international database for price cross-country comparison has not been created.

The Czech Republic and Slovakia do not have a financial limit to produce cataracts, which has a positive effect on the availability of the services used. This can be shown in Table 4 as in both countries the number of cataracts is rising and the number of cataracts is increasing. In the Czech Republic, the number of cataract rose from 99 000 to 131 000 in last 10 years, which means 12 476 surgeries per million people in 2020 which is significantly higher than 5 976 surgeries per million in Slovakia (32 268 surgeries in total). Although this was heavily influenced by COVID-19 pandemics. In Slovakia the drop of surgeries was -24%, while in the Czech Republic only -6%:

Quality criteria are not set in the Czech Republic. There is a need to set up a quality control system in the form of a pre-defined system and systematic tool for quality assessment. In contrast, quality criteria are set in Slovakia.

Table 4 summarizes the main findings regarding the type of care provided, payment mechanisms, material selection (lenses), availability of ophthalmological care and quality indicators in connection with the cataract-related medical services in the Czech Republic and Slovakia.

Table 4. Number of cataract surgeries financed from public sources (foreigners and self-payers excluded)

	Number of cataract surgeries		Number of surgeries per million people	
	Czech Republic	Slovakia	Czech Republic	Slovakia
2010	99 000	24 710	9 429	4 576
2011	100 000	22 430	9 524	4 154
2012	102 000	23 890	9 714	4 424
2013	97 000	29 835	9 238	5 525
2014	100 084	33 118	9 532	6 133
2015	110 002	34 996	10 476	6 481
2016	119 906	39 968	11 420	7 401
2017	129 605	35 863	12 343	6 641
2018	130 902	36 639	12 467	6 785
2019	139 000	42 466	13 238	7 864
2020	131 000	32 268	12 476	5 976

Sources: UZIS (2010 – 2017) and SAPOCH (2018 – 2020) for Czech Republic, NCZI for Slovakia (2010 - 2020)

Table 5. Main incentives for providers depending of the payment mechanism used in the country

	Czech Republic	Slovakia
Predominant type of services	ambulatory care and one day surgery	ambulatory care and one day surgery
Payment mechanism	OKA package price that covers the price of surgery (+ pre-op and post-op services) and the price of medical materials (incl. lenses)	model „surgery” + „material” that separately covers the surgery and separately the payments for medical material
Lens selection	the choice of lens is mainly decided by the care provider, the patient is not involved	the choice of lens is a dialogue between the patient and the ophthalmologist, but the decision is usually made by the doctor
Availability of care	waiting times are weeks in large cities and months in rural regions. differences in access to care in urban and rural areas no limit on cataract production	waiting times are 1-2 months (private providers) and 6 months (state providers) a lack of top experts no limits on cataract production
Measuring the quality of care provided	in the Czech Republic, no qualitative parameters are measured or controlled for cataracts	quality criteria: satisfaction, regionality, rehospitalizations (not implemented yet), complexity of cases, FTE of surgeon. the Healthcare Surveillance Authority (HCSA) is responsible for oversight and control over health insurance companies and providers
Incentives for providers based on personal interviews	High productivity 12 476 surgeries per 1 million (no production limits) with high pressure on lowering cost of lenses, choice of lens is an important business decision, because its price is significantly influencing the level of profit. The high productivity was not affected by COVID-19 pandemics heavily – only -6% decrease.	Increasing productivity from 4576 to 7864 surgeries before COVID-19 (no production limits) with low economic pressure on lens choice. The choice of lens is a medical decision based on dialogue between provider and patient. The productivity was hampered by COVID-19 pandemics – massive drop by -24%

Source: Own research

4. Discussion

Regarding pricing, the cataract surgery in the Czech Republic and Slovakia is quite inexpensive compared to other countries. In the Czech Republic, with OKA „package price“ the price range is 406 – 586 EUR depending on the lens used. In Slovakia, the surgery price is 560 EUR incl. the basic hydrophilic acrylic lens. And these prices are for the year 2021 and are far below the EuroZone average of 1968 USD, or the USA price of 3557 USD (Van C. Lansing et al, 2015). And these EuroZone and USA prices were calculated for the year 2012. Based on actual prices, according to www.myvision.org, the average cost of cataract surgery in USA is 3500 – 7000 USD per eye (MyVision, 2023). This is 5,5 to 11 times higher than an average cataract surgery in the Czech Republic or Slovakia.

It is important to mention that not only the total price, but also the payment mechanism itself takes important role. Different payment mechanisms are applied to individual types of services provided. Cataracts surgery in the Czech Republic is paid by bundled payment, which covers all pre-op, post-op services and the lens itself and all the costs are covered together in one package. In Slovakia, the "surgery" + "material" model payment mechanism is used, in which the surgery costs and costs of lenses are separated. This leads to different incentives for providers.

The impact of bundled payment on quality is discussed in academic literature. Struijs et al., (2020) point out, that according to their evidence, bundled-payment models have the potential to reduce medical spending growth while having either a positive impact or no impact on quality of care. The Czech Republic case of cataract surgery shows that the bundled payment provides incentives for costs reduction, choosing the lens by business criteria while the quality of surgeries is not measured. Since 2020, in the Czech Republic, the quality of care is supported by different package prices for three lens types. But the choice of lens is still rather a business decision.

In Slovakia it is a good practice to support the quality by separate payment for the lenses, which provides incentives for more medical than business choice of medical material. In Slovakia it is possible to choose from lenses that have passed the categorization system, which makes it difficult to enter the market and there are no extra cheap lenses. At the same time, the process of categorization is complicated by the need to identify lens prices in other countries, where the information is mostly not public.

Conclusion

Cataract is the second most common cause of visual impairment and the first most common cause of blindness. Early cataract surgery can improve patients' quality of life and prevent blindness. In connection with cataract-related health services, in the Czech Republic, the package price "OKA" payment mechanism is used, in Slovakia, the "surgery" + "material" model is used.

Both types of payment mechanisms combined with no production limits from health insurance funds support the high availability of care, thanks to the absence of financial limits and providing services mainly in the form of ambulatory care. Payment mechanisms in both countries vary considerably providing different incentives for providers in the terms of quality (e.g., lens choice) and access to care (e.g., waiting lists). In the Czech republic, the bundled payment (so called package price where price of the lens is included in the payment) increases the motivation of providers for more „business-like“ decisions and to seek for cheap and available lenses satisfying the required CE standards. In Slovakia, the reimbursement based on separation of surgery and lens prices leads to using the lenses that are categorized as cost-effective by Ministry of Health and the incentive for providers are more „medical-driven“.

To approximate, the price of a fully covered hydrophilic acrylic lens represents about 20 % of the cataract reimbursement in Slovakia. Given that the price of the lens in the Czech Republic depends on the provider, it is not possible to clearly determine the share of the price of the lens in the total cataract reimbursement.

Due to different payment mechanisms, the Incentives for providers differ in both countries. In the Czech Republic, there is high productivity (no production limits) with high pressure on lowering cost of lenses and meeting the CE criteria, choice of lens is an important business decision, because its price is significantly influencing the level of profit. In Slovakia, there is rising productivity reaching half of the levels in the Czech Republic (no production limits) combined with low economic pressure on lens choice. The choice of lens is a medical decision based on dialogue between provider and patient.

In the Czech Republic, the number of cataracts rose from 99 000 to 131 000 between 2010 - 2020, which means 12 476 surgeries per million people in 2020. This is significantly higher than 5 976 surgeries per million in Slovakia (32 268 surgeries in total). Although this was heavily influenced by COVID-19 pandemics, in Slovakia the drop of surgeries was -24%, while in Czech Republic only -6%:

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4. Finance

Economic Aspects of Bankruptcies of the Business Entities in Slovakia in the Post-Covid Period

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Abstract

Research background: The paper discusses the economic aspects of bankruptcies of Slovak business entities in the post-covid period. The COVID-19 pandemic caused Slovak business entities various financial, economic, personnel and other problems that complicated business activity. During the pandemic COVID-19, many Slovak business entities, particularly small and medium-sized enterprises, found themselves in very challenging economic situations, mainly due to the overall impact of government measures and state aid being relatively low, especially when compared to the strong negative economic impacts caused by COVID-19 pandemic.

Purpose of the article: The paper seeks to identify and analyse the diverse economic aspects of the COVID-19 pandemic, as well as the economic issues and consequences associated with the pandemic. Slovak business entities that did not have sufficient financial reserves available from previous years, and whose incomes dropped significantly during the pandemic, experienced a very turbulent business period. The most significant negative impact on business outcomes in Slovakia was undoubtedly the prolonged lockdown, which often led to business interruptions and, in some cases, bankruptcies.

Methods: The comparing data and the questionnaire survey.

Findings & Value added: The identification and analysis of weaknesses and problems of bankrupt business entities can contribute to the prevention of negative situations in other Slovak enterprises and the prevention of bankruptcies.

Keywords: corporate bankruptcies, financial problems of businesses, post-covid period

JEL classification: G33

1. Introduction

The COVID-19 pandemic has had a very adverse impact on a significant number of business entities worldwide, including in Slovakia. Many businesses have encountered serious financial problems, and some have even gone bankrupt. While it is true that the negative effects mostly affected economically vulnerable sectors and businesses with low efficiency and productivity, many successful enterprises also faced difficulties. Business entities with higher efficiency and productivity had a greater likelihood of receiving government aid and support, although usually with a lower proportion relative to their total revenue. As a result of the COVID-19 pandemic, financially unsustainable or declining companies received resources in lower volumes and with a lower probability.

Various economic analyses (such as Schivardi and Romano 2021 or Buchta et al. 2020) have shown that business entities may soon struggle with a liquidity shortage in connection with pandemic measures. The speed and scope of the economic shock related to the COVID-19 pandemic called for prompt and extensive responses. The threat of massive layoffs and declining investments motivated governments to take significant measures to prevent an excessive increase in business bankruptcies and unemployment in order to mitigate the economic downturn. The most common and significant measure adopted by EU member states was employment support in the form of subsidies to maintain jobs in companies. (Schivardi & Romano, 2021; Buchta et al., 2020)

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The COVID-19 pandemic affected the entire European Union, but in different ways and in different spheres of the economy. In the area of the labor market and employment, the pandemic has affected almost all EU countries. In general, employment in all EU countries (except Romania) fell, which was a significant economic impact of COVID-19. In 2020, employment was most severely affected by COVID-19 in Sweden, Ireland and Spain. The biggest changes were recorded in Germany in all sectors of the economy. As expected, the largest decline in employment was recorded in wholesale and retail, transport, accommodation and catering services, and real estate activities. The pandemic years did not significantly change the structural picture of employment and economic differences between EU countries. (Markowska & Sokołowski, 2023)

The spread of COVID-19 caused a significant economic shock, especially for employment and other economic aspects. Incomes and employment were partially protected, but the long-term effects proved to be quite significant. Unemployment and economic problems will increase - it's just a question of how much it affects economic and business entities development. Government measures were needed primarily to get people back into work quickly, to minimize and to achieve an optimal match between the skills that individuals have and those that employers demand. The COVID-19 pandemic most threatened young people, pensioners and other vulnerable population groups. (Mayhew & Anand, 2020)

Bankruptcies of business entities can be predicted to a certain extent. Bankruptcy prediction models are very important for identifying business entities facing potential bankruptcy. The main purpose of these models is to help business entities determine whether they are at risk of bankruptcy in the near future. They were developed based on the results of scientific research and are mostly intended for a specific group of companies according to their field of activity. The essence of these models is that business entities have experienced anomalies for some time before bankruptcy, and the values of the indicators of prosperous enterprises differ significantly from the indicators of non-prosperous enterprises. Prediction models can provide business entities with a certain degree of probability of occurrence of a negative financial situation. (Horváthová & Mokrišová, 2020)

The external economic aspects and influences are very important, it is necessary to pay attention to the financial health of businesses, which is a prerequisite for their existence. Determining the state of financial health of a company as well as its competitive position in the industry is nowadays a significant challenge for all business entities. In order to determine the real financial condition of the business entities, it is necessary to apply adequate methods and tools. In our research, statistical and graphical tools, as well as a non-statistical DEA model, were applied. These offered some important information on how to increase the company's performance and ensure its financial health. (Štefko et al., 2021)

Various statistical models can be used to predict the risk of bankruptcy of a business entity. Classic linear discriminant analysis and logistic regression are effectively used to classify banks as business entities. Applied predictions can also be based on so-called classification trees and nearest neighbor methods. Empirical verification of the correct classification by given groups of methods of statistical analysis of bankruptcy from the point of view of their effectiveness showed that the methods and can be characterized as having a high quality of bankruptcy prediction. Various models make it possible to easily evaluate the threat of bankruptcy for a given group of business entities. (Brożyna et al., 2016)

A significant problem of bankruptcies of business entities is often also the legislative environment and its instability. Due to too frequent and repeated amendments to the bankruptcy legislation, the legal certainty of the participants in business and contractual relations is reduced, which leads to a decrease in investment activities. Based on the application of this principle, it is also necessary to examine the issue of the proposal to declare bankruptcy, filing of claims, creation and competence of creditor bodies and dealing with claims as the main areas of discussion of the decree. Legislative aspects of bankruptcy of a business entity are an important part of this process. (Kliestikova et al., 2017)

After the end of the COVID-19 pandemic, it will be necessary to take measures to revive the economy. Given that Slovakia has the highest corporate income tax rate in Central and Eastern Europe. The income tax rate (21 % in Slovakia) should be reduced in order to improve the conditions for business entities. The result could be an improvement of the business environment in Slovakia to make the country more competitive. Depreciation of fixed assets can support research and investment and increase the number of business registrations. In the long term, the government should support innovation and technological development. This has the potential not only to improve the productivity of SMEs, but also to contribute to the transition to a more sustainable knowledge-based economy, reduce regional disparities and increase employment. (Pažický, 2021)

1.1 Economic support for the business entities in Slovakia

The legislative adjustments and economic support for the business entities in Slovakia were implemented in such a way as to enable effective business operation and initiate the process of business recovery after the end of the COVID-19 pandemic. Temporary protection created conditions for the viability and operation of businesses after its termination. Despite several measures that were implemented on a broad scale, the institute of temporary protection is based on the possibility rather than obligation.

The use of temporary protection was considered mainly in cases where business entities needed such regulation primarily for protection against creditors. The current economic situation is characterized primarily by the complexity of relationships between suppliers and customers, including financing entities. Entrepreneurs have felt the impact of COVID-19 in the form of restrictions on operating a significant number of businesses. However, the effects of temporary protection should be balanced not only with regard to preserving the business but also considering the interests of creditors. Every entrepreneur with registered office or place of business in Slovakia, whose business authorization was established before March 12, 2020, and meets the requirements stipulated by law, was entitled to apply for temporary protection. The application was submitted through a designated court form, and if the applicant was a legal entity, the application was submitted electronically. (Deloitte, 2020)

The institute of temporary protection does not apply to selected financial institutions such as banks, insurance companies, reinsurers, health insurance companies, securities exchanges, and central securities depositories due to the special nature of these entities. The effects of temporary protection are intended to apply only to business entities that have or are likely to encounter an adverse situation solely as a result of the coronavirus pandemic and the declaration of a state of emergency.

A Slovak business entity must meet the material prerequisites for granting temporary protection, which are as follows:

- A significant increase in the number of receivables past the due date or a substantial decrease in revenues compared to the same period in 2019, significantly endangering the business operation. If the applicant did not conduct business during that period, February 2020 is considered period.
- The business was not bankrupt as of March 12, 2020, and there are no reasons for its dissolution.
- No bankruptcy proceedings or permission for restructuring have been initiated against the business.
- No enforcement proceedings were conducted against the business as of March 12, 2020, to satisfy a claim arising from its business activities.
- No enforcement of a lien on the business, property, right, or other asset belonging to the business had commenced as of March 12, 2020.
- In the calendar year 2020, the business did not distribute profits or other equity resources or eliminated the consequences of such actions.
- In the calendar year 2020, apart from measures aimed at mitigating the consequences of the spread of the dangerous contagious human disease COVID-19, the business did not take any other measures endangering its financial stability or eliminated the consequences thereof, maintains proper accounting, and fulfils the obligation to prepare financial statements. (Deloitte, 2020)

1.2 Profitability, solvency and liquidity of the business entities in Slovakia

The COVID-19 pandemic caused a temporary decline in the profitability of the business entities in Slovakia, but it did not have a long-term impact on the solvency of the corporate sector. This was mainly due to the ability of Slovak companies to compensate for the decline in revenues by reducing their costs to a large extent. Economic support from the state also contributed to mitigating the losses. The share of loss-making companies in Slovakia increased only slightly compared to the pre-crisis period, and the impact on solvency was very low. However, it cannot be completely ruled out that there may be some lingering effects of the crisis in the form of additional failures of certain corporate loans and bankruptcies of business entities. The pandemic support effectively contributed to mitigating the impact of the crisis on the corporate sector, especially for medium and large enterprises. Without economic support, the impact on business profitability would have been twice as large.

In 2020, the COVID-19 pandemic caused a revenue loss in all business size categories. The year-on-year decline in revenues was up to 10 % in most companies, while a quarter of micro-enterprises experienced a revenue drop of more than 50 %. Small and medium-sized enterprises faced a more significant decline in revenues, while the micro-enterprise segment, on average, had a smaller decline, but the development was more heterogeneous, with slower revenue growth in this segment even before the crisis. Companies were able to compensate for the revenue drop to a large extent by reducing costs.

In each size category, this cost reduction accounted for 85 % to 87 % of the revenue decline. This reduction primarily involved cutting regular variable costs, while reducing wage costs played a relatively small role. With the help of funds from state support schemes (First Aid / + / ++), companies covered an additional 3 % to 7 % of the revenue loss. Large and medium-sized enterprises recorded the highest coverage rate of revenue loss through cost reduction and state support. The remaining uncovered portion of the revenue loss almost entirely resulted in a decrease in profit or incurred losses. (NBS, 2021)

Slovak business entities are also striving to reduce their tax obligations. Some Slovak business entities are relocating their headquarters to tax havens. The number of Slovak business entities in tax haven countries has been increasing since 2008. Business entities are thus attempting to avoid tax obligations in Slovakia. In 2020, the number of Slovak companies in tax havens reached 5,274, which is an increase of 3,271 companies compared to 2008. In 2008, there were only 2,003 Slovak companies in tax havens. (Jenčová et al., 2021)

From a longer-term perspective, it is important to note that the coronavirus crisis did not pose a threat to the solvency of the majority of companies. The crisis had only short-term consequences for most companies, primarily resulting in a decline in profit and the postponement of investments in modernization, innovation, and efficiency improvement. On the other hand, the crisis did not cause a long-term deterioration in the situation (a decline in equity). However, compared to the pre-crisis year 2019, the share of companies in loss increased by only 2.2 %. Furthermore, the crisis did not lead to a significant increase in the number of companies with negative equity - the share of these companies increased only slightly by 0.3 %. (NBS, 2021)

2. Methods

The goal of the presented article is to identify and analyse the issue of bankruptcies of business entities during the COVID-19 pandemic and post-COVID-19 period in Slovakia. To achieve this goal, data comparison methods and a questionnaire survey method were utilized.

Comparison of secondary data:

The article utilizes relevant scientific methods, specifically the comparison of secondary data on newly established business entities and bankrupt business entities in Slovakia. The comparison was conducted for the period from 2012 to 2023 based on FinStat data. The aim of the comparison is to identify how the COVID-19 pandemic has influenced the establishment and closure of business entities.

Questionnaire survey:

A questionnaire survey was also conducted to investigate the opinions of entrepreneurial entities regarding the impact of the COVID-19 pandemic. A total of 225 business (Table 1) entities with headquarters in Slovakia participated in the survey. The respondents included small, medium, and large businesses from various sectors of the national economy. The questionnaire survey was carried out in the first half of 2023 across the entire territory of Slovakia, with the questionnaires being sent via email. Over 300 entities were approached, and 225 completed questionnaires were considered usable.

Table 1. Structure of questionnaire survey respondents (business entities)

Number of employees	Service companies	Wholesale and retail businesses	Construction companies	Manufacturing companies	Together
1 - 9	22	24	14	21	81
10 - 49	27	18	12	20	77
50 - 249	9	10	12	11	42
250 and more	4	6	8	7	25
Together	62	58	46	59	225

Source: Authors (2023)

The questionnaire survey focused on the following areas:

- The impact of the COVID-19 pandemic on Slovak business entities.
- Measures taken by business entities in response to the pandemic.
- Overall revenues and profitability of business entities.
- Satisfaction with government assistance and state institutions during the pandemic.
- Prediction of business development and prevention of bankruptcies of business entities.

3. Analysis of bankruptcies of the business entities in Slovakia

Bankruptcies of business entities associated with the COVID-19 pandemic period can be best analysed by comparing their frequency. For a more comprehensive analysis, it is necessary to consider not only bankruptcies, but also newly established entrepreneurial entities in the same observed period. The legal forms are included in the statistics on the creation and bankrupt of companies: limited liability companies, joint stock companies, simple stock companies, joint stock companies, public commercial companies, cooperatives and European cooperatives.

Based on the data obtained from InfoStat, it is possible to analyse the development of the number of newly established and ceased business entities for the period from 2012 to 2023. As can be seen (Figure 1), the number of newly established business entities in Slovakia from 2012 to the first half of 2023 was practically steady, hovering around 20,000 entities. A significant increase in the number of newly established entrepreneurial entities was recorded mainly towards the end of 2013, shortly before a legislative change regarding the required repayment of the basic capital of a business company. According to the new amendment to the Commercial Code, it was no longer possible to pay the basic capital in cash directly to the deposit administrator; it became necessary to transfer it to a separate bank account.

In 2014 and 2015, there was a period of decline in the establishment of new business entities due to the fact that their number was above average in 2013. From 2016 until the present, the number of newly established entrepreneurial entities in Slovakia has stabilized at around 20,000.

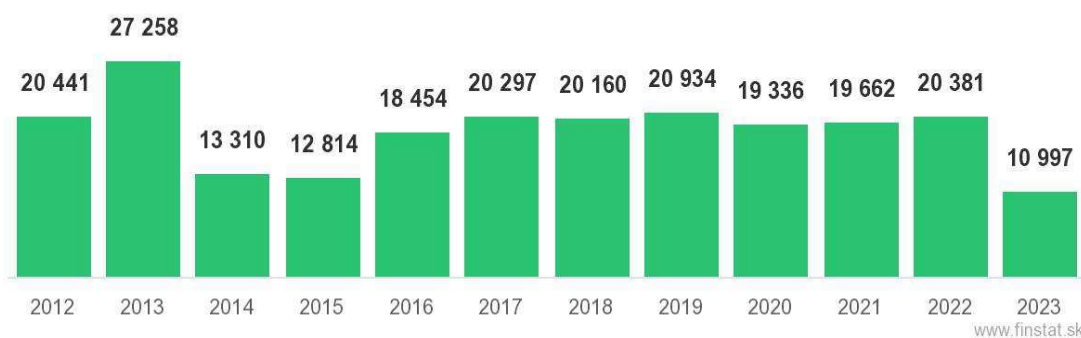


Figure 1. Number of newly established business entities in Slovakia for the period 2012-2023

Source: <https://finstat.sk/analyzy/statistika-poctu-vzniknutych-a-zaniknutych-firiem> (2023)

On the other hand, the number of bankrupt business entities in Slovakia is not as consistently uniform as their establishment. The number of bankrupt business entities reached its peak in the COVID year of 2021 (Figure 2). A high number of business closures (15,300) were largely caused by the COVID-19 pandemic, but legislative changes also contributed to this. In 2021, the goal of the Government of Slovakia was to clean up the Commercial Register from legal entities that should no longer be registered in the Commercial Register by their nature, as well as from inactive companies that have not fulfilled their obligations to state authorities over the long term.

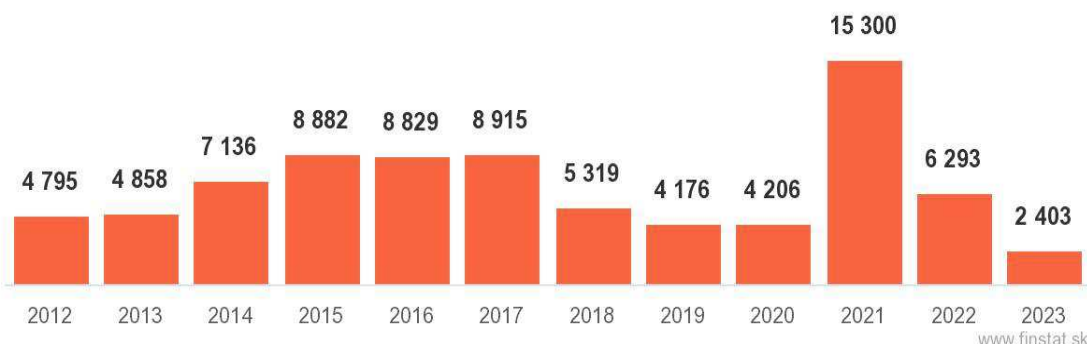


Figure 2. Number of bankrupt business entities in Slovakia for the period 2012-2023

Source: <https://finstat.sk/analyzy/statistika-poctu-vzniknutych-a-zaniknutych-firiem> (2023)

An increased number of bankrupt business entities in Slovakia could also be observed after the introduction of tax licenses in 2013. From 2015 to 2017, the number of dissolved businesses in Slovakia remained at less than 9,000 entities. Since 2018, the number of bankrupted businesses in Slovakia has

decreased to values seen before 2014. Figure 2 shows a sharp increase in the number of dissolved businesses in 2021, when the so-called "cleaning up" of the Commercial Register took place, and undoubtedly, business entities that went bankrupt in connection with the COVID-19 pandemic also had a significant contribution to this increase. In the period of 2022, the number of bankrupt business entities in Slovakia has decreased significantly to 6,293, essentially reaching the pre-crisis level of bankruptcies.

4. Results of the questionnaire survey

The impact of the COVID-19 pandemic on Slovak business entities

The impact of the COVID-19 pandemic on Slovak business entities was assessed through questions regarding how the pandemic negatively affected their business activities. A significant negative impact related to the COVID-19 pandemic was experienced by 84.4 % of Slovak business entities. 67.1 % of business entities felt a significant negative impact on their businesses, while an additional 17.3 % of the surveyed entrepreneurs felt a slight negative impact. About 7.1 % of the surveyed business entities experienced a significantly positive impact from the pandemic, while 6.6 % experienced a slight positive impact. The pandemic did not affect 4.4 % of the companies in either a positive or negative way.

Measures taken by business entities in response to the pandemic

In response to the COVID-19 pandemic, the majority of Slovak business entities were forced to implement a wide range of measures to save their businesses and reduce losses. Entrepreneurs had to adapt their production to meet the new market needs. Nearly half (46.2 %) of the business entities in Slovakia had to adapt their goods and services to the new pandemic conditions. About 52% had to utilize their reserves from the past to sustain their businesses. One-third (35.1 %) of the surveyed business entities responded to the COVID-19 pandemic by reducing the working hours of their employees. A more drastic measure, such as employee layoffs, was used by almost a quarter (24 %) of the surveyed companies. The food service industry had the highest number of employee layoffs during the pandemic, with over half of the restaurants and food establishments (55 %) laying off their employees.

Overall revenues and profitability of business entities

Within different sectors of the economy, the decline in revenue was most pronounced in sectors that were heavily impacted by anti-pandemic measures, such as food services, hotels and other forms of accommodation, the creative industry, and entertainment. Up to 71 % of the surveyed business entities in Slovakia experienced a significant drop in revenue. During the pandemic, 12% of business entities experienced a slight decrease in sales, and 8% of business entities throughout Slovakia experienced no decrease. During the early stages of the second wave of the crisis, a larger number of entrepreneurs experienced smaller declines in revenue compared to the first wave of the pandemic. Half of the surveyed companies experienced a revenue decline of over 50 % compared to the same period before the COVID-19 pandemic. In Slovakia 80.4 % of the business entities experienced a decrease in profitability during the pandemic. Up to 62.2 % of entities recorded a significant decrease in profitability, profit did not decrease in more than 10 % of business entities in Slovakia.

Satisfaction with government assistance and state institutions during the pandemic

Regarding the implementation of anti-pandemic measures, several business entities expected more significant assistance. The results of the questionnaire survey showed that the assistance from the state and its institutions did not come close to compensating for the loss of revenue and profit that entrepreneurs had to deal with. The decline in revenue was significantly higher than the assistance provided by the state in almost half of the surveyed businesses (48.5 %). The situation was particularly dire among entrepreneurs in the gastronomy sector, where over two-thirds of the entities (66 % of entrepreneurs) experienced a significantly higher decline in revenue compared to the state aid. State aid and support were able to fully or partially compensate for the revenue loss caused by the outbreak of the pandemic in less than one-fifth of the businesses (17.8 %). For various reasons, about 33.7 % of the surveyed business entities have not utilized state aid and support so far.

Prediction of business development and prevention of bankruptcies of business entities

The field of predicting the future development of entrepreneurial activity is relatively favourable. Up to 62 % of business entities in Slovakia expect higher revenues and profits in 2023 compared to the pre-COVID-19 period. Only 3.1 % of business entities that have overcome the pandemic period are at significant risk of bankruptcy. A mild risk of bankruptcy is present in only 4 % of business entities in Slovakia that have survived the pandemic period. These results are very interesting, especially with regard to the overall financial and economic stability of Slovak business entities.

The seriousness of the COVID-19 pandemic in Slovakia is evidenced by various proposed measures to prevent the bankruptcy of business entities. Entrepreneurs primarily demand a reduction in payroll burdens (66.7 %), and nearly half of the business entities (49.7 %) prefer measures in the form of direct subsidies and grants for the business sector when the national economy is going through a crisis period (such as COVID-19). These findings clearly indicate the priorities on which the government in Slovakia should focus.

Table 2. Results of the questionnaire survey of business entities in Slovakia

Main groups of survey questions	Strongly disagree % (number)	Disagree % (number)	Neither agree nor disagree % (number)	Agree % (number)	Strongly agree % (number)
Negative impacts of the COVID-19 on the functioning of a business entity	5.7 % (13)	4.4 % (10)	5.3 % (12)	17.3 % (39)	67.1 % (151)
Positive impacts of the COVID-19 on the functioning of a business entity	61.8 % (139)	20.0 % (45)	4.4 % (10)	6.6 % (15)	7.1 % (16)
Adaptation of goods and services due to the COVID-19 pandemic	23.1 % (52)	20.4 % (46)	10.2 % (23)	18.2 % (41)	28.0 % (63)
Utilization of own financial resources due to the COVID-19 pandemic	18.7 % (42)	18.2 % (41)	11.1 % (25)	20.0 % (45)	32.0 % (72)
Reduction of working hours of employees of the business entity	37.3 % (84)	24.0 % (54)	3.6 % (8)	16.0 % (36)	19.1 % (43)
Dismissal of employees from permanent employment in the business entity	46.7 % (105)	28.0 % (63)	1.3 % (3)	9.8 % (22)	14.2 % (32)
Significant drop in sales of entities during the COVID-19 pandemic	8.0 % (18)	12.0 % (27)	8.9 % (20)	28.0 % (63)	43.1 % (97)
Significant drop in profitability of business entities during the COVID-19 pandemic	5.3 % (12)	4.9 % (11)	9.3 % (21)	18.2 % (41)	62.2 % (140)
Insufficient help and support from the state during the COVID-19 pandemic	6.2 % (14)	11.6 % (26)	33.7 % (76)	19.6 % (44)	28.9 % (65)
Higher sales and profits in 2023 than before the COVID-19 pandemic	11.1 % (25)	15.1 % (34)	12.0 % (27)	23.5 % (53)	38.2 % (86)
Business entities at risk of bankruptcy in the post-covid period	51.1 % (115)	34.2 % (77)	7.6 % (17)	4.0 % (9)	3.1 % (7)

Source: Authors (2023)

5. Discussion

Based on the comparison, the number of bankrupt business entities reached its peak in the COVID year 2021 (Figure 2). The number of bankrupt business entities in 2021 reached up to 15,300 entities, which represented more than a threefold increase compared to the years 2018, 2019, and 2020. However, after overcoming the COVID-19 pandemic, the average annual number of bankrupt business entities in Slovakia returned to its original level. This means that the critical years for business entities were mainly 2020 and 2021 when companies faced serious economic and financial problems. As a result of these issues, the number of business bankruptcies increased, particularly in 2021.

According to a similar study by author Blahušiaková, many Slovak businesses gradually adapted to the COVID-19 pandemic, adjusted to the conditions, diversified their service portfolios, changed their work methods, and so on. This was also reflected in their revenue levels. While in the accounting period of 2020, nearly 60.6 % of entrepreneurs experienced a decline in revenue, in the accounting period of 2021, it was only 51.8 % of entrepreneurs. In the accounting period of 2020, 38.7 % of entrepreneurs reported a revenue decline of more than 21 %, while in the accounting period of 2021, only 32.8 % of entrepreneurs reported a revenue decline of more than 21 %. The situation has also improved in terms of business closures. In the accounting period of 2020, 26.3 % of establishments closed, whereas in the accounting period of 2021, it was 16.1 % of establishments. (Blahušiaková, 2022)

Based on various surveys and, especially, on our own questionnaire survey, it can be stated that Slovak business entities faced the greatest problems in terms of revenues and profitability during the COVID-19 pandemic. According to our own questionnaire survey, revenues significantly decreased in 71.1 % of business entities in Slovakia. Regarding the profitability of companies, profits decreased in over 80 % of entities operating in Slovakia. The assistance and support provided by the government during the pandemic proved to be insufficient. Business entities evaluated the support from the government and state institutions as inadequate. Half of the business entities in Slovakia considered state aid to be insufficient, and one-third of entities did not use it at all.

Regarding the future of business entities, more than 70 % of companies in Slovakia plan to achieve higher revenues and profits after the pandemic in 2023. The risk of bankruptcy for companies that have already overcome the issues associated with the COVID-19 pandemic is relatively low. Only 3.1 % of business entities have significant concerns about the risk of bankruptcy, and only 4 % have minor concerns about the risk of bankruptcy in Slovakia. Overall, the results of the questionnaire survey can be considered relevant and beneficial.

An interesting topic for further research could also be the impact of COVID-19 on the sphere of innovation. According to some studies, the pandemic COVID-19 crisis had only a minor impact on innovation spending, as well as on the main consumers of innovation. At the business entities level, the COVID-19 pandemic has affected the industry distribution of innovation. Also at risk are the costs of innovation in developing countries and more unstable business entities. An increased imbalance in access to funding for innovation is possible. (Gavrilko & Pobochenko, 2021)

Conclusion

In Slovakia, negative impacts and consequences of the COVID-19 disease pandemic are experienced by 75 % to 95 % of the surveyed business entities in various economic sectors, according to various surveys. According to a recent questionnaire survey, a significant negative impact on business was reported by a total of 67.1 % of Slovak business entities, and a slight negative impact by an additional 17.3 % of the surveyed Slovak businesses. Overall, 84.4 % of business entities in Slovakia felt the negative consequences of the COVID-19 pandemic. These findings emerged from a questionnaire survey on the impact of the COVID-19 pandemic, which involved a total of 225 respondents from small, medium, and large companies located throughout Slovakia.

The surveyed business entities adjusted their products to the new market conditions in order to keep their businesses running in 46.2 % of cases. More than a third (35.1 %) of the surveyed business entities responded to the COVID-19 wave by reducing their employees' working hours. A more drastic measure, such as laying off employees, was implemented by nearly a quarter of the entrepreneurs (24 %). Sales decline during the pandemic affected 71.1 % of Slovak businesses, and more than 80% of business entities experienced a decline in profits. A very interesting fact is that only 3.1 % of business entities that survived the COVID-19 period face a significant risk of bankruptcy. A mild risk of bankruptcy is faced by only 4% of business entities in Slovakia that survived the COVID-19 period. Overall, 7.1 % of business entities in Slovakia perceive the risk of bankruptcy in the post-pandemic period.

The limitation of recent questionnaire survey was primarily the number of respondents and the survey period. Further survey will require a larger research sample and a longer time period. In this way, the results of these survey could be more relevant and qualitative.

These surveys make it evident that COVID-19 significantly impacted the business environment in Slovakia. Within individual sectors of the Slovak economy, financial and economic problems were most pronounced in business entities that were most affected by anti-pandemic measures. These were mainly business entities in the service sector, especially tourism, catering and restaurant services, as well as art and creative industries. A significant decline in revenue and profitability during the COVID-19 period was observed in the majority of Slovak business entities.

Slovak business entities perceived the utilization of state aid and support as chaotic, unsystematic, and administratively demanding. Therefore, in many cases, they did not even request any form of assistance and support, although they would likely be entitled to it. In this regard, entrepreneurs would prefer targeted forms of assistance with clearly defined conditions and rules, primarily covering all fixed costs as well as the overall labour costs. The deferral of tax payments, insurance premiums, and loan instalments is considered counterproductive, as it only postpones the payment rather than forgiving it.

The COVID-19 pandemic significantly impacted the business environment in Slovakia, as evidenced by the increase in financial problems and the number of bankruptcies among business entities, especially in the year 2021. For these reasons, supporting business entities in Slovakia should be a priority for the Government of Slovakia as well as the members of the National Council of the Slovak Republic, as economic reforms, quality legislation, and effective measures can significantly support entrepreneurship and business entities in Slovakia.

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Bankruptcy Risk Prediction using Artificial Intelligence: An Empirical Study of the Slovak Chemical Industry

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Abstract

Research background: Bankruptcy prediction is important in business management, especially in the context of increasing competitiveness. Assessing the financial health of business entities using various models is an important area in not only scientific research, but also business practice. Comparing financial results and bankruptcy risk estimation is also important in economic practice.

Purpose of the article: This study aims to apply an artificial neural network (ANN) to predict the bankruptcy of non-financial corporations in the chemical industry of the Slovak Republic. We compared the results of artificial neural network with logistic regression.

Methods: We used multi-layer perceptron artificial neural network (ANN-MLP) with feed-forwarded connections and back-propagation (BP) type of learning for prediction the bankruptcy of non-financial corporations in the chemical industry of Slovakia. We tested nine prediction models on a sample of 663 chemical companies in Slovakia from 2020 and 2021, while we used five financial indicators. The results were compared with logistic regression.

Findings & Value added: An optimal neural network model was created for predicting risk bankruptcy in the chemical industry of the Slovak Republic. Our model can be applied in countries with undeveloped capital markets. We constructed an optimal network for the chemical industry using five financial indicators on the input layer in combination with one hidden layer (eight hidden nodes). All models achieved high accuracy.

Keywords: bankruptcy prediction, risk, chemical industry, artificial neural network, logistic regression

JEL classification: C45, C53, G33

1. Introduction

In business management, it is important to understand the financial and economic situation and react promptly in the event of impending danger. Various simple models, more complex statistical functions, and artificial intelligence have been used to predict bankruptcy. One frequently used and successful technique is an artificial neural network (ANN). The existing models were created for the particular conditions of a given economy during a specific period. Therefore, they are not directly applicable to Slovak conditions. Adjusting these models to align with the unique conditions of Slovakia is essential. In this context, this study aims to apply an artificial neural network to predict the bankruptcy of non-financial corporations in the chemical industry of the Slovak Republic during the period 2020-2021. Slovakia has a strong tradition in all major segments of the chemical industry, including petroleum refining, production of chemicals, fertilizers, rubber and plastics production. The portfolio of products is also influenced by Slovakia's strong automotive and electronics sectors, which serve as constant clients for different companies from the chemical industry. Unlike in some other countries, the output of the Slovak chemical industry does not consist of one product or a group of few products, but includes a diversified portfolio of hundreds of different products, ranging from petrochemicals, agrochemicals, and primary organic/ inorganic chemicals, to rubber and plastic products. Chemical industry has traditionally been one of the largest sectors of Slovak economy, so we chose this sector for analysis.

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1.1 Literature review

As a fundamental economic entity of a market economy, an enterprise is linked to its activity by various financial resources. Financial and economic analysis is used to evaluate the financial situation of a company. This analysis provides a summary of the company's performance during the evaluation period. Vochozka (2020) describes it as a formalized method that provides an understanding of a company's financial health with the advantage of an analytical and systemic approach to the company's activities. Lukáč & Rozkošová (2017) present it as a tool for uncovering strengths and weaknesses and evaluating the past, present and future state of the company. Financial indicators used to evaluate the company are classified into liquidity, activity, profitability, indebtedness, and market value.

Banks and financial institutions frequently employ bankruptcy prediction models to evaluate clients and determine the level of risk associated with their business. This helps to evaluate the creditworthiness and determine the classification of the company based on potential credit risk. Such models are also referred to as rating models, and their primary task is to estimate the probability of a borrower defaulting within a year. As an early warning system, companies frequently use the forecast for their own purposes. The first works comparing healthy and bankrupt company indicators date back to Fitzpatrick (1932) and Fisher (1936). The initial scoring functions were simple models such as univariate discriminant analysis applied by Beaver (1966) and Altman (1968), who used linear discriminant analysis based on five financial indicators. The next level of models included logistic regression (Ohlson, 1980) and probit (Zmijewski, 1984).

With the gradual development of technologies, other methods based on artificial intelligence are becoming more popular. The suitability of using an artificial neural network was proven in the work of Odom & Sharda (1990). Current models based on artificial intelligence are expanding and creating various hybrid models that increase their accuracy. Garcia (2022) reports that nonlinear models based on machine learning achieve better results and more accurately determine bankruptcy than traditional statistical methods.

One of the main issues with bankruptcy prediction data is the representation of individual samples in the analyzed set. Generally, the representation of bankrupt samples is much smaller than non-bankrupt samples, leading to the tendency of the model to fit non-bankrupt samples. The high imbalance of data is also confirmed by Wang & Liu (2021) and Garcia (2022), who try to compensate for the imbalance with various statistical methods (e.g., resampling, generation of synthetic samples).

The artificial neural network model is based on the simplified principle of the neural structure of the brain. Learning consists of gaining experience, and information is stored in patterns. The artificial neuron is the basic unit of the network, and its principle is to receive input signals, combine them, perform a non-linear operation (using the activation function), and then produce a signal at the output. By organizing the same nodes, layers (input, hidden, output) can be created, forming a network by connecting to each other. The input layer consists of input neurons that receive signals from the external environment. The neurons producing the output of the network form the output layer and all the others are the hidden neurons. The network consists of one input layer, one output layer, and a certain number of hidden layers (or none) (Grumstrup et al., 2021; Sahoo & Pradhan, 2021).

The most frequently used network structure for prediction is the multi-layer perceptron (MLP). Networks connected without feedback, i.e., information passes gradually through the individual layers only from the input to the output and does not get back, are referred to as feed-forward (FF). Conversely, when using feedback (recurrent networks), they are referred to as feed-back (FB) (Kabir, 2021). Table 1 shows a comparison of studies by various authors using this type of network.

Table 1. Comparison of bankruptcy prediction with ANN

Author(s)	Models	Number of indicators	Research set				Period	Country	Accuracy
			Number of businesses			ANN			
			Non-bankrupt	Bankrupt	Overall				
Kasgari et al. (2013)	ANN (Probit)	4	71	65	136	1999 – 2006	Iran	95 / 94	
Lee & Su (2015)	ANN (Logit)	10	60	60	120	2006 – 2009	Taiwan	96.3 / 82.3	
Hosaka (2019)	Convolutional ANN (LDA, SVM, MLP, AdaBoost)	6	2,062	102	2,164	2002 – 2016	Japan	84.8	

Thanh-Long et al. (2022)	ANN (SMOTE)	20	1,218	44	1,262	1970 – 2008	USA	80
Sigrist & Leuenberger (2023)	ANN (Tree Boost)	14	18,833	1,402	20,235	1961 – 2020	USA	93.1

Source: own processing

The selection of predictors is a crucial aspect of modeling as the resulting performance of the model heavily depends on them. However, there is no exact procedure for their selection indicated in the literature and most studies rely on using predictors that achieve the highest accuracy in the modeling process. Popular predictors from previous studies are also often selected or stepwise method is employed to choose a few strong predictors from a larger set of available ones. Vochozka (2020) notes the great variety of predictors used and the ambiguity in their selection. Hammond et al. (2022) attempt to identify prediction factors using expert methods, while Valášková et al. (2018) use multiple regression, and Mihalovič (2018) employs evolutionary algorithms to select suitable predictors.

2. Methods

This study aims to apply an artificial neural network to predict the bankruptcy of non-financial corporations in the chemical industry of the Slovak Republic. The total dataset consists of 1,683 non-financial corporations in the chemical industry of the Slovak Republic, classified as SK NACE 19, SK NACE 20, SK NACE 21, and SK NACE 22.

Type of network was selected as MLP (multi-layer perceptron) with feedforward connections only and back-propagation (BP) for learning. BP is part of the process in which the neuron weights are adapted according to the current output error signal. This process continues iteratively and makes the network 'learn' what is the response for actual inputs. This algorithm propagates the error toward the network input, where the error in some layers is defined as the sum of the errors in the next layer of neurons with corresponding weights.

For the calculation, we used the financial indicators of non-financial corporations in the chemical industry. Financial indicators were calculated based on absolute indicators from the financial statements of non-financial corporations. Absolute indicators were obtained from the Register of Financial Statements of the Slovak Republic for the years 2020 and 2021. From the dataset, 20 financial indicators were compiled and analyzed for each category (liquidity, profitability, indebtedness, and activity). From these financial indicators, five ratios were selected based on previous research and literature to predict bankruptcy. The stepwise method was used to construct neural networks models. We used the following five financial indicators as inputs for the neural network:

- *ROS* - return on sales,
- *TI* - total indebtedness,
- *FL* - financial leverage,
- *CL* - current ratio,
- *NWC/A* - share of net working capital to assets.

Samples with missing data for the selected indicators were excluded from the analysis. The interquartile range method was used to remove inconsistent samples (outliers) from the database. An outlier can be considered as an inconsistent observation in the dataset. This observation may not even be from the same statistical distribution as the rest. The inter-quartile range ($Q3 - Q1$) produces 50% of most represented data (the middle 50% of a distribution). The deviated observation must be at the end of the distribution. The boundaries are set at a fixed distance from this range. The information contained in the values outside the boundaries is extreme and creates suspicion of an abnormality. We considered the boundary as three times the inter-quartile range, and observations outside these boundaries were removed. The resulting set consisted of 663 samples, including 56 bankrupt and 607 healthy ones.

Modeling was performed using the statistical program IBM SPSS Statistics, which includes artificial neural networks (MLP – multi-layer perceptron). The scaling of the samples was performed automatically by the software using the standardization method (rescaling of data with a mean value of 0 and a standard deviation of 1). Scaling is a pre-processing step which generally moves the centre of the coordinate system and lengthens or shortens the scale on the axes. It is important for comparing measurements with different units. The sigmoid function was used as an activation function, and several artificial neural network models with different configurations were created for comparison purposes.

The network had five input nodes (according to financial indicators), and the output of the network was 0 for healthy businesses and 1 for bankrupt businesses. Act no. 7/2005 Coll. on Bankruptcy and Restructuring defines bankruptcy as the ratio of equity to debt, while Act no. 513/1991 Coll. The Commercial Code specifies the minimum ratio for each year. In the analyzed period, this ratio was set at 8%, and samples with an equity to total debt ratio of less than 0.08 were considered bankrupt. The neural networks were assembled with one hidden layer (number of hidden nodes was either 3, 8, or 20), and the ratio of training and testing samples was 60:40, 70:30, or 80:20, resulting in a total of nine models.

Logistic regression, a standard and frequently used prediction method, was also performed on the data sample to compare accuracy. Due to the logistic regression condition, which requires independent variables to be uncorrelated, the input indicators were examined for multicollinearity. The *FL* indicator (financial leverage) was removed from the model due to high correlation. In the case of logistic regression, the model consisted of only four independent variables.

3. Results

We create an optimal neural network for non-financial corporations in the chemical industry of the Slovak Republic for 2020 and 2021. Best model was network with 8 hidden nodes, 5 input nodes and his schema is in Figure 1. Figure 1 shows the connections between the neurons. Lines have different thicknesses and colours. When the weight between the variables is less than zero, the lines are blue. When the weight has a value greater than zero, the lines are grey. Lines are thinner (thicker) as one moves closer (farther) to zero.

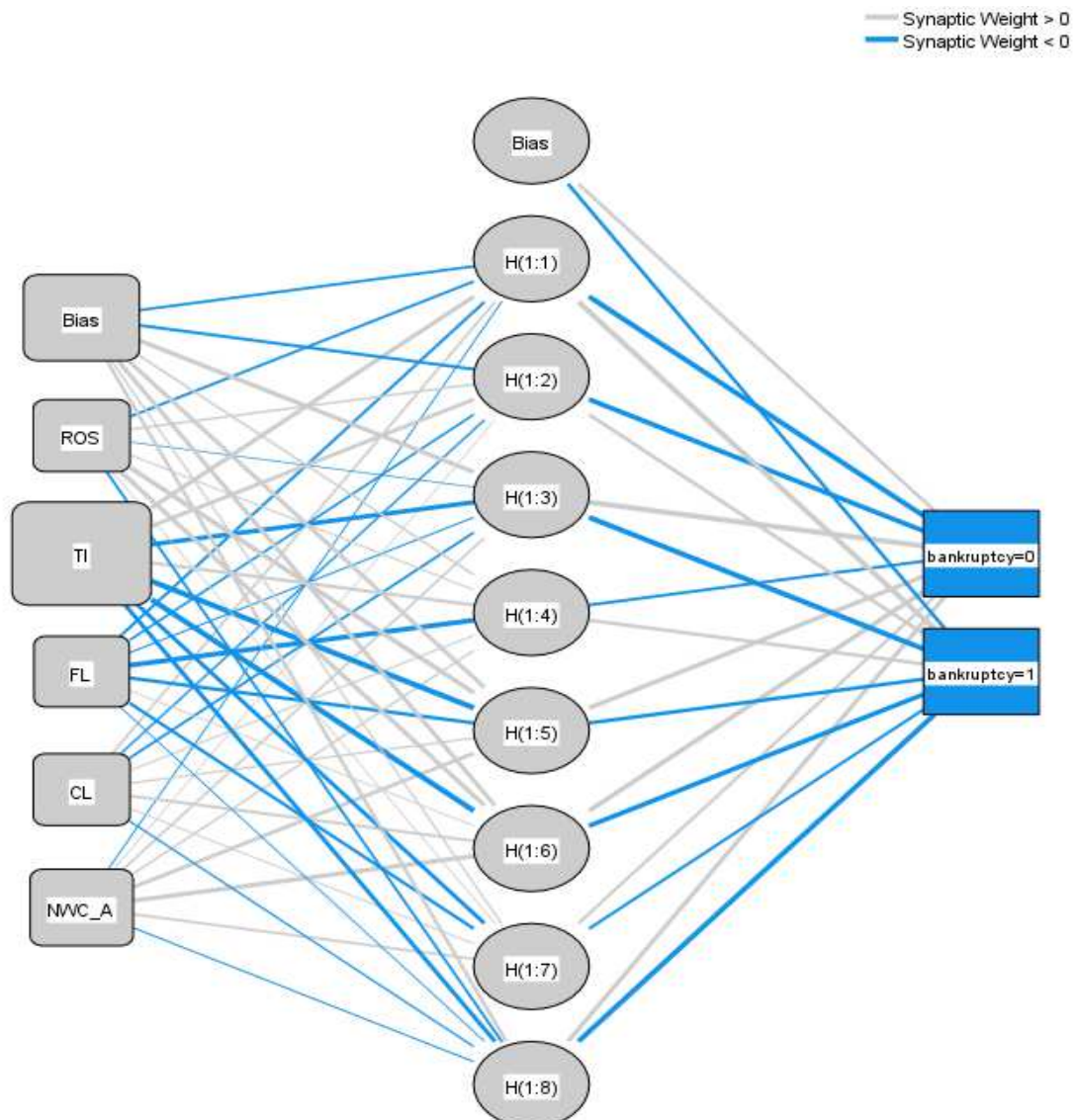


Figure 1. ANN bankruptcy prediction model for chemical industry in Slovakia
Source: own processing in SPSS

Predictors of profitability (*ROS*), indebtedness (*FL*, *TI*), and liquidity (*CL*, *NWC/A*) were used to estimate bankruptcy and an optimal neural network was created for the years 2020-2021 with one hidden layer with the number of hidden nodes 3, 8, or 20. The number of hidden nodes had no significant effect on the resulting accuracy. The *TI* predictor had the highest information weight (normalized importance over 90%), which is related to the fact that bankruptcy itself is defined by high indebtedness. Other predictors of *NWC/A* (23%), *ROS*, *CL*, *FL* were less than 10%. Estimated parameters for model are in Table 2.

Table 2. ANN prediction model parameters

Parameter Estimates											
Predictor		Predicted									
		Hidden Layer 1							Output Layer		
		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)	H(1:6)	H(1:7)	H(1:8)	[bankruptcy=0]	[bankruptcy=1]
Input Layer	(Bias)	-0.493	-0.580	1.330	0.318	1.048	1.076	0.218	0.728		
	ROS	-0.492	0.319	-0.004	0.173	1.430	1.247	0.075	-0.426		
	TI	1.169	0.944	-1.379	0.692	-2.704	-2.690	-0.967	-1.072		
	FL	-0.499	-0.358	-0.164	-1.747	-0.860	0.107	-0.677	-0.088		
	CL	0.397	-0.229	-0.422	0.190	0.221	0.526	0.136	-0.194		
	NWC_A	-0.126	0.053	0.372	0.307	0.920	1.333	0.463	-0.145		
Hidden Layer 1	(Bias)									0.826	-0.795
	H(1:1)									-1.965	2.064
	H(1:2)									-1.696	0.875
	H(1:3)									2.465	-2.072
	H(1:4)									-0.559	0.870
	H(1:5)									1.355	-0.913
	H(1:6)									1.659	-1.576
	H(1:7)									0.666	-0.545
	H(1:8)									1.112	-1.818

Source: own processing

All proposed models achieved high accuracy. The estimate of non-bankrupt samples was above 99% in all cases, probably due to their higher number of samples. The most important task of the model was to correctly identify bankrupt samples, which was also emphasized in this modeling. The best results were achieved by the model with 8 hidden nodes, which had only 37.78% accuracy of bankruptcy samples during learning, but 81.82% in the test set. The overall accuracy was 98.32% (Table 3). Area under the curve (*AUC*) was 0.865 for both predicted values (Figure 2).

Table 3. ANN prediction results

Hiddens		8		
Sample	Observed	Predicted		
		0	1	Correct
Training	0	438	1	99.77%
	1	28	17	37.78%
	Overall	96.28%	3.72%	94.01%
Testing	0	167	1	99.40%
	1	2	9	81.82%
	Overall	94.41%	5.59%	98.32%

Source: own processing

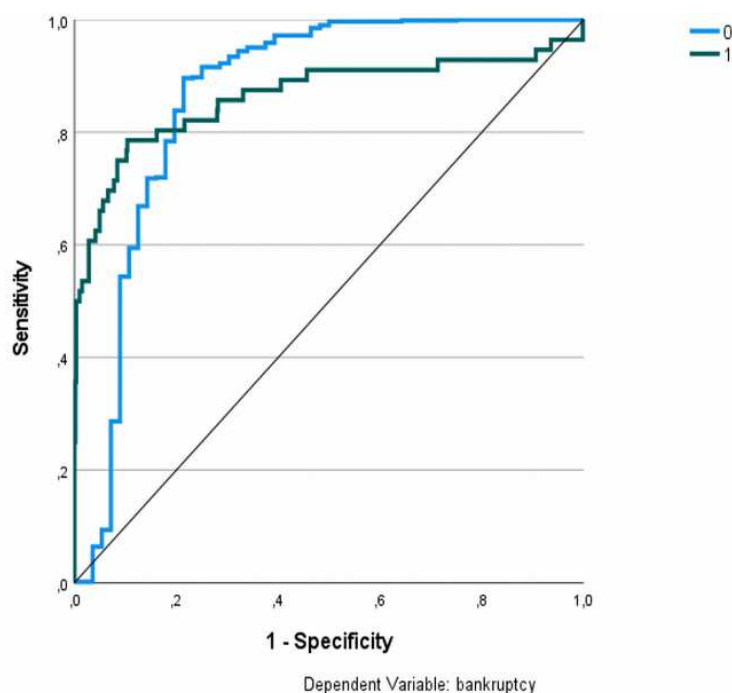


Figure 2. ANN prediction results by AUC
Source: own processing in SPSS

4. Discussion

When we estimated the bankruptcy by logistic regression, overall accuracy was 95.17% (Table 4). The neural network model is more accurate, which is supporting by most studies (Kasgari et al., 2013; Lee & Su, 2015; Garcia, 2022). Like ANN, Logit estimated non-bankrupt samples with an accuracy above 99%, mainly due to the imbalance of the number of samples in the data set. Data imbalance was dealt in studies by Wang & Liu (2021) and Garcia (2022). They indicate that when the number of samples are equal, the prediction of bankrupt samples improves and the ratio of prediction of non-bankrupt and bankrupt samples also balances out.

Table 4. Logit prediction results

observed	Predicted		
	0	1	Correct
0	605	2	99.67%
1	30	26	46.43%
Overall	95.78%	4.22%	95.17%

Source: own processing

The importance of using five indicators in AAN follows from previous studies on company's financial aspects. First, the indebtedness indicators were represented by *FL* and *TI* (Purvinis et al., 2008; Kim & Kang, 2010; Nyitrai & Virag, 2019). *CL* and *NWC/A* belong to the liquidity indicators (Purvinis et al., 2008; Kim & Kang, 2010; Nyitrai & Virag, 2019). Finally, *ROS* is profitability indicator (Nyitrai & Virag, 2019).

Conclusion

This study dealt with the estimation of bankruptcy of non-financial corporations in the chemical industry of the Slovak Republic using an artificial neural network. As it is unlikely to create a general model that works under any conditions, several models applied to specific conditions have been proposed. The most frequently used type of network is the MLP (multi-layer perceptron) with back-propagation (BP), which was also used in this study. The aim of this study was to apply an artificial neural network to predict the bankruptcy of non-financial corporations in the chemical industry of the Slovak Republic. All proposed models used five indicators (four indicators in the case of Logit) and achieved high accuracy. Since there were only small differences in accuracy between models with different configurations, it is not

possible to determine the significance of increasing the number of nodes in the hidden layer. We found that a network with eight hidden nodes (one hidden layer, Sigmoid activation function) is the most optimal model after generalization.

The limitations of this work are mainly due to the short period of analysis (2 years), which was affected by the pandemic. Therefore, the results may differ from those in other periods. Qualitative data were not included in the model, and further studies could segment businesses by size or region. Additionally, the use of an unbalanced ratio of bankrupt and non-bankrupt samples is another limitation. Similar analysis could be conducted in other countries and sectors to compare the results. While these results can help financial analysts estimate risk, it is recommended to use multiple methods and compare the results for a more comprehensive assessment.

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Dividend Policies Adopted by the Banks. Their impact on the prospects of the Greek Banking System

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Abstract

Research Background: The author got interested in the topic of the article after more than seven years of employment in the Greek Banking System and especially in Ergobank, which is the core of our current study. The lack of studies in the field of dividend policy of the Greek Banks and the familiarity of the author with the particularities of Ergobank, led us to deal with the specific topic.

Purpose of the article: We are dealing with observed practices adopted by Greek Banks, with special emphasis on the extremely “generous” dividend policy exercised by Ergobank (a medium-sized Greek Bank, small-sized with international standards) and evaluate the consequences of this particularity on the prospects of the specific Bank.

Methods: We have used a small scale survey to show the impact of dividend policy of Ergobank on the continuous increase of its share’s price. We also calculate the ROA, ROE and DPR ratios of the Bank for 25 years, relying in all the published financial statements.

Findings & Value added: Taking into account the answers of the interviewed former employees of Ergobank, regarding its dividend policy, we concluded that they are closer to the bird in the hand theory of Gordon and Lintner and not with the dividend irrelevance theory of Miller and Modigliani.

Keywords: dividend policy, banking system, banks, Ergobank, Greece

JEL classification: G35

1. Introduction

It is beyond any doubt that the dividend policy exercised by the management of any company shows the extent of interest of the management for the shareholders and (in our opinion) certainly affects them and the potential shareholders in their attitude towards buying or selling shares.

In the context of this paper, we will first describe the existing framework and restrictions ruling the dividend policy in Greece, and then we will refer to the case of Ergobank, which followed an “extreme” dividend policy. We will continue with the calculation of certain financial ratios of the specific bank and their evaluation and impact on the prospects of the bank. We have carried out a survey addressed to former employees of Ergobank in order to know their views concerning the followed by the bank dividend policy.

Finally, we will try to draw some conclusions regarding the role of the dividend policy of any bank in the prospects of the overall banking system.

1.1 The Existing Framework

It has been observed that the vast majority of the companies enlisted in the Athens Stock Exchange, do not follow a standard predetermined dividend policy. This is the case for all the companies including the banks, when the latter were distributing profits to their shareholders. Their unwillingness to distribute dividends is attributed mainly to the difficulties in raising funds through an increase of share capital. These difficulties have soared especially since 2010, when the problems of the Greek economy showed up. Of course in the case of banks, dividends have been vanished due to the losses or lack of sufficient profits or due to the recommendations of the central bank to avoid the distribution of dividends in times of successive recapitalizations.

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In Greece there are restrictions on the exercised dividend policy, which are imposed by the existing legislation. According to these restrictions, 5% of the net profits is channeled towards the creation of a necessary reserve capital. The obligation of the company stops when the necessary reserve capital reaches the 1/3 of the share capital . On the other hand, according to legislation, companies have to distribute an amount of at least 6% of the share capital (called first dividend). Of course legislation leaves room to the general assembly of the company to decide. Non-distribution of dividends requires a majority of 3/4 of the votes represented in the general assembly (Kiochos P.-Panagou V.)

2. The Case of Ergobank

Ergobank was a medium-sized Greek bank (small-sized with international standards), established in 1975. The founder of the bank (a charismatic personality) managed to convince a number of businessmen and other individuals to invest in the new bank, taking into account some restrictions regarding the amount of investment and the percentage of their participation in the share capital (nobody could initially have more than 5% of the total share capital) (Dritsa 2006).

In all the 25 years of its operation, the management of the bank achieved an impressive performance. Despite its small size and the lots of restrictions from 1975 to the end of the 80s, the bank managed to overcome the hurdles of administrative determination of interest rates and succeeded in outstanding profitability. In 1997, the magazine “The Banker” ranked Ergobank 10th in the world regarding its return on equity (ROE).

The failure of the effort to create a new bank up to its standards confirms the importance of the founder’s personality and the difficulty of repeating the successful model of Ergobank under different conditions and time periods(The effort took place in 2001, by former executives of Ergobank and failed in a few years). Ergobank was finally acquired by Eurobank in 1999.

3. Methods and Results

3.1 ROA, ROE and DPR for Ergobank from 1976 to 1999

In the following table, we have calculated the Return on Assets (ROA), Return on Equity(ROE) and Dividend Payout Ratios(CPR) from 1976 to 1999. The profitability of Ergobank was highly appreciated by the magazines “Business Week”(1986) and “The Banker “(1997).

Table 1. ROA,ROE, DPR for Ergobank

YEAR	ROA (%)	ROE (%)	Dividend Payout ratio (%)
1976	2,96	12,80	76,2
1977	2,50	17,11	75,7
1978	2,10	18,22	73,2
1979	2,02	19,41	65,1
1980	2,04	25,13	61,2
1981	1,75	31,02	65,7
1982	1,07	19,86	82,7
1983	0,90	19,61	84,3
1984	1,60	44,46	71,9
1985	1,95	54,84	49,9
1986	1,72	55,89	56,2
1987	2,10	78,83	52,6
1988	2,25	62,05	50,5
1989	3,55	59,38	50,3
1990	3,80	52,80	67,5
1991	4,52	69,41	61,3
1992	4,26	63,37	39,3
1993	3,90	62,95	39,1
1994	3,90	63,00	39,3
1995	3,71	60,88	39,2
1996	4,03	62,26	38,4
1997	3,92	48,71	37,3
1998	3,55	48,38	37,1
1999	4,23	37,54	34,5

Source: Author’s own calculations based on published financial statements (Kyrmizoglou P. 2020).

The previous table shows that the highest dividend payout ratios were implemented in 1982 and 1983, when Ergobank had lower net profits. On the contrary, the lowest DPRs were implemented in 1996, 1997, 1998, and 1999, when Ergobank had some of its higher net profits.

Such a contradiction in dividend policy shows the wish of management to attract investors in periods of relatively lower profits and their reluctance (or indifference) to convince investors about the value of the shares in periods of higher profits. Of course, we can not exclude that the above-mentioned reluctance was connected with the acquisition of Ergobank by Eurobank in 1999.

In general, all the relative ratios (P/E, PEG, P/BV, marketability ratio, beta coefficient, capitalization/turnover ratios) were very attractive during the entire life of Ergobank.

3.2 The Opinion of Ergobank's Employees

A small scale survey addressed to 52 former employees of Ergobank (living in Northern Greece) reinforced our argument that the generous dividend policy adopted by the management of the bank, led to the continuous spectacular increase of the price of Ergobank's share. From the total 52 participants, 48 responded. 46 of them expressed their view that the bank's exercised generous dividend policy gave a boost to the price of the bank's share.

On the other hand 43 out of the 48 employees who answered, believe that a less generous dividend policy could help Ergobank to play a much more important role in the Greek banking system. 41 employees expressed their full satisfaction from the salaries, promotions and bonuses (partly through the distribution of shares, so they might be biased in their opinion) they received during the years of their service in the bank. 42 employees stated that the priority of the bank was the financing of SMEs and the best service provided to the customer in the fields of exports and imports. That was confirmed by the fact that although Ergobank had a very small market share in the Greek banking system, around 2.5%-3.5 % regarding total assets, their market share in exports and imports ranged from 18% to 21%.

36 employees believe that some investments were neglected, due to the choice of a generous dividend policy. 32 employees believe that the acquisition of the bank by Eurobank in 1999, could have been avoided, if the amounts distributed as dividends in all those years, were reinvested in the bank. According to their opinion, they would be enough to make Ergobank one of the leading players of the system, by acquiring other banks.

The sample of the 48 employees is considered representative of the total population of the bank, with 21 graduates of secondary education, 25 graduates of higher education and 2 holders of Master degree. 39 of the respondents were males, and 9 were females. 27 ended their career as bank managers, 17 as heads of department, and 4 as ordinary employees. 32 of the respondents ended their career with more than 30 years of service and 16 with less than 30 years.

We have to take into account that the composition of the sample refers to people who retired more than 9 years ago. Therefore it reflects the profile of employees of those years. The views expressed by the former employees of Ergobank, regarding the bank's dividend policy seem to agree with the bird in the hand theory of Gordon and Lintner. On the contrary, they are opposed to the dividend irrelevance theory of Miller and Modigliani.

4. Discussion and Conclusions

Our small scale survey confirmed the impact of the dividend policy on the share's price. On the other hand, there is evidence that a less generous dividend policy could lead the specific bank to a more important role in the Greek banking system. Given the priority attributed by Ergobank in financing SMEs and favoring exporting activities, a more strict dividend policy might have a remarkable positive impact on the macroeconomic developments of the country.

Beyond the importance of dividend policy, in the case of Ergobank, it was proved that despite its small size, they managed to achieve an excellent financial performance, combined with effective communication with the customers. As we can see nowadays, the unstoppable evolution of technology does not necessarily lead to the better satisfaction of customers due to the bureaucracy existing in big organizations, the lack of sufficient control, and the confusion caused by wrong instructions. Therefore, we should not overestimate or underestimate the role of dividend policy. The problem is much more complicated, and the need for better management is imperative.

In any case, a more strict dividend policy could free up a lot of resources to the benefit of financing productive activities.

Criticizing the extremely generous dividend policy does not necessarily lead to the other extreme of zero dividend. Our objective should be a more balanced dividend policy that could benefit the bank itself and the whole economy of the country. A bigger bank can play a more important role in the economy, especially when it retains the advantage of monitoring and feeling the needs of the firms.

If all the banks adopt a more balanced dividend policy, more resources will be available to be channeled to productive sectors and have a positive impact on the whole economy.

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The Role of Taxation in Moving Towards Sustainable Green Growth

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Abstract

Research background: The issue of environmental pollution from fossil fuels is a current phenomenon. This paper seeks to find out to what extent, if at all, electricity production can be suppressed using tax instruments, and the problem we are going to try to describe has been dealt with to some extent by the world's leading economists, but we believe that there is still no sufficiently effective instrument to achieve at present a reduction in electricity production from these sources.

Purpose of the article: This research paper wants to reflect the rationale behind taxes as a tool to reduce externalities. It was hypothesized that after the introduction of the new tax, transaction costs would not increase beyond the proceeds of the tax.

Methods: We recalculated the emissions produced by power plants using coal and natural gas, and through this calculation we found out the volume of gross revenue of this tax. We have also compared and assessed electricity generation from different sources within the European Union over the period January to December 2022.

Findings & Value added: It can be concluded that the European Union would collect a certain package of funds from the Member States and their originators of negative externalities, but the transaction costs would exceed these revenues, and this would bring an unwanted effect to the final stage. The introduction of environmental taxes would, in certain circumstances, undermine the competitiveness of producers of electricity from the sources concerned.

Keywords: electricity, environmental taxes, natural resources, pollution

JEL classification: E23, F15, G18, H20, H26

1. Introduction

Externalities are a highly undesirable element in the economy, as they are the result of poorly defined property rights. Electricity generation has recently been experiencing a turbulent period, as its price has soared in the aftermath of the period. Many European Union countries have resorted to the return of fossil fuels as a source of electricity. But is such an approach the right one? Fossil resources such as coal and natural gas are the biggest polluters of all sources of electricity generation. This research paper aims to highlight this issue, using taxes as a tool to mitigate the impact of these resources on the environment. In this case, taxes could function as an incentive element to mitigate the effect of negative externalities.

We assume that the tax is the best tool to solve this problem. We use this tool for coal and natural gas because the production of electricity from these sources pollutes the environment very strongly, despite the fact that, according to the latest taxonomy of the European Union, natural gas and nuclear facilities are considered as a green energy source (ec.europa.eu, 2022), with which we also partially agree, as it is not possible to switch to purely renewable energy sources in the short term. Another objective is to describe why we currently must pay huge prices for electricity. Are these consequences the cause of the war in Ukraine or is the reason different? However, the introduction of environmental taxes on such commodities raises the issue of transaction costs. It would be interesting to observe the degree of willingness of the subjects concerned to pay the taxes imposed. It is also important to look at who is the originator of negative externalities from the point of view, whether they are representatives of the private sector or the states themselves.

Another important feature that we will be looking at is the degree of competitiveness of this sector after the introduction of environmental taxes – we will examine whether such a burden is too

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discriminatory and whether producers of electricity from cleaner sources are not at an undue competitive advantage. If such a situation were to arise, the introduction of taxes would miss its effect.

This research paper aims to reflect the rationale behind taxes as a tool to reduce externalities. It was hypothesised that after the introduction of the new tax, transaction costs would not increase beyond the proceeds of the tax. The hypothesis we tested is whether transaction costs would increase above the revenue from the tax after the introduction of the new tax and what impact this will have on competitiveness in the European Union environment. At the same time, we tried to find an answer to the question of whether the newly introduced tax will have a sufficiently punitive effect for the originators of negative externalities. The paper also deals secondarily with the issue of the importance of natural gas and coal as productive resources in the environment of the European Union.

We tested the hypothesis by taking empirical data on electricity source prices, based on the reference prices of model power plants for 2020. Then we recalculated the emissions produced by power plants using coal and natural gas, and through this calculation we found out the volume of gross revenue of this tax. We also compared and evaluated electricity production from various sources within the European Union for the reference period January to December 2022. We tested the hypothesis using empirical data on electricity resource prices based on model power plant reference prices for 2020. However, for the relevance of the data, we adjusted the prices of natural gas and coal to 1 MWh using a factor that reflects the current evolution of the exchange prices of these commodities in the market. As input data, we subsequently processed the volume of electricity production from individual sources for the monitored period. Subsequently, to simplify the data, we decided to introduce an environmental tax, the rate of which we set at: 1 euro = 1 t/CO₂. At this rate, we then calculated the emissions produced by power stations using coal and natural gas and, through this calculation, we found out the gross income of this tax. We then assessed, through a deduction, whether the tax introduced should, and if so, to what extent it would have an incentive effect on the originators of negative externalities and to what extent switching to other energy sources would be financially challenging in terms of the share of coal and natural gas in the total electricity production in its current form.

Environmental sources of electricity are incomparably less burdensome to the environment compared to fossil sources. Environmental taxes are needed to reduce the burden of using coal and natural gas. Electricity production in the EU is very uneven based on generation sources. Once the environmental tax is introduced, the proceeds from this tax, which would be wasted in the European Union's common purse, would amount on average to around EUR 30 million for coal and around EUR 20 million for natural gas. It all depends on the amount of electricity produced from these sources and on the number of emissions produced. It can be concluded that the European Union would receive a certain package of funding from the member states and their originators of negative externalities, but the transaction costs would exceed these revenues, bringing an undesirable effect to the final stage. It is likely that the introduction of such a tax would have to go through a long discussion and legislative process at supranational level, and it is not excluded that such a tax might not meet with understanding at all.

1.1 Literature Review

The importance of energy sector planning and energy demand modelling has increased significantly in recent decades, and scientists are trying to predict and model the most effective methods for transitioning to a sustainable energy system. To determine whether policy instruments and investments in certain projects are effective, it is important to measure and evaluate achievements in the fight against climate change. (Siksneilyte et al., 2019)

Despite environmental problems and competitive pressure from other fuels, coal is expected to retain a significant share of future global energy use. The role of coal in the use of energy around the world has changed over the decades from a fuel widely used in all sectors of the economy to a fuel that is now used primarily for electricity generation and in several key industries such as steel, cement, and chemicals. Although coal has lost market share in oil products and natural gas, it remains a key source of energy due to the dominant role it has maintained in its key markets and its success in penetrating emerging economies. For coal to remain competitive with other energy sources in the industrialised countries of the world, it is necessary to continue technological improvements in all aspects of coal mining (Balat, 2007).

As environmental degradation negatively and severely affects all landscapes and people, efforts to define the causes of degradation and propose potential solutions to prevent degradation and even improve the quality of the environment have intensively increased in recent years. In this way, various factors have been considered in the empirical review of the studies. Fossil fuel energy is the most important cause of

environmental degradation. According to data from British Petroleum and the World Bank, around 99% of total CO₂ emissions come from energy consumption. (Kartal et al., 2023)

Omokanmi et al. (2022), based on empirical findings, the studies recommend promoting cleaner energy sources by subsidizing renewable energy and raising people's income levels through investments in capital projects to support healthy life expectancy.

Despite growing concerns about increasing CO₂ concentrations and climate change, fossil fuels are always an essential driver of gross domestic product (GDP) growth in EU countries. In fact, countries are reluctant to reduce environmental pollution at the expense of higher incomes. In other words, continued economic development depends on greater energy consumption, which leads to increased CO₂ emissions. Renewable energy could provide a possible way to rebalance economic growth with environmental quality. (Radmehr et al., 2021)

Climate change has been one of the most pressing problems in the world in recent years due to its devastating effects on property and human lives. Greenhouse gas emissions are a major contributor to global warming, with CO₂ emissions gaining considerable attention as a pollution metric over the years. As a potential factor of CO₂, it plays a key role in the openness of trade, the use of renewable energy and GDP. Over the past few decades, economic expansion has been the main cause of CO₂ emissions, and there is an inverse U-shaped relationship between ecological deterioration and GDP. (Adebayo et al., 2022)

Urbanisation increases CO₂ emissions, but negatively affects emissions once it reaches a certain level. Economic growth and energy intensity increase CO₂ emissions, while openness to trade does not have a significant impact on CO₂ emissions. (Ahmed et al., 2019)

In most countries, many tools are used for various applications in the general field of environmental management. In many cases, the application itself limits the use of tools in a natural way. Cleaning of public spaces is provided as a "public good" in all countries. Many industrial processes are so complicated that they can hardly be regulated by taxation, but there can still be a choice between disclosure, labelling, liability, and licensing. Environmental taxation plays a more significant role in Europe than on other continents. This is partly but very imperfectly reflected in higher revenues from environmental taxes than a share of GDP. However, environmental taxes should be divided into two categories. In the first case, we have taxes related to energy and transport, at least partly motivated by global concerns such as climate change. We already have considerable revenue in this category and, in principle, even more potential if taxation were to be used as the primary way of achieving global climate objectives. The flexibility of energy use to price is limited but not insignificant, which means that high taxes and large revenues will be needed to achieve ambitious targets. The global nature of this environmental problem gives rise to numerous coordination problems between countries that are motivated by concerns about industrial competitiveness. The second concern may be if the incidence of taxes is regressive or harms politically influential groups. (Stern, Köhlin, 2017)

According to Abbasi et al. (2021) electricity consumption has a positive and significant impact on economic growth. They note that generating and preserving electricity using renewable energy and avoiding fossil energy minimizes the cost of generating electricity and could be beneficial for economic growth. In addition, environmentally friendly electrical appliances should be used and the import of low-efficiency appliances that consume excessive energy, which can reduce the gap between growing electricity demand and problematic supply, should be banned. Finally, most importantly, the sustainable implementation and management of demand and supply by regulators can achieve the desired economic objective. However, they found that electricity prices have a negligible impact on economic growth due to unauthorised connections, electricity theft, etc. By addressing cause and effect, electricity prices can play a key role in boosting economic growth.

Wang et al. (2021) examine the dynamic interdependence between CO₂ emissions, real gross domestic product (GDP), renewable and non-renewable energy production, urbanization, and export quality for the top ten renewable energy countries and the top ten countries in the Economic Complexity Index. Long-term estimates indicate that in the ten largest renewable energy countries, only renewable energy production contributes to reducing CO₂ emissions, while other variables lead to an increase in emission levels in the long term. For leading complex economies, however, empiricism has highlighted the important role of renewable energy in mitigating carbon emissions. The quality of exports leads to a reduction in emission levels and real GDP, non-renewable energy and urbanisation contribute to the increase in emissions. Interestingly, for the top ten renewable energy countries, the analysis interprets the two-way short-term relationship between renewable energy production and export quality, and the one-

way causality from export quality to CO2 emissions. The adoption of clean renewable energy technologies could function as a key tool to improve export quality and mitigate CO2 emissions.

The reason why energy-intensive industries, despite all the environmental and economic logic, are wholly or partly exempted from environmental taxes is because of concerns about the negative impact of such taxes on the competitiveness of these industries. Competitiveness considerations are important for environmental policy for both economic and environmental reasons. **Economic** – if environmental policy has a negative impact on competitiveness, it will be associated with a corporate, sectoral, or national economic downturn, making it politically difficult or impossible to implement. **Environment** – if domestic "dirty" (environmentally demanding) industry declines, which is replaced by the growth of foreign "dirty" industry, the overall environmental impacts may not change.

In this context, it should also be borne in mind that the negative effects of the coronary crisis on the economy have been particularly pronounced in small and medium-sized enterprises, which are more sensitive to changes in business conditions. (Rabatinová, 2022)

If the environmental impact were local, then a cleaner domestic environment would be bought at the cost of losing competitiveness (and increasing foreign competitiveness would mean a worse environment there). If the environmental impact were global (e.g., greenhouse gas emissions), then the loss of national competitiveness would bring no environmental benefit at all.

In fact, the impact of a carbon tax on competitiveness will be determined by a few impacts, including: (Ekins, Speck, 1999)

- the size of the carbon tax and the nature and extent of offsets (a way of recycling income through the economy),
- carbon intensity of the product,
- intensity of trade in the product (ratio of exports plus imports to production).

If tax revenues are recycled back to the sectors concerned, there is no reason to believe that this will have any long-term effects on national competitiveness. Even those sectors that could be negatively affected **could offset the effects of the tax** if they were able to increase the rate at which they improved environmental efficiency in the areas affected by the tax. There are good theoretical and empirical reasons to believe that **the tax itself and the increase in the relative price of environmental inputs that it would generate would help to achieve such improvements.** To avoid costly early scrapping of capital, to allow time for industrial modifications and to influence future investment plans, **environmental taxes should be introduced at low levels and progressively increased according to a pre-announced timetable.** (Ekins, Speck, 1999)

In the context of escalating global environmental pressures, it has become increasingly clear that Europe's prevailing model of economic development —based on steadily growing resource use and harmful emissions —cannot be sustained in the long term. Therefore, one of the priorities of the European Union and the V4 countries that are the subject of our research is the transition to a resource-efficient and a low-carbon society. (Chovancová et al., 2021)

2. Methods

This study ranks among all these listed works. We will focus on the issue of increased transaction costs in terms of efficiency after the imposition of environmental taxes, an issue that has already been partially tested by Arrow. (1970). Furthermore, we would like to point out whether, even after the imposition of taxes, natural gas and coal would continue to be such important sources to produce electricity. The ideas of Sterner and Köhlin (2017) will help us to lean on the basic concept of our study, namely the justification for imposing environmental taxes on certain sources for electricity generation. Finally, we rely on a research paper by Ekins and Speck (1999), who argued that environmental taxes are not imposed on energy-intensive industries because it would undermine the competitiveness of the industries in question. We would like to use this study to find out if this is in fact the case.

The hypothesis that we would like to test is that after the introduction of the new tax, transaction costs would not increase beyond the proceeds of the tax. Then we examine the answer to the question: Will the newly introduced tax have a sufficiently punitive effect? In doing so, we will examine the importance of natural gas and coal as a productive resource in the European Union environment.

We chose the January-December 2022 range as our reference period. We tested the hypothesis by taking empirical data on electricity source prices, based on the reference prices of model power plants for 2020. (Lazard, 2021) However, for the sake of relevance of the data, we have adjusted the prices of natural gas and coal per 1 MWh using a coefficient that reflects the current market evolution of exchange prices

for these commodities. We then summarised the evolution of the environmental impact of these resources using the rate of greenhouse gas emitted into the atmosphere. (Balat, 2007) We then processed as input data the volume of electricity production from individual sources over the period under review.

Subsequently, to simplify the data, we decided to introduce an **environmental tax**, the rate of which we set at: **1 euro = 1 t/CO₂**

At this rate, we then recalculated the emissions produced by power plants using coal and natural gas, and through this calculation we found out the volume of gross revenue of this tax. We would like to point out that our calculation does not assume with administrative costs. (Sternier, Köhlin, 2017)

We reflected the taxes that outsiders would have to pay in the prices for 1 MWh of electricity produced through coal and gas, and then compared the total costs before and after the tax. In the end, we compared this increase with the theoretically achieved tax revenue and evaluated the results.

We compared in detail the production of electricity from individual sources within the European Union over the reference period. Subsequently, we assessed, through deduction, whether the tax introduced should and, if so, to what extent it would have an incentive effect for the originators of negative externalities and how much the switch to other energy sources would be financially demanding in terms of the representation of coal and natural gas in total electricity production as it currently stands. (Balat, 2007)

3. Results

To compare the current state of electricity production before and after the imposition of environmental taxes, we will use price benchmarks to produce one megawatt-hour of electricity from individual sources for 2020, but we have recalculated fossil fuel prices to the ratio of current commodity market prices. It should be noted that the price values are only indicative for the need to construct a research model. The reference values are interpreted in the following table.

Table 1. Data on reference prices for electricity from selected sources (2020)

Resource:	Price of 1 MWh in EUR
Nuclear	144
Gas	597
Coal	156
Wind	35
Solar	33

Source: Lazard (2021)

According to the above data, the most demanding to produce is electricity from coal and natural gas, at 156 euros and 597 euros per 1 MWh, respectively. The production of electricity from coal and natural gas is currently reaching such high amounts that they are among the costliest sources for electricity generation. The table shows those sources that have the largest presence in the Slovak Republic. It should be noted that prices do not include subsidies or prices for emission permits. For the sake of simplification, the table also does not show the additional costs resulting from the volatility of solar and wind power plants. The data are reference based on model power plants, in fact, the prices of resources within the structure vary depending on the region and the availability of resources where electricity is produced from which source. In terms of environmental burden, those sources produce the following emissions shown in the table below.

Table 2. Emissions from selected sources in the European Union in the period 1/2022-12/2022

Production of emissions in Megatons					
Month	Solar	Wind	Coal	Gas	Nuclear
1/22	0,29	0,51	33,61	26,17	0,76
2/22	0,44	0,57	26,84	20,44	0,65
3/22	0,76	0,37	35,6	22,91	0,65
4/22	0,91	0,4	26,93	16,38	0,57
5/22	1,18	0,3	24,79	16,37	0,51

6/22	1,21	0,24	26,9	19,35	0,51
7/22	1,27	0,27	28,31	21,31	0,53
8/22	1,17	0,22	30,12	20,75	0,52
9/22	0,84	0,29	30,61	19,26	0,51
10/22	0,61	0,39	27,53	19,68	0,52
11/22	0,35	0,46	30,99	20,06	0,55
12/22	0,22	0,45	34,5	24,12	0,65

Source: own processing based on data from: <https://ember-climate.org/countries-and-regions/regions/european-union/> (2023)

The above indicators show that environmental sources of electricity are incomparably less burdensome on the environment compared to fossil sources. This table demonstrates that environmental taxes are needed to alleviate the burden of using coal and natural gas. A nuclear source is a positive exception for the environment, as it equals green energy with its burden. However, its overall disadvantage is the expensive technological procedure and the overall social dislike of nuclear power. However, we are of the opinion that, despite these disadvantages and the potential risk, nuclear energy is clearly a better alternative to fossil resources.

Electricity production in the EU is very uneven based on sources in production. Among the sources equated in this research paper, it is from nuclear sources that electricity generation is the largest represented, and it is interesting that nuclear energy has the largest presence in the EU, even though EU Member States have a long-term strategy to gradually reduce this resource. But the war in Ukraine has shown that this is not the happiest step. The details of the ratio of production from each source are explained in the following overview.

Table 3. Total production from selected sources in the EU for the period 1/2022 - 12/2022

Production of electricity in Terawatt hours					
Month	Solar	Wind	Coal	Gas	Nuclear
1/22	6,02	46,72	40,02	53,99	63,46
2/22	9,14	52,36	32,73	42,05	54,44
3/22	16,00	33,96	43,34	47,19	54,44
4/22	19,07	36,28	32,85	34,02	47,32
5/22	24,53	27,05	30,24	33,94	42,29
6/22	25,24	21,56	32,87	40,09	42,55
7/22	26,48	25,20	34,82	45,05	43,86
8/22	24,38	20,92	36,99	43,98	43,25
9/22	17,32	27,14	36,93	40,12	42,76
10/22	13,15	36,61	32,42	41,49	43,26
11/22	7,34	41,93	37,79	40,89	46,16
12/22	4,44	40,65	42,07	49,22	54,29

Source: own processing based on data from: <https://ember-climate.org/countries-and-regions/regions/european-union/> (2023)

With the introduction of an environmental tax, the rate of which would be set at 1 ton of emissions produced = 1 euro, the proceeds of this tax, which would flow into the common purse of the European Union, would amount to an average of around EUR 30 million for coal and around EUR 20 million for natural gas. It all depends on the amount of electricity produced from these sources and the number of emissions produced. It should be noted that the model envisages maintaining the purchase of emission permits, while trying to use taxes as an incentive element. Based on the reference prices chosen by us, the total revenue from the introduction of environmental taxes for 2022 would bring EUR 603,53 million to the common European coffers, which is not at all a negligible item. For interpretation, we give a detailed overview of the environmental tax revenue in the table below.

Table 4. Total revenues from the environmental tax introduced for the period 1/2022 – 12/2022

Tax revenue in EUR		
Month	Coal	Gas
1/22	33 610 000,00	26 170 000,00
2/22	26 840 000,00	20 440 000,00
3/22	35 600 000,00	22 910 000,00
4/22	26 930 000,00	16 380 000,00
5/22	24 790 000,00	16 370 000,00
6/22	26 900 000,00	19 350 000,00
7/22	28 310 000,00	21 310 000,00
8/22	30 120 000,00	20 750 000,00
9/22	30 610 000,00	19 260 000,00
10/22	27 530 000,00	19 680 000,00
11/22	30 990 000,00	20 060 000,00
12/22	34 500 000,00	24 120 000,00
Total	356 730 000,00	246 800 000,00

Source: own processing based on the data in tab 2 (2023)

However, it would be wrong to believe that the originators of negative externalities in the form of producers of electricity from fossil sources would not pass these items on to the cost of 1 MWh of electricity. The price increase is interpreted by the following report.

Table 5. Price increase for one MWh of electricity after tax for the period 1/2022 – 12/2022

Price increase for 1 MWh in EUR		
Month	Coal	Gas
1/22	1,2196	2,0409
2/22	1,2194	2,0411
3/22	1,2197	2,0410
4/22	1,2195	2,0409
5/22	1,2194	2,0403
6/22	1,2212	2,0408
7/22	1,2197	2,0404
8/22	1,2195	2,0410
9/22	1,2195	2,0405
10/22	1,2194	2,0412
11/22	1,2194	2,0404
12/22	1,2194	2,0406
Average	1,2196	2,0408
Price after change	157,220	599,0400

Source: own processing based on the data in tab 3 and 4 (2023)

When converted with the reference prices, after averaging the price of electricity produced from coal, the price of electricity produced from coal would rise by EUR 1.22 per 1 MWh and the reference price from the natural gas source would increase by EUR 2.04. For the volumes of electricity produced from these sources, this price increase caused by the introduction of the tax is far from negligible.

In the graph above, we can see how the tax introduced would affect the supply and demand of electricity from coal. There would be a dead-loss cost effect, so that neither the producer nor the consumer would benefit from part of the tax introduced. From the foregoing, we can conclude that the introduction of an environmental tax would not have the desired effect in this case. The same scenario would be observed with the introduction of an environmental tax on natural gas.

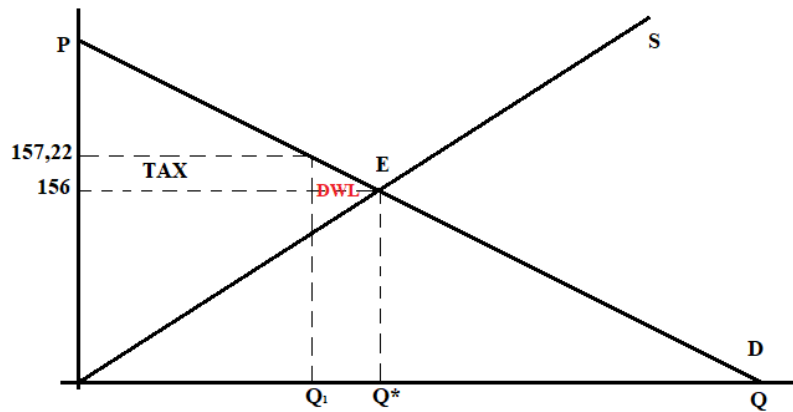


Figure 1. Evolution of electricity demand and supply from an angle before and after the tax
Source: own processing (2023)

Names of abbreviations:

- **P** – price
- **Q** – quantity
- **E** - equilibrium
- **S** – supply
- **D** – demand
- **Q*** - quantity in baseline
- **Q₁** – quantity after the change

In the following reviews, we will take a closer look at the total cost of generating electricity from the sources we have selected, focusing on showing the impact of the introduction of an environmental tax on the level of these costs for coal and natural gas.

Table 6. Total costs from individual sources of electricity before tax is levied for the period 1/2022 – 12/2022

Total costs with resources (million EUR)					
Month	Solar	Wind	Coal	Gas	Nuclear
1/22	221,10	1 634,15	6 394,44	31 885,77	9 136,80
2/22	300,96	1 827,70	5 105,88	24 906,84	7 839,36
3/22	525,36	1 185,80	6 773,52	27 915,72	7 839,36
4/22	630,30	1 262,10	5 123,04	19 957,71	6 814,08
5/22	808,50	939,75	4 715,88	19 939,80	6 089,76
6/22	828,96	748,30	5 124,60	23 575,53	6 127,20
7/22	873,18	859,60	5 386,68	25 957,56	6 315,84
8/22	802,23	708,75	5 729,88	25 282,95	6 228,00
9/22	580,80	920,15	5 823,48	23 462,10	6 157,44
10/22	420,75	1 250,55	5 236,92	23 981,49	6 229,44
11/22	242,88	1 465,1	5 895,24	24 435,21	6 647,04
12/22	147,84	1 420,65	6 562,92	29 384,34	7 817,76

Source: own processing based on the data in tab 1 and 3 (2023)

The total cost of electricity generation is directly proportional to how much is produced from each source and the price per 1 MWh. Price is influenced by various conditions such as the value of the commodity on the stock exchange, the geographical conditions where the energy is produced, the availability of the given resources, and so on.

In the review that shows us the evolution of the total cost before the imposition of the tax, we see that the cost of production from coal and natural gas holds a dominant position. Among them, the costs from

the nuclear source were still entangled. This development is paradoxical in that the prices of these three units are the highest based on a long-term trend, but these sources also hold the most dominant position in electricity generation. This is due to a few factors, such as the availability of given resources, national policies, and others.

With the introduction of environmental taxes, production from coal and electricity will become significantly more expensive. However, the consequences could be positive in the long term, as the incentive in the form of overpricing of production can be an incentive to switch to another type of production. In the conditions of the European Union, this could be, above all, wind and solar energy, although it is true that production from these sources can be very volatile and unpredictable, since production from these sources depends on natural and climatic conditions and is therefore not applicable to the entire territory of the European Union, or there could be resentment from the Member States in terms of the initial high financial complexity.

Table 7. Total costs from individual sources of electricity on the imposition of tax for the period 1/2022 – 12/2022

Total costs with resources after impact of environmental tax (million EUR)					
Month	Solar	Wind	Coal	Gas	Nuclear
1/22	221,10	1 634,15	6 444,44	31 994,77	9 136,80
2/22	300,96	1 827,70	5 145,80	24 991,98	7 839,36
3/22	525,36	1 185,80	6 826,48	28 011,15	7 839,36
4/22	630,30	1 262,10	5 163,09	20 025,93	6 814,08
5/22	808,50	939,75	4 752,75	20 007,96	6 089,76
6/22	828,96	748,30	5 164,67	23 656,12	6 127,20
7/22	873,18	859,60	5 428,80	26 046,29	6 315,84
8/22	802,23	708,75	5 774,68	25 369,38	6 228,00
9/22	580,80	920,15	5 869,01	23 542,30	6 157,44
10/22	420,75	1 250,55	5 277,86	24 063,47	6 229,44
11/22	242,88	1 465,1	5 941,33	24 518,74	6 647,04
12/22	147,84	1 420,65	6 614,23	29 484,76	7 817,76

Source: own processing based on the data in tab 3 and 5 (2023)

In the table below, we can see to what extent production from coal and natural gas will become more expensive for market participants. Apart from the preventive incentive, there is a significant inefficiency in the tax introduced. This is since in the market modelled by us, the costs would increase up to 2.59 times compared to the tax revenues based on a cumulative point of view. Thus, the introduction of an environmental tax can be viewed from two perspectives:

- if countries do not start using alternative sources, and nuclear energy is also considered an alternative source, the tax introduced will make electricity significantly more expensive, which will cause a further negative externality in the form of overpricing for the final consumer, be it households or businesses.
- If these taxes had an incentive effect on the countries that are the biggest contributors to negative externalities and they resorted to infrastructure reform, then these taxes would have a significant societal contribution to mitigating the creation of harmful externalities in the form of greenhouse gases.

Table 8. Level, by which costs would increase in absolute terms for the period 1/2022 – 12/2022

Level of cost increases after tax in EUR		
Month	Coal	Gas
1/22	49 993 196,20	108 996 667,17
2/22	39 918 939,05	85 140 253,78
3/22	52 956 930,44	95 425 653,57
4/22	40 053 099,86	68 222 403,74
5/22	36 869 829,74	68 161 181,12

6/22	40 065 296,29	80 589 372,53
7/22	42 114 297,75	88 731 980,69
8/22	44 797 513,94	86 425 928,75
9/22	45 529 300,17	80 201 629,28
10/22	40 943 439,77	81 977 085,20
11/22	46 090 336,28	83 528 058,18
12/22	51 310 411,42	100 445 908,22
	530 642 590,92	1 027 846 122,22

Source: own processing based on the data in tab 6 and 7 (2023)

The graph below explains to the extent to which the European Union is using sources of electricity from individual sources over the period under review, and it is clear from the data that the most used source is nuclear energy, but behind it are near our coals and natural gas, with an average of around 40% of the population from all sources. Nuclear production is at the forefront, despite long-term efforts to reduce it. This is since the potential of this energy can only be altered in the long term, and we believe that the European Union's intentions will remain unfulfilled.

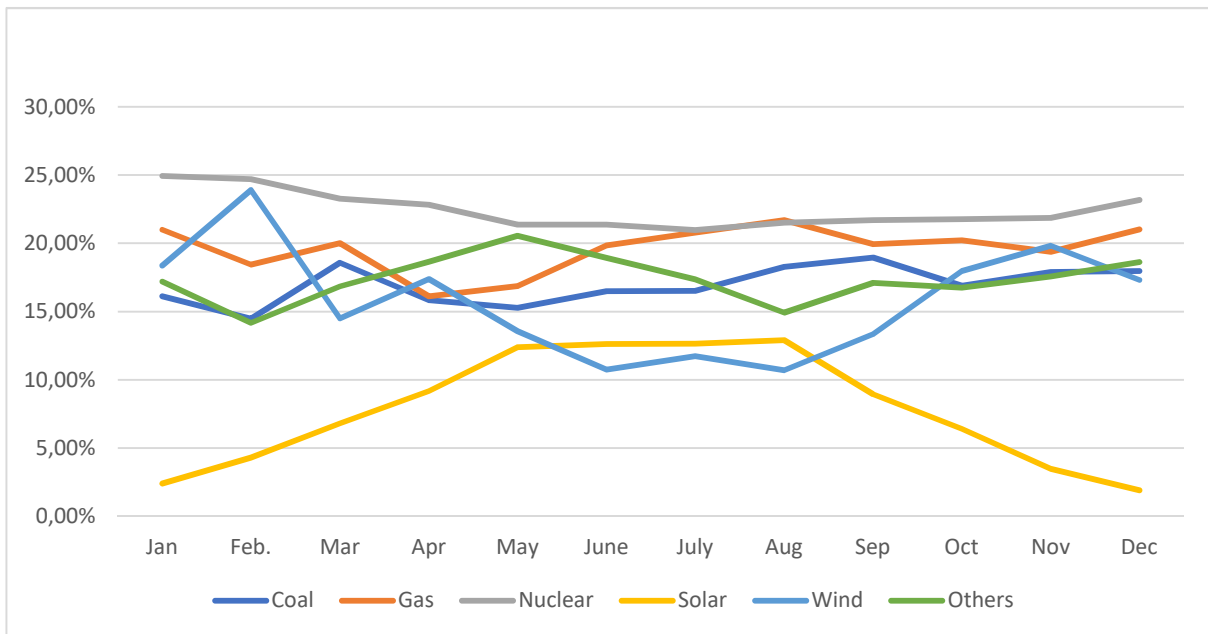


Figure 2. Ratio of electricity use in the European Union for the period 1/2022 – 12/2022

Source: own processing based on data from: <https://ember-climate.org/countries-and-regions/regions/european-union/> (2023)

If, as things stand, the European Union wanted to shut down fossil electricity sources altogether, member states would have to spend very heavily on changing infrastructure. This is particularly the case in countries such as Poland, Italy, and Germany, where thermal power plants have the most significant presence. However, it is precisely these countries that would benefit from change because the environment of these countries is the hardest hit by the impact of greenhouse gases.

Green energy is characterised by a high volatility in production, which is influenced by the current climate situation and season. With the size of countries such as Poland, Italy and Germany, there would be a threat of production volatility and thus countries would be reliant on electricity imports from third countries, otherwise they would run the risk of electricity disruptions to final consumers.

4. Discussion

Our study confirmed Arrow's assertion (1970) that introducing taxes to mitigate the impact of negative externalities would incur large transaction costs. Arrow argued that the cost varies from system to system. One of the advantages of a pricing system over bargaining or some form of authoritative allocation is usually indicated by the economy in the cost of information and communication. Our model

interprets that transaction costs are indeed indicated by the economy, and in our case, this is precisely the introduction of an environmental tax.

Balat's theory (2007) was confirmed on the scale that even the introduction of environmental taxes would not prevent coal from being displaced as one of the primary sources of production. Despite the European Union's strategies, the current situation has caused the return of coal as one of the main sources after a prolonged phase of decline. Also, on the issue of natural gas, it will not be possible to conduct such a fundamental technological reform in the short term.

Sterner (2017) appropriately described the impacts of environmental taxation and noted that in many countries there are levels of regulatory and policy instruments, which means that when comparing instrument choices between countries, the main difference may be rather the degree or emphasis placed on one type of instrument, such as taxes, compared to other instruments in the policy mix applied. However, we share his view that, in the long term and in terms of stimulus, taxes are one of the most effective tools for mitigating the impact of negative externalities. With increasing digitisation and the need for digital transformation of the tax administration, the ways of communication between the taxpayer and the tax administration are changing. (Ihnatišinová, 2022) This is also where the so-called data pollution arises - which will need to be addressed soon.

Ekins and Speck (1999) conclude that the reason why energy-intensive industries, despite all environmental and economic logic, are wholly or partly exempted from environmental taxes is because of concerns about the negative impact of such taxes on the competitiveness of these industries. Competitiveness considerations are important for environmental policy for both economic and environmental reasons. Following this, our research question confirms that the imposition of an environmental tax on the sector, as things currently stand, would indeed have a negative impact on the competitiveness of the sector, while artificially putting other producers from other sources at a competitive advantage. At the same time, we have shown, with the help of instruments, the possibilities of redistributing the revenue of this tax, which would significantly affect the situation on the electricity market and, at the same time, put several countries at a competitive disadvantage, which would be of an incentive nature for them, thus confirming the authors' assertion that if the environmental impact were local, then a cleaner domestic environment would be bought at the cost of losing competitiveness and increasing foreign competitiveness would again, it meant a worse environment there. If the environmental impact were global (e.g., greenhouse gas emissions), the loss of national competitiveness would bring no environmental benefit whatsoever.

Since, based on our findings, a tax constructed in this way would not bring the desired effect, an alternative approach could be, for example, subsidies from the European Union to individual member states in an even broader form than is currently the case. We can imagine that, with an appropriate policy at supranational level, individual member states, especially those that are the largest producers of electricity from fossil fuels, would have an incentive to change their strategy, even if it would be technologically demanding at first, while it is not excluded that the return on these investments would be in the long term. Another alternative is to encourage households and companies, where possible, to generate their own electricity from renewable sources, such as photovoltaic panels, thereby reducing demand for fossil fuel resources, as this alternative is currently not sufficiently attractive, especially for companies, and this investment does not provide them with a sufficiently fast return and possible compensation at national level. However, this could be the subject of possible further research.

Conclusion

It can be concluded that the introduction of an environmental tax would only partially bring the desired effect. On the one hand, the European Union would collect a certain package of funds from the Member States and their originators of negative externalities, but the transaction costs would exceed these revenues, and this would bring an unwanted effect to the final stage.

Environmental sources of electricity are incomparably less burdensome for the environment compared to fossil sources. Following the introduction of an environmental tax, the rate of which would be set at 1 tonne of emissions produced = EUR 1, the proceeds from this tax, which would be wasted in the European Union's common purse, would amount on average to around EUR 30 million for coal and around EUR 20 million for natural gas. It all depends on the amount of electricity produced from these sources and on the number of emissions produced. Based on our chosen reference prices, the total revenue from the introduction of environmental taxes would bring a significant item to the common European treasury. When converted with reference prices, after averaging the price of electricity generated from coal, the

price of electricity generated from coal would increase by EUR 1.22 per 1 MWh and the reference price from a natural gas source would increase by EUR 2.04 per 1 MWh.

Another conclusion to be noted is that coal and natural gas currently have a major influence on electricity generation, since in some countries it is precisely these sources that hold a dominant position. It follows that, as things stand, these resources would be difficult to exchange for alternative sources, mainly because the initial investment in infrastructure would be very costly. Another argument in favour of these sources is the current seasonality and unreliability of alternative sources of electricity, such as wind and solar power plants, which depend on the geographical conditions of the territory, while the construction of such power plants requires a high initial cost of capital.

The introduction of environmental taxes would, in certain circumstances, undermine the competitiveness of producers of electricity from the sources concerned, resulting in an overall increase in the market price of electricity for consumers and, at the same time, there is the possibility of generating excessive profits for electricity producers from sources on which the tax would not be imposed. There would be a dead-loss effect, so that neither the producer nor the consumer would benefit from part of the tax introduced. From this we can conclude that the introduction of an environmental tax would not have the desired effect.

The main conclusion is that if countries do not use alternative sources, such as nuclear energy, the tax introduced would make electricity significantly more expensive, causing another negative externality in the form of overcharging for the final consumer, be they households or businesses. If these taxes had an incentive effect on countries that contribute most to negative externalities and resorted to infrastructure reform, then these taxes would make an important societal contribution to mitigating the creation of harmful externalities in the form of greenhouse gases.

The challenge for further research in this area is to deal with the reform of the entire tax system, not just the introduction of a special-purpose tax. A carbon tax could have a significant impact and, in our view, setting it up effectively would be a better across-the-board incentive for the originators of negative externalities to switch to alternative sources, as well as contributing to a change in political behaviour in general. This tax could replace some of the current taxes, while the effective setting and introduction of an alternative tax mix could be the subject of further study.

Taxing coal and natural gas as sources of electricity would entail high transaction costs that would exceed the revenue from the tax thus imposed. At the same time, the introduction of an environmental tax would reduce competitiveness for producers of electricity from these sources. It follows from the above that the introduction of an environmental tax would not have the desired effect but would aggravate the current situation in terms of price levels, and it is therefore necessary to find another way of reducing the emergence of negative externalities, while tax imposition should serve only as a supporting tool and not as a primary tool.

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Financial Reporting in the Public Sector in the Republic of Bulgaria under the Conditions of European Harmonization and Global Legitimacy of IPSAS

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Abstract

Research background: The progress made in the development of accounting theory, as well as the accumulated experience of EU Member States, illustrate the growing advantages of public sector accounting systems based on the accrual based over cash-based accounting. The adoption and application of accounting standards based on an accrual basis and in accordance with the requirements of the IPSAS poses important questions for accounting harmonization within the Union. The various existing practices in the public sector are considered when choosing an accounting model. A challenge to the European harmonization of accounting systems in the public sector is also the differences between the national accounting systems based on a modified cash basis and the adopted methodological principles of the European System of National and Regional Accounts 2010.

Purpose of the article: The purpose of this article is to enrich and further develop in a theoretical aspect the European debate on the key issues in the public sector, analyzing the modern trends and challenges facing financial reporting in Bulgaria - as a member state of the EU, in conditions of accounting harmonization and growing legitimacy of the IPSAS in a global aspect.

Methods: The major research method used in the study is the theoretical review of the European and national legislation and the practice in the field of public sector financial reporting.

Findings & Value added: The Conceptual Framework is the starting point of reference for creating a system of pan-European harmonised standards for the public sector in full compliance with accrual-based accounting principles.

Keywords: financial reporting, public sector, harmonization, IPSAS, accrual basis principle

JEL classification: M41, M48

1. Introduction

Public sector reform which originated towards the end of the 1980s and the beginning of the 1990s of the past century was primarily guided by the application of market-oriented management models intended to incite economic effectiveness of public management. (Melo et al., 2022)

The introduction of management mechanisms and instruments from the private sector into the management of the public sector is at the root of the *New Public Management concept*. A basic feature of the concept is *the enhancement of the quality of financial reporting in the public sector*. (Christiaens et al., 2015)

More specifically, an important stage of the extensive reform in the state administration is the implementation of an *accrual-based* accounting system and budgeting. *Cash-based reporting which is characterized by cash-based recognition of the effects of transactions and events* is regarded as an antipode to accrual-based accounting.

The concept of interrelation between the frameworks for statistical and financial reporting presumes the requirement for the application of accrual basis principle in accounting. The European regulatory framework adopted for business entities requires the application of IFRS on a mandatory basis by the exchange-traded companies registered in the territory of the EU when preparing the consolidated

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financial statements. *Financial statements prepared on the basis of IFRS appear to be the main source of information about the corporate activities in the national accounts.* Similar to business organizations, *the information contained in the financial statements of public sector entities is used for the purposes of national accounts for the General Government.* The latter presumes proper knowledge of the International Public Sector Accounting Standards (IPSAS) developed by the International Public Sector Accounting Standards Board (IPSASB) – a requirement adopted in Regulation (EU) No. 549/2013 of the European Parliament and of the Council on the European system of national and regional accounts in the European Union (ESA 2010). There is no European regulation for mandatory implementation of IPSAS by the Member States what implies the application of national legislation. In this connection, the differences between the national accounting legislations and the various existing accounting practices are the main challenge for the global transition to financial reporting harmonization in the public sector.

2. Methods

The major research method used in the study is the theoretical review of the European and national legislation in the field of public sector financial reporting. The method of summarization and analysis was applied in a number of aspects, for example, in the examination of the European public sector accounting practices, the outcomes of the public sector reform and its reflection on the level of European harmonization in reporting and the legitimacy of IPSAS. The observation of facts method and the method of comparison were employed in the examination of country's governmental policy conducted under the impact of the institutional environment at a macro level. The documents officially issued to international organizations and governmental institutions, as well as the research studies of the academic community published in the internationally reputed databases were used as sources of information.

The main limitation to this research affects its scope. The study is focused on the public sector reform of a single EU member state, namely the Republic of Bulgaria. The fact taken into consideration was that some considerable changes occurred in the national legislation over the years of transition from centralized planned economy to market economy, and the accession of the Republic of Bulgaria to the European Union in the year 2007. In addition to the above, the research is limited to public sector entities. Public enterprises (commercial public sector entities)¹ and business organizations are excluded from its scope.

3. Results

A contemporary characteristic of the development of public sector financial reporting is the *standardization of accounting*. The global tendency towards standardization of public sector accounting is reflected in the establishment of a certain set of generally accepted rules and their implementation by the national governments at different levels of management and by international organizations including the European Commission (EC), North Atlantic Treaty Organization (NATO), United Nations Organization (UN) and others. The objective of the International Public Sector Accounting Standard Board (IPSASB) is to “serve the public interest by contributing to the development, adoption and implementation of high-quality international standards and guidance; contributing to the development of strong professional accountancy organizations and accounting firms, and to high quality practices by professional accountants; promoting the value of professional accountants worldwide; and speaking out on public interest issues where the accountancy profession's expertise is most relevant.” (International Public Sector Accounting Board, 2022)

Daniela Feschiyan (2018) maintains the statement that „Standardization of public sector accounting is an objectively determined dynamic process that provides for the establishment and application of generally accepted rules for the regulation of the accounting system and the creation of a uniform structure and content of the financial statements that meet all public interests with regard to obtaining reliable information about public finances.“ The result of author's thesis being proven is a prerequisite for the realization of another scientific study dedicated to the applicability of standardized models for accounting of infrastructure assets based on the philosophy of IPSAS in the accounting systems of public sector entities in the Republic of Bulgaria. The empirical results confirm the benefits of the implementation of suggested new accounting models in the public sector practice in the Republic of Bulgaria. (Feschiyan & Andasarova, 2022)

¹ The specification of *public enterprises* was introduced to the regulatory practice of the Republic of Bulgaria with the promulgation of the Public Enterprises Act and the Regulation on its implementation.

Despite the initial proposal by the European Commission for adoption of IPSAS, after a series of professional debates and the continuing practices of some member states, including *Bulgaria, in the application of budget-oriented and modified cash basis accounting systems*, the European Parliament reached a compromise by providing an opportunity for conducting preliminary assessment of IPSAS “appropriateness” in separate jurisdictions within the EU. IPSASB at the International Federation of Accountants (IFAC) does not possess legal powers to demand from the EU member states to implement the requirements of IPSAS into their national accounting legislations. The Board relies on some convincing evidence and good practices for attaining legitimacy of public sector standards in a global aspect.

A number of scientific research studies have been dedicated in support of the reforms for improving accountability and transparency of public sector entities through the implementation of a set of generally accepted accounting standards (IPSAS) in separate jurisdictions. (Chan, 2006; 2008; Manes Rossi et al., 2014; Biondi & Soverchia, 2014; Ismailia et al., 2021)

Over the past several decades, increased research interest has been observed within the academic community towards analysing the evolution of public sector accounting standardization based on accrual accounting principles. (Brusca & Condor, 2008; Martí, 2006; Christiaens et al., 2015; Schmidhuber, et al., 2022; Farshadfar et al., 2022)

According to Isabel Brusca et al. (2012), research studies addressing the development and propagation of IPSAS are principally focused on the countries applying the Anglo-Saxon model of accounting.

Countries like Australia, New Zealand, the USA and the United Kingdom have been pioneers in the realization of a far-reaching reform in state administration as early as in the 1980s of the past century which is known under the name of „*New public management*“. The public sector reform in these countries involves essential changes both to financial reporting and to the budgeting processes, which reform is accomplished through the transition to accrual based financial reporting and budgeting (Pallot, 1994; Likierman, 2003; Newberry & Pallot, 2006)

On the other hand, the governments of some continental Europe countries such as Austria, France, Spain, Portugal, and Switzerland have also started a similar reform in the public sector by adapting their national accounting systems to the requirements of IPSAS retaining the traditional budgeting model based on the cash principle and on the modified cash basis of accounting. (Brusca et al., 2015)

There is a group of authors who perform an extensive scientific research dedicated to the challenges associated with the transition of the Organisation for Economic Cooperation and Development (OECD) member states to accrual based financial reporting and budgeting on the one hand, and on the other hand – with regard to the applicability of IPSAS in individual jurisdictions of the member states. The research data definitively highlight the differences in the manner of perceiving the public sector reform by OECD member states, in the context of the transition to accrual based financial reporting and budgeting. More specifically, the preferences of OECD member states to the *accrual based financial reporting* (i.e. decisions at the level of organizational field) have been confirmed when compared to the adoption of *accrual based budgeting* by individual agents in Organization’s member states among which are accountants, state officials, governmental bodies and politicians (i.e. decisions at an organizational level). A statement has been expressed that, in OECD member states, which have adopted a sector-neutral approach for the implementation of accounting standards, i.e. a uniform set of accounting standards (IFRS) in different sectors of economy, there are favourable conditions generated for the approximation of the national accounting systems to IPSAS. On the other hand, the authors substantiate the need of adopting IPSAS in the potential member states of the Organisation (such as Bulgaria, *author's note*) in terms of the lack of applicable public sector accounting standards within their jurisdictions. (Adhikari & Gårseth-Nesbakk, 2016)

The traditional approach applicable by the researchers when conducting similar research studies aims at tracing the entire process of public sector reforms. In 2015, Isabel Brusca and her team published a collective scientific paper addressing the results of public sector reforms in 14 countries, the greater part of which are EU member states, taking into account that Bulgaria is not part of the extensive study. The empirical results outline the contemporary challenges facing the international harmonization in the field of financial reporting, budgeting, and public sector auditing. (Brusca et al., 2015)

The national specifics of the European countries concern a number of limitations which impede the process of harmonization and the achievement of comparability among the financial statements of public sector entities. Summarisations in the research study come out to be a serious theoretical basis for evaluating the effects of IPSAS adoption by the European countries over the implementation of national accounting standards.

An analogous study has been conducted by M. Kowalczy and J. Caruana (2022) among other two EU member states – Malta and Poland. The authors arrive at the conclusions that, in response to the reform intended to enhance the reporting and budgeting in public sector, the two countries demonstrate dissimilar accounting and budgetary practices at central government level regardless of the institutional environment influence at a macro level on the part of EU and IMF.

As at present, Bulgaria has been strictly adhering to the improvement of the *budgeting process* with focus of the implementation of the European framework for statistical reporting and fiscal data presentation based on the methodology of the European System of Accounts (ESA 2010) and the Government Finance Statistics Manual of the International Monetary Fund. ***This change is realized on the account of postponement of governmental decisions for an accounting reform in public sector entities within the context of accounting standardization and full-fledged implementation of the accrual principle.***

To analyze the specifics of the reform in public sector accounting of the Republic of Bulgaria is the main task of this research the conducting of which aims at identifying the important perspectives facing the national government on its way to the European accounting harmonization and growing legitimacy of IPSAS on a global scale. The more noteworthy of them are as follows:

- ***Regulation of public sector reporting by national laws, subordinate legislation, as well as mandatory orders and instructions.*** The country-specific national financial reporting regulation in the public sector involves the application of rules contained in the Law on Accounting, Public Finance Law and the multitude of instructions drawn by the Ministry of Finance. The existing tradition in the country for ***not applying public sector accounting standards*** is an apt example of the ongoing influence of the regulatory economic theory in the accounting of these entities.
- ***Implementation of a budget-oriented accounting system based on the modified cash principle.*** Under the impact of ***national legislation***, the accounting practice is “sealed” as a dominating and acceptable model excluding any possibility for implementation of alternative accounting models. In response to the regulatory function of the state is the accounting practice existing for decades in Bulgaria on the implementation of the ***accounting principle of cash-based recognition*** of some kinds of revenue and expenditure (for example, tax revenue, social security contributions, budgetary credits). The accrual basis principle founded on the European System of Accounts (ESA-2010) standard and adopted by the European practice differs from the national requirements for modified cash-basis reporting.
- ***Lack of accounting practice for the preparation of accrual-based consolidated financial statements.*** As far back as in the year 2016, Daniela Feschiyan, in a paper titled „On the need of adjusting public sector financial statements to the requirements of IPSAS”, brought forth the problems associated with not preparing consolidated financial statements in the public sector and provided some projections for their improvement.
In addition, it could be indicated that „consolidation of financial statements is a process of combining and subsequent synchronisation of data from the statements of a certain group of entities for the purpose of presenting summarised information on a consolidated basis about the assets and financial position, about the financial performance, the cash flows, and about the changes that have occurred in group’s equity, in a single pack of reports.“ (Nachkova, 2020)
“It is necessary to develop some additional internal bylaws for clearer decisive regulatory requirements to the organization and methodology of accounting, the applicable chart of accounts, as well as specific procedures and techniques for preparing financial statements.“ (Nikolova, 2020)
- ***The decisions of the national government on the implementation of accrual-based accounting system pursuant to the principles of IPSAS and the lack of real reforms for translating them into action are intended for the purposes of institutional legitimacy.*** On a nationwide scale, the practice for preparing specific cash-based statements is maintained by public sector entities for the purposes of financial reporting and the consolidated fiscal programme. The existing regulatory texts in the Public Finance Law on the preparation and presentation of annual financial statements based on accounting standards developed in consistence with IPSAS and the lack of recognised and published public sector accounting standards in the Republic of Bulgaria are quite contradictory as at present.
- ***The link between public sector financial reporting and government’s political incentives.*** Public sector financial reporting in Bulgaria has a relatively lengthy history associated with undertaking a ***political commitment*** rather than as an effective contemporary accounting system based on global accounting standards.

- ***The reform in the public sector of the Republic of Bulgaria*** evolved in 2013 with the publication of a monography concerned with accounting standardization and the models of reporting fixed assets in the public sector. The author, D. Feschiyan (2020), maintains the thesis about „the need of accounting standardization in public sector entities with full application of the accrual principle and of the rules and provisions of IPSAS.“ ***Subsequently, the government of the country undertook significant changes to the accounting legislation for public sector entities among which accrual of depreciation, recognition of a strategic group of resources within the public assets such as public infrastructure, military equipment, heritage assets, etc. and inclusion of income statement as a mandatory component of the general purpose annual financial statements.*** The undertaking of this first step of the government towards reforms in the public sector is acceptable and refers to the usefulness of the information in financial statements for the purposes of taking managerial decisions in the process of implementing governmental policies and achieving transparency of public finance.

4. Discussion

For all the EU member states, particularly those that are currently using only cash-based reporting or reporting based on the modified cash principles, the implementation of the Conceptual Framework and IPSAS will mean a substantial reform. Some of the problems that might spring up and which, in our point of view, will affect Bulgaria are:

- conceptual and technical accounting problems;
- expert knowledge of employees and consultants, training skills;
- communication with managers and decision makers, as well as their training;
- connection with auditors, as well as their training;
- correction and modernization of IT systems;
- adaptation of the existing national legal frameworks.

If the adoption of IPSAS based on the accrual accounting principle and the philosophy of the Conceptual Framework in the EU member state is initiated, Bulgaria will find itself in a stressful and unequal situation. (Feschiyan, 2010)

Due to the non-application and lack of IPSAS knowledge and understanding, as well as owing to the overall lack of standardization in the public sector accounting system (Feschiyan, 2012), trainings will need to be organized, as well as exchange of expert knowledge, support to the government on conceptual and technical issues, coordination and exchange of plans of reforms for the public sector accounting with member states having greater depth of experience. Our reservations are that due to the lack of adaptation of public sector accounting to the Conceptual Framework and IPSAS, Bulgaria will be treated as a state with substantial and obvious drawbacks, failings and inconsistencies in the financial management information systems across the public sector. Therefore, it is expedient to carry out urgent reforms and innovation in the accounting system (Feschiyan & Raleva, 2013)

Extensive research, approval and implementation of the Conceptual Framework and IPSAS need to begin immediately and turn into an incessant process which should be realized within a certain period of time. This has to be accomplished gradually by laying the initial focus on the accounting issues where the harmonization is of utmost importance, for instance:

- full observance of the accrual accounting principle;
- internationally harmonized financial statements;
- compatibility with the philosophy of the Conceptual Framework and the provisions of IPSAS.

In view of the fact that IPSAS are the conceptual basis for the development of national accounting standards in distinct jurisdictions, our country will have much higher methodological preparedness and significant degree of readiness for the transition. Review and categorisation of the adopted accrual based IPSAS should be performed and they can be classified in three categories:

- standards which can be applied directly or with minimum adaptation;
- standards that need adaptation or a selective approach;
- standards that need substantial amendment in order to be implemented.

The transition to IPSAS, the philosophy of which incorporates the complete implementation of accrual accounting principle, will provide for the adequacy of the national accounting framework in the process of harmonization and integration of Bulgaria into the European Union. This is some sort of

innovation in the public sector accounting system. Such innovation will reduce the possibilities for financial data manipulation what makes the cash basis possible (for example, a payment can be carried forward in time or deferred in order to be presented in a period selected by the entity of the public sector). The accrual accounting principle, however, is not intended to remove or replace cash based reporting for the purposes of budgeting and budget control. At a macroeconomic level, accounting standardization will ensure timely and reliable financial and fiscal data and an opportunity for greater comparability of financial statements. Thus, good conditions can be created for the implementation of most of the principles laid down in the Directive on budgetary frameworks (EC 2011/85/EU).

Conclusion

The existing scientific debates most assertively illustrate the usefulness of the implementation of accounting standards in the public sector based on the accrual accounting principle. The existence of various accounting practices in separate countries raises important questions related to the expected level of European harmonization of the public sector accounting systems.

Extensive study and application of the Conceptual Framework of IPSAS which regulates the specifics in the public sector accounting systems is required. That way, a variety of differences in the accounting treatment and in the financial statements of public sector entities in different jurisdiction will be eliminated. The Conceptual Framework of IPSAS is the starting point of reference for creating a system of pan-European harmonised standards for the public sector in full compliance with accrual-based accounting principles.

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Application of the Bankruptcy Models in the Teaching of Financial Subjects

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Abstract

Research background: In a modern economy, ensuring a business' financial stability, and increasing its competitiveness, has become especially difficult. To measure firms' economic sustainability, researchers need to connect traditional and modern metrics. Monitoring the company's financial situation and predicting its future development becomes important. Therefore, searching for applicable models to predict bankruptcy is important not only in scientific research, but also in the practice of business entities.

Purpose of the article: The aim of the paper is to apply selected bankruptcy models in the teaching of financial subjects. The intention is to compare individual bankruptcy models and their use in teaching financial subjects.

Methods: The paper will focus on the comparison of models that were created using multivariate discriminant analysis, logistic regression, and neural networks.

Findings & Value added: In business management, it is important to understand the financial and economic situation and react promptly in the event of impending danger. Various simple models, more complex statistical functions, and artificial intelligence have been used to predict bankruptcy. Financial analysts should simultaneously use multiple methods to compare the results. Managers and business owners can use this paper to guide their firms and inform future business plans.

Keywords: bankruptcy models, financial subjects, logistic regression, multivariate discriminant analysis, neural networks

JEL classification: C45, G33

1. Introduction

In an increasingly dynamic world, ensuring a business's financial stability and sustainability has become increasingly difficult. Assessing the financial health of business entities using various models is an important area in not only scientific research, but also business practice. Crucially, estimating a risky company or its probability of bankruptcy is always very important not only for creditors but also for the managers or owners themselves. The bankruptcy models can provide warning signals of impending danger and allow early intervention.

Bankruptcy itself is the result of several causes that lead to insolvency. Furthermore, owing to the impact of globalization and the dynamically changing business environment, we need to constantly update prediction models and increase their accuracy and efficiency. Finally, prediction of future development requires an expansion of the range of mathematical and statistical methods because several methods to clarify a company's financial health.

The prediction of the financial situation of business entities began in the 1930s, when the first studies on the adverse manifestations of insolvency of business entities were developed. Fitzpatrick (1932) was the first, who dealt with the prediction of the financial health of business entities. In his study he compared the financial indicators of solvent and insolvent enterprises. Beaver, Netera and Tamari are considered the founders of the prediction of the financial health of business entities. Two significant trends can be observed in the field of bankruptcy prediction. The first tendency is oriented towards the description of the conditions when a business entity fails financially, by revealing the symptoms of failure (Jo, Han & Lee,

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1997). The second tendency in the field of solving this issue is to compare the prediction accuracy of individual prediction models (Jo & Han, 1996).

Many statistical estimation methods have been developed and used for this, especially for understanding financial risk. One such method is discriminant analysis, which allows the variables to differ from known groups of statistical units in the file and helps formulate classification rules. The aim of discriminant analysis is to design a discriminant function as a linear combination of various discriminatory variables. Multidimensional discriminant analysis functions include Indexes IN, Altman's model, Springate's model, Taffler's model, Fulmer's model, Chrastinova's Ch-index, and Gurcik's G index (Kliestik et al., 2018).

Logistic regression analysis is one of the basic methods for estimating enterprise failure. Models based on logistic regression assume a log probability distribution. In our context, the estimated result is the value of the probability of bankruptcy in the range of 0 to 1. Its advantage over discriminant analysis is that logistic regression does not require the fulfilment of certain assumptions, such as normality of financial indicators (normal distribution of independent variables) and homogeneity of variance-covariance matrices (Jencova et al., 2020).

However, as non-linear models for bankruptcy estimation, logit and probit models have some limitations, including the restriction of the outcome by bias of the regression function, sensitivity to exceptions in bankruptcy, and implicit Gaussian distribution in most conclusions (Neves & Vieira, 2006). With technological advancements and improvements in computing performance, artificial intelligence has helped in designing new prediction models or improved the precision of existing models. For instance, an artificial neural network (*ANN*) is considered a good instrument for bankruptcy prediction.

Kalinova (2021) saw that the current economic system often shows instability and is changing dynamically. Therefore, it is important to look for new procedures and models for estimating the financial and economic conditions of businesses and their future prospects. Classical prediction methods are often insufficient mainly because of the lack of useful information in historical data, which arises from the dynamics of the economic system. The authors found the use of *ANN*-based prediction procedures to be better owing to their nonlinearity and ability to recognise complex relationships between indicators.

The artificial neural network model is based on the simplified principle of the neural structure of the brain. The advantage of neural networks is that they do not require the fulfilment of assumptions such as linearity, normal distribution, or independence of variables. They transform inputs into desired outputs by adjusting the weights of the signals between neurons (Jencova et al., 2020). There are two basic types of neural networks: feed-forward (*FF*) neural networks, which spread signals in only one direction, and recurrent neural networks, which have synapses oriented in different directions (Kabir, 2021; Privara & Rievajova, 2021).

One of the most important problems of such an analysis is the diversity of the input data for prediction, besides the different models and network settings. The authors found that individual studies compared *ANN* with discriminant analysis, logistic regression, and heuristic models. The results are not unambiguous: some show approximately the same accuracy of the *ANN* prediction as the compared classical model, while some found significantly higher success rate in the *ANN*. Interestingly, no study showed a statistically significant higher accuracy of the classical model compared to *ANN* or excluded its use for prediction.

2. Methods

The aim of the paper is to apply selected bankruptcy models in the teaching of financial subjects. The intention is to compare individual bankruptcy models and their use in teaching financial subjects. The paper will focus on the comparison of models that were created using multivariate discriminant analysis, logistic regression, and neural networks.

Multivariate discriminant analysis forecasts the financial situation of a company using various characteristics, i.e., using a certain set of indicators, which are usually assigned different weights. In the discriminant analysis models, various financial indicators and variables are applied, which form one aggregate number - the multidimensional discriminant scores. The main benefit of this method is the inclusion of companies in groups based on discriminant scores. Most studies that deal with this method are based on the assumption that a low value of the discriminant score signals poor financial health of the company.

The impact of individual explanatory variables can be expressed using the standardized canonical discriminant function coefficients as well as the correlations coefficients between discriminating variables and the standardized canonical discriminant function. Standardized coefficients are used to determine which explanatory variables have the best discriminatory ability.

The quality of the discriminant model can be assessed using the statistical significance of the discriminant function. If the created canonical discriminant function distinguishes between prosperous and non-prosperous enterprises, the model is statistically significant. The distinction between these groups of enterprises is because the differences in the mean values of the variables that are included in the model are statistically significant. The statistical significance of each discriminator is tested by analysis of variance. Wilk's Lambda can be applied as a test statistic. The classification ability of the discriminant model is assessed based on the confusion matrix. This matrix contains the absolute and relative numbers of enterprises classified into individual groups correctly and incorrectly.

Logistic regression is used to model the unilateral dependence between variables when the dependent variable is not continuous but discrete (categorical). Independent variables can be continuous, discrete, or categorical (Jencova et al., 2020). Here, the logit-score lies between zero and one, which indicates the probability of a company's bankruptcy. Logistic models are extremely sensitive to the problem of multiple regression; therefore, it is necessary to avoid the inclusion of highly dependent variables. To use a logistic regression, the dependent variable was transformed into a continuous value by calculating the logarithm of the odds ratio:

$$\text{logit}(p) = \ln \left(\frac{p(Y=1|X)}{p(Y=0|X)} \right) = \ln \left(\frac{p}{1-p} \right) \quad (1)$$

By logit transformation we go from non-linear to linear dependence, and the equation of the logarithmic model has the following form:

$$\ln \left(\frac{p}{1-p} \right) = \ln \left[p^{(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k)} \right] = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad (2)$$

The logistic function takes the form of an exponential function:

$$p = \frac{e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k}}{1 + e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k}} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k)}} = \frac{e^z}{1 + e^z} = \frac{1}{1 + e^{-z}} \quad (3)$$

where β is the vector of the estimated parameters and x_i is the individual input value. Estimates of the logistic model parameters were obtained using non-linear maximum likelihood estimation.

The basic element of an ANN is a neuron. The principle of a neuron is to obtain signals from an environment or other neurons, combine them in some way, make a non-linear operation (activation function), and produce the result on its output:

$$y = f(\sum_n x_n \cdot w_n) \quad (4)$$

where y is an output, x_i are inputs, w_i are synaptic weights, and f is an activation function. The activation function converts the inputs to a specific output depending on the type of network (or activation function used). These functions can vary from linear to non-linear. The most common transfer functions are step, threshold, sigmoid, htan, and *RBF*. The learning process consists of adjusting weights to minimise the error in the associated known input-output pairs (training data set):

$$w_{ij} = w_{ij}^f + \Delta w_{ij} \quad (5)$$

where new weights (w_{ij}) are the sum of the old weight (w_{ij}^f) and new delta (Δw_{ij}) (referred to as the generalized delta rule). The new delta (Δw_{ij}) is proportional to the negative change in the sum of squared errors (*SSSE*) with respect to the change in weights (∂w_{ij}):

$$\Delta w_{ij} \propto - \frac{\partial SSSE}{\partial w_{ij}} \quad (6)$$

3. Results and Discussion

In this section, we offer an overview of selected bankruptcy models that can be used in the teaching of financial subjects. We mainly focused on bankruptcy models based on multivariate discriminant analysis, logistic regression and neural networks. Table 1 shows the multivariate discriminant analysis models.

Table 1. Multivariate discriminant analysis

Author(s)	Country	Sample	AUC
Pervan, Pervan & Vukoja (2011)	Croatia	156 differently sized companies from manufacturing and wholesale/retail trade industry	-
Karas & Reznakova (2014)	Czech Republic	2,956 manufacturing companies for the years 2010-2013	93.91%
Kliestik et al. (2018)	Slovakia	74,957 companies in 2015	77%
Yakymova & Kuz (2019)	Ukraine	50 municipal companies during 2014-2017, test sample consisted of 71 companies operating in Bulgaria (3), Croatia (3), Czech Republic (7), Poland (2), Romania (6) and Ukraine (50)	94%
Musa (2019)	Slovakia	companies in 2015	-
Valaskova et al. (2020)	Slovakia	3,329 agricultural companies over the years 2016-2018	86.3%
Svabova et al. (2020)	Slovakia	75,652 SMEs during 2016-2018	93.4%
Noga & Adamowicz (2021)	Poland	72 wood enterprises	89.0%
Horvathova, Mokrisova & Petruska (2021)	Slovakia	444 companies in the field of heat supply	84.0%

Source: own processing

Horvathova, Mokrisova & Petruska (2021) used financial indicators in their multivariate discriminant analysis model, average collection period, inventory turnover, total assets turnover ratio, return on assets, return on costs, equity to debt ratio, equity to fixed assets ratio, and cost ratio. Noga & Adamowicz (2021) used current assets/current liabilities, total income/mean assets, equity capital/total debt, profit from operating activity-depreciation to sales ratio, and operating cost/short-term commitment. Svabova et al. (2020) used sales/total assets, current assets/current liabilities, net income/shareholders equity, operating profit/total assets, (non-current+current liabilities)/total assets, cash & cash equivalents/total assets, cash flow/total assets, cash flow/(non-current+current liabilities), cash flow/sales, net income/sales, and non-current liabilities/total assets. Yakymova & Kuz (2019) used absolute liquid ratio, working capital to current assets ratio, debt to equity ratio, return on equity, and current asset turnover ratio. Kliestik et al. (2018) used current ratio, cash ratio, return on assets, return on equity, debt to assets ratio, debt to equity ratio, number of days of receivables, number of days of payables, inventory turnover, net assets, and retained earnings to total assets ratio. Table 2 shows the logistic regression models.

Table 2. Logistic regression

Author(s)	Sample	Country	AUC
Jakubik & Teply (2011)	757 non-financial firms for the period 1993-2005	Czech Republic	-
Pisula (2012)	205 transport companies during 2004-2012	Poland	94.8%
Vochodzka, Strakova & Vachal (2015)	12,930 transportation and shipping companies during 2003-2012	Czech Republic	91.75%
Gulka (2016)	120,854 companies during 2012-2014	Slovakia	80.81%
Brozyna, Mentel & Pisula (2016)	47 companies in TSL sector (transport, spedition, logistics) during 1997-2003	Poland, Slovakia	95.0%
Kovacova & Kliestik (2017)	1,000 companies	Slovakia	97.0% on training data, 86.7% on test data

Jencova (2018)	856 electrical engineering corporations in 2017	Slovakia	95.35%
Horvathova & Mokrisova (2020)	343 companies active in the field of heat supply for the year 2016	Slovakia	95.0%
Svabova et al. (2020)	75,652 SMEs during 2016-2018	Slovakia	93.4%

Source: own processing according to Pavlicko, Durica & Mazanec (2021)

Horvathova & Mokrisova (2020) used financial indicators in their logistic regression model, current liability/total assets, net income/total assets, working capital/total assets, earnings before interest and taxes/interest expenses, and equity/debt. Jencova (2018) used accounts payable turnover ratio, return on sales, quick ratio, financial leverage, net working capital/assets. Kovacova & Kliestik (2017) used net return on total income, current ratio, net working capital ratio, retained earnings to total assets ratio, total debt to total assets ratio, current debt to total assets ratio, equity to assets ratio, current assets to total incomes ratio. Gulka (2016) used cash ratio, turnover of working capital, share of financial accounts, equity ratio, credit burden, liabilities towards state institutions/total assets, EBITDA/total assets. Jakubik & Tepy (2011) used financial leverage, interest coverage, gross profit margin, inventory ratio, cash ratio, return on equity. Table 3 shows the artificial neural networks models.

Table 3. Artificial neural networks

Author(s)	Country	Sample	Accuracy
Virag & Kristof (2005)	Hungary	156 industrial companies	86.5%
Purvinis, Sukys & Virbickaite (2008)	Lithuania	230 companies	-
Lin (2010)	Russia	565 banks	53.8%
Bagheri, Valipour & Amin (2012)	Tehran	80 companies	-
Vochozka & Rowland (2015)	Czech Republic	128 construction companies	94.5%
Brozyna, Mentel & Pisula (2016)	Poland, Slovakia	47 transport companies during 1997-2003	95.0%
Horvathova, Mokrisova & Petruska (2021)	Slovakia	444 companies in the field of heat supply	98.3% on training data, 95.9% on test data

Source: own processing according to Kliestik et al. 2019

Based on publicly available information, FinStat (2022) evaluates the financial health of Slovak companies using its credit model for assessing the bankruptcy risk in the next accounting period, i.e., the FinStat score (accuracy 83%). The model includes total indebtedness, equity ratio, financial accounts to assets ratio, return on assets, and debt repayment period to sales. The value of the FinStat score ranges from 0% to 100%. The higher the value, the greater the bankruptcy risk of the company. If the value of the FinStat score is lower than 30%, the company is financially stable. A score higher than 70% indicates the company faces a high probability of bankruptcy. There is a grey zone between these limit values. In the accounting year 2021, 8% of companies (from 245,000) show a high probability of bankruptcy. Almost 64% of trading companies can be considered financially stable. 28% of companies are in the grey zone. Most of the financially stable companies are in public administration (88%), information technology (80%), healthcare (77%), projecting and engineering (76%), but also in education and training (75%). On the other hand, companies from the tourism sector and gastronomy (20%), food industry (13%), public administration (13%), retail (12%), and sale and maintenance of vehicles (10%) have high a probability of bankruptcy. 50% of companies from the automotive industry are in the grey zone. On the contrary, no company from the public administration is in the grey zone (Hrncarova, 2023).

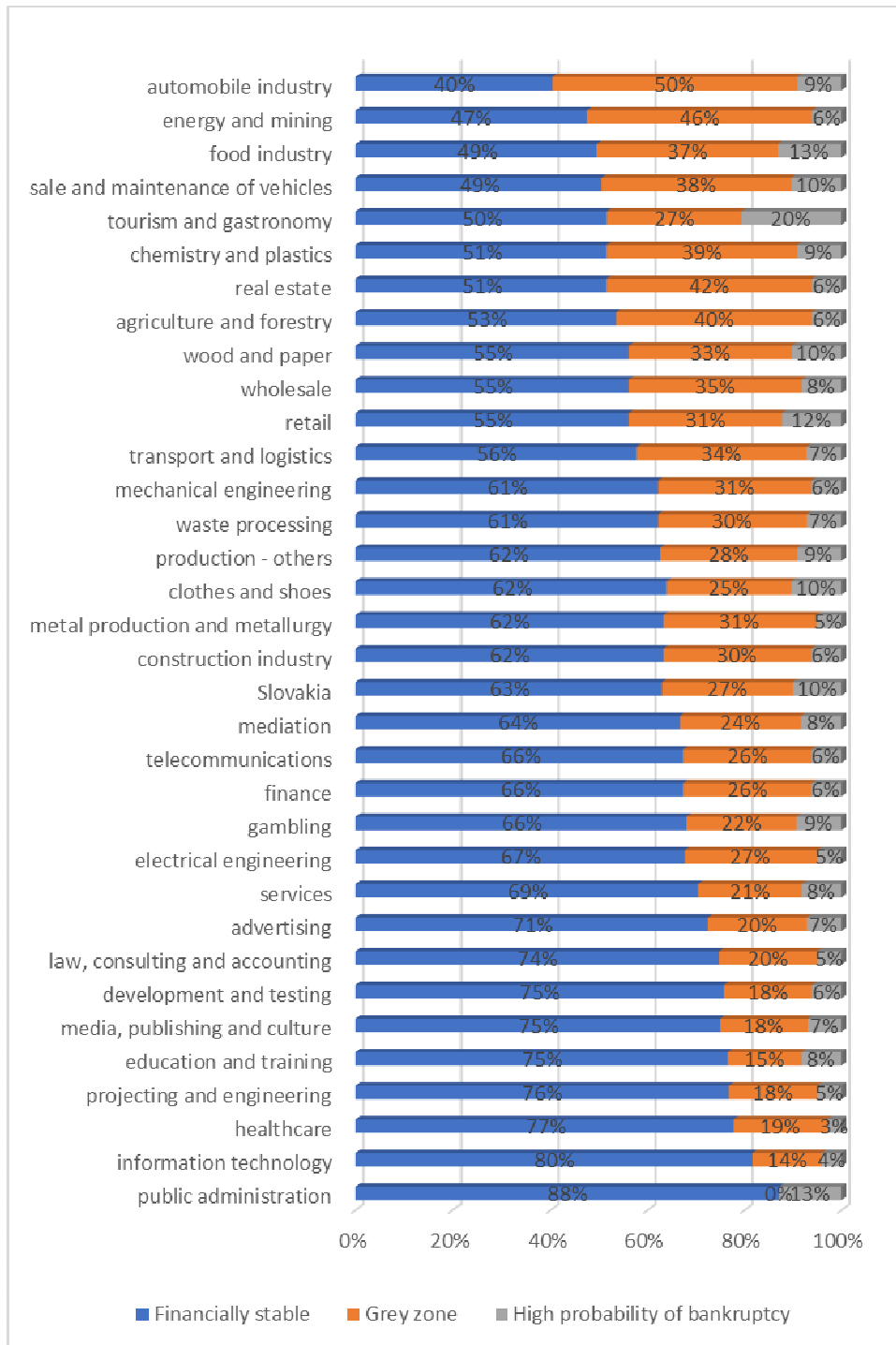


Figure 1. Evaluation of the probability of bankruptcy of companies by industry in 2021
Source: Hrnčarová (2023)

Conclusion

Estimating the riskiness of company or the probability of its bankruptcy is important, especially for investors and creditors, besides business owners. Therefore, searching for applicable models to predict bankruptcy is important. This is an important area not only in scientific research, but also in the practice of business entities. In essences, corporations must identify and prevent instability over time. Therefore, it is necessary to evaluate the financial health of companies using appropriate models.

The aim of the paper was to apply selected bankruptcy models in the teaching of financial subjects. The intention was to compare individual bankruptcy models and their use in teaching financial subjects. The paper focused on the comparison of models that were created using multivariate discriminant analysis, logistic regression, and neural networks.

In business management, it is important to understand the financial and economic situation and react promptly in the event of impending danger. Various simple models, more complex statistical functions, and artificial intelligence have been used to predict bankruptcy. Financial analysts should simultaneously use multiple methods to compare the results. Managers and business owners can use this paper to guide their firms and inform future business plans.

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The Rolling SML-based Portfolio Strategy

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Abstract

Research background: The Security Market Line (SML), also known as the Capital Asset Pricing Model, offers investors a simple and excellent way to identify current market pricing as over- or undervalued. Based on this information, the investor can make appropriate investment decisions. However, most of the literature focuses on CAPM anomalies. The best known CAPM anomalies include the zero-beta effect (Black et al. 1972), the book-to-market value anomaly (Basu 1977) and firm-size effect (Banz 1981).

Purpose of the article: In contrast to the approach in the literature, we focus on the original over- or undervaluation idea of the SML. Investment portfolios are formed in which individual assets are either bought or sold short. The objective is to check whether the portfolio formed can outperform a benchmark.

Methods: Selected asset classes are either bought (in the case of undervaluation) or sold short (in the case of overvaluation) in line with the momentum strategy. A portfolio is formed and portfolio performance is determined on a rolling basis. This is compared to a benchmark and checked for outperformance using a two-sample test for significant differences. The intervals we use for the rolling are defined as quarters. The study period is 20 years and starts in 2000.

Findings & Value added: Within the framework of the empirical analysis, an outperformance of the SML base rolling portfolio was determined. This is also statistically significant in part.

Keywords: CAPM, portfolio management, Rolling momentum strategy, security market line, SML

JEL classification: G11, G12, G15, G17

1. Introduction

Portfolio managers search for returns like the Knights Templar search for the Holy Grail. The problem with returns, however, is that once identified, they disappear through active trading. Therefore, the scientific community is encouraged to investigate new methods and trading strategies. This is also the objective of our contribution, in which we examine the following research question: Can an analysis of the cost of capital and the company returns, which make it possible to identify under- or overvaluations according to theory, also be used as an investment strategy?

To investigate this, a BUSO (buying undervalued, selling overvalued) portfolio is created. This leads us to the following hypothesis:

H_0 : Identifying existing over- or underperformance based on the SML and analogously use it to invest according to the momentum strategy does not outperform the MSCI World Index.

The Security Market Line (SML) also known as the Capital Asset Pricing Model (CAPM) (Sharpe, 1964; Lintner, 1965; Mossin, 1966) provides investors with a simple and excellent way to identify the current market pricing of stocks as overvalued or undervalued. The SML determines if the stock is expected to generate higher or lower returns than the actual market (Sinha, 2012). Based on this information, the investor can make appropriate investment decisions. The rolling momentum strategy (Užík et al., 2021) focuses on identifying stocks that have shown positive price trends over certain periods of time such as a couple of weeks or months. The rolling momentum strategy assumes stocks with positive price trends will likely perform better in the near future as well. The main idea is to include and keep stocks in your portfolio that have a positive price trend and exclude stocks that have been performing poorly.

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However, most of the literature focuses on CAPM anomalies. The best known CAPM anomalies include the zero-beta effect (Black et al. 1972), the book-to-market value anomaly (Basu 1977) and firm-size effect (Banz 1981). CAPM anomalies have been subject to research thoroughly (Lewellen and Nagel 2006; Emiger 2018; Cederburg and O'Doherty 2015).

1.1 CAPM

The Capital Asset Pricing Model (CAPM) was developed almost simultaneously and independently by William F. Sharpe (1964), John Lintner (1965) and Jan Mossin (1966). It is based on the portfolio theory of Markowitz (1959), who assumed that all forms of investment involve risk. Investors' preferences for expected return and risk are represented by indifference curves. The CAPM extends portfolio theory by assuming risk-free investments such as fixed-rate federal bonds. These provide a safe return with a certain expected value and a standard deviation of zero. The inclusion of the risk-free rate opens up new investment opportunities for investors by allowing them to build their portfolio of risk-free and risky assets. The investor has to decide on the ratio of risky securities in his portfolio and the weighting of the risk-free investment. Since its inception, CAPM has been subject to research in many different approaches. In the first wave of research, assumptions regarding the CAPM were mainly researched (Lintner 1969; Brennan 1970; Black 1972) and more recently Acharya and Pedersen (2005). Later empirical tests were the main subject of research (Fama and MacBeth 1973; Fama and French 1993, 1996; Jagannathan and Wang (1996). The third wave consisted of the search for economic transmission channels (Campbell and Vuolteenaho 2004).

The capital market line, which is the tangent between the risk-free rate and the efficiency curve, helps determine efficient portfolios. The market portfolio that lies at the tangent point of the line is held by a rational and efficient investor. The capital market line includes all efficient portfolios that can be obtained by combining the market portfolio with the risk-free investment. The CAPM answers the question about the expected return of a portfolio in the presence of a risk-free investment if the investor is willing to take some investment risk. The security market line (SML) describes the relationship between the expected return of a security in the market portfolio and the risk of the market portfolio, measured by the covariance of returns. The expected return is composed of the risk-free interest rate and a risk premium. The risk of a security is represented by the beta factor, which measures systematic risk.

CAPM provides the theoretical basis for determining the expected return of an investment based on its systematic risk, while the SML visualizes this relationship by plotting the required return based on the beta of the investment. The SML serves as a tool to evaluate the attractiveness of investments and to determine whether they are overvalued or undervalued relative to their risk.

The Capital Asset Pricing Model (CAPM) is built upon several underlying assumptions:

- The planning period is considered to be a single period.
- All investors are risk-averse and evaluate portfolios based on the expected return and standard deviation of security returns.
- Investors share the same expectations regarding the expected returns, standard deviations, and covariances of security returns. Stock returns are assumed to follow a normal distribution.
- All risky securities are freely traded in the capital market and can be divided into any desired quantity.
- A risk-free interest rate exists, allowing investors to borrow or lend capital without restrictions.
- The capital market operates without constraints, transaction costs, or taxes. All relevant information is available to investors and already reflected in market prices (Užík, 2004).

It is evident that the CAPM assumes a perfectly efficient capital market, although these assumptions diverge from the realities of real-world capital markets. Consequently, valuation inefficiencies arise, significantly impacting the allocation function of capital markets. This work assumes the availability of all information and its continuous integration into market prices.

The equity return corresponds to the cost of equity in terms of the minimum required return from shareholders' perspective. Capital can be invested or borrowed at the long-term risk-free interest rate. The risk-free interest rate is typically aligned with the long-term government bond yield, often based on a ten-year period. The market portfolio refers to a portfolio that includes all investment instruments.

1.2 Momentum Strategy

To begin with, the focal point for momentum strategy as a procyclical investment strategy resides in the hypothesis that the winning shares of the past will reasonably grow in the upcoming future with identical assumption for the performance of loser shares. (Bajgrowicz & Scaillet, 2012; Asneset al. 2013). Subsequently, as an investing strategy, investors purchase securities that are rising and sell them when they appear to have reached their prime. However, the idea of selling losers & buying winners is highly provocative, but it strikes sharp contrast with the tried & tested Wall Street proverb "buy low, sell high." (Barone, 2021)

Portfolios are built using straightforward regulations in the Momentum strategy. On the basis of previous price levels, equities are chosen within a formation period under the return standard, subsequently, the stocks with best & worst return on equities in formation period are combined into winning and losing portfolios, each with the same number. Therefore, the final phase consists of acquisition of the winning portfolio which is held for the duration of the investment with the loser portfolio being sold short simultaneously (Brock et al. 1992).

Furthermore, Momentum strategy can be viewed & is established as market-proven phenomena, from the standpoint of investment, the momentum effect empowers the development of corresponding investment strategies for market outperformance.(Chordia & Shivakumar, 2012; Celiker et al., 2016). Thus, the key to momentum investing is being able to capitalize on volatile market trends.

2. Methods

For the purpose of this study, we focused on companies listed on the EURO Stoxx 600. Since its introduction in 1998, the STOXX Europe 600 has become one of Europe's benchmark indices. The period of investigation extends from 2000 to 2022 and amounts to a total of 22 years whereby we use data since March 31, 1999 and until September 30, 2022. This shift in the period is due to the methodology.

The empirical analysis combines two financial concepts to enable portfolio construction. On the one hand, the CAPM and its security market line, which serves as a reference comparison with respect to the identification of over- or undervaluation.

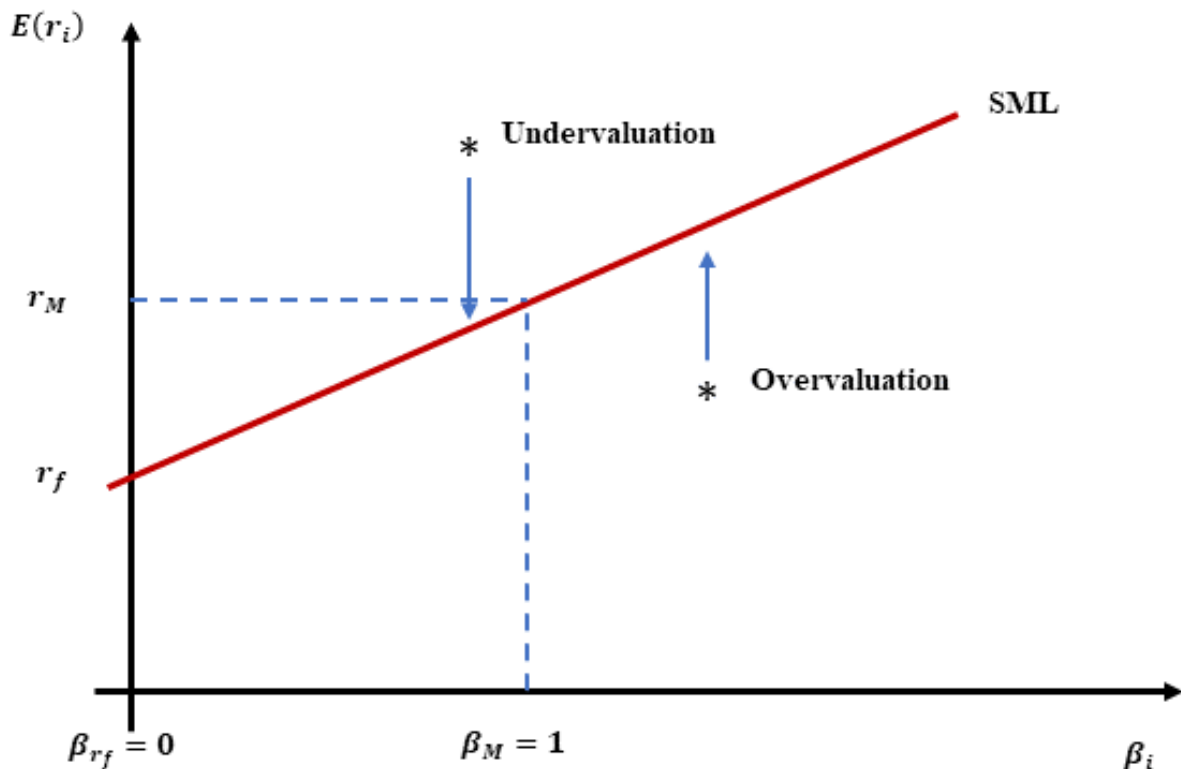


Figure 1. Security Market Line. Over- and undervaluation of assets.
Source: own processing (2023)

This assumption exploits the functional relationship between asset prices and their returns.

$$r_i = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

If the return is lower than the theoretical CAPM return, investors sell the asset, which leads to falling prices. As prices fall, the return of market participants increases, which also shifts the return below the SML toward the SML line. The same is true for undervaluation. Thus, if an asset class is undervalued, which is associated with a low entry price, market participants will continue to buy these assets as long as the return on the assets has not reached the SML.

Second, this paper makes use of the assumption that, analogous to the momentum strategy, we buy the undervalued assets and sell the overvalued ones short. This approach was implemented in this paper on the basis of quarterly returns. The first step was to calculate the expected CAPM return for each asset at the end of the quarter. We used daily returns for a period of one trading year (260 trading days) and the MSCI World Index as the market portfolio to calculate the beta value. The risk-free returns as well as the market returns are taken from the website www.marktrisikoprämie.de and were also recorded at quarterly intervals.

$$r_{CAPM} = r_f + (r_M - r_f) \times \beta$$

Where:

$$\beta_i = \rho_{i,M} \times \frac{\sigma_i}{\sigma_M}$$

r_{CAPM} = Expected return according to the Capital Asset Pricing Model

r_f = Risk free rate

r_M = Market Return

β_i = Beta (systematic risk)

$\rho_{i,M}$ = Correlation between the returns of the asset and the market

σ_i = Volatility of the asset's returns

σ_M = Volatility of market returns

Finally, according to the momentum strategy for first quarter 2000, the expected return was calculated according to CAPM and compared with the actual return of the asset. The following rules were followed:

$$r_{CAPM,t} > \ln\left(\frac{r_{i,t}}{r_{i,t-1}}\right) \quad \text{then go short and sell the asset}$$

$$r_{CAPM,t} < \ln\left(\frac{r_{i,t}}{r_{i,t-1}}\right) \quad \text{then go long and buy the asset}$$

For portfolio returns, the following applies:

$$BUSO_{t+1} = pr_{t+1} = \begin{cases} \sum_{i=1}^{n=600} \ln\left(\frac{r_{i,t+1}}{r_{i,t}}\right) & \text{if } r_{CAPM,t} > \ln\left(\frac{r_{i,t}}{r_{i,t-1}}\right) \\ \sum_{i=1}^{n=600} -\ln\left(\frac{r_{i,t+1}}{r_{i,t}}\right) & \text{if } r_{CAPM,t} < \ln\left(\frac{r_{i,t}}{r_{i,t-1}}\right) \end{cases}$$

Where:

$BUSO_t$ = Buying Undervalued Selling Overvalued

pr_t = Portfolio return

3. Results

In the empirical analysis, the focus is placed on the entire BUSO strategy. This will also be tested empirically.

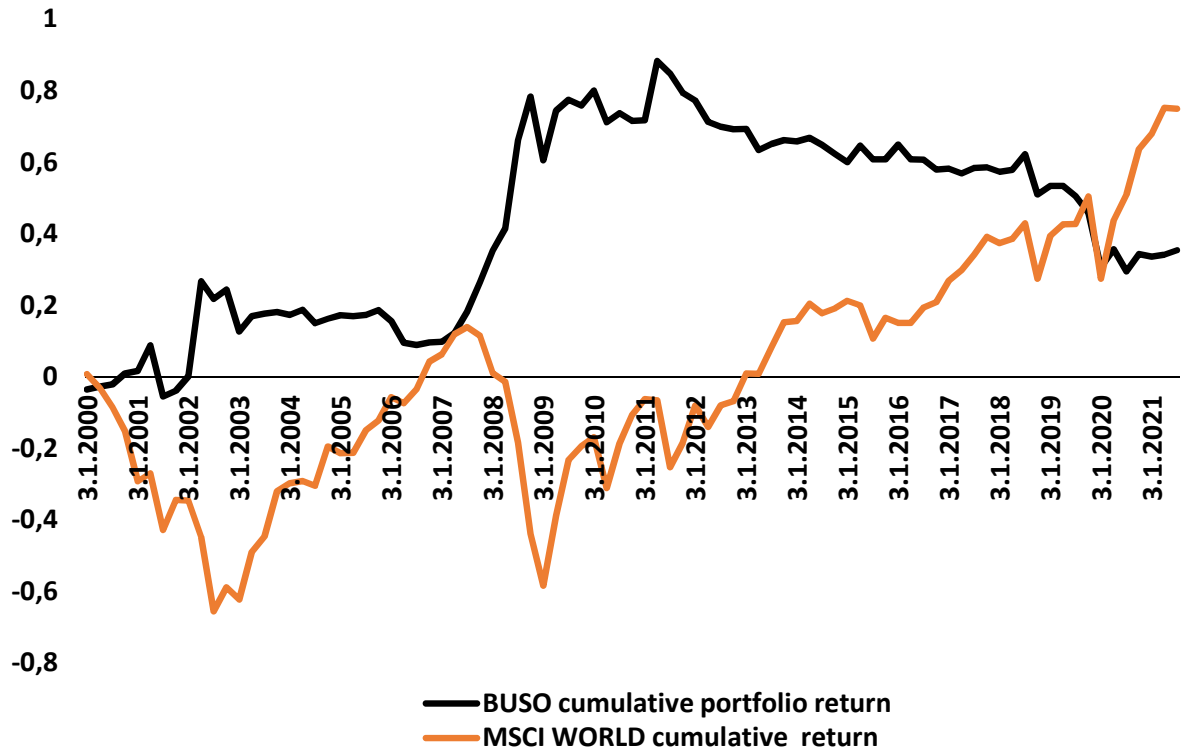


Figure 2. BUSO cumulative portfolio return.
Source: own processing (2023)

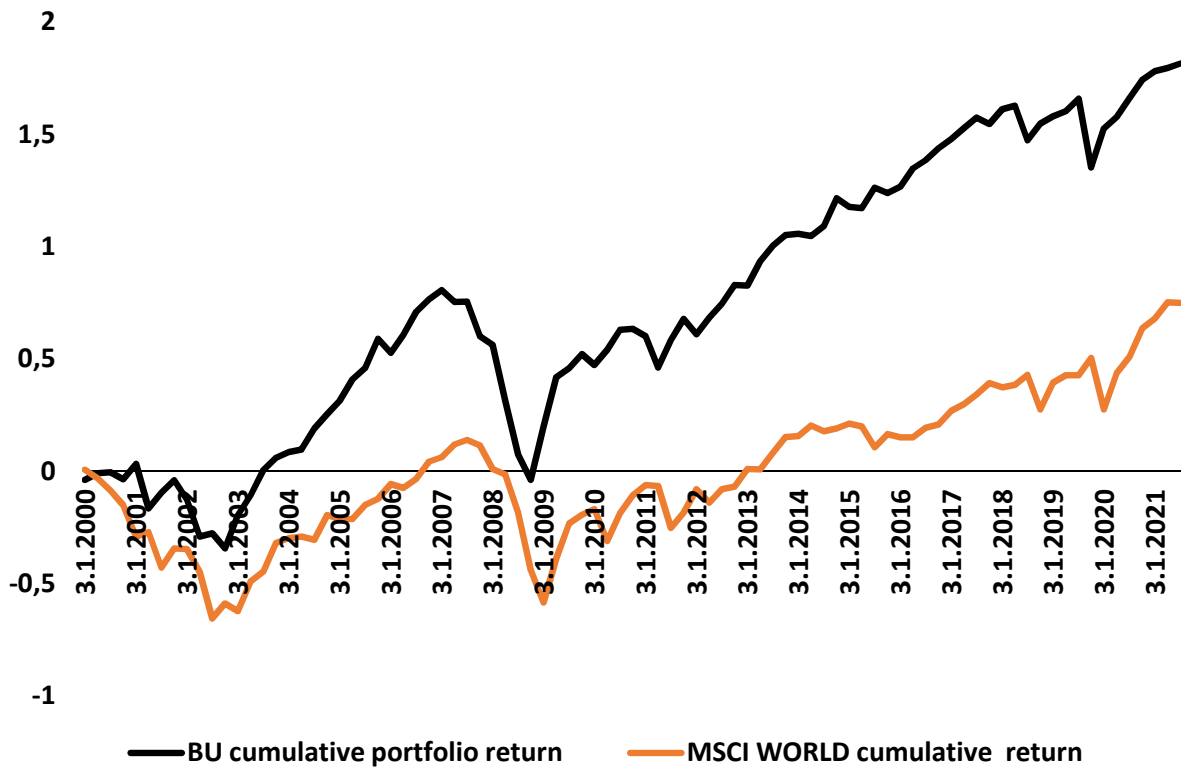


Figure 3. BU cumulative portfolio return.
Source: own processing (2023)

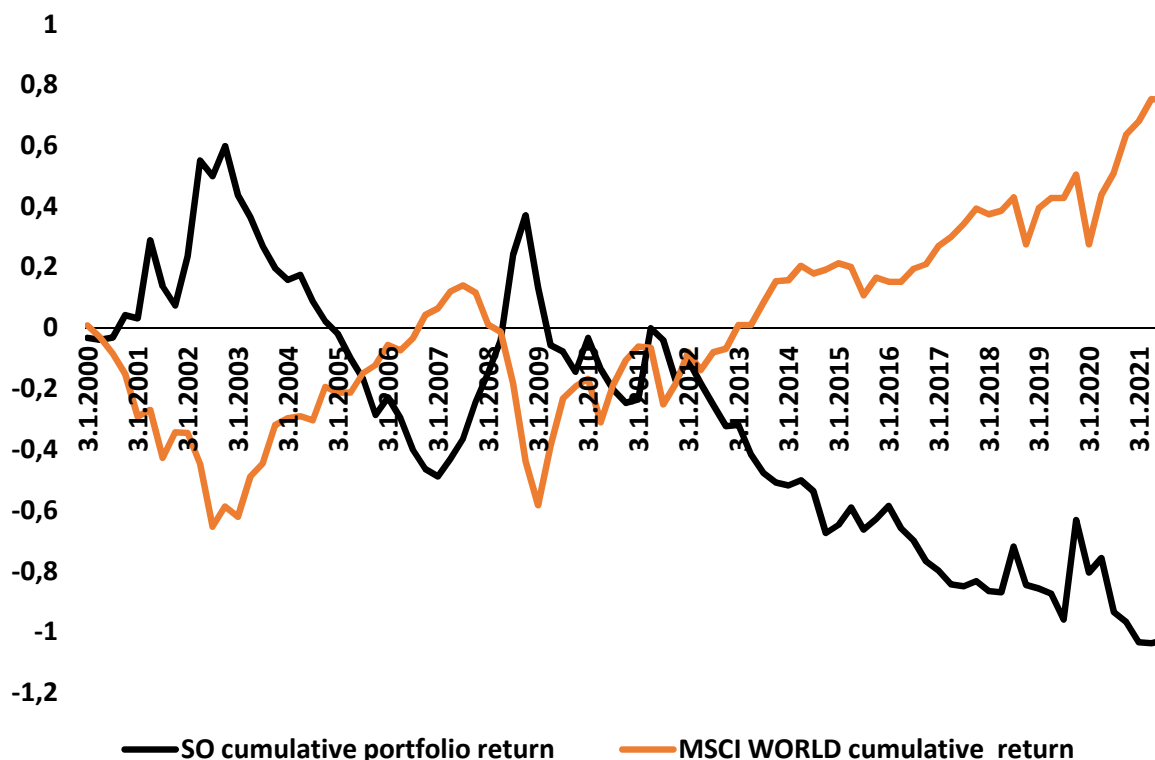


Figure 4. SO cumulative portfolio return.
Source: own processing (2023)

Finally, according to the momentum strategy for first quarter 2000, the expected return was calculated according to CAPM and compared with the actual return of the asset. The following rules were followed: The Accumulated Portfolio Returns formed show the overall BUSO strategy in the upper left panel. The top right shows the pure Buing Undevalue and the bottom left the Selling Overvalue performance. The straight line for comparison is the performance of the MSCI World Index over the period under consideration. It should be noted that the returns of the MSCI index are also calculated on a quarterly basis. For better clarity, the MSCI World is shown alone at the bottom right. To illustrate the impressive performance of the BUSO strategy, it is necessary to focus on currency performance rather than return performance. While the MSCI World Index increased from 1377.72 to 3101.8 from 2000 to 2021, which is 125.14%, the BUSO strategy achieved the profit performance 2766.43 in 2000 and cumulative value 719333.35 in 2021 on the basis of the profits in currency units, so the total performance was 25902.21%. Also impressive are the clear outperformances of the Selling Overvalue strategy in the crisis periods of the dotcom bubble and the financial crisis of 2008.

Table 1. Two sample t-test

Paired Samples Test		Paired Differences					t	df	Sig.	(2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference					
						Lower					Upper
Pair 1	Q1/2000 - MSCI Q1/2000	-0.104	0.829	0.044	-0.191	0.016	-2.338	349	0.020	**
Pair 2	Q2/2000 - MSCI Q2/2000	0.061	0.262	0.014	0.034	0.088	4.406	356	0.000	**
Pair 3	Q3/2000 - MSCI Q3/2000	0.082	0.369	0.019	0.044	0.120	4.215	358	0.000	**
Pair 4	Q4/2000 - MSCI Q4/2000	0.170	1.035	0.054	0.064	0.276	3.145	365	0.002	**
Pair 5	Q1/2001 - MSCI Q1/2001	0.205	1.000	0.052	0.103	0.307	3.965	373	0.000	**

Pair 6	Q2/2001 - MSCI Q2/2001	0.242	2.755	0.141	-0.036	0.520	1.710	37 8	0.088	*
Pair 7	Q3/2001 - MSCI Q3/2001	- 0.148	2.808	0.143	-0.430	0.133	- 1.035	38 3	0.301	
Pair 8	Q4/2001 - MSCI Q4/2001	- 0.062	0.359	0.018	-0.097	- 0.026	- 3.417	39 3	0.001	** *
Pair 9	Q1/2002 - MSCI Q1/2002	0.117	1.083	0.054	0.011	0.224	2.160	39 7	0.031	**
Pair 10	Q2/2002 - MSCI Q2/2002	0.930	8.016	0.398	0.147	1.713	2.335	40 4	0.020	**
Pair 11	Q3/2002 - MSCI Q3/2002	0.354	5.104	0.253	-0.142	0.851	1.402	40 7	0.162	
Pair 12	Q4/2002 - MSCI Q4/2002	0.256	5.538	0.273	-0.281	0.792	0.935	41 0	0.350	
Pair 13	Q1/2003 - MSCI Q1/2003	- 0.046	3.945	0.195	-0.429	0.336	- 0.237	41 0	0.813	
Pair 14	Q2/2003 - MSCI Q2/2003	0.144	4.062	0.198	-0.245	0.534	0.728	41 9	0.467	
Pair 15	Q3/2003 - MSCI Q3/2003	0.171	4.121	0.201	-0.224	0.566	0.850	42 0	0.396	
Pair 16	Q4/2003 - MSCI Q4/2003	0.085	4.195	0.204	-0.317	0.486	0.415	42 1	0.678	
Pair 17	Q1/2004 - MSCI Q1/2004	0.157	4.033	0.196	-0.229	0.542	0.797	42 1	0.426	
Pair 18	Q2/2004 - MSCI Q2/2004	0.232	4.325	0.210	-0.181	0.644	1.102	42 3	0.271	
Pair 19	Q3/2004 - MSCI Q3/2004	0.111	3.633	0.176	-0.236	0.457	0.627	42 3	0.531	
Pair 20	Q4/2004 - MSCI Q4/2004	0.099	3.808	0.185	-0.265	0.462	0.533	42 4	0.594	
Pair 21	Q1/2005 - MSCI Q1/2005	0.231	4.002	0.194	-0.150	0.613	1.193	42 5	0.233	
Pair 22	Q2/2005 - MSCI Q2/2005	0.181	3.906	0.188	-0.189	0.550	0.961	43 1	0.337	
Pair 23	Q3/2005 - MSCI Q3/2005	0.134	3.973	0.191	-0.241	0.509	0.702	43 3	0.483	
Pair 24	Q4/2005 - MSCI Q4/2005	0.201	4.243	0.203	-0.198	0.601	0.991	43 5	0.322	
Pair 25	Q1/2006 - MSCI Q1/2006	0.046	3.658	0.175	-0.297	0.390	0.266	43 6	0.791	
Pair 26	Q2/2006 - MSCI Q2/2006	0.004	2.632	0.125	-0.242	0.250	0.031	44 2	0.975	
Pair 27	Q3/2006 - MSCI Q3/2006	0.051	2.173	0.103	-0.152	0.254	0.495	44 3	0.620	
Pair 28	Q4/2006 - MSCI Q4/2006	0.044	2.293	0.108	-0.168	0.256	0.407	45 2	0.685	
Pair 29	Q1/2007 - MSCI Q1/2007	0.093	2.330	0.109	-0.122	0.308	0.850	45 3	0.396	
Pair 30	Q2/2007 - MSCI Q2/2007	0.125	2.886	0.135	-0.139	0.389	0.928	45 9	0.354	
Pair 31	Q3/2007 - MSCI Q3/2007	0.290	4.291	0.200	-0.102	0.683	1.453	46 1	0.147	
Pair 32	Q4/2007 - MSCI Q4/2007	0.458	6.102	0.282	-0.097	1.013	1.623	46 6	0.105	
Pair 33	Q1/2008 - MSCI Q1/2008	0.639	7.970	0.368	-0.084	1.362	1.737	46 8	0.083	*
Pair 34	Q2/2008 - MSCI Q2/2008	0.563	9.149	0.420	-0.262	1.388	1.342	47 4	0.180	
Pair 35	Q3/2008 - MSCI Q3/2008	1.322	15.364	0.703	-0.059	2.703	1.881	47 7	0.061	*
Pair 36	Q4/2008 - MSCI Q4/2008	1.270	17.195	0.782	-0.267	2.807	1.623	48 2	0.105	
Pair 37	Q1/2009 - MSCI Q1/2009	0.387	13.694	0.623	-0.837	1.611	0.621	48 2	0.535	
Pair 38	Q2/2009 - MSCI Q2/2009	0.810	16.386	0.744	-0.652	2.272	1.089	48 4	0.277	
Pair 39	Q3/2009 - MSCI Q3/2009	0.663	16.770	0.761	-0.831	2.158	0.872	48 5	0.384	
Pair 40	Q4/2009 - MSCI Q4/2009	0.673	16.410	0.744	-0.790	2.136	0.904	48 5	0.366	
Pair 41	Q1/2010 - MSCI Q1/2010	0.844	17.340	0.786	-0.700	2.387	1.074	48 6	0.284	
Pair 42	Q2/2010 - MSCI Q2/2010	0.662	15.503	0.703	-0.718	2.043	0.943	48 6	0.346	
Pair 43	Q3/2010 - MSCI Q3/2010	0.645	15.922	0.721	-0.772	2.063	0.895	48	0.371	

								6		
Pair 44	Q4/2010 - MSCI Q4/2010	0.575	15.424	0.698	-0.795	1.946	0.825	48 8	0.410	
Pair 45	Q1/2011 - MSCI Q1/2011	0.664	15.537	0.707	-0.725	2.053	0.939	48 2	0.348	
Pair 46	Q2/2011 - MSCI Q2/2011	1.192	19.384	0.873	-0.523	2.907	1.365	49 2	0.173	
Pair 47	Q3/2011 - MSCI Q3/2011	0.938	18.263	0.821	-0.675	2.550	1.142	49 4	0.254	
Pair 48	Q4/2011 - MSCI Q4/2011	0.584	17.041	0.764	-0.918	2.086	0.764	49 6	0.445	
Pair 49	Q1/2012 - MSCI Q1/2012	0.592	16.502	0.739	-0.861	2.045	0.800	49 7	0.424	
Pair 50	Q2/2012 - MSCI Q2/2012	0.620	15.222	0.681	-0.718	1.959	0.910	49 8	0.363	
Pair 51	Q3/2012 - MSCI Q3/2012	0.578	14.858	0.665	-0.729	1.885	0.869	49 8	0.385	
Pair 52	Q4/2012 - MSCI Q4/2012	0.630	14.676	0.656	-0.658	1.919	0.962	50 0	0.337	
Pair 53	Q1/2013 - MSCI Q1/2013	0.579	14.687	0.656	-0.710	1.868	0.883	50 0	0.378	
Pair 54	Q2/2013 - MSCI Q2/2013	0.480	13.437	0.600	-0.700	1.659	0.799	50 0	0.424	
Pair 55	Q3/2013 - MSCI Q3/2013	0.573	13.743	0.614	-0.633	1.780	0.934	50 0	0.351	
Pair 56	Q4/2013 - MSCI Q4/2013	0.574	13.964	0.623	-0.650	1.799	0.922	50 1	0.357	
Pair 57	Q1/2014 - MSCI Q1/2014	0.608	13.872	0.619	-0.607	1.824	0.984	50 2	0.326	
Pair 58	Q2/2014 - MSCI Q2/2014	0.597	14.051	0.625	-0.631	1.824	0.955	50 5	0.340	
Pair 59	Q3/2014 - MSCI Q3/2014	0.591	13.600	0.603	-0.594	1.777	0.980	50 7	0.328	
Pair 60	Q4/2014 - MSCI Q4/2014	0.510	12.989	0.575	-0.619	1.639	0.887	51 0	0.375	
Pair 61	Q1/2015 - MSCI Q1/2015	0.483	12.443	0.549	-0.597	1.562	0.878	51 2	0.380	
Pair 62	Q2/2015 - MSCI Q2/2015	0.699	13.495	0.595	-0.470	1.867	1.175	51 4	0.241	
Pair 63	Q3/2015 - MSCI Q3/2015	0.563	12.526	0.548	-0.514	1.640	1.027	52 1	0.305	
Pair 64	Q4/2015 - MSCI Q4/2015	0.486	12.453	0.543	-0.581	1.553	0.895	52 5	0.371	
Pair 65	Q1/2016 - MSCI Q1/2016	0.675	13.373	0.581	-0.466	1.817	1.163	52 9	0.245	
Pair 66	Q2/2016 - MSCI Q2/2016	0.452	12.383	0.536	-0.601	1.505	0.843	53 3	0.399	
Pair 67	Q3/2016 - MSCI Q3/2016	0.489	12.320	0.533	-0.557	1.535	0.918	53 4	0.359	
Pair 68	Q4/2016 - MSCI Q4/2016	0.425	11.586	0.497	-0.550	1.401	0.857	54 3	0.392	
Pair 69	Q1/2017 - MSCI Q1/2017	0.441	11.589	0.496	-0.533	1.414	0.889	54 6	0.374	
Pair 70	Q2/2017 - MSCI Q2/2017	0.422	11.235	0.479	-0.518	1.362	0.882	55 0	0.378	
Pair 71	Q3/2017 - MSCI Q3/2017	0.480	11.572	0.492	-0.487	1.447	0.976	55 2	0.330	
Pair 72	Q4/2017 - MSCI Q4/2017	0.445	11.571	0.490	-0.518	1.408	0.907	55 6	0.365	
Pair 73	Q1/2018 - MSCI Q1/2018	0.469	11.253	0.476	-0.466	1.404	0.985	55 8	0.325	
Pair 74	Q2/2018 - MSCI Q2/2018	0.480	11.359	0.479	-0.461	1.421	1.002	56 1	0.317	
Pair 75	Q3/2018 - MSCI Q3/2018	0.562	12.391	0.521	-0.462	1.586	1.078	56 4	0.281	
Pair 76	Q4/2018 - MSCI Q4/2018	0.335	10.016	0.420	-0.490	1.161	0.798	56 7	0.425	
Pair 77	Q1/2019 - MSCI Q1/2019	0.358	10.232	0.429	-0.485	1.202	0.835	56 7	0.404	
Pair 78	Q2/2019 - MSCI Q2/2019	0.395	10.202	0.427	-0.444	1.235	0.925	56 9	0.355	
Pair 79	Q3/2019 - MSCI Q3/2019	0.338	9.500	0.396	-0.440	1.116	0.853	57 4	0.394	
Pair 80	Q4/2019 - MSCI Q4/2019	0.177	8.419	0.350	-0.511	0.866	0.506	57 6	0.613	

Pair 81	Q1/2020 - MSCI Q1/2020	0.121	5.944	0.247	-0.365	0.607	0.489	57 6	0.625	
Pair 82	Q2/2020 - MSCI Q2/2020	0.183	6.007	0.249	-0.306	0.672	0.735	58 1	0.463	
Pair 83	Q3/2020 - MSCI Q3/2020	- 0.012	4.653	0.193	-0.391	0.367	- 0.062	58 1	0.950	
Pair 84	Q4/2020 - MSCI Q4/2020	0.200	5.667	0.234	-0.260	0.660	0.854	58 5	0.393	
Pair 85	Q1/2021 - MSCI Q1/2021	0.165	5.379	0.222	-0.271	0.602	0.744	58 5	0.457	
Pair 86	Q2/2021 - MSCI Q2/2021	0.165	5.495	0.227	-0.280	0.611	0.729	58 6	0.466	
Pair 87	Q3/2021 - MSCI Q3/2021	0.269	5.807	0.240	-0.201	0.740	1.124	58 6	0.262	

Source: own processing (2023)

4. Discussion

The statistical analysis of the results is based exclusively on the BUSO strategy as a whole. Even without statistical analysis, the performance charts show that the Selling Overvalued strategy only generates positive outperformance in times of crisis. The same applies to the Buying Undervalued strategy, which can be assumed to generate statistically positive outperformance from around mid-2002 onwards.

This means that the overall BUSO strategy takes a somewhat more conservative view, as the combination of the two individual strategies means that the overall performance is lower. The outperformance is always measured against the MSCI World. In table 1 above, the mean values represent the difference in the respective quarterly return of the BUSO strategy compared to the quarterly return of the MSCI World index. In only five of 87 quarters was BUSO performance negative compared to the MSCI-World. In contrast, it was positive in 82 quarters. The statistically significant values are marked in bold.

Conclusion

This paper deals with a newly developed strategy, in which the existing over- or underperformance based on the SML is used analogously to investing according to the momentum strategy. The generated BUSO portfolio shows a general and partly statistically significant outperformance compared to the MSCI World Index. Considering these results, the H_0 hypothesis can partially be rejected for the bold market pairs in table 1. Overall, the results regarding the newly developed methodology are to be verified by further work. The extension of the intervals to single months or weeks can be considered as recommendable.

Resources

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Application of Fundamental Screening in Active Portfolio Management

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Abstract

Research background: The paper highlights fundamental screening use in investment portfolio creation.

Purpose of the article: The article aims to test the performance of the selected active approach to managing investments into equities in a historical time horizon, which captures various stages of development in financial markets, alternating periods of boom and crisis. We monitor performance by comparing portfolio, risk and risk-weighted returns with the same parameters of selected benchmarks.

Methods: The research focuses on the Growth at a Reasonable Price (GARP) investment strategy applied to the universe of stocks in the S&P 500 index. The results of the tested strategy are compared with the selected benchmark.

Findings & Value added:

Our results demonstrate that using fundamental screening and the GARP investment strategy can outperform passive forms of investing and factor indexes focused on value or growth stocks in terms of cumulative and annualized returns. We have shown that the selected screening criteria defining the combination of value and growth style formed concentrated portfolios achieving higher returns than the S&P 500 index approximately 70% of the time. A higher average annual return than the S&P 500 index was realized by our GARP portfolio and the ETF GARP strategy, which describes a combination of Value and growth style. Considering that during the monitored period of 19 years, various economic cycle periods alternated, the results indicate that the GARP strategy has the potential to outperform the average returns of a more broadly defined market.

Keywords: fundamental screening, market efficiency, GARP strategy, portfolio

JEL classification: G00, G11, G12, G14

1. Introduction

Long-term civilizational trends that can currently be observed include the extension of the average human age and the increase in the standard of living worldwide. The trends mentioned above are closely related to the increase in demand for high-quality investment management services due to the need to refinance the living costs of an unproductive or less productive population and the rising middle-class wealth management. As Choi *et al.* (2017) wrote, the quality of investment management is manifested, among other things, by the ability to adapt investment goals to the specific needs of individual investors, whether individual or institutional. The goals in the field of investment management are primarily based on the investment horizon, which changes over time. The primary level of adaptation to goals in investment management is asset allocation, whether classic, such as shares and bonds, or alternative, such as real estate or commodities or dynamic (Woon Jeong *et al.*, 2023; Kontosakos *et al.*, 2023; Ma *et al.*, 2023). The hierarchically following level of adapting to investment goals is deciding on the investing style, i.e. how much to invest, for how long to invest, actively or passively, or in a semi-active/semi-passive form of factor investing within the limits defined by the allocation to selected assets (Tao *et al.*, 2023). If, for example, a decision has been made to invest actively into equities, there is a vast space for applying diverse investment approaches, such as sector and factor rotation, fundamental, technical and quantitative approaches, absolute returns vs. relative and many others (Chen, Jin, 2023; Braga *et al.* 2023; Bessler *et al.*, 2021; Platanakis *et al.* 2021).

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This article aims to test the performance of the selected active approach to managing share investments in a historical time horizon, which captures various stages of development in financial markets, alternating periods of boom and crisis. We monitor performance by comparing portfolio returns, risk and risk-weighted returns with the same parameters of selected benchmarks. We assume that the asset allocation decision has already been made in portfolios. When choosing an active approach, we tried to consider a certain degree of originality, which we integrated through a combination of classic Growth and value style while applying a purely systematic approach to stock selection. We have used a specific approach to selecting stocks for our portfolios, fundamental screening, which combines elements of value and growth investment styles.

2. Methods

The subject of the investigation is the use of fundamental screening based on the Growth at a reasonable price (GARP) investment strategy (Rabener, 2019; Fernández *et al.*, 2019). We combine the value and growth approach when creating investment portfolios and comparing the performance of a defined systematic active strategy with selected passive indices. The strategy identifies companies that can be expected to grow above average but are still traded at a reasonable price relative to earnings and growth potential. In the beginning, we defined the screening criteria for selecting stocks for the portfolio, specifically PEG (Price to Earnings Growth), ROE (Return On Equity), EPS (Earnings Per Share), D/E (Debt to Equity), see (Robinson *et al.*, 2009; Sevastjanov & Dymova, 2009; Pinto *et al.*, 2022). These criteria were defined strictly and were not modified during the analysis. Each year, a new portfolio was created for the past 19 years (2004-2022). A total of 19 portfolios were analyzed. Securities for the portfolios were selected by screening the historical universe of the S&P 500 index of the given year. Subsequently, equal weight was assigned to each title in the portfolio (Elton *et al.*, 2019; Fabozzi *et al.*, 2016; Baines *et al.*, 2021; Gârleanu *et al.*, 2022). The number of stocks in the portfolio was limited to a maximum of 30. The minimum number was not determined so that we could create relatively concentrated portfolios. Rebalancing did not take place during the year. The portfolio structure remained unchanged during the year. Backtesting of the strategy was performed automatically on out-of-sample data. The performance of the portfolios was measured for each year. The results are compared with benchmarks based on absolute and risk-adjusted return (Sharpe Ratio).

The paper used the following comparative benchmarks: iShares Core S&P 500 ETF, iShares S&P 500 Value ETF, iShares S&P 500 Growth ETF, and S&P 500 GARP ETF.

The data was obtained from the Yahoo Finance Inc. Website, and the historical composition of the S&P 500 index was downloaded from the file from GitHub. Adjusted close prices of stocks and ETFs were obtained from the Yahoo Finance Inc. Website. The data were then processed and filtered in MS Excel. All financial data is on an annual basis. Stock and ETF prices are monthly data in USD.

3. Results

We present the results of our analysis for the following portfolios: our proposed portfolio (GARP Portfolio), iShares Core S&P 500 ETF (S&P 500), iShares S&P 500 Value ETF (S&P 500 Value), iShares S&P 500 Growth ETF (S&P 500 Growth). The results for the portfolio S&P 500 GARP ETF (S&P 500 GARP) are not presented due to the unavailability of the data from 2004-2011. Table and 2 represent the annualized return, volatility and Sharpe Ratio (Fabozzi *et al.*, 2016; Funtek, 2023).

The macroeconomic environment during the year 2004 was presented by stable economic Growth. US GDP grew by 4.4% in the third quarter of 2004, the fastest pace in nearly 20 years. The unemployment rate in December 2004 was at the level of 5.4%. The Federal Reserve raised interest rates four times in 2004, from 1% to 2.25%. We have selected stocks based on the results of fiscal year 2003 by the fundamental screening. We obtained seven stocks to create our GARP portfolio for the year 2004. The portfolio generated the highest return and Sharpe Ratio in 2004 compared to all other benchmarks. Although the growth style has not been successful this year, our GARP portfolio has been successful due to the selection of suitable value stocks with growth potential. Stable economic Growth continued in 2005.

The country's GDP grew by 3.5% in the third quarter of 2005. The unemployment rate was 5% in December 2005. The Federal Reserve raised interest rates eight times from 2.25% to 4.25% to curb inflation. We created our GARP portfolio based on the results of fiscal year 2004 again. Screening filtered eight stocks for 2005. Seven stocks of them achieved positive returns. This year, the primary value style did well, and our GARP portfolio again achieved the highest yield and Sharpe Ratio among all other benchmarks. The high volatility of the portfolio was directly related to its high concentration.

The US economy in 2006 was characterized by slowing job growth, an eroding housing market and rising federal debt that underscored the fragile state of economic Growth. The Great Ease ended when a decade-long expansion in the US housing market peaked in 2006, and residential construction began to decline. The Federal Reserve raised interest rates from 4.25% to 5.25%. Our GARP portfolio this year included 19 stocks. However, up to 10 of them had a negative yield. Our GARP portfolio lost in all aspects this year compared to other benchmarks. The portfolio included stocks whose returns were negatively affected by the second year of interest rate increases and the slowdown in economic Growth. Looking at the results of the other ETFs, we can conclude that the weaker performance of the portfolio was caused by stock selection rather than the macroeconomic situation, as the other ETFs had a successful year. Value stocks and the traditional S&P 500 were the best performers. The US economy in 2007 was characterized by losses on mortgage-related financial assets, which began to cause tension in global financial markets. The US economy went into recession in December 2007. The FED cut interest rates from 5.25% to 4.25%.

Table 1. Comparison of the performance of the analyzed portfolios during the period 2004-2011

		GARP Portfolio	S&P 500	S&P 500	S&P 500
				Value	Growth
2004	Return	30.23%	6.03%	10.14%	1.31%
	Volatility	13.27%	7.13%	7.33%	7.73%
	Sharpe Ratio	2.14%	0.58	1.17%	-0.08
2005	Return	21.46%	9.92%	11.29%	8.51%
	Volatility	14.69%	8.17%	7.94%	8.42%
	Sharpe Ratio	1.21%	0.77	0.97%	0.58
2006	Return	6.70%	14.76%	19.52%	10.08%
	Volatility	12.25%	5.63%	5.71%	6.64%
	Sharpe Ratio	0.14%	1.74	2.56%	0.78
2007	Return	21.22%	-2.70%	-3.80%	-1.78%
	Volatility	13.10%	11.45%	10.65%	13.01%
	Sharpe Ratio	1.27%	-0.63	0.78	-0.49
2008	Return	-38.54%	-38.26%	-44.36%	-32.17%
	Volatility	31.27%	21.16%	22.97%	21.11%
	Sharpe Ratio	-1.29	-1.89	-2.01	-1.67
2009	Return	65.68%	32.70%	34.76%	30.61%
	Volatility	24.18%	21.30%	24.01%	18.04%
	Sharpe Ratio	2.7	1.59	1.43	1.67
2010	Return	9.22%	22.28%	21.13%	23.08%
	Volatility	19.51%	18.46%	18.86%	18.60%
	Sharpe Ratio	0.46	1.19	1.1	1.22
2011	Return	-1.51%	4.18%	0.97%	7.14%
	Volatility	18.84%	17.11%	18.72%	15.94%
	Sharpe Ratio	-0.09	0.23	0.04	0.44

Source: own processing (2023)

These economic conditions caused the screening to select 21 shares. Shares of five companies recorded significant losses, but these were more than compensated by the excellent performance of other shares. The results show the absolute dominance of the portfolio for the year 2007 compared to other indices. In 2008, the US economy was characterized by a deep recession caused by the financial crisis of 2007–2008. From late 2007 to mid-2009, it was the most prolonged and deepest economic downturn in the United States since the Great Depression (1929).

The FED reduced interest rates from 4.25% to 0%. Even our GARP portfolio recorded losses. A yield was -38%. On a relative basis, the portfolio's performance was satisfactory, especially concerning the value indices. In contrast, from the point of view of the risk-weighted return, expressed by the Sharpe Ratio value, the portfolio achieved the best result among all the compared indices (see Table). The US economy was characterized by a continuing recession in 2009, with GDP falling by 2.5%, with the cycle bottoming out this year and the conditions for a recovery in the following year beginning to form.

The FED kept interest rates at 0%. Our GARP portfolio achieves high returns and the best Sharpe ratio values compared to other benchmarks. Such positive results were mainly due to the expansionary monetary policy and the previous market slump. The portfolio was composed of 30 stocks. The results indicate that when the economy moves from a recession to a recovery phase, the GARP strategy combines the positives of both investment styles and brings investors a return above the rate of a passive investment method.

The GDP growth rate of 2.71% characterized the US economy. US employment grew, the layoff rate fell, and the average wage (adjusted for inflation) rose. Inflation was at the level of 1.64%. The FED kept interest rates at 0%. At the beginning of 2010, fundamental screening selected ten stocks for the portfolio, half ending the year with a negative return. The most successful growth strategies benefited from cheap capital and the economy's recovery after the recession. Compared to the other benchmarks, our GARP portfolio significantly lagged. In 2011, the pace of US economic growth slowed significantly. GDP grew by 1.55%. Inflation was at the level of 2.96%. FED rates remained at 0%. Our GARP portfolio once again lagged behind other benchmarks. Growth stocks performed best. We could attribute the portfolio's poor performance this year to the overall state of the stock markets and the fact that, at this time, the orientation towards value characteristics deprived us of a better return.

Table compares the performance of the analyzed portfolios from 2012-2022. After a decline, the US economy grew by 1.5% in 2012. The unemployment rate fell from 8.5% to 7.9%. However, at the end of 2012, the debt-to-GDP ratio was 100%, higher than ever since World War II. Inflation was 2.01%, and the FED kept rates at 0%. Since 2012, data for the GARP ETF is also available, which allows us to compare our GARP strategy with Invesco's GARP ETF. Our GARP portfolios are generally constructed according to different criteria than the GARP ETF. Screening in the GARP ETF takes place quarterly, and the rules are set to allow more stocks to be included in the portfolio. Our GARP portfolios are more concentrated and thus more exposed to idiosyncratic influences. In 2012, however, up to 30 shares entered our GARP portfolio.

Although the absolute results were attractive, our GARP portfolio offered the worst results relative to other benchmarks. The annual GDP growth rate at the end of 2013 was 2.5%. The inflation rate in the United States reached 1.5%. The unemployment rate in December 2013 was 6.7%. FED rates were again at the level of 0%. As we have seen in previous years, after 1 or 2 years of weaker portfolio performance, a year comes to the scene that overwhelms other comparative benchmarks. In 2013, 22 shares were included in the portfolio, and none recorded a loss at the end of the year. The year 2013 was overall the most successful from the point of view of the achieved Sharpe ratio. The annual GDP growth rate at the end of 2014 was 2.4%. The inflation rate was 0.8%. The unemployment rate in December 2014 was 5.6%.

FED rates remained at 0%. The screening generated an 11-member portfolio. The portfolio had an average year compared to other benchmarks. The GARP ETF fared best in all respects. Regarding return, it beat the S&P 500 index, both value funds and the Pure Growth fund. The annual GDP growth rate at the end of 2015 increased to 2.9% compared to 2014. The inflation rate was 0.7%. The unemployment rate fell to 5.0% in December 2015. Again, the FED did not change interest rates and remained 0%. Under these economic conditions, our screening filtered only eight companies into the portfolio, but the portfolio results were the worst this year compared to other benchmarks. In 2016, compared to the previous year, the US economy showed a decline, on the one hand, in the year-on-year growth rate of GDP, which fell to 1.6% at the end of this year. The inflation rate fell to 2.1%, and the unemployment rate was 4.7% in December 2016. FED rates remained at 0%. As of 2015, our GARP portfolio consisted of only eight shares. This year, the result from the previous year was repeated, and the portfolio achieved the worst results compared to other benchmarks.

The change occurred the following year in the year-on-year GDP growth rate when, at the end of 2017, it was 2.3%. The inflation rate in the United States was 2.1% in 2017, and the unemployment rate was 4.1% in December 2017. The FED raised the interest rate to 1.5%. Only four actions passed the screening. The highly concentrated portfolio offered the highest return, combined with the highest volatility, reflected in a lower Sharpe ratio than other benchmarks. In 2018, the annual GDP growth rate

was 2.9%. In December 2018, the inflation rate was 1.9% and unemployment rates were 3.9%. The FED reacted by raising the rate from 1.5% to 2.5%. The fundamental screening selected only five stocks for the portfolio in 2018. All stocks saw significant losses at the end of the year. Too narrow a concentration and strict screening criteria caused problems, especially during interest rate increases and FED braking. The annual GDP growth rate at the end of 2019 was 2.3%. In December 2019, the inflation rate was 2.3% and the unemployment rate was 3.5%. The FED lowered the rate to 1.75%.

Table 2. Comparison of the performance of the analyzed portfolios during the period 2012-2022

		GARP Portfolio	S&P 500	S&P 500	S&P 500	S&P 500
				GARP	Value	Growth
2012	Return	10.26%	16.61%	15.85%	19.26%	14.20%
	Volatility	18.25%	10.61%	12.35%	11.68%	10.03%
	Sharpe Ratio	0.55	1.55	1.27	1.63	1.4
2013	Return	42.76%	21.48%	19.87%	18.72%	23.73%
	Volatility	10.54%	10.15%	9.65%	10.29%	9.76%
	Sharpe Ratio	4.04	2.1	2.05	1.81	2.42
2014	Return	14.50%	14.26%	15.34%	11.61%	16.15%
	Volatility	12.26%	7.87%	7.87%	8.06%	8.52%
	Sharpe Ratio	1.17	1.8	1.93	1.43	1.88
2015	Return	-12.03%	-0.91%	-0.46%	-3.77%	1.59%
	Volatility	17.11%	15.08%	17.34%	14.15%	16.01%
	Sharpe Ratio	-0.72	-0.08	-0.05	-0.29	0.08
2016	Return	0.43%	19.47%	13.42%	24.13%	15.93%
	Volatility	20.90%	7.79%	9.85%	8.35%	8.83%
	Sharpe Ratio	-0.01	2.42	1.3	2.82	1.74
2017	Return	42.37%	26.47%	42.50%	19.19%	32.42%
	Volatility	15.55%	6.42%	8.12%	6.78%	7.49%
	Sharpe Ratio	2.65	3.94	5.08	2.65	4.17
2018	Return	-26.30%	-2.47%	1.99%	-5.28%	0.04%
	Volatility	19.82%	17.09%	18.58%	17.39%	17.19%
	Sharpe Ratio	-1.44	-0.28	-0.02	-0.44	-0.13
2019	Return	39.81%	21.61%	23.67%	18.02%	24.51%
	Volatility	23.38%	31.08%	15.31%	13.72%	9.91%
	Sharpe Ratio	1.62	1.77	1.41	1.16	2.27
2020	Return	-4.76%	17.18%	19.15%	2.34%	29.61%
	Volatility	48.67%	26.56%	33.78%	27.83%	26.21%
	Sharpe Ratio	-0.11	0.61	0.56	0.07	1.12
2021	Return	48.93%	23.22%	26.56%	24.64%	21.32%
	Volatility	26.96%	13.29%	16.18%	12.78%	17.49%
	Sharpe Ratio	1.81	1.74	1.63	1.92	1.21
2022	Return	-0.40%	-8.17%	0.31%	2.89%	-18.74%
	Volatility	27.29%	24.65%	24.35%	23.31%	27.32%
	Sharpe Ratio	-0.12	-0.44	-0.1	0	-0.79

Source: own processing (2023)

This year, the portfolio recorded the highest absolute return for the monitored period but with an average level of Sharpe ratio. Growth stocks fared better. In 2020, the economy was affected by the COVID-19

pandemic, which was reflected in the year-on-year GDP growth rate of -3.4% at the end of 2020. The inflation rate in the United States was 1.4% in 2020. The unemployment rate was 6.7% in December 2020. The FED responded to the pandemic and lowered the interest rate to 0%. Our GARP portfolio consisted of 3 stocks. Only one of the shares recorded a positive return at the end of the year, which was also reflected in the result of the portfolio, which ended the year with a negative return (Table). The situation is repeated when the screening criteria also remove suitable candidates from the portfolio, and then, despite good market results and a favourable monetary policy, the portfolio loses significantly. A weak year can also be due to the inclusion of companies with value characteristics in the portfolio, which also experienced a weak year. Overall, we observed high volatility in the market, which best corresponded to growth stocks. The annual GDP growth rate at the end of 2021 was 5.7%. The inflation rate in the United States was 6.8% in December 2021. The unemployment rate was 3.9% in December 2021. The FED kept interest rates at 0%. Again, our GARP portfolio consisted of 3 successful companies. The portfolio earned an above-standard return of almost 50%. From the point of view of risk-weighted return, value stocks also did well after the previous disappointing year. The slightly weaker performance of growth stocks could be attributed to the sentiment of investors who slowly realized that the FED would have to intervene soon. The year 2022 is the last observed year in our analysis. The annual GDP growth rate at the end of 2022 was 2.1%. The inflation rate in the United States was 6.5% in December 2022, and the unemployment rate was 3.7%. The FED increased the interest rate to 4.5%. The fundamental screening selected 21 shares. The markets' performance reflected the sharp increase in interest rates in the US, which hurt growth stocks the most. The portfolio survived the year almost without a loss, which is positive considering the abovementioned situation. In particular, value stocks had the advantage, as they were the only ones able to create a profit. The financial markets were undoubtedly affected by the situation in Ukraine and the uncertainty in geopolitics.

To evaluate our strategy, we can say that it lacked higher diversification and greater consistency in performance. Despite this, the strategy we proposed ended in loss only six years out of 19, while two years could be considered instead in terms of the amount of loss than years when we did not lose or gain. We observed the highest yield after the dips in the economic crisis when the portfolio reached almost 67% yield in 2009. Conversely, the worst year was the previous year, 2008, when the portfolio lost over 38% of its Value (Figure 1).

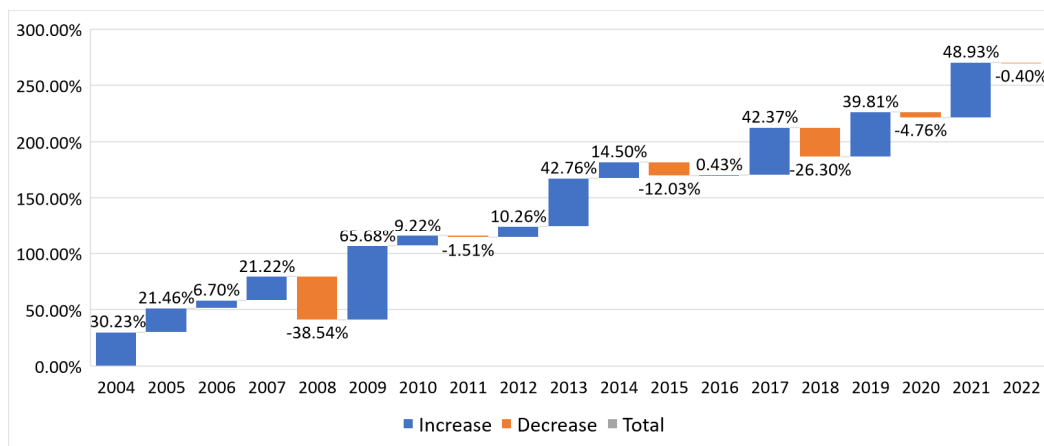


Figure 1. Cumulative portfolio return over the period 2004-2022
Source: own processing (2023)

Our investment strategy explored in this article achieved a cumulative return of 686.65% over 19 years. For comparison, the growth portfolio recorded a cumulative return of 565.67% (see Figure 2). We compare our GARP portfolio with the S&P 500 GARP (see Figure 3) and note that data was available from 2012. Until 2018, we copied the S&P 500 GARP almost precisely. A minor deviation appeared in 2016 when the portfolio was inexplicably favourable conditions. It lost significantly compared to the benchmarks. The S&P 500 GARP obtained the final rebound when our GARP portfolio was insufficiently diversified and experienced two disappointing years in 2018 and 2020. Given the market sentiment, if we had constructed a more diversified portfolio in these years, we would probably have achieved a similar result to the S&P 500 GARP. Interestingly, on the horizon since 2012, the ETF using the GARP strategy was the most successful in terms of cumulative, annualized, and risk-weighted returns. Since the S&P 500

GARP uses fundamental screening and rebalances the portfolio quarterly, we can confirm the assumption that thanks to fundamental screening, it is possible to obtain a return above the level of passive investing, which is the S&P 500 in our case.

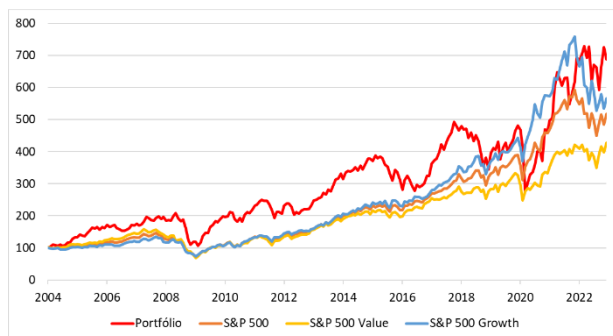


Figure 2. Comparison of the cumulative performance of portfolios over the period 2004-2022

Source: own processing (2023)

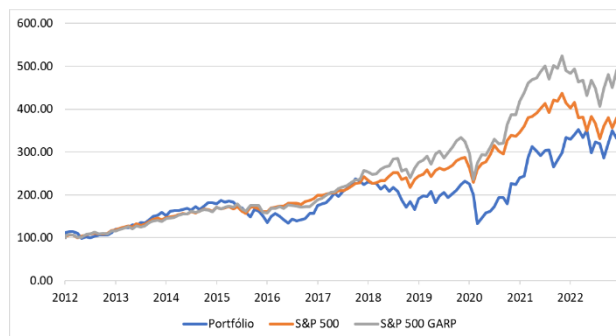


Figure 3. Comparison of the cumulative performance of portfolios over the period 2012-2022

Source: own processing (2023)

4. Discussion

Fundamental screening is becoming a popular strategy among investors because it does not require as much time investment as, for example, fundamental analysis and can yield a return above the level of the underlying index.

Table 3. Overall performance of individual portfolios

	Measures	2004-2022	2012-2022
GARP Portfolio	% Return	14.20%	14.10%
	Volatility	20.41%	21.80%
	Sharpe Ratio	0.59	0.85
S&P 500	% Return	10.40%	13.50%
	Volatility	14.79%	15.50%
	Sharpe Ratio	0.98	1.37
S&P GARP	% Return		16.20%
	Volatility		15.76%
	Sharpe Ratio		1.37
S&P Value	% Return	9.50%	12.00%
	Volatility	14.24%	14.03%
	Sharpe Ratio	0.74	1.16
S&P Growth	% Return	10.90%	14.60%
	Volatility	14.12%	14.40%
	Sharpe Ratio	0.94	1.39

Source: own processing (2023)

Table gives the overall performance of individual portfolios. The best values in individual categories are highlighted in bold. During the period 2004-2022, our GARP portfolio realized the highest average annual returns with significant differences compared to other benchmarks (+3.8% p.a. vs S&P 500, +4.7% p.a. vs. value S&P 500 and 3.3% p.a. vs. growth S&P 500). Like returns, the volatility of our GARP portfolio was the highest compared to other benchmarks, ultimately resulting in the lowest Sharpe ratio of our GARP portfolio. The GARP strategy, representing a combination of growth and value approach, ensured the highest return. Comparing the volatilities of the individual basic approaches (S&P 500, Value S&P 500 and growth S&P 500), it is possible to conclude that there were no fundamental differences between them. At the same time, it is interesting that the S&P 500 index had the highest volatility among the three approaches mentioned. Although our GARP portfolio consists of strategies with lower volatility than the broad market, its volatility was the highest, which we attribute precisely to its high concentration

(13 stocks on average). From 2012-2022, it was possible to track the performance of the GARP S&P 500. This ETF recorded the highest return with a significant difference from other strategies. Our GARP portfolio realized higher returns than the S&P 500 index and the Value S&P 500. It is, therefore, possible to conclude that even in this shorter period, the GARP strategy did better than the broad market, which is supported by our concentrated portfolio and the actual ETF representing the GARP strategy. Similar to the more extended period, the growth strategy outperformed the Value and broad market (S&P 500) regarding returns in this shorter period.

Interestingly, the growth strategy lagged behind the GARP S&P 500 regarding returns, while GARP also includes the value factor, which recorded the lowest return. We attribute this characteristic to the GARP S&P 500's ability to select value stocks with higher growth potential. The adverse effect of the high concentration of our GARP portfolio was again reflected in a significantly lower Sharpe ratio compared to all other strategies, specifically against the GARP S&P 500. We see that the Sharpe ratio of the GARP S&P 500 reached the second highest Value, only very closely behind the growth strategy. We attribute the more favourable values of the Sharpe ratio of the GARP ETF to our GARP portfolio values to the higher degree of diversification of the ETF.

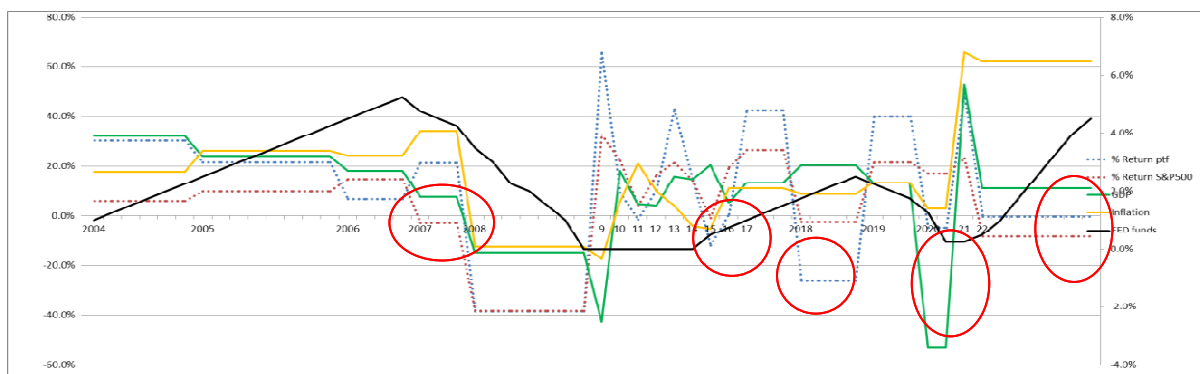


Figure 4. Potential sources of profitability of individual strategies
Source: own processing (2023)

Figure 4 serves us in the discussion about the potential sources of profitability of individual strategies. The left vertical axis shows the return percentages of the two strategies (our GARP portfolio "% Return" and the broad market represented by the S&P 500 index "% Return S&P 500"). The right vertical axis shows the percentage rates of inflation, US GDP and FED interest rates. The horizontal axis shows the shift in time. The figure highlights five periods in which our GARP portfolio has underperformed the S&P 500. Approximately 70-75% of the time over the more extended period under review, our GARP portfolio outperforms the broad market regarding returns. To identify the potential causes of the relative performance of our GARP portfolio against the broad market, we used the development of the essential macroeconomic variables of inflation, GDP and FED interest rates. We monitor the interaction of variables and returns in selected five periods (higher returns of the broad market) based on the assumption that possible signals will be more assertive in such defined exceptional periods (only 25-30% of the total time). Let's look at each period in more detail.

1/Period 2006/2007: FED rates are on an upward trend and are approaching the ceiling. The average FED rate level has increased and exceeded the 4% mark. GDP had a downward trend. Inflation was above the required level of 2%, had an upward trend and has not yet reached the ceiling.

2/Period 2010/2011: FED rates are stably low. GDP is in a downward trend; during this period, a trend from the original increasing to decreasing occurs. In the monitored period, there is also a change in the inflation trend, a sharp increase from zero values to a level exceeding the required rate of 2%.

3/Period 2015/2016: Change in the trend of FED interest rates, the beginning of their increase as a reaction to increasing inflation. GDP, on the other hand, reaches a ceiling level and begins to decline.

4/2018 Period: FED rates are on an upward trend, approaching the ceiling. Inflation and GDP reach ceiling values.

5/Period 2020: Changing trends in GDP, inflation and FED rates caused by the recession due to the Covid-19 pandemic.

Summarizing the knowledge from the development of the interaction of essential macroeconomic variables and the performance of the GARP portfolio concerning the performance of the broad market, we formulate the following main conclusions:

- The lower return of the GARP portfolio was realized in the years before the FED interest rate ceiling was reached.
- The lower return of the GARP portfolio was realized in years in which the GDP recorded a downward trend/recession or there was a reversal or approach to a reversal of the trend from increasing to decreasing.
- The sensitivity of the GARP portfolio to changes in the GDP trend is higher than the sensitivity of the broader market to said changes.

Conclusion

The objective of the analysis presented in this paper was to examine the ability of a strategy based on a combination of value and growth investment styles to consistently outperform the broader market, as defined by the S&P 500 index. The period covered was from 2004 to 2022. The universe of securities to which the screening was applied was the S&P 500 index. The screening criteria were defined systematically and did not change during the entire period. The portfolios were created new at the beginning of each year, and the selected titles were weighted equally. The average number of shares in the portfolio was 13.

The analysis showed that the selected screening criteria defining the combination of value and growth style formed concentrated portfolios that achieved higher returns approximately 70% of the time than the S&P 500 index. A higher average annual return than the S&P 500 index was realized by our GARP portfolio and the following ETF GARP strategy, which describes a combination of Value and growth style. Considering that during the monitored period of 19 years, various economic cycle periods alternated, the results indicate that the GARP strategy has the potential to outperform the average returns of a more broadly defined market. The higher volatility of the returns of the generated portfolios was probably directly related to their higher concentration, which harmed the lower values of the Sharpe Ratio compared to the broader market. Unlike our GARP portfolios, the ETF following the GARP strategy achieved the same Sharpe Ratio values as the broader market, which is likely related to the greater diversification of the GARP ETF compared to our GARP portfolios. The analysis of the periods in which the return of the portfolios according to the chosen strategy was lower than the return of the broader market indicated a negative relationship between the peak of the economic cycle and the chosen strategy. The strategy achieved below-average performance in the very year that preceded the reaching of the FED interest rate ceiling and the turning point in the GDP trend.

We recommend viewing the analysis results in the context of the following limiting factors.

In the article, we considered a relatively short historical period, which reduces the explanatory power of the analysis. The stocks in our GARP portfolios were equally weighted compared to the market capitalization weighting of the S&P 500. As a result, the size of the companies may have affected the results. The relatively high concentration of generated portfolios, which resulted from rigorous systematic screening, resulted in above-average exposure to idiosyncratic influences. The universe of selected titles represented the S&P 500 index, from which it follows that the generated portfolios could be influenced by, for example, the size factor of the companies. As part of the analyses, we selected in-sample and out-of-sample periods. We created the portfolios based on screening the previous year's results and monitoring performance in the following year. A different combination may have produced different results.

We assume that it will be possible to follow up on our analysis, for example, by modifying the aforementioned limiting factors, such as choosing a more extended period of data collection, modifying the screening criteria enabling the generation of more diversified portfolios, changing the universe of selected titles so that the generated portfolios more accurately express the essence of the Growth and value strategy, by adjusting the ratio of periods in-sample versus out-of-sample, or by a more detailed analysis of the relationship between changes in the economic cycle and the performance of the GARP strategy.

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Innovative Tools for Financing Municipalities

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Abstract

Research background: The lack of financial resources for local governments is a social problem. Local governments in Slovakia have recently come under significant economic and budgetary pressures as a result of the refugee and energy crisis, but also through various legislative amendments. The current municipal financing model is inefficient. The model is poorly differentiated, and municipalities are largely dependent on the collection of a single type of tax. All these crises were accompanied by relatively poor government stability, which had no effect on the predictability of local government revenues. These pressures can be found mainly through management modernisation. This should include a high-quality design and implementation of the necessary structural reforms, the removal of existing obstacles, and support for innovation.

Purpose of the article: In the following contribution, we present innovative tools for financing municipalities. It is a set of tools that are necessary to restore the financing of public infrastructure in order to preserve the necessary budget of municipalities for other important tasks, such as social housing or health care.

Methods: These tools are part of the value capture issue and were investigated by the authors within the COST project and the study by the OECD and Lincoln Institute of Land Policy. Due to the lack of information on this issue, theoretical and methodological frameworks were first created. The subsequent investigation was carried out through several discussions with various stakeholders - experts from the public administration but also from the private sector, such as developers, architects, spatial planners, and economists.

Findings & Value added: As part of the project and study mentioned above, a comprehensive analysis of tools to capture public values in Slovakia was developed, an overview of which is offered in this contribution.

Keywords: value capture, municipalities, public finance, real estate tax, development fee

JEL classification: H13, E62, G23

1. Introduction

The current crisis in the field of public financing, not only in Slovakia, but also in other European countries, forces municipalities to approach significant cuts in their budgets. Among the main reasons in Slovakia, we can include a significant increase in energy costs, high inflation, and various current legislative changes (caused by cuts in personal income tax, or a jump in wages for pedagogical and non-pedagogical staff in education, which are borne by local governments from their budgets). Furthermore, these reasons are accompanied by insufficient compensatory measures from the state, which caused a systemically inadequate position of local governments in the system of power. If one adds to all this the very weak and inefficient use of financial resources from European funds, it represents a serious existential problem for Slovak municipalities. Furthermore, it cannot be forgotten that the biggest challenge for local governments in the coming decades is adaptation to the impact of climate change.

Modernising governance is a way to relieve economic and budgetary pressures, to design and deliver needed structural reforms, to remove existing barriers, and to foster innovations. Public value capture (PVC) is an essential phenomenon to improve the refinancing of public infrastructure and keep the necessary budget for other important duties like education, health and social care. (Halleux et al., 2023, p.

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13) According to Weitkamp and Hartmann, value capture is meant to pursue public goals. How these goals are formulated and achieved depends on the focus of each municipality. (Halleux et al., 2023, p. 5)

The authors of this contribution actively participated in the project Cost Action CA17125: Public Value Capture of Increasing Property Values (PuVaCa) and in the preparation of the study for OECD: Global Compendium of Land Value Capture Policies (OECD and Lincoln Institute of Land Policy, 2022).

1.1 Theoretical concept of public value capture

In the scientific literature, the field of PVC is addressed by several authors (for example, Hendricks, 2017; Havel, 2017; Alterman, 2012; Smolka, 2013; Muñoz Gielen, 2012; Ingram & Hong, 2012; Van der Krabben & Needham, 2008; Munoz-Gielen et al., 2022; Vejchodská, E., et.al., 2022; and others), while this issue from a historical point of view is not new. The first contemporary research related to this topic appeared in the second half of the 1970s. It should also be noted that there has been no uniform definition or clear terminology within this topic for a relatively long time.

Hendricks et al. describe PVC as a method or a strategy to capture value increase to use it for specific purposes, e.g., for improvement of public infrastructure through local development. (Hendricks et al., 2017) According to Munoz-Gielen, public value capture is when public bodies transfer the costs of public infrastructure and affordable housing (the costs of land and construction) to developers while capturing the benefits of development, i.e. the increase in economic value that accrues from re-zoning the site. (Munoz-Gielen, 2014) The definition of PVC according to Valtonen et al. comprises a wide range of methods that public authorities can use to capture part of the land value increment from landowners. (Valtonen et al. 2018) Authors Munoz-Gielen and van der Krabben lead a discussion regarding the concepts of land value capture (LVC) and PVC and compare their meanings. LVC refers not to the capture of value created by the efforts of the landowner himself, because there is no discussion of whether this value belongs to him. LVC thus refers first to the capture of the land value created by efforts of public bodies. The authors consider whether LVC should also refer to the capture of the land value created not by public bodies, but by other private parties than the owner. Another discussion regards whether LVC can be considered a tax or not. While PVC includes all instruments that capture all possible increases of the value of land and properties, whether they are considered taxes or not. PVC thus includes LVC and more. (Munoz-Gielen & van der Krabben, 2019)

OECD (2022) presents a definition of land value capture as a policy approach that enables governments to recover and reinvest land value increases that result from public investment and government actions. This can happen through recurrent taxes, one-time charges, or in-kind contributions from landowners or developers to a public entity. Land value capture is rooted in the notion that public action should generate public benefit.

The definitions of PVC used in the literature are many, and they may differ. Based on this, one of the goals of the aforementioned Cost project was to create a common definition of PVC, which is as follows: The term public value capture includes all instruments that capture all possible increases of the value of land and buildings, whether they are considered as taxes or not. It focusses primarily on capturing unearned benefits resulting from actions other than the landowner. The resulting funds may be earmarked for specific purposes (e.g. recovery of development costs or provision of affordable housing). (Halleux et al., 2023, p. 19)

We consider it important to understand the concept of PVC to understand the causes of the increase in land value. These causes have been investigated by several authors, including, e.g., Hong and Brubaker (2010), Smolka (2013), Ingram & Hong (2012) and Hendricks et al. (2017), and others. Hong and Brubaker (2010) divided the main causes of land value increase into the following categories:

1. the original function of the land, the original value of the land in the current function of its use,
2. changes in the functional use of land, extension of ownership rights (for example, changing the function of land from agricultural to construction),
3. public interventions in the form of investments in the territory in the form of building infrastructure and services in the territory (e.g., building roads and ensuring their service through public transport),
4. private investments in the territory in the form of territorial development (e.g., residential or commercial development projects that affect the value of the surrounding land),
5. population growth and economic development (the influence of economic factors such as demand and supply for real estate in a given area - too high a demand, e.g. for housing, which cannot be

satisfied by the current supply, can have an enormous impact on the value of all real estate in a given location, including land).

It should be noted that under Slovak conditions, the term of "public value capture" is relatively unknown; this issue in the context of PVC has so far not been examined at all and is also absent in the Slovak scientific literature.

1.2 Classification of PVC tools

There are several classifications of PVC tools in the literature, which differ from author to author. We present the classification that was created within the project COST CA17125.

The basic division of tools is divided into recurring and non-recurring forms of PVC. Recurring forms are further divided into annual payments (e.g. real estate tax) and payments in case of sale or purchase (real estate transfer tax). Non-recurring forms are further divided into: one factor increase in value (development fee) or multiple factor increase in value (e.g. developer agreements). (Halleux et al., 2023, p. 27)

Recurring forms may include real estate tax, real estate transfer tax, tax for unbuild plots, capital gains tax, inheritance tax, gift tax, and others.

Non-recurring forms may include: development fees or lieves (for new development or infrastructure), developer agreement, tax or levy on planning gains, real estate consortium, land reallocation / land readjustment, interim acquisition / land banking, cooperative development by urban contracts, contract models / developer obligations, and others.

An important factor for the functioning of these instruments is the legal framework, the basis of which is anchored in the constitution in the form of the definition of property rights (in the Slovak constitution: Article 20 - Property rights - Second Section, Second Title, Constitution of the Slovak Republic) and then at the level of local governments (in Slovakia: e.g. Act no. 447/2015 Coll. Act on the Local Development Fee and on Amendments to Certain Acts).

2. Methods

As part of the research carried out during the years 2018 - 2023 through the COST CA17125 project, a conceptual framework focused on the typology of PVC tools was created, the detailed classification of which was described above. A common definition of PVC was also created to ensure a better understanding of the issue of public value capture, which has not yet been sufficiently researched in several European countries, including Slovakia. Subsequent examination of the current state of this issue was carried out in Slovakia through several discussions with various stakeholders, experts from public administration, actors from the private sector, such as real estate valuers, real estate developers, architects, civil engineers, spatial planners, economists, and also municipal politicians. Subsequently, a comprehensive analysis of existing public value capture tools was developed in the Slovak Republic. The authors used the typology of tools to analyse and integrate individual PVC tools used in the Slovak Republic and describe the current situation of this issue as a newly created public policy under our conditions. In addition, simultaneously ongoing research on the study for the OECD and Lincoln Institute of Land Policy "Global Compendium of Land Value Capture Policies", in which one of the authors also participated. Research was carried out in the form of a detailed questionnaire survey focused on specifics related to the topic of land value capture and specific case studies from the Slovak practise.

This article provides an overview of individual PVC tools in the context of the Slovak Republic.

3. Results

3.1 Analysis of PVC tools in the Slovak Republic

This section presents an analysis of the available PVC tools in Slovakia. These are relatively common tools, available in several EU countries. The instrument is divided into two groups for recurring and non-recurring forms of PVC, according to the typology mentioned above.

The following sub-chapter is devoted to selected innovative tools that are used mainly in the western countries of Europe.

3.1.1 Recurring forms of PVC

Among the **recurring forms** of PVC that are made on the basis of **annual payments**, there is the Real Estate Tax. The real estate tax is a local tax imposed by a city or municipality. The jurisdiction is

determined by the place where the property is located. The municipality determines in its generally binding regulation the details of the amount of tax, reduction, or exemption from tax. The tax includes houses, apartments, and non-residential premises, and land. The real estate tax return is mandatory for entities that have changed the real estate they own, rent, or use. Changes mean the purchase or sale of real estate, acquisition by gift, inheritance, acquisition of real estate at auction, divorce, and subsequent court decision on property settlement, obtaining a valid building permit or a valid approval decision, obtaining a valid permit for changes in the use of a building, demolition of a building, land adjustments, a lease relationship with the Slovak Land Fund, and a long-term lease relationship, which is registered in the cadastre. It is possible to be exempted from paying tax or to get a real estate tax discount in the following cases due to age, disability, social disadvantage, and limited use of the given property (e.g., due to reconstruction). The law regulating real estate tax is Act no. 582/2004 Coll. on local taxes and a local fee for municipal waste and small construction waste. It is followed by other laws, the most important of which is Act No. 563/2009 Coll. on tax administration.

Another *recurring form* of PVC, but this time based on *payments in case of sale or purchase*, is the Real Estate Transfer Tax and Capital Gain Tax.

The Real Estate Transfer Tax is regulated by Act no. 554/2003 Coll. on the tax on the transfer and the transition of real estate. This law regulates the taxation of consideration transfer and consideration transition of real estate. For the purposes of this law, apartments and non-residential premises are also considered real estate. The subject of the tax is the chargeable transfer or chargeable transition of ownership of real estate in the territory of the Slovak Republic and real estate deposits in business companies and cooperatives. The tax rate is 3% of the tax basis. The basis of the tax is the agreed price for real estate, but at least the general value of real estate determined according to a special regulation. The tax administrator is the tax office in whose territorial district the real estate is located.

The Capital Gains Tax is a local tax. The tax is calculated by the tax administrator (city or municipality) who, based on the data provided by the taxpayer, such as the area of the apartment, land or the number of floors of the building, etc. Capital gains from the transfer of real estate are subject to a personal income tax of 19% or 25% as part of the taxpayer's annual income. The tax rate depends on the tax base that is formed according to the partial income tax base. If the tax base for 2022 does not exceed € 38,553.01, a tax rate of 19% applies. A tax rate of 25% applies to that part of the tax base that exceeds € 38,553.01. Profit from the sale of real estate is exempt from tax if certain conditions are met. The capital gains tax is paid by natural and legal persons who own, manage, or rent real estate with a lease period of at least 5 years or the user of the real estate. The tax is paid annually according to the assessment issued by the local authorities according to the cadastral territory in which the property is located. The transfer of buildings within 5 years of their construction (issuance of approval decision/permit) is subject to 20% VAT, transfers of real estate more than 5 years after their construction are exempt from tax. Profit from the sale of real estate is subject to corporate income tax in the Slovak Republic as business income. Business income is taxed at a 21% (15%) tax rate depending on taxable income (i.e., income that is subject to tax) for the tax period exceeding the amount of 49,790 euros (in 2022). The taxation of income from the sale of real estate in the Slovak Republic is regulated by Act No. 595/2003 Coll. on income tax.

3.1.2 *Non-recurring forms of PVC*

Non-recurring forms of PVC are divided from the point of view of focussing on single-factor value increase or multifactor value increase.

The single factor value increase in Slovakia includes the developer's contribution to the local infrastructure and the development fee.

Developers contribution to the local infrastructure in Slovakia is not enshrined in legislation or laws, and thus it is not enforceable. We can also call them forced investments from the point of view of the municipality, which the developer bears and often transfers these associated investments to the end user of the property. This means that the increased costs of development projects in the form of the completion of greenery, parks, road infrastructure, or social infrastructure, which are directly related to the given project and, ultimately, overpriced prices, will be paid by apartment buyers. The municipalities' requirements are formulated in the form of an agreement with the developer. These negotiations with the developer are purely within the competence of the municipality. There are cases, in particular, of small, less developed municipalities that do not ask developers for any contribution to urban infrastructure for fear of discouraging the developer from investing in their territory. It should also be added that the developer, through these associated investments in the immediate vicinity of his project intention, only often makes

his project more attractive in terms of marketing (more greenery and cycle paths), thereby increasing its market price, from which the developer ultimately benefits the most.

The development fee is enshrined in Act no. 447/2015 Coll. Local Development Fee Act. The purpose of development fees is to increase municipalities with additional resources to build new infrastructure so that new construction brings immediate benefits to old settlers. The fee, unlike the above-mentioned contribution to the infrastructure, can be considered predictable for the developer, since he knows in advance that he will have to pay the city a legal, predefined fee for each square metre of the above-ground part of the building, the price range from €10 to €5. The municipality can decide whether to introduce it and in what amount by adopting a generally binding regulation (in most cases set at the upper limit of the rate of €35). According to the law, municipalities must spend funds from the development fee only on capital investments for the purposes specified by the law. The purpose of development charges is to provide municipalities with additional resources to build new infrastructure so that new construction will bring immediate benefits to existing city residents. However, the developer has no way of influencing what the city will use the said fee and when it will be used. In addition, current practise shows that local governments are not able to effectively use the income from this fee, and its utilisation is relatively weak, while the most frequent argument heard from local governments is that the fee is low and insufficient for the costly investments for which it is to be used. In conclusion, it should be added that the development fee institute was created in order to replace and make transparent the aforementioned forced investments by developers in local infrastructure. Instead of abolishing individual bargaining with developers about their contributions, both approaches are now in place in practise, resulting in a double financial burden for developers, who once again pass everything on at prohibitive prices to the end users, who ultimately pay for it all.

Multi-factor value increases in Slovakia include: development according to the Urban Planning Legislation, and land reallocation.

Development according to the Urban Planning Legislation. These are relatively inflexible regulations and it is not possible to change them due to the complexity of individual development projects. The municipality can collect suggestions for changes or additions to the spatial plan and can from time to time approve a summary change or supplement to the spatial plan (and not for each parcel). The process of incorporating the proposed changes could take several years, so the statutory plans are quite rigid at first glance. For example, the current regional plan of Bratislava establishes certain conditions for the mixing of functions in the territory of the city, which absolutely do not reflect the needs of the current development of the city. It is a consequence of the low flexibility when the city needs the construction of new housing, but the spatial plan prescribes large areas of civic amenities. Therefore, developers build complexes that are not defined directly by law. The law distinguishes only residential and non-residential premises. Therefore, developers often bypass existing zoning regulations without requesting a change in the zoning plan or its zoning. The second option is often very time-consuming and more expensive because developers have to prepare extensive studies as a basis for changing the zoning plan.

Land reallocation. In 2019, the Slovak government approved land reallocation after almost a decade of complete stagnation. The government approved the list of cadastral territories for the years 2022 and 2023, but nothing has been actively done on them so far. Land reallocation in Slovakia is divided into two categories. The first category is "Complex land reallocation", which covers the entire area of the rural zone of the cadastral territory. The Ministry gives its consent to their implementation, and the costs of their implementation are covered by the state. To the maximum extent possible, land consolidation is carried out, as well as the design of common facilities and measures (public improvements). The second category consists of a simple land reallocation. This includes only a selected part of the cadastral territory, the so-called territory of interest. Land reallocation of this type is paid for by owners or investors who apply to the district office, land and forest department for permission to simply redistribute land. Land reallocation in the phase of processing the initial documents, land reallocation procedures also enable the government to identify the intentions of land owners and users (tenants) and thereby define and condition further steps in the land adjustment of their position. This makes it possible to address discrepancies and inconsistencies in land use and create seamless land use plans, better access to land, and direct payments. Sometimes owners do not agree with the land reallocation. To prevent the land reallocation process from being stopped due to the disagreement of individuals or a smaller group of owners, the law conditions the validity of the land reallocation process on the consent of the participants with at least two thirds of the area of the land on which the redistribution will take place. The reason for the implementation of simple land improvements for investment purposes is the quality of investment actions and their compliance with

spatial planning. A suitable example for the application of such reallocation is, in addition to residential construction, the construction of industrial parks or highways. The application of this type of land reallocation is currently the most widespread type, thanks to which the towns and cities are expanding with new residential zones. (Halleux et al., 2023)

3.2 Innovative PVC tools from selected countries

In the following section, we present several examples from European countries that use tools other than those mentioned above. However, it should be noted that all these examples come from developed western countries that have a long-term, stably developed institutional environment that, unlike Slovakia (and other countries in Central and Eastern Europe), did not undergo such dynamic changes. During the 19th century, the economic and institutional environment of Slovakia was affected by major political transformations that significantly affected the ownership system. The development of the arrangement of land ownership in Slovakia was influenced by the belonging to the Austro-Hungarian monarchy and, after 1945, to the countries of the eastern bloc. With the advent of socialism, property rights and their registration were pushed to the background until 1990, when the socialist regime fell and turned into a democracy. The transformation of society after 1990 brought about a change in the economy from a centrally planned to a market economy and the related need to return to private property, which was violently suppressed and suppressed by the collectivist form of management in the socialist era. In the early 1990s, massive privatisation occurred. The biggest problems and challenges were caused by these changes in agriculture, land ownership, and real estate (especially in the state housing sector). All these factors had a huge impact on the development and shaping of the current institutional environment of ownership and public policies in Slovakia, which must be reflected in the considerations of possible inspiration regarding the selected tools and their implementation in our conditions.

In *Austria*, municipalities now have the opportunity, based on state planning laws, to use planning contracts, for example, to ensure satisfactory development within a certain time frame, to agree on additional fees for infrastructure development, or to grant preemption rights. Moreover, in Vienna, the regulation allows to agree on additional services provided by developers in exchange for higher building density or similar. (more Schindelegger and Mayr, 2023)

Belgium has introduced special city taxes, especially on empty buildings or undeveloped building plots. Belgium has also introduced refund and urbanisation taxes, which are a mandatory levy of the local authority for a service performed, which is related to public improvements in the area of infrastructure (roads, sidewalks, sewerage) that benefit the adjacent land. Thus, only the owners who are directly affected by the public improvement are tax payers. The calculation of taxes is related to the costs of the work performed. In some Belgian regions, taxes on planning gains have been introduced, where the principle applies that the tax must be paid when a non-building plot becomes a building plot in the master plan. The contribution is therefore applied if the public authority decides to rezone the territory.

Furthermore, in Belgium, income from property tax in 2019 represented a share of 1.2% of GDP, the average in the EU was 1.6% of GDP in the same year, while Slovakia is among the countries with the lowest income from property tax with a share of only 0.4% of GDP. (more Halleux and Lacoere In: Halleux et al., 2023)

In Belgium, they are also considering the introduction of a special tax for development projects that do not meet current sustainability standards (especially from an environmental and energy point of view). A higher tax will be imposed on such projects and properties.

In the *Netherlands*, *Sweden*, and *Finland*, municipalities are actively involved in land trading on local land markets and are actively involved in public land development. The municipality acquires raw land through voluntary purchase, pre-emption or expropriation, develops a detailed local plan, builds the necessary infrastructure and sells (or leases) the serviced building plots to developers, thereby capturing all the plan-induced value increases. (more Falkenbach, Riekkinen, Viitanen In: Halleux et al., 2023)

In *Germany*, one of the PVC tools is interim acquisition. Municipalities create land reserves that they use to have land available for public purposes within the framework of urban development. The main advantages of this tool are the absolute control of future land owners and the capture of the entire increase in price between purchase and sale. Another tool are contract models, which are agreements on certain obligations of the private partner in exchange for subsequent construction rights. They may include planning contracts (e.g. draft of a preparatory or legally binding spatial plan) and contracts for the preparation of construction activities (e.g. demolition of old buildings, removal of plants or contaminated soil). They can regulate the use of land (e.g., the type and degree of authorised use, the obligation to

complete the construction in a given time period), ecological compensation, provision of housing for segments of the population that have extraordinary difficulties in finding adequate accommodation, or the offer of housing for local residents. (more Hendricks In: Halleux et al., 2023)

4. Discussion

We think that Slovakia could look for inspiration in these mentioned examples. A self-evident condition is that each instrument requires clearly defined and transparent rules, anchored in a legal framework in accordance with the constitution and the issue of ownership included in it. Additionally, there must be clear regulations that must be sufficiently known and fully accepted at the municipal level. All this must be supported by a mature institutional environment, whose existence in Slovakia is more than debatable from the point of view of its historical development.

The city of Bratislava has prepared a pilot agreement on cooperation with selected developers. The contract is supposed to ensure mutual cooperation between developers and the city, in exchange for apartments, there will be a change in the existing code of functional use of the territory in the spatial plan. This means that with such cooperation, it is possible to reduce the percentage for civic amenities in favour of housing. This is a pilot package of changes in favour of rental housing, with which the city is trying to expand its housing stock. The changes concern six developers in roughly eight locations that are owned by the city but also owned by developers, where the municipality will acquire a share in the form of rental apartments in its ownership. According to estimates, the city could get 140-150 rental apartments. It is questionable why cooperation concerns only selected developers, and clear and transparent rules are not set equally for everyone. It is to be hoped that this will happen soon, right after the implementation of these pilot projects.

Conclusion

Decentralisation of public administration performance, the issue of balance in the area of competences, and their set financing is relatively different in each country. Despite this, almost all municipalities are united by the issue of lack of financial resources from the state for transferred competences. In addition, research by Holíková, Meričková and Muthová (2022) confirmed that Slovak municipalities do not even have information about the real costs of transferred public competences; therefore, they do not even know how to budget these activities.

Slovak municipalities and cities are quite critical of the reform of territorial administration currently being prepared by the Ministry of the Interior of the Slovak Republic. It will focus on district offices, transferred performance of state administration, local and regional self-government, and two-level administration of the capital city of Bratislava and the second largest city of Košice. The most common arguments are warnings about their unfair funding and ongoing underfunding.

The issue of PVC and its specific tools present opportunities for local governments to address the current lack of funds. We can look for ideas and inspiration in countries like Belgium or Germany, where they have well-developed tools to capture value, as a result of public investments and interventions.

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Resources

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Active versus Passive: The Case of Slovak Guaranteed Pension Funds

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Abstract

Research background: Active and passive investing are continuously compared, but there is no constant winner. Bond funds in Slovakia are criticized for their low returns, which opens the question of whether investing in a diversified global bond index is not a more viable alternative.

Purpose of the article: The research paper aims to compare the Slovak guaranteed pension funds with the global benchmark and with other randomly generated asset allocations to compare active and passive approaches. Secondly, the return is not the sole objective, and the paper aims to study the effect of the risk (volatility) on the utility of both savers and pension companies.

Methods: The key method is simulating fictive pension funds with corresponding fees and monthly contributions based on the gross wage in Slovakia. The performance for comparisons is either driven by the returns of global benchmark, random allocations, or the geometric Brownian motion.

Findings & Value added: The results of comparing active funds and the passive strategy of investing to the global index during 2014-2023 show that the passive approach lags professional fund managers in terms of returns, with much higher volatility and drawdowns. During the bond bull market, the prospect of beating random allocations based on return is low for most funds and high during the bear market, but active funds are less risky. We have shown that the higher risk is undesirable as it can lead to higher breaches of guarantees and lower utility of the savers.

Keywords: pension funds, benchmarks, guarantees, risk-return analysis, active versus passive

JEL classification: G11, G23, D81, G01, C15

1. Introduction

There is an ongoing dispute in financial markets about whether passive or active investing is superior. Passive investing has become easily accessible with the evolvement of low fee ETFs. According to Bessembinder, Cooper, and Zhang (2023), the passive style is getting more profitable as the percentage of active US mutual funds outperforming passive ETF that tracks widely followed S&P 500 index substantially decreased over the past 30 years. Similar results were found by Dichev and Yu (2011) in the notoriously active hedge fund universe, as dollar-weighted returns of hedge fund investors are lower than those of the S&P 500 index. On the contrary, Gereakos, Linnainmaa, and Morse (2021) studied active asset managers and identified that active institutional asset managers are skilled and outperform market returns in both the equity and bond universe.

We examine “the passive versus active debate” in Slovak pension funds managed by pension management companies (Dôchodkové správcovské spoločnosti – DSS in Slovak). This research aims to examine Slovak guaranteed bond funds as they hold a significant market share. Partially, the substantial share might be caused by a political decision that transferred clients from risky equity funds to safe bond funds. For the review of legislative changes in the Slovak pension system, we refer to Miťková and Mlynarovič (2021). Nonetheless, Slovak investors are highly risk averse. Evidence from the Slovak survey of investing behavior (Baláž, 2010) shows that more than 70% of respondents perceive financial loss as remarkably negative. In addition, only 7% of respondents in the base sample had previous experience with equity, mixed or real-estate funds. Approximately 80% of investors are risk-averse and unwilling to invest in riskier financial vehicles. Most investors, who perceive the loss significantly negatively, would prefer riskless and guaranteed investment.

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On the contrary, professionals and academics (for example, see Jakubík, Melicherčík, and Ševčovič (2009), Šebo, Melicherčík, Mešťan, and Králik (2017), Fodor and Cenker (2019) or Černý and Melicherčík (2020)) suggest investing in more risky funds, especially when the savers are young. The bond funds should be used to stabilize the investment, and according to the law, the savers are transferred into safer bond funds several years before their retirement. Therefore, the saver ought to look for minimal risk and volatility, and a thorough analysis of guaranteed bond funds is of great necessity.

To some extent, guarantees in Slovak pension funds have been studied by Mlynarovič (2011), where the Constant Proportion Portfolio Insurance method is studied in the context of pension funds with moving investment horizons. The research presents several simulations and applications of portfolio insurance methods but does not evaluate the performance of existing funds and their performance in the presence of guarantees.

1.1 Benchmarks for pension funds

The literature has offered several benchmarks for pension funds. Šebo, Mešťan, and Králik (2016) study the market risk using the VaR and the Expected shortfall in the second pillar of the Slovak pension system. For the static benchmark in guaranteed funds, the authors propose the Xtrackers II Eurozone Government Bond 3-5 UCITS ETF, and for the dynamic benchmark, several Eurozone bond ETFs are suggested. Ódor and Povala (2019) compare bond funds with the Bloomberg Barclays Global Aggregate index with returns adjusted for implementation costs of 30 basis points (0,3%) per year. The adjustment fee corresponds to the maximum management fee of capital in DSS, which was at the level of 0,3% per year in 2019 (Act no. 43/2004 coll.). The comparison is focused on the period from March 2005 until June 2019, comparing the average real annual returns (net of inflation) of funds: Aegon (merged with NN) - 0,02%, Allianz -0,14%, Axa (Uniqa) -0,29%, Poštová Banka (365 life) 0,63%, NN -0,3% and VÚB-Generali 0,35% with the real return of the Bloomberg Barclays Global Aggregate index: 2,5%. We examine if the suggested global index would have outperformed the active management. Based on simulations of fictive pension funds, during the recent years (from 31.5.2014 to 26.4.2023), the index allocation had a lower return than an average DSS, accompanied by higher risk, evaluated as either volatility or maximum drawdown.

1.2 Randomly generated benchmarks

According to Malkiel (2020), "A blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by experts." One strand of the literature proposes passive investing and the efficient-market hypothesis, stating that it is almost impossible to outperform passive index investing (Malkiel, 2020). These pseudorandom allocations give the motivation to evaluate the skills of fund managers and the performance of funds based on random asset allocations. Using several ETFs or indices as investment universes to proxy opportunities of fund managers, we randomly choose investments to create 30 000 fictive pension management funds. The investment universe is an expanded set of Šebo, Mešťan, and Králik (2016) since it also includes other European, non-government, or non-European ETFs/indices. The aim is to examine if professional fund managers can perform better than random investments. The results show that the likelihood of beating the return is low on average during 2014-2021, which could be characterized as a bond bull market. Despite lower returns, funds managed the risk well, which has materialized in a crisis period of 2022-2023. Actively managed funds had higher returns than most random allocations with lower risk. Mešťan, Šebo, and Králik (2017) also compare bond funds, but with a focus on comparing funds across countries. The results for comparable pension systems of Latvia, Estonia, and Slovakia also point to the favorable performance of Slovak bond funds. Based on Sharpe or Sortino ratios, Slovak funds outperform their peers in Latvia and Estonia, especially after the Financial crisis of 2007-2008. Mířková and Mlynarovič (2021) compare conservative, balanced, growth, and index funds. The authors' comparison is closely related to our research; the notable differences include different methodologies. We compare the funds based on returns, volatilities, maximum drawdowns, and risk-adjusted returns while the authors construct efficient frontiers and use returns and CVaR throughout the research. Kopa, Štutienė, Kabasinskas, and Mešťan (2019) analyze the performance of Slovak pension funds primarily using stochastic dominance relations.

1.3 Volatility and guarantees

Lastly, we examine how volatility affects the probability and size of breaching individual guarantees. After a pension reform in 2022, the pension companies must guarantee that the clients will get at least the

cumulative sum of their contributions. In a theoretical setting based on the simulated fictive funds, we show that if the performance is driven by the geometric Brownian motion, then the high volatility is undesirable for pension companies as it increases the probability of breaching guarantees. From the point of view of the saver, the higher volatility can lead to a higher payout as the profits of the saver are skewed to the right. The average profit of the saver increases with volatility. However, the median, on the contrary, declines. Therefore, the optimal strategy for the saver is individual and depends on the perception of risky lottery-like payouts versus more stable but lower payouts.

2. Methods

We further study and compare the performance of the Slovak funds with the global benchmark in a prolonged sample. The passive index investment is simulated using a fictive pension fund from 26.3.2014 to 26.4.2023. The simulation includes realistic assumptions of fees before 2023: an account management fee of 1% applied to contributions, a management fee of 0,3%, and a performance fee of 10% (only if the actual unit value is higher than its previous day's three-year maximum). As a result of the legislature change, the fees have changed in the year 2023: there are no performance and account management fees, and the management fee is 0,45%. We started the sample in 2014 as it solves the discrepancy of investment possibilities as the system had six months guarantees in the past, which has caused that the funds were mainly composed of money market instruments.

The key for our research is a simulation of pension funds where we assume that at the start of the period, the NAV is 100 000 000 euros, the fictive fund has 150 000 clients, and the value of one share of the fund is one euro. We also assume that the number of savers is constant, and each month the contribution of the saver is based on the social security contribution to the second pillar from the average gross monthly wage. In exchange for contributions, the fund invests in assets and issues additional shares for savers. The gross wage and contribution to the second pillar are defined in Table 1.

Table 1. The gross wage and contributions to the second pillar from 2011 to 2023. The gross wage for 2023 was estimated using linear regression, where the gross salary is explained by a constant and lagged gross wage by one year.

Year	Gross wage	Contribution
2011	786	4%
2012	805	4%
2013	824	4%
2014	858	4%
2015	883	4%
2016	912	4%
2017	954	4,25%
2018	1013	4,5%
2019	1092	4,75%
2020	1133	5%
2021	1211	5,25%
2022	1304	5,5%
2023	1407	5,5%

Source: Ministry of Labour, Social Affairs and Family, own processing

For fictive funds for the upcoming years of 2023-2032, the average gross wage grows by 5,16% yearly (based on a linear model where the gross wage for the current year is explained by that of the previous year without intercept); social security contribution to the second pillar is equal to 5,5% in 2023 and 2024, 5,75% in 2025 and 2026, and 6% in the rest of the sample (sourced from the Ministry of Labour, Social Affairs and Family); and the management fee is equal to the planned 0,4% yearly.

For all cases where we simulate fictive funds, we need a return series of assets that drive the performance of all funds. We define the performance drivers in the following sections.

2.1 Performance of fictive funds based on the global index

The fictive pension fund that tracks the global index invests solely in the Bloomberg Global Aggregate Bond Index, which returns are represented by the currency-hedged total return series of the index up to 21.11.2017 and by EUR hedged accumulating iShares Core Global Aggregate Bond UCITS ETF since 22.11.2017. In practice, the most common way to gain exposure to an index is by investing in ETFs as direct replication would be costly, e.g., the proposed ETF has 12433 holdings as of 11.5.2023 (sourced from iShares). It is necessary to use the hedged version of the index as its top geographical allocation includes US, Japan, and China, with a weight of approximately 60%, the index is frequently published denominated in US dollars, and the currency unhedged investments in guaranteed funds can form 5% of the funds at maximum (Act no. 43/2004 coll.). Usage of the USD return series of the index would lead to spurious results as it would include currency risk.

As it is common practice that passive funds that only track benchmarks do not charge performance fees, we propose two scenarios. The realistic scenario (Scenario 1) matches the fees with the fees charged by pension companies to fairly compare the performance net of fees and the active management of fund managers and that of the benchmark. The second scenario (Scenario 2) does not charge the performance fee. The real performance comparison is based on the period from 26.3.2014 to 26.4.2023 since the first three years are used to generate enough data to be able to compute the performance fee, as the fee is computed based on the maximal value of one share in the fund during the past three years, which is compared to the current value (Act no. 43/2004 coll.). It is assumed that one calendar year consists of 260 trading days. Although the period is reduced by three years, it ensures that the main funds' compositions are not bank saving accounts but rather bonds, bond mutual funds, and ETFs. Finally, we compare the pension funds available in the Slovak market and the theoretical average pension fund denoted as "Average DSS," which performance is calculated as an equally-weighted average of all pension funds, as a representative case of all funds.

2.2 Performance of randomly generated benchmarks

The investment universe, i.e. the instruments that could be randomly selected into portfolio include: ETFs tracking government bonds of Eurozone of following maturities: 0-1 years (X01), 1-3 years (X13), 3-5 years (X35), 5-7 years (X57), 7-10 years (X710), 15-30 years (X1530) from iShares, ETF tracking aggregate euro government bonds across different maturities/countries (EU.AGG) from iShares, ETF tracking benchmark euro investment grade corporate bonds (Corp) from iShares, ETF tracking euro investment grade corporate bonds with maturity of 1 to 5 years (Corp15) from iShares, Bloomberg Euro-Aggregate: Financials Index (CorpFin) that tracks the euro financial bonds adjusted for a total expense ratio of 0,2% for a comparable investable ETF (ETF does not have historical data that covers the whole sample of the paper), Bloomberg US Aggregate Bond Index (US.AGG) that tracks investment grade government and corporate bonds to proxy for the US bond market (the returns are hedged to EUR and the index is adjusted for a total expense ratio of 0,3% for a comparable investable ETF), indices for Slovak (SVK): S&P Slovakia Sovereign Bond Index, Italian (Italy): Bloomberg Italy Treasury Bond Index, Spanish (Spain): Bloomberg Spain Treasury Bond Index, government bonds as a proxy for individual bonds. The Slovak bond market is a key market as it is the domestic market for Slovak pension funds. Spain and Italy represent the riskier government bonds in Eurozone. Lastly, we include the global benchmark mentioned above: Bloomberg Global Aggregate Bond Index (Global). All ETFs and indices track only investment-grade bonds. They are denominated in EUR or are hedged to EUR as pension funds are bounded by law to hold only investment-grade bonds, and the maximal foreign currency exposition is 5%. Furthermore, all returns are total return series to represent the bonds' coupons better. Using price series for distributing ETF would flaw the research design if the price series were not adjusted.

We design our simulations such that the random allocations do not include investments with a higher duration with the same probability as those with a lower duration. We argue that this is an important step in the design if we want to compare the skills of the fund managers as we could easily obtain most allocations with a duration that is too high that would be much more profitable during the bull market in the first part of the sample but would largely suffer at the end of the sample. Moreover, the research design still includes high-duration funds, but their occurrence is less probable compared to a design without the duration adjustment.

We first estimate the average duration of all bond funds across the sample period from monthly reports and an estimate of the duration of all ETFs/indexes. The rounded estimates are as follows: average for Slovak bond funds: 2,5; X01: 0,5; X13: 1,5; X35: 4; X57: 5,5; X710: 8; X1530: 16; EU.AGG: 7;

Corp15: 3; Corp: 4,5; CorpFin: 4; US.AGG: 6; Spain: 7; Italy: 6; Global: 6,5; SVK: 6,5. As a first step, we attribute weight to each asset j as follows:

$$w_j = \frac{d_{DSS}}{a_j} \frac{d_j}{\sum_{i=1}^{15} d_{DSS} a_i} \quad (1)$$

where d_{DSS} is the average duration of bond funds managed by pension companies, and d_j is the duration of j -th asset.

Nextly, each random allocation (a) is a result of two random distributions:

$$n_i = u_i s_i, \quad (2)$$

$$a_i = \frac{n_i}{\sum_{j=1}^m n_j}, \quad (3)$$

where u is a vector with a length equal to the number of instruments, and each element has uniform (0,1) distribution and s is a vector with a length equal to the number of instruments, and j -th element has alternative distribution with values either zero with the probability of $1 - w_j$ or one with the probability of w_j .

2.3 Performance of funds driven by the geometric Brownian motion

We examine how the volatility affects the utility of both savers and pension companies in a theoretical setting where the geometric Brownian motion drives the performance of the fund. We explore several scenarios where the drift can be 1%, 2%, or 3% yearly, and the volatility could be 1%, 2%, 4%, or 8% (as the performance is simulated daily, all variables are scaled to a daily horizon in simulations).

Our design of the simulations allows us to evaluate the cumulative sum of contributions, fees, and the final value of the client's savings. Subsequently, we can evaluate if the guarantees were broken (the final value of the savings for a client was lower than the sum of his contributions). If the guarantees are broken, the pension company must pay the difference between the contributions and the final value of the savings. In the case of broken guarantees, the profit of the saver is zero as he only gets back his contributions, and the difference is a loss for the company.

3. Results

3.1 Fictive funds based on the global index

The performance, volatility, and maximum drawdown are compared in Table 2. The table includes performance metrics of both scenarios mentioned above, the pension funds available in the Slovak market, and the theoretical average pension fund denoted as "Average DSS," which performance is calculated as an equally-weighted average of all pension funds.

Table 2. Performance comparison of actual and fictive funds from 26.3.2014 to 26.4.2023.

Fund	Performance	Volatility	MDD
Scenario 1	-1,30	4,26	-18,25
Scenario 2	-1,25	4,27	-18,25
VÚB-Generali	0,46	1,22	-11,34
Allianz	0,11	1,18	-8,77
NN	-0,21	1,45	-11,93
Uniqa	0,21	1,01	-4,84
365 life	0,9	2,99	-14,35
Average DSS	0,3	1,29	-10,02

Performance is annualized cumulative return, volatility is annualized, and MDD denotes maximum drawdown. All variables are in percentage points.

Source: Individual funds, Národná banka Slovenska, own processing

Actively managed funds would have been a much better investment compared to the passive benchmark as it offers lower returns with higher volatility. It is essential to note that the global index has a much higher duration of approximately 6,69 (duration of iShares Core Global Aggregate Bond UCITS ETF – the ETF that tracks this benchmark as of June, source: iShares). The duration is extremely high compared to the bond funds in Slovakia (the average duration during the sample period is approximately 2,5, source: monthly reports of pension funds), which is a key driver of the underperformance as our sample ends in the period of bond crisis since the yields have risen sharply in 2022. Figure 1 shows that performance was not great even before the crisis, as both scenarios ended the year 2021 at similar levels as they had started.

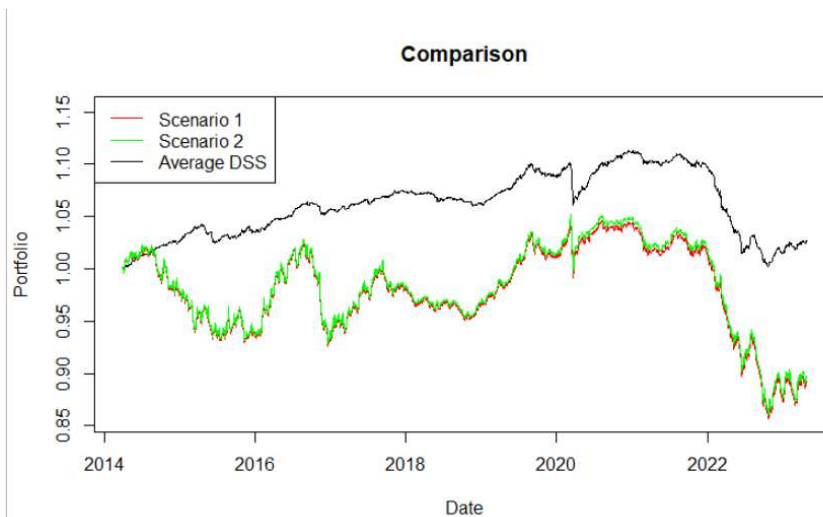


Figure 1. Performance comparison of scenarios and the average DSS fund from 26.3.2014 to 26.4.2023.
Source: own processing

3.2 Random allocations

Firstly, we generate 30 000 random allocations based on equations (1)-(3). Next, we rank each allocation based on the absolute cumulative return, and the performance is evaluated for two periods: from 26.3.2014 to 31.12.2021 and from 1.1.2022 to 26.4.2023. The first three years before 2014 are used to generate enough data to compute the performance fee. The years 2014-2021 can be characterized as the bond bull market with a short covid crisis. The second part of the sample can be characterized as the bond bear market, as the yields have risen steeply.

For the comparison, deciles or the best 3000-th, 6000-th, ..., 30 000-th strategies/funds, as we use these terms interchangeably, are examined based on cumulative returns. The strategies are denoted as 10%, 20%, ..., and 100% (the strategy characterized as 10% has a return greater or equal to 10% of all the strategies).

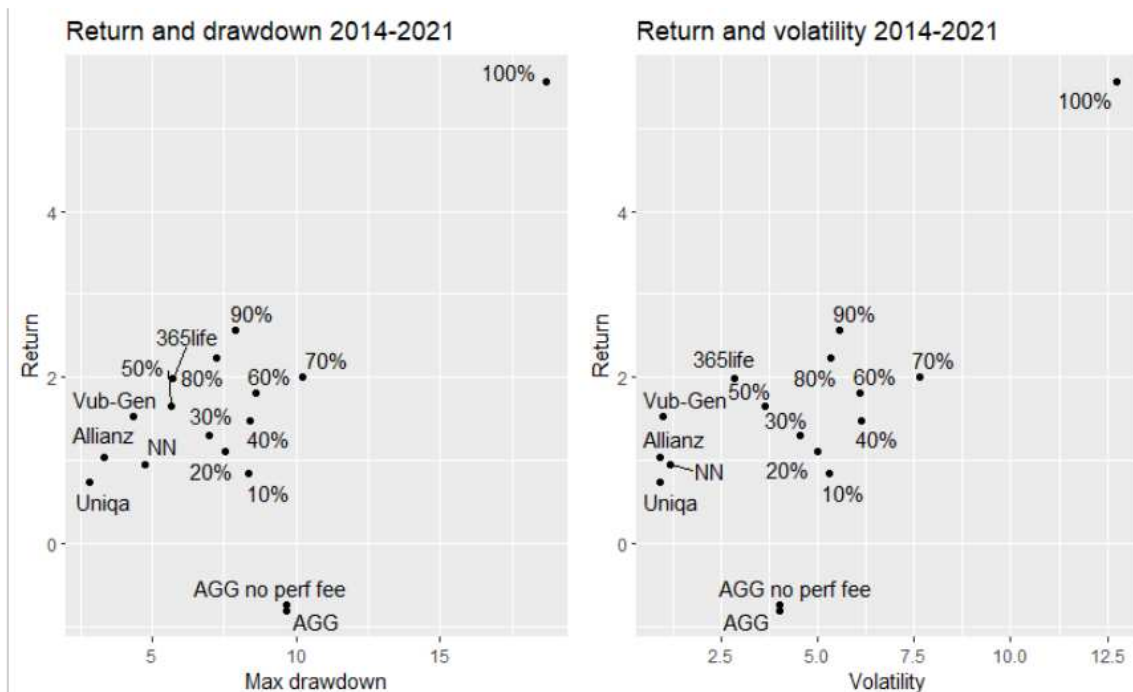


Figure 2. Comparison of return, volatility, and maximum drawdown for random and standard allocations from 31.5.2014 until 31.12.2021.
Source: own processing

In the pre-crisis period, the comparison of funds managed by pension companies and random allocation varies from company to company, but there is a clear trend that the actively managed funds are

significantly less risky. In the case of a return, the 365.life was the most profitable fund with a return better than 60% of random allocations. The second best is the Vúb Generali, with a return slightly lower than the fifth decile. Other companies have returns lower than second decile, but the return to risk is significantly better for all companies.

Albeit the returns of pension funds on average were not higher than random allocations in 2014-2021, the risk was lower, which materialized in the crisis period as shown in Figure 3. Returns were higher than 70% of random allocation for every company, and the risk was also lower than the majority of random allocations.

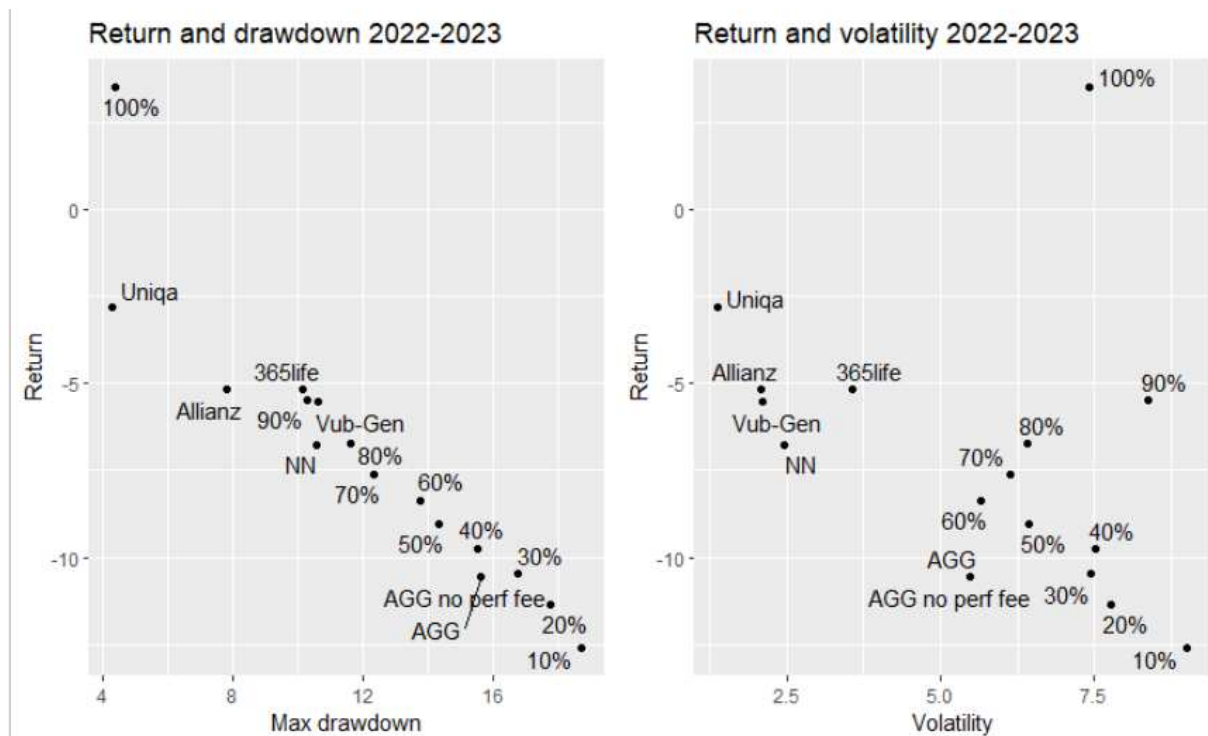


Figure 3. Comparison of return, volatility, and maximum drawdown for random and standard allocations from 1.1.2022 until 26.4.2023.

Source: own processing

3.3 Funds driven by the geometric Brownian motion

For each combination of drift and volatility in section 2.3, we simulate 3000 fictive funds for 2023-2032. As already mentioned, we can compute both the profit of the saver and loss of the company for each scenario (combination of drift and volatility), which allows us to examine the utility of both the pension company and individual saver: the probability of breaking the and the profit distribution of both saver and company. Although we report the absolute values of profit/loss for both company and saver, the loss/gain can be easily compared to a total sum of contributions of 10477,89 in our theoretical setting. Consequently, calculating relative profit over the saving period for the client is straightforward. However, the company's profit would need an assumption of costs for the pension management company, which is out of the scope of this research.

The results show that the profit of the pension company is negatively skewed as the mean tends to be lower than the median. The median is positive across all scenarios, but the distribution shows that there is a tail risk that the company would suffer a large loss, which is why companies should expect much lower profits on average. Moreover, there is a clear trend that with increasing volatility, the probability of breaches is rising, same as the maximal loss, mean value, and first quartile are also decreasing, and the third quartile or the maximum profit do not change a lot. To sum it up, the companies should be rather conservative as the risks outweigh the potential gains.

Table 3. The probability of guarantee breaches in various scenarios of drift and volatility, profit of the pension company (Panel A), and profit of the saver (Panel B).

Panel A: Profit of the pension company							
Scenario	P	Min	1Q	Median	Mean	3Q	Max
$\mu = 1, \sigma = 1$	4,3%	-148	196	198	195	199	207
$\mu = 1, \sigma = 2$	21,8%	-740	192	197	150	200	212
$\mu = 1, \sigma = 4$	36,4%	-2320	-66	194	8	203	233
$\mu = 1, \sigma = 8$	48,7%	-3685	-774	179	-334	206	295
$\mu = 2, \sigma = 1$	0%	197	203	204	204	206	213
$\mu = 2, \sigma = 2$	1,6%	-310	201	204	202	207	219
$\mu = 2, \sigma = 4$	15,5%	-1840	196	203	142	210	237
$\mu = 2, \sigma = 8$	35,8%	-4065	-292	197	-140	213	287
$\mu = 3, \sigma = 1$	0%	204	209	211	211	213	219
$\mu = 3, \sigma = 2$	0%	197	208	211	211	214	232
$\mu = 3, \sigma = 4$	4,6%	-1327	203	210	197	217	257
$\mu = 3, \sigma = 8$	23,3%	-3212	185	206	15	221	289
Panel B: Profit of the saver							
$\mu = 1, \sigma = 1$	4,3%	0	204	336	342	468	1307
$\mu = 1, \sigma = 2$	21,8%	0	37	309	365	587	1680
$\mu = 1, \sigma = 4$	36,4%	0	0	250	472	806	3561
$\mu = 1, \sigma = 8$	48,7%	0	0	46	721	1170	8072
$\mu = 2, \sigma = 1$	0%	261	761	908	909	1045	1757
$\mu = 2, \sigma = 2$	1,6%	0	605	892	902	1182	2594
$\mu = 2, \sigma = 4$	15,5%	0	278	844	947	1464	4686
$\mu = 2, \sigma = 8$	35,8%	0	0	602	1083	1754	8178
$\mu = 3, \sigma = 1$	0%	825	1346	1509	1510	1669	2279
$\mu = 3, \sigma = 2$	0%	27	1166	1492	1495	1789	3484
$\mu = 3, \sigma = 4$	4,6%	0	835	1449	1481	2017	6973
$\mu = 3, \sigma = 8$	23,3%	0	85	1167	1564	2532	9418

Source: own processing

The distribution of the savers' profits is the opposite of that of the companies. The median is lower than the mean, and the distribution is positively skewed. As a result of the individual guarantees, the savers do not risk their contributions, and their worst scenario is that their profit would be zero. With an increasing volatility minimum, first quartile and median are decreasing (or remaining constant at zero). On the other hand, mean, third quartile, and maximum are increasing. The data shows that higher volatility relates to lottery-like payoffs where the savers exchange a highly probable profit for a chance of a big payoff at the expense that the profit would probably be small or zero.

4. Discussion

The results show that contrary to Ódor and Povala (2019), the global index would not have been more profitable compared to actively managed pension funds in Slovakia. Based on a fictive pension fund that would have been investing only to the global benchmark with matched fees, the global benchmark would be beaten by every fund in Slovakia. Even with more favorable fees for a passive fictive fund, where the performance fee would not be charged, the active funds have easily beaten the passive alternative. Moreover, the Slovak funds had lower risk measured as volatility or maximum drawdown. Such results align with other research, such as O'Neil and Muñoz (2022), that identified that most actively managed funds are beating their benchmarks after expenses or Clare, O'Sullivan, Sherman, and Zhu (2019) with a finding that mutual bond funds outperform their benchmarks in both gross and net of fees returns.

We obtain similar results regarding risk when we generate 30 000 random asset allocations composed of benchmark-like investments in which active managers can invest. In the pre-crisis period of 2014-2021. the returns of most actively managed funds are below the median, but the active funds had a lower risk. In the crisis period of 2022-2023, the lower risk materialized, and the active funds achieved much higher returns and were, to some extent, able to protect the savers by minimizing the losses. The results show that choosing a benchmark for pension funds is a complex issue, as it is critical to assess our expectations. In the pre-crisis period, the most profitable fictive fund had the highest duration and risk as it was composed only from long term euro government bonds, but it suffered the most during the crisis.

On the contrary, the least profitable fund during the bond bull market performed the best in the crisis and period of the sharp increase in interest rates since it has the lowest duration. As a result, any comparison of Slovak pension funds and benchmarks is sensitive to the chosen time frame, and hence, it could be misinterpreted. If we compare the whole period, the average DSS would have outperformed 87,2% of random allocations during the whole sample of 2014-2023 based on return. The high number only underlines that the comparison is sensitive to the period. The actively managed funds tend to have higher returns compared to passive during crises but lower during bull markets. Therefore, it is crucial to differentiate between these periods as active funds can be presented as extremely successful once compared at the bottom of the crisis or as extreme laggards if they are compared at the top of the bull market.

Additionally, we show that actively managed funds are much better in risk management, and they are less risky measured by the volatility or maximum drawdown. In practice, the lower risk has materialized during the crisis, but it could be much more important in the upcoming years as the legislative change has brought individual guarantees. In a theoretical setting, we show that if the performance is driven by the geometric Brownian motion with several scenarios of different drifts and volatilities that high volatility could be an undesirable component of investing for pension companies. The probability of breaching the individual guarantees increases with rising volatility, while the expected return of the pension company decreases with increasing volatility. For savers, the higher volatility induces lottery-like payouts as the volatility leads to a higher dispersion in returns, and savers might profit from extremely positive outcomes while being protected from the worst outcomes as their contributions are protected and the return cannot be negative. However, the best strategy for savers depends on individual preferences, whether it is more desirable to have a smaller profit with a higher probability or a small chance for a high return with a high chance of no return at all. Risk and volatility in investing and potential breaches of guarantees is an important research topic for further studies as it is systematically new in the Slovak pension system, and the guarantees might be a key driver of the sustainability and profitability of the Slovak pension companies.

Conclusion

We have shown that compared to the global bond market benchmark, the actively managed funds were able to provide better returns for the Slovak savers with lower risk. Furthermore, we have identified that even when we randomly generate asset allocations from benchmark-like indexes or ETFs, the fund managers can deliver reasonable returns with lower risk compared to these allocations. We have emphasized that the returns depend on the chosen period to compare. The actively managed funds have been more profitable during a crisis, while the passive allocation has been more profitable during a bull market.

The lower risk of the Slovak pension funds could be increasingly more important in the upcoming years as the regulation has imposed individual guarantees, where the funds are obliged to guarantee non-negative performance. We have shown that with higher volatility, the probability of breaches increases, the pension companies' expected profit decreases, and the saver's return becomes lottery-like.

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Impact of Fiscal rules on Government capital expenditure: Evidence from EU countries

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Abstract

Research background: Many countries today have persistent problems with rising government debt and are unable to ensure healthy public finance. Fiscal rules are implemented by countries precisely to ensure the long-term sustainability of public finances, and the implementation of these rules brings with it several other effects. Fiscal rules can prevent increases in government expenditure and limit politicians from adopting populist measures. However, there is also a downside to this, namely that politicians with limited sources of funding may resort to trying to ensure the financing of the basic tasks of the state (in form of government consumption expenditure) at the expense of government capital expenditure.

Purpose of the article: The aim of this paper is therefore to clarify the relationship between fiscal rules and government capital expenditure, or whether the fiscal rules in place reduce the level of government capital expenditure to comply with the fiscal rules in question.

Methods: Using correlation analysis, we have shown a negative relationship between the strictness of fiscal rules (measured by the fiscal rules strength index) and the level of capital expenditure in the European union over the period 1995-2021.

Findings & Value added: In countries with stricter fiscal rules, the share of government capital expenditure in total public expenditure is decreasing, which may have long-term adverse effects on the economy and reduce the level of economic growth. For this reason, the discussion can be opened about further reform, and mitigation the strictness of fiscal rules in the form of exempting government capital expenditure from the assessment of fiscal compliance could also take place.

Keywords: capital government expenditure, fiscal rules, fiscal rules strength index, public investment

JEL classification: H11, H50, H83

1. Introduction

Fiscal rules are a public finance management tool that, in most cases, set upper limits for selected budgetary and fiscal aggregates. In this respect, it can be said that, as a rule, fiscal rules limit the use of fiscal policy in influencing the development of the national economy. The main objective of fiscal rules is to ensure the long-term sustainability of public finances, which is mostly challenged by the arrival of an extraordinary event such as a financial or economic crisis. For this reason, we have seen an upsurge in the implementation of fiscal rules after the financial crisis of 2007-2009 and the subsequent debt crisis in the euro area. In the European Union, the situation regarding fiscal rules is slightly more complex because, in addition to national fiscal rules, there are also supranational fiscal rules in force, laid down by the Stability and Growth Pact, which serve to coordinate the fiscal policies of individual Member States. In addition to the main objective of the fiscal rules, which is to achieve long-term sustainability of public finances, these rules have several spill-over effects. One of these spill-over effects is the impact on government capital expenditure. The main argument for the existence of this impact is that policymakers, with limited allocative possibilities, will resort to cutting government capital expenditure rather than cutting current expenditure intended to ensure the proper functioning of the state. Thus, fiscal rules may appear to be detrimental to public investment and, consequently, to the country's economic growth. The main objective of this paper is therefore to shed light on the relationship between national fiscal rules and government capital expenditure through a correlation analysis across European Union countries. Our research question

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is whether there is a relationship between fiscal rules and government capital expenditure. Consequently, our hypothesis is derived from our research question, which posits that the ratio of government capital expenditure to total government expenditure decreases under the influence of the implementation of national fiscal rules.

The structure of the article is as follows, the first part deals with a review of the literature and a theoretical definition of the problem. The second part deals with the working procedure and methodology, through which we test our assumptions and hypothesis. The next part presents the achieved results of empirical research, which are then conceived into discussion and conclusions.

1.1 Theoretical background and literature review

As already mentioned, fiscal rules have several effects in the national economy. One of them is the effect on the composition of public expenditure. Dahan & Strawczynski (2013) showed that fiscal rules have a negative effect on the ratio of social transfers to total government consumption in 22 OECD countries. Similarly, a change in the composition of public spending can also occur in the case of capital and current expenditures by the government. IMF 2018 and Guerguil, Mandon, and Tapsoba (2017) have pointed out that efforts to comply with fiscal rules can lead to a reduction in capital spending as it is a more politically transitory solution than cutting current spending. This relationship is both obvious and logical, but empirical studies have not conclusively confirmed the negative impact of fiscal rules on public investment, as this relationship may depend on additional factors (in terms of significance and intensity). A listing of all the available literature would be very extensive indeed, and for this reason we focus in the following section on the most relevant studies that are directly related to the present paper and our research.

Wijsman & Crombez (2021) focused on national fiscal rules and constructed a panel regression model of the EU 28 between 1997 and 2016. Based on the results, they showed that fiscal rules have a negative impact on public investment and their ratio to GDP decreases. In contrast to others, this study focuses on national fiscal rules expressed in the form of FRI (Fiscal rules index constructed by the European Commission) and not on supranational fiscal rules contained in the Maastricht Treaty (e.g., Turrini, 2004; Balassone & Franco, 2000). Thus, this study is also relevant for lower levels of government. In particular, the impact of fiscal rules on public investment at the subnational EU level has been addressed by Mühlenweg & Gerling (2023). In their research, they showed that one standard-deviation increase in fiscal rules stringency index reduces overall public expenditure by up to 1.28%, while investment declines by more than 4%. Thus, there is a disproportionate distribution of public spending and the ratio between public investment and current spending.

The impact of different types of fiscal rules on public investment across 35 OECD countries over the period 1995-2015 was examined by Tkachev (2020). Based on his research, he confirmed that the expenditure rule negatively affects both the amount and the share of public investment in total public expenditure. On the other hand, the results for the budget balance rule are inconclusive and depend on whether public investment is exempted from the assessment of rule compliance (e.g. in the form of escape clauses).

Basdevant et. (2020) came up with interesting findings. The first finding showed that the presence of numerical fiscal rules reduces the level of public investment, and this holds across all income categories of countries. The second finding is related to the volatility of public investment, expressed through the standard deviation of public investment as a share of GDP. Higher volatility of public investment is characteristic of developed and emerging economies, suggesting that public investment may be subject to expenditure adjustments to comply with numerical fiscal rules. In low-income countries, however, fiscal rules are typically accompanied by lower volatility of public investment, although the difference is small. When it is necessary to make cuts on the expenditure side, low-income countries and emerging economies make larger cuts on the public investment side. The opposite situation can occur in advanced countries where the public financial management system is more developed and hence public investment is more protected from spending cuts, e.g., in the form of the implementation of a medium-term budgetary framework. Thus, low-income countries and emerging economies need to be cautious and prudent in periods of fiscal consolidation when public expenditure levels need to be reduced.

Similarly, Kell (2001) confirms that in the case of fiscal consolidation or budget constraints, government capital spending is cut first, followed by current spending. He argues that such a situation should have occurred in the United Kingdom in the period 1980 -1990.

Based on the results of the studies mentioned above, we can conclude that in general the fiscal rules in place limit the amount of capital expenditure, and the strength of this relationship may vary according to the maturity of the country. However, almost all these authors (Wijsman & Crombez, 2021; Kell, 2001; Basdevant et. al., 2020; Tkachevs, 2020) agree that properly set fiscal rules need not jeopardize public investment and the introduction of the golden rule can support these efforts.

2. Methods

To test our hypothesis that fiscal rules can lead to a reduction in government capital expenditure, we used correlation analysis based on time series (disaggregated data at the level of individual European Union countries) and panel data (for the whole European Union). We also focused on assessing the impact of fiscal rules at the level of the European Union but split between "new" (countries that joined the EU after 2004) and "old" members of the European Union (countries that joined the EU before 2004). To capture the specific conditions relating to the single monetary policy condition, we have focused on testing this relationship separately also within the Eurozone, i.e., in countries that currently use the Euro as legal tender. The observed time period covers the years 1995-2021, while the dataset is balanced. The following table provides information on the individual variables used in the correlation analysis.

Table 1. List of variables

Variable	Abbreviation	Expression (frequency)	source/database
Fiscal rules index	FRI	Aggregated fiscal rules strength indices (annual)	a)
Government capital expenditure	GCE	Percentage of total expenditure of General government (annual)	b)

Source: a) European commission.; b) ECB data portal

Descriptive statistics using panel data for the whole European Union can be found in the table below.

Table 2. Summary statistics

Metrics/Variable	Mean	Median	Minimum	Maximum
FRI	0,15963	0,03478	-1,0181	2,824
GCE	0,11275	0,10602	0,01458	0,39228
Metrics/Variable	Standard deviation	Coefficient of variation	Skewness	Ex. kurtosis
FRI	1,0012	6,2719	0,50957	-0,60613
GCE	0,039219	0,34785	1,6951	6,5087
Metrics/Variable	5% Perc.	95% Perc.	IQ range	Missing obs.
FRI	-1,0181	1,9593	1,8097	0
GCE	0,066821	0,17961	0,047993	0

Source: own calculations based on data retrieved from EC and ECB

The Fiscal Rules Index (FRI) variable is compiled annually by the European commission. The Fiscal rule strength indices (FRSI) are aggregated to one index (FRI) per country and year, creating the fiscal rule index. Effectively, the FRI is calculated using equal weights for all its components. This index is standardized with an average of zero and a standard deviation of one, meaning that negative values occur. (Enzinger, 2015). According to the European commission Fiscal Rule Strength Index (FRSI) is calculated considering five criteria:

- 1) legal base,
- 2) binding character,
- 3) bodies monitoring compliance and the correction mechanism,
- 4) correction mechanisms,
- 5) resilience to shocks.

, and the methodology is based on the empirical study by Deroose, Moulin and Wierts (2005). The analysis and description of the development of the Fiscal Rules Index has been dealt with in a number of studies, e.g., Hodžić & Bečić (2015).

To test the relationship in question between fiscal rules and government capital expenditure, we used several metrics such as covariance and correlation. Covariance measures whether variables evolve in a common direction or inversely proportional. In other words, covariance expresses the linear relationship of two variables and whether as one variable increases, the values of the other variable also increase and vice versa. The basic formula for calculating covariance can be written as follows:

$$Cov(x, y) = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{n}$$

, where x represents the values of the x -variable and y represents the values of the y -variable, where \bar{x} and \bar{y} represent the mean values of these variables, n represents the number of observations.

From the covariance value, we can determine the direction of the linear relationship, but we cannot determine the strength of the linear relationship, so in the next step, we also calculate the Pearson product-moment correlation coefficient (Pearson product-moment correlation coefficient). The equation for calculating the correlation coefficient can be written as

$$r = \frac{\sum x_i y_i - n \times \bar{x} \bar{y}}{\sqrt{(\sum x_i^2 - n \times \bar{x}^2)(\sum y_i^2 - n \times \bar{y}^2)}}$$

, where r can take values ranging from 1 (full direct dependence) to -1 (full indirect dependence). If r is equal to 0, there is no dependence between the variables. (Zlacká, 2004)

To ensure robust estimation and avoid errors of first and second order we used non-parametric tests, namely Kendall's tau and Spearman's rho to evaluate relationship based on panel data. Spearman's rho can take values between -1 and +1, and similarly to Pearson's coefficient, the sign also determines the direction of the correlation. If the values obtained are close to 1 or -1, then there is a perfect dependence between the variables. If the obtained value is equal to 0, then the variables are independent of each other. A similar interpretation is given in the case of Kendall's tau.

3. Results

The first step in our analysis will be to calculate the covariance and correlation coefficient for each member country of the European Union. In the table below we present the calculated values for countries where there is a positive (directly proportional) relationship between the Fiscal Rule Index (FRI) and the share of government capital expenditure in total government expenditure.

Table 3. Results of the correlation analysis in the presence of a positive relationship

Country	Covariance	Correlation
BG	0,023737	0,382123
CY	0,002740	0,069236
DK	0,000374	0,079864
HU	0,017025	0,678132
LV	0,003165	0,127555
MT	0,006966	0,298222
PL	0,003469	0,252548
SE	0,003524	0,541500

Source: own calculations based on data retrieved from EC and ECB

The following table shows the EU Member States for which there is a negative correlation between fiscal rules and government capital expenditure.

Table 4. Results of the correlation analysis in the presence of a negative relationship

Country	Covariance	Correlation
AT	-0,003764	-0,388031
BE	-0,002073	-0,340414
CZ	-0,018210	-0,413652
DE	-0,002892	-0,180401
EE	-0,001004	-0,174926
EL	-0,005667	-0,183226
ES	-0,021256	-0,705378
FI	-0,000733	-0,202618
FR	-0,002903	-0,745273
HR	-0,006725	-0,368702
IE	-0,020386	-0,388748
IT	-0,002296	-0,113866
LT	-0,012908	-0,250544
LU	-0,000855	-0,135956
NL	-0,007936	-0,486349
PT	-0,022680	-0,695318
RO	-0,001974	-0,048245
SI	-0,008926	-0,357247
SK	-0,027116	-0,643604

Source: own calculations based on data retrieved from EC and ECB

As we can see from the correlation analysis for individual member states, there is a negative correlation between fiscal rules and government capital expenditure in EU countries (19:8). In other words, the greater the strength of fiscal rules, the smaller the share of government capital expenditure in total government expenditure. These results are consistent with our assumptions and hypothesis.

In a second step, we also estimate the given correlation for the European Union as a whole and in several subgroups ("new" and "old" EU members and the Eurozone), and we report the results in the following table.

Table 5. Correlation analysis results for country (sub)groups

(Sub)Group	Pearson's coefficient	Spearman's rho	Kendall's tau
European Union	-0,2319*	-0,2701***	-0,1861***
Eurozone	-0,2555*	-0,2974***	-0,2054***
Old members	-0,3458*	-0,3768***	-0,2591***
New members	-0,0649	-0,0432	-0,0299

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: own calculations based on data retrieved from EC and ECB

As we can see from the results of the correlation analysis, for all groups of countries there is a negative correlation between the Fiscal rule strength index and the share of government capital expenditure in total government expenditure. This correlation is statistically significant for all country groups except for the new member countries, where the tightness is very low to non-existent.

4. Discussion

In the present paper, we demonstrate and confirm our hypothesis regarding the impact of fiscal rules on government capital expenditure. Strength and stringency of fiscal rules may play a role in the composition of public spending to the detriment of public investment. This may be primarily because in the case of fiscal consolidation, policymakers' resort to reducing just public investment rather than current expenditure due to greater political pass-through and the presence of a political cycle.

The results are, however, ambiguous in the sense that, although at the European Union level this relationship is visible, in individual countries the effect may be negative or positive. In general, we can confirm that the negative character prevails and that fiscal rules reduce the share of public investment in total public expenditure. Therefore, these results are generally in line with previous results of authors dealing with this issue (Wijsman & Crombez, 2021; Kell, 2001; Basdevant et. al., 2020; Tkachevs, 2020).

In the case where we split the countries according to Eurozone membership, the negative relationship was again confirmed and showed a higher degree of dependence between the two variables. Conversely, if we split the EU countries into older and newer members, we can no longer speak of a clearly significant negative correlation, as the relationship is not statistically significant in the case of the newer EU member states. This may be due to the different level of public finance management in the case of the newer member countries and their history of centrally planned economies. Another factor may be that these post-communist countries implemented national fiscal rules much later than the older EU Member States.

Based on the results of the correlation analysis, we can to some extent conclude that fiscal rules can harm public investment and thus reduce the level of economic growth. For this reason, it is necessary to reform the fiscal rules and introduce a golden rule at national level to protect public investment.

Conclusion

Fiscal rules are one of the tools of public financial management to achieve the sustainability of public finances in the long term. However, in addition to this effect, they bring with them several spill-over effects, one of which is the impact on the level of public investment. The present paper deals with the correlation in question. Our main hypothesis was that fiscal rules reduce the share of government capital spending in total spending. We were able to confirm this hypothesis through correlation analysis for the European Union member countries over the period 1995-2021. This negative correlation is also prevalent in disaggregated data, i.e., at the level of individual member countries, although it is not always clear-cut and for some countries there is even an inverse (positive/proportional) correlation. In the case of focusing on sub-groups of countries, we obtained similar results as when using panel data at the EU level, although for the newer Member States this relationship appeared statistically insignificant. Thus, it is important to get the fiscal rules right so that the first move of policymakers is not to reduce public investment in the event of a period of fiscal consolidation, as reducing public investment in the long run can also have a negative impact on the level of economic growth. Future research needs to focus not only on correlation analysis but also on regression analysis using more sophisticated econometric methods.

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Predictive Modelling of Financial Distress of Slovak Companies Using Machine Learning Techniques

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Abstract

Research background: Financial distress prediction is one of the key tasks of risk management and is still a widely discussed topic by many authors. Identification of the financial distress situation at least one year in advance is necessary for the company's management to implement measures that could alleviate or eliminate this situation.

Purpose of the article: The paper aims at predictive modelling of the financial distress of companies operating in the conditions of the Slovak economy, regardless of the economic segment. The models are created using real data from real Slovak companies and can potentially be effective and universal tools for ex-ante analysis in Slovakia.

Methods: Models are created using several machine learning techniques, namely Support Vector Machines, k-Nearest Neighbours, Bayesian Networks, and Genetic Algorithms. These algorithms provide a very good predictive ability of the models. A precisely prepared dataset of tens of thousands of Slovak companies is used to create models. The quality of the models is analysed and compared based on several evaluation metrics calculated from the confusion matrix and the value of AUC.

Findings & Value added: The achieved results point to the potential of the tools used in modelling financial distress. The model created by the Support Vector Machines technique best identifies the financial distress of Slovak companies because it correctly classifies almost 87% of companies.

Keywords: prediction model, financial distress, machine learning, prediction ability, confusion matrix

JEL classification: C38, G33

1. Introduction

In recent years, the economic environment has developed very turbulently, resulting in financial problems for many companies. Therefore, it is necessary to evaluate the company's financial health and predict its future development. That also reflected a significantly higher interest in creating predictive tools capable of predicting financial problems with relatively high reliability. These forecasts are necessary not only for the companies themselves but also for cooperating entities.

Traditional approaches to creating prediction models are multivariate discriminant analysis and logistic regression. However, various data mining approaches based on machine learning are being used more often. These tools are often better able to identify hidden connections in historical data and are therefore able to achieve higher predictive power. In addition to the widely used artificial neural networks and decision trees, various alternatives are also used, such as the technique of Support Vector Machines, k-Nearest Neighbors, etc.

However, the use of these tools in predicting the financial distress of Slovak companies is still not very widespread. Therefore, the article aims to point out the effective use of these tools in the Slovak economy's conditions. Specifically, the goal is to create the most accurate financial distress prediction models using four selected machine learning techniques – Support Vector Machines (SVM), Genetic Algorithms (GA), Bayesian Networks (BN), and k-Nearest Neighbors (kNN). Data from real Slovak

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companies will be used for modelling, while the quality of the models will be quantified on a randomly created test set using several evaluation metrics derived from the confusion matrix and the AUC metric, i.e. the Area Under the Curve ROC.

The remainder of the paper is structured as follows. In the Literature Review section, we present some interesting studies in the field of predicting financial distress that uses various machine learning algorithms. The Methodology section describes selected techniques, the source database used in modelling, and characteristics used for model evaluation. We present the created models and their evaluation metrics in the Results section. Subsequently, in the Discussion, we analyse the results of the models and compare them with some models of other authors. Finally, the Conclusion section summarises the main findings.

1.1 Literature review

Predictive modelling of financial distress using various machine learning techniques is a frequently discussed topic by many authors worldwide. The use of these techniques has expanded not only in the area under consideration, especially in connection with the development of computer technology. The authors mostly deal with creating new national models, which, compared to global models, usually provide a higher predictive ability because it considers the specifics of the national economy, which are hidden in the real data used.

In the past, prediction models were created using mathematical-statistical methods, and later the use of neural networks and decision trees prevailed. However, those used by us are also used. For example, Akman et al. (2020), Gutierrez et al. (2022), Shetty et al. (2022), Shrivastav and Ramudu (2020), and Teles et al. (2021) used the SVM technique to model and predict corporate bankruptcy. Shrivastav and Ramudu (2020) analysed Indian banks. Based on the collected data, they created several prediction models, and the best of them achieved a prediction ability of almost 93%. On the other hand, Teles et al. (2021) compared many machine learning algorithms and pointed out that SVM outperformed all other models, including the random forest model.

Bayesian networks are also used in credit scoring, but often in combination with other approaches. For example, a fuzzy-Bayesian approach was used by Aydin and Kamal (2022) to analyse the financial situation of shipping companies. A probabilistic Bayesian network and other approaches were used by Wang and Chen (2021) to identify the financial status of SMEs from different countries. Comprehensive surveys comparing different approaches (including Bayesian networks) in credit risk modelling are published by Tripathi et al. (2022).

The most critical factors influencing the classification of companies based on credit risk were identified by Jandaghi et al. (2021). They used the ant colony algorithm and the k-nearest neighbours technique for this. Wang and Liu (2021) also used this technique for undersampling bankruptcy prediction on a sample of Taiwan bankruptcy data. From the point of view of the financial failure of the companies, Aljawazneh et al. (2021) compared this technique with other techniques, using unbalanced data from Spanish, Taiwanese and Polish companies.

2. Methodology

We take creating a prediction model as a classic data mining task and use one of the common data mining methodologies, namely CRISP-DM. Its first phase is Business Understanding, within which we focused on the study of the current state of the problem, the partial result of which is the presented literature review. As the main task, we have identified the creation of models that will predict the financial status of Slovak companies with a success rate of around 90% in a one-year time horizon. This status is the prosperity or non-prosperity of the company.

In the subsequent Data Understanding phase, we identified 25 financial ratios, company size and SK NACE identifier as potential predictors. The source for us was the Amadeus database. To create a one-year model, we need data from two consecutive years. Since we wanted to avoid using data affected by the COVID-19 pandemic and the consequences of the conflict in Ukraine, we decided to use data from 2018 and 2019. We cleaned the original data set of more than 660 thousand companies and prepared it to model financial distress. That was the content of the Data Preparation phase. From the data set, we removed those companies' data for which data were unavailable in both monitored years. We also removed variables with more than half of the missing data and, based on the Variance Inflation Factor analysis, variables that caused an undesirably high degree of multicollinearity. Thus, we created a final set of financial ratios as potential predictors for the models being created. As can be seen in Table 1, the final set

contains ratios from each of the four basic areas of financial analysis. Subsequently, we focused on defining the target variable, i.e. the identifier of financial distress or prosperity of companies. As non-prosperous, we consider companies that meet the conditions of a "company in crisis" defined by current Slovak legislation. However, only 12.6% (9,497) of companies met these conditions. Therefore, we proceeded to balance the subsets, and from the remaining prosperous companies, we randomly selected only 9,497 of them into the final dataset. Finally, we split the final dataset in a ratio of 80:20 into training and testing subsets.

Table 1. List of financial ratios as potential predictors

Ratio	Type	Symbol	VIF
Asset Turnover Ratio	Activity	SAL/TA	1,614
Current Ratio	Liquidity	CA/CL	1,741
Return on Equity	Profitability	ROE	1,014
Return on Assets	Profitability	ROA	2,484
Debt Ratio	Leverage	TL/TA	1,840
Cash to Assets Ratio	Liquidity	CASH/TA	1,239
Return on Sales	Profitability	ROS	2,323
Non-Current Debt Ratio	Leverage	NCL/TA	1,025
Liability Turnover Time	Activity	TL/SAL	1,776

Source: authors (2023)

Next comes the Modeling phase, in which we created the models themselves. We wanted to point out the potential for effective use of machine learning tools, which are relatively less used in modelling financial distress, at least in the conditions of the Slovak economy. At first, we use the SVM technique, which can be used not only for solving classification problems. This technique uses a convex quadratic programming algorithm to find a solution. The technique was created in 1995 by Vladimir Vapnik, and in the following decades, it surpassed some techniques in many applications (Suykens et al., 2002). Assuming linear data separability, the SVM technique can also be used as a linear classifier in the case of binary as well as multiple classifications. In this case, the principle is to find the optimal separation function, which is a linear function of the input data vector. This procedure was designed for non-overlapping data but has also been shown to apply to overlapping data. Geometrically, this technique is analogous to multivariate discriminant analysis. The general SVM technique is used in more realistic cases where the data is not linearly separable. (Thomas et al., 2017)

Furthermore, we used the technique of genetic algorithms (GA) in modelling. Genetic algorithms belong to the so-called evolutionary algorithms, while the idea is to find the most suitable individual and transfer its properties and qualities (genetic material) to the next generations. The algorithm starts working with the initial generation, or population, which is gradually improved by repeating the cycle of this algorithm consisting of five steps. Most applications need 50 to 500 cycles (generations) to reach the end condition, which is usually the maximum of the objective function. That is related to the relatively high computational complexity of these algorithms.

In modelling, we also use Bayesian networks, which describe the dependence of a discrete independent variable on dependent variables using the values of conditional probabilities calculated using Bayes' theorem. The advantage of Bayesian networks is that they are relatively easy to implement and can be used to conclude even if the values of some dependent variables are unknown and thus predict even on incomplete data.

The last technique used is the k-Nearest Neighbors (kNN) technique, which is one of the simplest machine learning classification algorithms. Its principle is learning by analogy. The entire training set essentially forms the model itself, and we classify the new case based on the majority vote of the k-nearest neighbours from the training set, which are closest to the new case. Various metrics are used to determine the distance, but the Euclidean or Manhattan (city-block) metric is the most common.

Evaluation is the last phase, in which we quantify the predictive ability of the created models based on the classification of cases from the training set, which was not used in the modelling phase. We start from the confusion matrix, in which there is the number of correctly and incorrectly classified positive and negative cases. In our case, positive cases are non-prosperous, and positive cases are prosperous

companies. We quantify the overall quality of the models based on several characteristics. Overall Accuracy (ACC) expresses the proportion of correctly classified cases out of all cases in the test set, and Precise (PR) expresses the proportion of correctly classified positive cases. In addition to these characteristics, we use the Matthews correlation coefficient (MCC) as equivalent to the classic Pearson correlation coefficient and the F1-score, the harmonic mean of PR and the model's sensitivity (True Positive Rate, TPR). Sensitivity (TPR) is a metric expressing the proportion of true positive cases correctly identified as positive. In addition, we also used specificity (True Negative Rate, TNR), which quantifies the proportion of negative cases correctly identified as negative by the model. The maximum value of all characteristics is 100%, with higher values identifying a better model. The last evaluation characteristic used is the Area Under the Curve (AUC), i.e. the area under the ROC curve. The maximum AUC value is one, and a value of 0.5 belongs to a random classifier, so in this case, a value close to one identifies a better model.

We used IBM SPSS Modeler software in all phases.

3. Results

First, we describe the results obtained in the modelling phase. We model the financial distress of Slovak companies in a one-year time horizon. We applied the selected machine learning tools to the training sample created in the previous phases. Potential predictors are the values of nine financial ratio indicators (see Table 1) and two indicators (size and SK NACE indicator) of 15,235 companies obtained from the financial statements for 2018. The target variable is a binary identifier of the prosperity of Slovak companies in 2019, while there are 7,629 prosperous and 7,606 non-prosperous companies in the training set.

We failed to create a model using a genetic algorithm, so we only present the results of these models – LinearSVM (SVM model as a linear classifier), SVM (general SVM model), Bayes (Bayesian network), and kNN (k-nearest neighbours model). Almost all created models work with all eleven predictors, i.e., nine financial ratios and indicators of company size and its SK NACE classification. However, the TL/TA ratio is the most significant predictor.

Now the results of the evaluation phase follow, in which we quantified the predictive ability of the created models on a test set of 3,759 (approximately 20% of all) companies. From the point of view of the target variable, the test set is balanced, as it contains 1,868 (49.7%) prosperous and 1,891 (50.3%) non-prosperous companies. We constructed a confusion matrix for each model and calculated its ACC, TPR, TNR, PR, F1 and MCC metrics. Analogously, we also constructed the ROC curve of all models and, in particular, calculated the size of the area under that curve, i.e. the AUC value. The values of these metrics are summarised in Table 2 and illustrated in Figure 1.

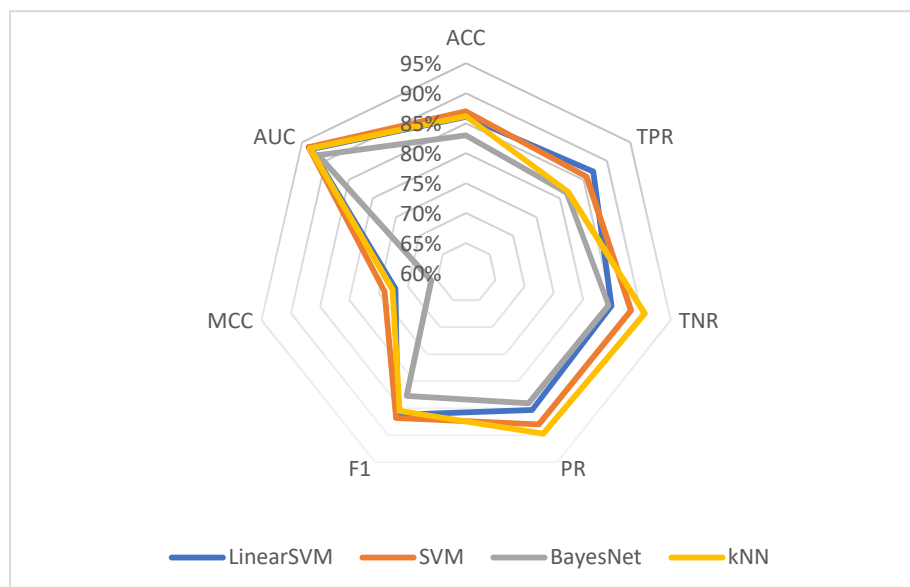


Figure 1. Comparison of evaluation metrics
Source: own processing (2023)

Table 2. Evaluation metrics of created models

Model	ACC	TPR	TNR	PR	F1	MCC	AUC
LinearSVM	86,03%	87,15%	84,90%	85,39%	86,26%	0,721	0,931
SVM	86,96%	85,72%	88,22%	88,05%	86,87%	0,740	0,936
Bayes	82,95%	81,49%	84,42%	84,12%	82,78%	0,659	0,915
kNN	86,14%	81,76%	90,58%	89,78%	85,58%	0,726	0,933

Source: authors (2023)

4. Discussion

We created prediction models using several machine learning techniques that achieved relatively high predictive ability. Due to software issues, we could not build a model using a genetic algorithm. All other methods used can be considered suitable for modelling the financial distress of Slovak companies in a one-year time horizon.

Based on the comparison of the values of the evaluation metrics, we can conclude that the Bayesian network model achieved the worst results of all models we created. This model lagged in all metrics but most significantly in those that characterise the overall quality of the models (ACC, F1, and MCC). On the contrary, the best overall quality (based on ACC, PR, F1, MCC, and AUC) was achieved by the SVM model, that is, the model created by the general Support Vector Machines technique. The SVM model lagged only in sensitivity (TPR) and specificity (TNR). In terms of sensitivity, the LinearSVM model is the best, which therefore best identifies truly non-prosperous companies, as it correctly identified the impending financial crisis for $TPR_{\text{LinearSVM}} = 87.15\%$ of non-prosperous companies.

An interesting finding is that from the point of view of specificity, the best is the kNN model, a very simple model created by the k-nearest neighbours technique. This model correctly identified prosperity (financial health) for $TNR_{\text{kNN}} = 90.58\%$ of really prosperous companies. As a result, this model is also the best in terms of precision (PR). The AUC metric also confirms the above findings. The Bayesian network achieved the lowest value, and the other three models achieved similar results.

Several authors deal with the issue of predicting the financial distress of Slovak companies. Gavurova et al. (2022) have studied non-financial companies, Mazanec et al. (2022) non-profit companies, while data from the post-pandemic period were examined by Valaskova et al. (2023). The quality of our models is comparable to the results of these authors. In addition, our models are created using a large and precisely prepared data set and are designed for use in all economic segments and in all size categories of companies. Therefore, they are capable of competition compared to the mentioned models and the models of other authors (Jencová et al., 2020; Stefko et al., 2019, 2020, 2021).

Conclusion

In recent years, the use of various machine learning tools in predicting the financial problems of companies has greatly expanded. Artificial neural networks and decision trees are probably used the most. Our goal is to point out the possibility of using other tools to identify the financial distress of Slovak companies. We used real data for modelling, which we first prepared precisely. The values of nine financial ratios of almost 20,000 companies remained in the final set, together with the identifier of their size and the SK NACE category of their economic activity. These variables served as potential predictors of models trained on the training sample (about 80% of the whole sample) using Support Vector Machines, Bayesian Networks and k-nearest neighbours techniques. On the test set (the remaining 20% of the entire sample), the models achieved a high predictive ability of almost 90%. The Bayesian network model achieved worse results, and the other models achieved comparable results. Despite such good results, we recommend combining our models with other models, especially with a financial-economic analysis of the company for practical use. That is one of the main limitations of our research.

Of course, our research also has several other limitations. We used older data that had not yet been affected by the COVID-19 pandemic. However, this may result in a lower quality of the created models when assessing the company's current financial situation. Another limitation is the need for relatively complex data when using the created models.

These limitations also result in possibilities for the direction of our future research, which is the creation of models based on newer data. It would also be possible to combine the used approaches with other machine learning techniques and thus create robust ensemble models capable of revealing complicated data patterns and providing even more accurate predictions.

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Prediction of Corporate Bankruptcy – Selecting an Appropriate Prediction Method

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Abstract

Research background: One of the important decision-making processes in the prediction of businesses' bankruptcy is the selection of an appropriate prediction method and creation of an early warning model. Several methods and approaches can be applied when predicting the bankruptcy of companies. The aim of academics is to find a prediction model with the best possible classification accuracy.

Purpose of the article: The aim of the paper was to select an appropriate bankruptcy prediction method and to predict bankruptcy of analysed sample of companies.

Methods: The research was carried out on a sample of companies from the construction industry. Most important financial bankruptcy features were selected applying Least Absolute Shrinkage and Selection Operator (Lasso). Within prediction methods, Logit model, decision tree learning algorithm and feed-forward neural network were applied. Overall performance of created models was measured with the use of accuracy, F1-score and AUC.

Findings & Value added: The result of the research is finding that the best performance was achieved by decision tree learning algorithm. This model is also very beneficial in terms of managerial implications since it is able to identify most important financial features for bankruptcy prediction. These features can be very helpful for managerial decision-making in construction companies not only in Slovakia but also in V4 countries. We consider it as the most important value added of the given research.

Keywords: bankruptcy prediction, decision tree, Logit model, neural network

JEL classification: C45, C52, M20

1. Introduction

Predicting financial difficulties is absolutely essential for traders, creditors and suppliers. To avoid any financial loss, they have to assess the financial risk of the firm before taking any decisions (Rafatnia et al., 2020). An early warning system for business failure events (e, g, bankruptcy or financial distress) has such economic benefits for the mentioned stakeholders that many models have been proposed to predict these events in several areas of research (Mousavi et al., 2022). Techniques for predicting business bankruptcy can be divided into parametric and nonparametric ones (Mousavi et al., 2022). Among parametric techniques can be mentioned univariate and multivariate discriminant analysis, linear probability models, Logit and Probit analysis and others. Regarding non-parametric techniques there are two main groups - machine learning and artificial intelligence methods, which include case-based reasoning, neural networks, decision trees, genetic algorithms and other methods and Operation research methods comprising of Data Envelopment Analysis and other multi-criteria decision making methods.

Academic research on business bankruptcy began to rise in Western countries in the 1960s. It was driven by huge demand from practice (Bae, 2012). Pioneer of business financial distress prediction models based on financial ratios was Fitzpatrick, who published his study in 1931. Beaver (1966) was the first who applied univariate discriminant analysis. When choosing specific ratios entering the model, he applied a dichotomous classification test to identify financial ratios that best describe the difference between prosperous and non-prosperous enterprises. His research was important to developed threshold value for individual indicators to classify them into two groups.

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In 1968 Altman applied the method of multivariate discriminant analysis in predicting financial distress and formulated Altman Z-score model. This model used five financial ratios and has become the most popular method since then in the accounting and finance research fields (Cindik & Armutlulu, 2021). Altman's work was followed by Taffler and Tisshaw, who published the first model in 1977 and many other authors.

When using multivariate discriminant analysis, it is necessary to fulfill several assumptions. They include independence of observations, multivariate normality and homogeneity of covariance matrices (Brown & Wicker, 2000). According to Mihalovič (2015) the problem with multivariate discriminant analysis is that although it is able to identify businesses that are likely to be non-prosperous, it cannot estimate the probability with which this situation may occur. Objections to discriminant analysis as a technique for predicting business financial distress have led several authors to search for new ways of predicting. As one of the possible solutions, conditional probability models came to the fore.

The first author who applied logistic regression to predict the financial situation of companies was Ohlson (1980). His model was based on data from 1970-1976 and it considered 9 financial indicators. Ohlson examined 2,163 American industrial enterprises, 105 of which were insolvent and 2,058 were solvent. The study concluded that logistic regression is a suitable method for predicting business failure. Compared to discriminant analysis, logistic regression has several advantages. It does not require multivariate normality of the values of independent variables or homogeneity of covariance matrices. The main weaknesses of Logit models include their extreme sensitivity to multicollinearity, outliers, and missing values (Hassan, 2017). Another conditional probability model is the Probit model. The main difference compared to Logit model is that it assumes normal distribution of random variables (Kováčová & Klieštk, 2017). The Probit model was used for the first time by Zmijewski in 1984.

In the next years the achieved improvements in other fields of science like mathematics and computer science enabled the creation of prediction models based on more computationally demanding methods. In the next part we focus on neural networks and decision trees applied in this paper.

The first theoretical work dealing with neural network was the work of McCulloch and Pitts published in 1943. These authors pointed out the possibility of the existence of an artificial neural network that could work with arithmetic or logical formulas. The first experiments with a simple single-layer neural network dates back to 1950s and 1960s. This network was created by a single neuron called the "perceptron" and consisted of several inputs and one output. However, it was found that the linear neural network algorithm was not suitable for solving tasks that are more complex. This limitation could be removed by constructing a multilayer network. One of the most popular network types is multilayer perceptron (MLP), which represents a feed-forward network trained with backpropagation learning algorithm and consists of one input layer, one or more hidden layers and one output layer (Bianchesi et al., 2022). MLP was used to predict bankruptcy of businesses by various authors. We can mention Brenes et al. (2022) who examined the discriminatory power of a MLP on a sample of Taiwanese firms. They considered different setups of optimization algorithms, activation functions, number of neurons and number of layers. They conclude that the proposed MLPs show superior performance compared to other methods.

First authors who used decision trees to predict business failure were Frydman et. al. in 1985. They found out that decision tree created in their study is a better predictor of business failure compared to MDA (Durica et al., 2019). Many other authors applied decision trees in bankruptcy prediction, while the most frequently used types of decision trees include ID3, C4.5, C5, CART (Classification and Regression Trees), Best First Decision Tree and AD Decision Tree (Olson et al., 2012). One of the most successful ones is CART learning algorithm. This algorithm was used in the study of Karas & Reznakova (2017), who created two CART models for a sample of 630 active and 24 bankrupt companies operating in the construction industry (data were obtained from AMADEUS database). While the first CART model contained 3 variables, the second one used 5 variables. They came to a surprising finding that the model with a lower number of variables is more accurate than the model with a larger number of variables.

Many authors dealing with bankruptcy prediction compared classification accuracy of several approaches. Olson et al. (2012) used neural networks, support vector machines, decision trees and logistic regression to predict bankruptcy of US firms. For the analyzed data, decision trees were found to be more accurate than neural networks. Logistic regression was less accurate than decision trees, while support

vector machines worked less well on the analyzed data than any of the other models. Chen (2011) created financial distress prediction models applying decision tree classification methods (C5.0, CART, and CHAID) and logistic regression. They used sample of Taiwanese firms for the period amounting to 7 years and 5 months. They found out that decision trees approach is suitable for financial distress prediction in short run, while logistic regression approach gets better prediction accuracy in long run. Altman et al. (2020) applied different methods to predict bankruptcy up to 10 years before it in an open European economy. They found out that logistic regression and neural networks are superior to other approaches.

Based on the information presented above, the research objective was established, focusing on selecting an appropriate bankruptcy prediction method and predicting bankruptcy of analysed sample of companies. Appropriate prediction method was selected with regard to its classification accuracy. From the managerial point of view, the most easily interpretable model with sufficient classification accuracy was chosen.

The structure of the paper is as follows: In the "Methods" section, the research sample and financial features are introduced, and the methodologies of features selection method and bankruptcy prediction methods are explained. The "Results" section presents the most important performance features selected by Lasso regression and provides results of bankruptcy prediction using Logit model, decision tree learning algorithm and feed-forward neural network. The "Discussion" section provides discussion to the obtained results. The "Conclusion" section offers conclusions, limitations and future research.

2. Methods

The input database for the prediction of financial bankruptcy of companies operating under SK NACE 41 - Construction of buildings consisted of data from the financial statements of 1,349 companies. The database of the financial statements of these companies was provided by CRIF – Slovak Credit Bureau, s.r.o. (CRIF, 2022).

The construction industry was chosen because it is one of the few industries that can have a stabilizing effect on the economy, this segment is an indicator of economic development and affects the development of other industries and segments of the economy (PS Stavby, 2021). Therefore, it is necessary to pay attention to the prediction of financial difficulties of companies operating in this industry and to identify possible risks these companies have to face.

In this study, the following financial ratios were considered: Cash ratio, Quick ratio, Current ratio, Net working capital to current assets, Net working capital to total assets, Netto cash flow to total assets, Netto cash flow to debt, Netto cash flow to short-term debt, Assets turnover, Receivables turnover, Short-term debt turnover. Return on assets, Return on equity, Return on sales, Return on costs. Return on assets with EAT (Earnings after taxes), Return on sales with EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization), Total debt to total assets, Financial leverage, Debt to equity ratio, Equity to fixed assets ratio, Long-term capital to fixed assets ratio, Short-term debt to total assets, Cost ratio.

2.1 Method used for features selection

In this paper most appropriate features for bankruptcy prediction were selected with the use of Lasso regression introduced by Robert Tibshurani in 1996. When performing Lasso regression in software Statistica, logistic regression was selected. The penalized logarithmic likelihood function of Lasso logistic regression that needs to be maximized can be written as (1) (Pereira et al., 2016):

$$l_{\lambda}^L(\beta) = \sum_{i=1}^n [y_i x_i \beta - \log(1 + e^{x_i \beta})] - \lambda \sum_{j=1}^k |\beta_j|, \quad (1)$$

where $\lambda \geq 0$ is the penalty parameter, β is the column vector of the regression coefficients, x_i are the independent variables, y_i is the binomial dependent variable, n is the number of observations, and k is the number of variables.

The penalty parameter λ was determined based on the minimum prediction error in cross-validation (λ_{\min}).

2.2 Methods used for bankruptcy prediction

Logit model uses the dependent variable in nominal form (binary logistic regression) (Sperandei, 2014). The variable y_i can take only two values, i.e $y_i = 1$ if the enterprise is not doing well and $y_i = 0$ if the enterprise is doing well. We can further assume that the probability $y_i = 1$ is given by P_i and the probability that $y_i = 0$, is given by $1 - P_i$. Using the logistic transformation, we specify the probability of P_i as follows: $P_i = f(\alpha + \beta x_i)$, where x_i are selected financial indicators, α and β are estimated parameters. We then calculate P_i using the logistic function (2):

$$P_i = \frac{\exp(\alpha + \beta x_i)}{1 + \exp(\alpha + \beta x_i)} = \frac{1}{1 + \exp(-\alpha - \beta x_i)} \quad (2)$$

The Logit model is defined as follows (3) (Kováčová & Klieštík, 2017):

$$\text{Logit} = \ln\left(\frac{P_i}{1 - P_i}\right) = f(\alpha + \beta x_i) \quad (3)$$

The above represents the logarithm of the odds ratio of both possible alternatives ($P_i, 1 - P_i$). A likelihood ratio test (LR test) was used to verify the statistical significance of the model. Statistical significance of individual explanatory variables in the Logit model and their regression coefficients (β) was tested with the use of Wald test. The Hosmer-Lemeshow goodness-of-fit test was applied to assess the strength of the resulting model.

A decision tree is a non-linear discrimination method which uses a set of independent variables to divide the sample into smaller subsets. The procedure is iterative, in each branch of the tree the goal is to select the independent variable that has the strongest association with the dependent variable according to a specific criterion (Chen, 2011). In the mathematical formulation of decision tree we consider training vectors $x_i \in R^n, i = 1, \dots, l$ and a label vector $y \in R^l$, a decision tree recursively partitions the feature space in such a way that the samples with the same labels or similar target values are grouped together. Let the data at node m be presented by Q_m with n_m samples. For each candidate split $\theta = (j, t_m)$ consisting of a feature j and thresholds t_m , partition the data into $Q_m^{\text{left}}(\theta)$ and $Q_m^{\text{right}}(\theta)$ subsets as follows (4) (Scikit-learn, 2023)

$$\begin{aligned} Q_m^{\text{left}}(\theta) &= \{(x, y) | x_j \leq t_m\} \\ Q_m^{\text{right}}(\theta) &= Q_m / Q_m^{\text{left}}(\theta) \end{aligned} \quad (4)$$

In this paper the optimized version of CART algorithm implemented in Python module Scikit-learn was used. Quality of a candidate split of node m was calculated with the use of Gini coefficient.

Artificial neural networks (ANN) are a group of learning statistical models inspired by biological neural networks. They are used for estimating functions that may depend on a large number of inputs and are generally unknown (Zhu et al., 2021). The error backpropagation method for feed-forward ANN with hidden layers was introduced by Rumelhart et al. in 1986. The feed-forward neural network is a feed-forward connection w_{ij}^m (i is a neuron of m -layer and j is a neuron of $(m - 1)$ - layer) between neurons, with each neuron of one layer transmitting signals to each neuron of the next layer. A neuron works with two types of inputs, namely inputs from other neurons and inputs from the environment. Input from the external environment is a threshold value - bias (θ). The outputs of each neurons are y_i^m while i is a number of neurons ($i = 1, 2, \dots, n$) in m -layer. The total number of layers is M , while the input layer is marked 0 . The activation values of a neuron are marked as V_i^m , where $y_i^m = V_i^m$ ($m = 1, 2, \dots, M$). The activation values of the input neurons are V_i^0 . The total outputs of the network are V_i^M , where $y_i^M = V_i^M$ and M is the last layer of the network. The general formula for calculating the activation value of any neuron and any layer can be written as follows (5) (Pfeifer et al., 2010):

$$V_i^m = y_i^m = f(\text{int}_i^m) = f\left(\sum_{j=1}^{n+1} w_{ij}^m \times V_j^{m-1}\right) = f\left(\sum_{j=1}^n w_{ij}^m \times V_j^{m-1} - \theta_j\right), \quad (5)$$

where int_i^m is the total input to the i -neuron of m -layer, which is calculated as the sum of the product of the weight going from j -neuron to i -neuron and the activation value of the neuron from which the signal originates. N represents the number of neurons in the input layer, f is an activating function.

Individual models were built in software Statistica and Python module Scikit-learn. The assumption about whether the company is prosperous or not was made based on the approach of Bakeš

& Valášková (2018). According to these authors, non-prosperous businesses included those with an equity-to-liability ratio less than 0.08, current ratio less than 1 and negative EAT (Earnings after taxes). These criteria take into account the currently valid legislation and the practice of Slovak businesses in this area. Based on these criteria, there were 1,282 prosperous and 67 non-prosperous enterprises in the research sample.

Research sample was divided into two sets: 80% training data and 20% test data. K-fold cross-validation was applied to ensure that observations in each set are equally distributed between prosperous and non-prosperous businesses. Models were trained and tested five times, while the dataset was divided into five subsets of equal size and each time, the model was trained on four subsets leaving one subset for testing. Performance of bankruptcy prediction models was measured by accuracy, F1-score and AUC. F1-score is calculated as harmonic mean of the precision and recall, while AUC represents area under the ROC curve. Overall performance metrics are an average of the five individual performance metrics obtained for each individual experiment.

3. Results

As part of the analysis of financial ratios, averages and medians of individual indicators of businesses from the analyzed sample were evaluated and compared (see Table 1).

Table 1. Comparison of averages and medians of financial ratios

Indicator	Abb.	Average	Median	Indicator	Abb.	Average	Median
Cash ratio	CaR	1.50	0.32	Return on equity	ROE	0.11	0.09
Quick ratio	QR	2.45	1.11	Return on sales	ROS	0.03	0.02
Current ratio	CuR	2.75	1.26	Return on costs	ROC	0.06	0.02
Net working capital to current assets	NWCCA	0.07	0.21	Return on assets with EAT	ROA _{EAT}	0.05	0.03
Net working capital to total assets	NWCTA	0.18	0.15	Return on sales with EBITDA	ROSEBITDA	0.10	0.06
Netto cash flow to total assets	NCFTA	0.10	0.07	Total debt to total assets	TDTA	0.64	0.68
Netto cash flow to debt	NCFD	0.33	0.11	Financial leverage	FL	5.78	2.69
Netto cash flow to short-term debt	NCFSD	0.41	0.14	Debt to equity ratio	DER	4.78	1.69
Assets turnover	AT	1.81	1.43	Equity to fixed assets ratio	EFAR	3.25	1.01
Receivables turnover	RT	12.35	4.71	Long-term capital to fixed assets ratio	LCFAR	3.82	1.34
Short-term debt turnover	SDT	5.34	2.99	Short-term debt to total assets	SDTA	0.56	0.57
Return on assets	ROA	0.08	0.04	Cost ratio	CoR	0.96	0.98

Source: authors (2023)

Results of initial analysis show that there are no significant deficiencies in the liquidity of analyzed businesses. However, the safety of businesses shows considerable reserves - the median of NWCCA is 0.21, the average is even lower. From the point of view of assets management, AT achieves adequate results while on the other hand Creditors payment period is very high (its median is 120.29 days). In terms of profitability, ROA and ROE show better results, while results of ROS and ROC are lower. Debt dominates the capital structure of analysed businesses. In terms of operating indicators, CoR achieves positive results.

3.1 Results of Lasso regression

The most important bankruptcy prediction features were selected with the use of Lasso regression, while Lasso Logit model was used. The optimal value of λ was determined based on the minimum prediction error of the model using 10-fold cross-validation (λ_{min}). The optimal value of λ (λ_{min}) was chosen at the lowest point of the curve (Figure 1). From 24 financial features Lasso regression identified 10 features with non-zero coefficients at $\lambda_{min} = 0.003$. Coefficients of other indicators were shrunk to 0.

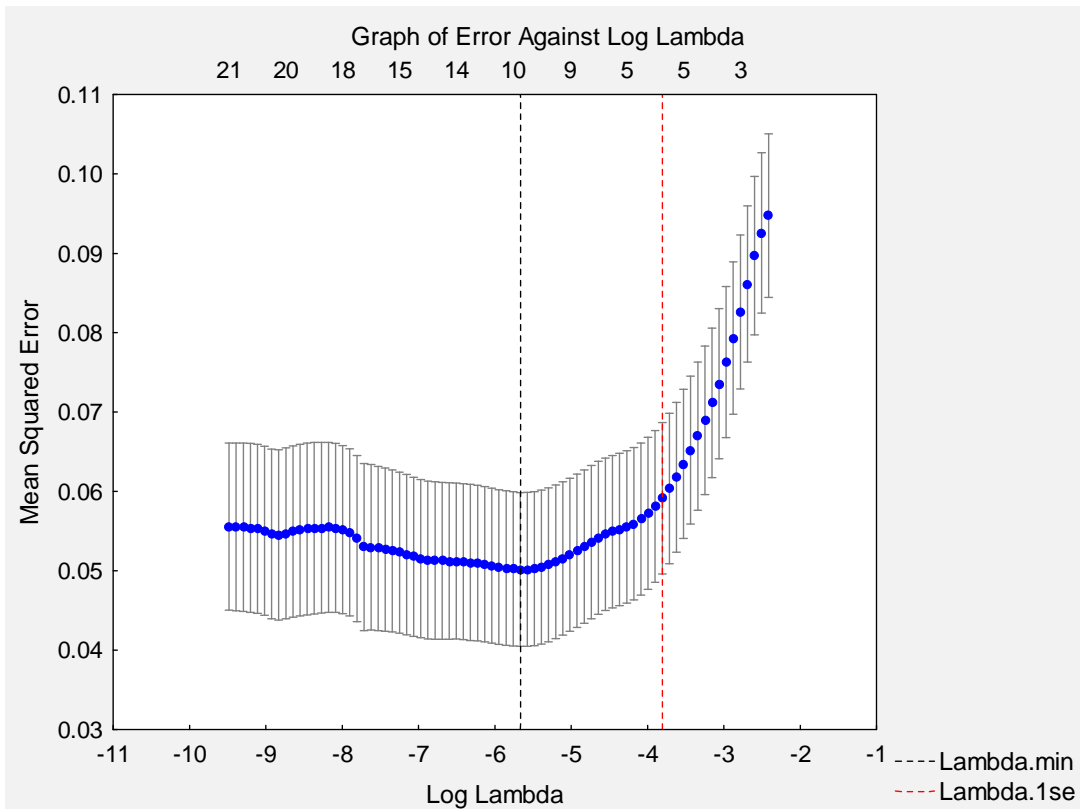


Figure 1. Graph of error against Log Lambda
Source: authors (2023)

Figure 2 shows, that the most important bankruptcy features for the analysed sample of businesses are TDTA, ROC, ROE, SDTA, NWCTA, NCFTA and AT. Coefficients of FL, LCFAR and DER were close to zero, therefore we did not use them in further analysis.

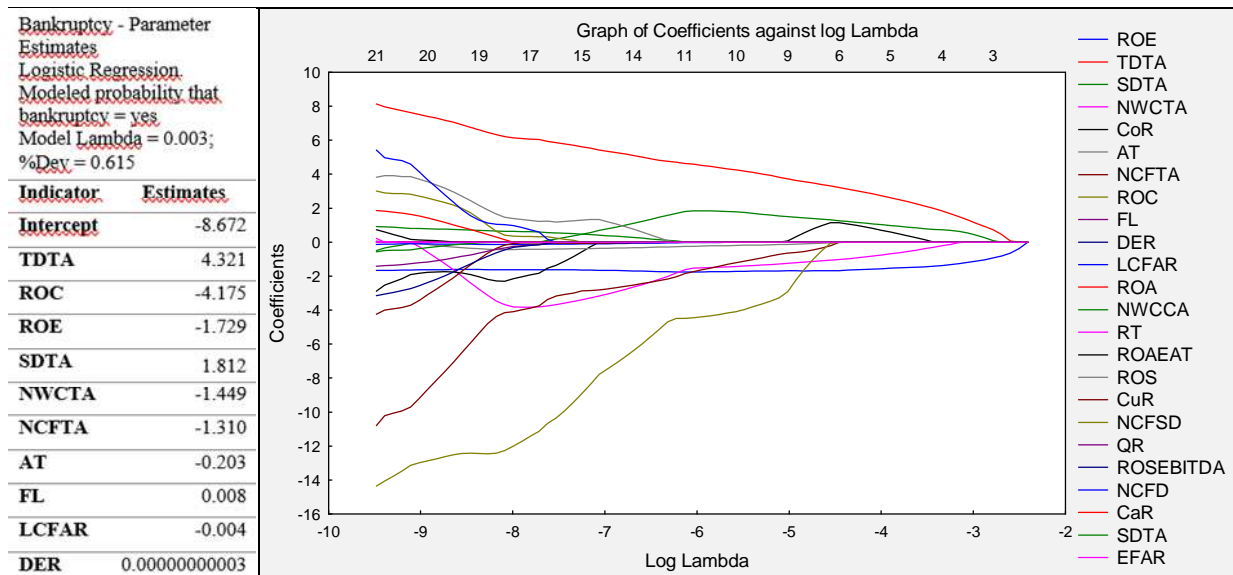


Figure 2. Results of Lasso regression for λ_{\min}
Source: authors (2023)

Features selected by Lasso regression were used as inputs for Logit model, decision tree learning algorithm and feed-forward neural network.

3.2 Results of Logit model

Logit model allows us to identify statistically significant explanatory variables. For this purpose we used the Wald test (table 2). Based on its results for the selected training data we can say that explanatory variables ROC, TDTA, NWCTA and ROE significantly contribute to the predictive ability of the model. Regarding NWCTA, ROE and ROC we talk about negative dependence. It means that the higher the value of these indicators, the lower the probability of business bankruptcy. Regarding TDTA, it is a positive dependence - the higher the value of TDTA, the higher the probability of business bankruptcy.

Table 2. Logit function coefficients

Parameter	Estimate	Standard error	Wald stat.	Lower and Upper Confidence Limit 95.0%		p-value
Intercept	-10.37	1.39	55.62	-13.09	-7.64	0.00
NWCTA	-1.90	0.85	5.07	-3.56	-0.25	0.02
ROE	-1.54	0.38	16.04	-2.29	-0.79	0.00
ROC	-7.08	2.38	8.82	-11.75	-2.41	0.00
NCFTA	-2.19	2.27	0.93	-6.65	2.27	0.34
AT	-0.19	0.19	1.03	-0.55	0.18	0.31
TDTA	4.92	1.57	9.80	1.84	8,00	0.00
SDTA	2.81	1.45	3.74	-0.04	5.67	0.05

Source: authors (2023)

The explanatory variables NCFTA, AT and SDTA are not statistically significant (see Table 2). However, their omission from the model did not bring a significant improvement in the model's characteristics, so we decided to keep these variables in the resulting model.

The statistical significance of the Logit model as a whole was tested using a likelihood ratio test. P-value is lower than the significance level $\alpha = 0.05$ (see Table 3). Therefore we can conclude that Logit model is statistically significant.

Table 3. Statistical significance of the Logit model

	Chi-Square	Df	p-value
Likelihood ratio	274.41	7	0.00

Source: authors (2023)

Table 4 shows the results of the Hosmer-Lemeshow goodness-of-fit test, which can be used to evaluate the quality of the logistic regression model. The p-value of the test is higher than the significance level $\alpha = 0.05$. Therefore, the null hypothesis is not rejected and we conclude that the model is statistically significant and suitable, because there is no big difference between the actual and predicted values of the dependent variable.

Table 4. Quality of the Logit model

	Chi-Square	Df	p-value
Hosmer-Lemeshow test	3.72	6	0.88

Source: authors (2023)

3.3 Results of decision tree algorithm

Decision tree algorithm allows us to rank features according to their importance for preventing the possible bankruptcy. Based on table 5 we can say that the most important feature is profitability indicator ROC, followed by indebtedness indicators TDTA and SLTA.

Table 5. Features importance based on the decision tree algorithm

Feature	ROC	TDTA	SLTA	NWCTA	ROE	NCFTA	AT
Coefficient	0.42	0.25	0.16	0,10	0,04	0,03	0.01

Source: authors (2023)

Graphical representation of the results of decision tree algorithm for the selected training data is shown in Figure 3.

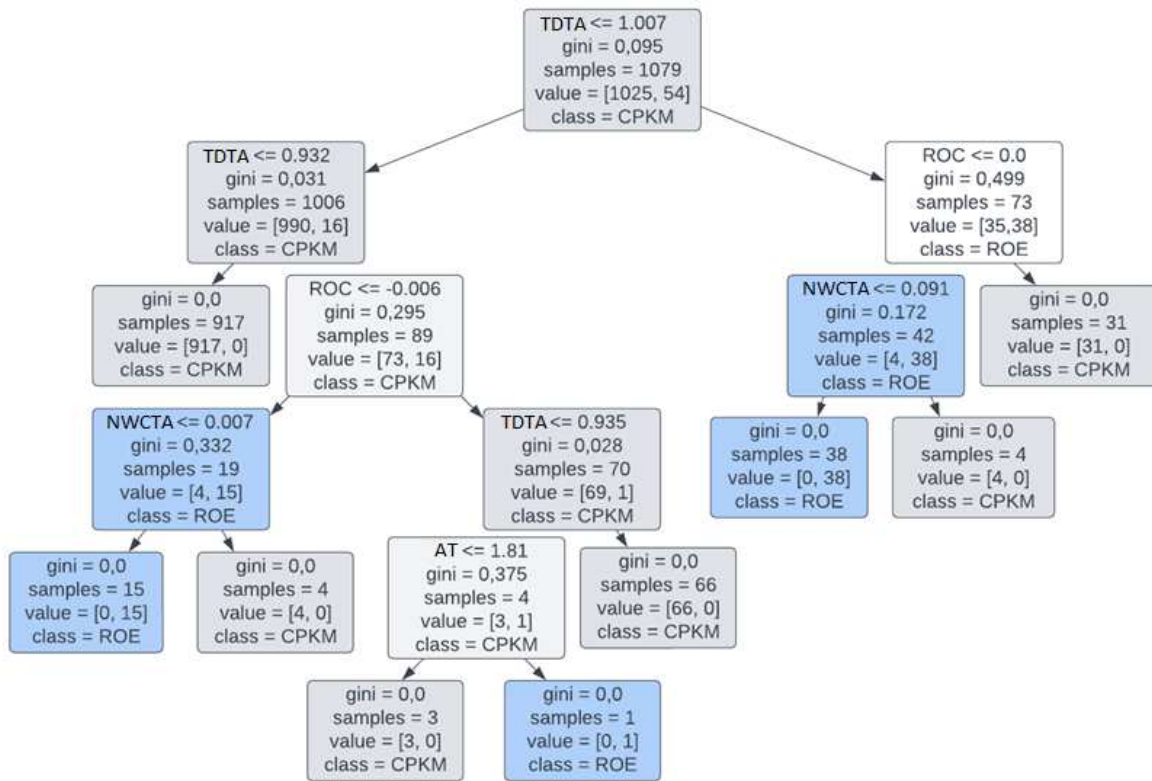


Figure 3. Decision tree diagram
Source: authors (2023)

3.4 Results of neural network

A feed-forward network with 5 layers, one input layer, one output layer and three hidden layers was chosen to predict the financial bankruptcy of businesses. The model worked with 7 financial features at the input layer. These features were selected by Lasso regression. As the additional input, the unit bias (θ) was added, which acts as a constant in the regression analysis. Neural network worked with three hidden layers of 16, 32 and 16 units respectively. The output layer represents one dependent variable - bankruptcy, while the total number of units is equal to 2. The network parameters can be seen in the figure 4.

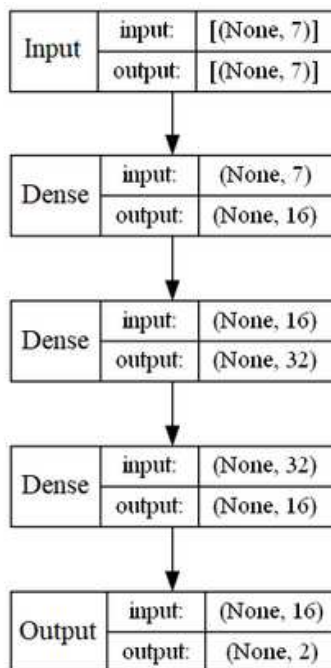


Figure 4. Neural network's parameters
Source: authors (2023)

4. Discussion

Overall performance of bankruptcy prediction models created in this paper was assessed with the use of accuracy, F1-score and AUC. Figure 5 shows results of these measures for the test data. As stated in section “Methods”, overall performance metrics were calculated as an averages of the five individual performance metrics obtained for each individual experiment.

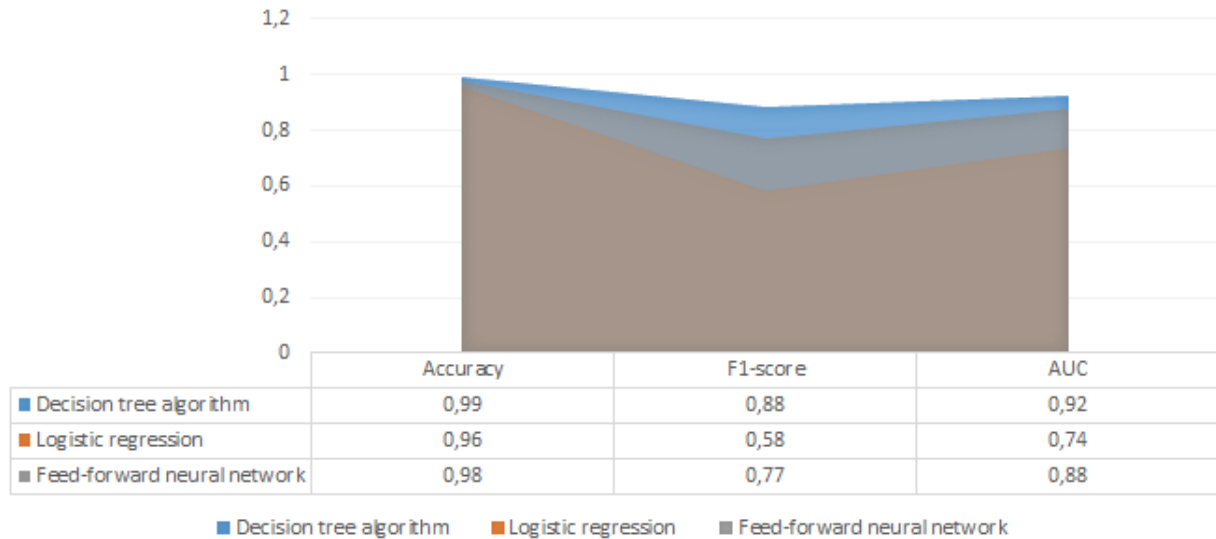


Figure 5. Overall performance of bankruptcy prediction models for test data
Source: authors (2023)

Applied models achieved the most balanced results in terms of accuracy. Decision tree learning algorithm achieved accuracy 0.99, feed-forward neural network 0.98 and logistic regression 0.96. Accuracy is a very often used performance characteristic of bankruptcy prediction models in other studies. For example accuracy of neural network created by Olson et al. (2012) in software SPSS was 0.798, while logistic regression achieved the same accuracy 0.798 and CART learning algorithm achieved the best result with the accuracy 0.898.

There are larger fluctuations in the results of AUC and F1-score for individual bankruptcy prediction models. The best results of AUC achieved decision tree learning algorithm (0.92) followed by feed-forward neural network (0.88) and logistic regression (0.74). We can see that decision tree learning algorithm achieved the best results also in this characteristic. Its results can be compared with AUC of CART learning models of Karas and Reznakova (2017), who created two CART models for construction industry. The difference between them was in the number of indicators. While the CART model with 5 indicators achieved AUC of 0.785, the CART model with 3 indicators achieved better AUC (0.859).

Decision tree learning algorithm achieved also the best results of F1-score (0.88). We consider this characteristic as the most appropriate one for the given sample of businesses since it is suitable for unbalanced datasets.

Two of the methods applied for bankruptcy prediction are able to assess the importance of the features entering the model. Therefore, we consider these models significant in terms of their interpretability. Logistic regression is able to identify statistically significant indicators in terms of businesses` bankruptcy. For the research sample of construction companies were identified as statistically significant two indicators of profitability ROA and ROE, indicator of indebtedness TDTA and safety indicator NWCTA. Decision tree classifier is able to rank indicators according to their importance in relation to businesses bankruptcy. Based on this method indicator of profitability ROC ranked first, followed by two indebtedness indicators TDTA and SLTA. Indicator of safety NWCTA ranked fourth. Based on these results we can say that construction companies should focus on managing their profitability, indebtedness and safety to avoid bankruptcy.

Conclusion

The best performing model in terms of all applied characteristics was CART learning algorithm. Therefore we consider this model as the most appropriate one for the given sample of construction

companies. This model is also early-warning model which is able to identify most important features which should be monitored in order to avoid bankruptcy. Based on its results we can conclude that analysed construction companies should focus on managing their profitability, indebtedness and safety. Due to the similar economic conditions in the V4 countries compared to Slovakia, the results of this model can also be applied in the construction companies of the V4 countries. Limitation of the given research is lack of available data to create a sufficiently large balanced sample of prosperous and non-prosperous companies doing a business within the construction industry. Due to the limited length of the article, the results of individual bankruptcy prediction models are presented briefly. They will be analyzed in more detail in the future research. To improve the performance of decision tree learning algorithm, boosted decision tree created with the use of AdaBoost methodology will be applied.

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Prediction of Corporate Bankruptcy - Malmquist Index Approach

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Abstract

Research background: The issue of bankruptcy is still relevant. Academics, as well as practitioners in the business environment, deal with it. In their studies, they apply different features selection methods, different features as well as various bankruptcy prediction models. When constructing bankruptcy prediction models, an often-solved question is whether to apply characteristics according to the knowledge of experts or apply any of the available scientific methods, or combine them.

Purpose of the article: The paper deals with the analysis of the financial failure of companies. The aim was to select bankruptcy prediction features applying selected methods and to compare the results of the dynamic bankruptcy prediction model constructed for these selections.

Methods: The research was carried out on a sample of businesses from the construction industry. The selection of bankruptcy features was carried out using domain knowledge (DK) and the LASSO method. For the dynamic prediction of bankruptcy, the Malmquist index based on Data envelopment analysis (MIDEA) was applied. When evaluating the results of bankruptcy prediction, attention was paid to the change in technical efficiency and frontier shift.

Findings & Value added: The contribution of the paper is a dynamic approach to predicting bankruptcy of businesses, which is based on the comparison of results over the years and on efficiency evaluation, which is divided into two categories, namely the change in the technical efficiency and frontier shift of businesses. The selection of features using the DK technique indicates that significant results can be achieved when applying suitable prediction method.

Keywords: bankruptcy, domain knowledge, features, LASSO, Malmquist index

JEL classification: C52, C53, M2

1. Introduction

The discussion surrounding the prediction of the company's financial decline and the potential risk of bankruptcy is prevalent in the current period. Various global issues, including the pandemic, as well as internal problems within the country and businesses form the assumption of their possible failure, and thus they have to face many challenges. There has been an increase in bankrupt companies in Slovakia, particularly from 2021 onwards. According to the information provided by the European Statistical Office Eurostat (2022), however, the number of new businesses grew faster than the number of businesses that went bankrupt, especially in the third quarter of 2022, while the most registrations were recorded in the field of construction (+8.1%), information and communication technologies (+2.3%) and transport and storage (+1.8%). Businesses analyzed in the given research are active in the construction industry. According to data from the Statistical Office of the Slovak Republic (2022), the growth in civil engineering construction exceeded 20%. The amount of works implemented abroad, which helped boost the industry's performance throughout 2021, has currently experienced a year-on-year decline. However, there has been an increase in domestic construction activities, including new construction, renovations, modernizations, as well as repairs and maintenance. When examining the construction industry's major subfields, there was a notable decrease of 3.7% in the construction of buildings, whereas engineering constructions, which mainly include highway construction, experienced a remarkable year-on-year increase of up to 23.7%. Currently, works on domestic civil engineering constructions make up almost 30.1% of the total construction production. Construction production in aggregate for the first quarter of

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2022 reached 1.1 billion EUR and increased by 4.9% year-on-year. Construction business is very important for the economy because it creates a strong multiplier effect. The construction industry's growth is bringing about positive outcomes in the supply sectors and services, fostering employment and supporting public finances. Nevertheless, it is worth noting that in the last two years, the construction industry in Slovakia has experienced a detachment from the business cycle's development. This unfortunate situation has resulted in the industry being unable to consistently and efficiently utilize the generous opportunities provided by EU financial frameworks for investments in essential engineering and civil infrastructure.

While the automotive industry was considered the main pillar of the Slovak economy before the crisis, experts currently agree that the construction industry will help the economic recovery in the recession the most. The construction industry actively contributes to the gross fixed capital in the economy by undertaking the construction of durable infrastructure and serving as a reliable gauge of the economic cycle's development. With its contribution to the gross domestic product ranging from 7-8%, the construction sector holds substantial importance. It is crucial to recognize that the proper functioning of this economic pillar is paramount, as it encompasses the construction of buildings and structures that form a significant component of investments and the overall formation of gross fixed capital.

1.1 Bankruptcy prediction models

The first to deal with bankruptcy prediction was Fitzpatrick (1932) (In: Klieštík et al., 2019), who in his study compared the financial indicators of financially sound business entities and those facing financial problems. In the following years, research into bankruptcy prediction was carried out by Merwin (1942), Chudson (1945), Jackendoff (1962) and Beaver (1966) (In: Delina & Packová, 2013). Beaver (1966), who used one-dimensional discriminant analysis to predict bankruptcy, pointed out that financial indicators can be useful in predicting the financial failure of individual business entities (Šarlija & Jeger, 2011). At the same time, he confirmed that not all financial indicators are suitable for this prediction. Multivariate discriminant analysis (MDA) models, such as Altman's Z-score model devised in 1968, were employed for bankruptcy prediction subsequent to univariate discriminant analysis. Since Altman's seminal study, there has been a significant increase in both the number and complexity of these models. Discriminant analysis was especially popular in the early days of predicting corporate bankruptcy. This method was used in the study by Taffler (1983) and other well-known studies. Following multivariate discriminant analysis (MDA), the subsequent approach in predicting corporate bankruptcy favoured the logistic regression method. Ohlson (1980) was the pioneer in utilizing this method in the prediction of businesses' bankruptcy. Ohlson's model demonstrated superior classification capability compared to discriminant analysis models (Aziz & Dar, 2006). Another conditional probability model employed in the prediction of corporate bankruptcy is the Probit model. Zmijewski (1984) introduced the Probit model for the first time. Mathematical programming and operational research have also become increasingly prominent in the field of corporate bankruptcy prediction. Markowski and Markowski (1987) also employed these methods to predict the financial health of business entities.

Data Envelopment Analysis (DEA) models are a special mathematical programming method applicable in bankruptcy prediction. Authors who devoted themselves to bankruptcy prediction using DEA included Cielen et al. (2004), Premachandra et al. (2009),

Conventional (static) DEA models were constructed to research only one time period. However, many researchers have also been interested in the change in efficiency over time, as such information can provide particularly important insights into financial difficulties prediction (Li et al., 2017). Shahwan and Habib's (2020) study using MIDEA was one of the first attempts to assess the relative effectiveness of corporate governance and intellectual capital practices and their impact on financial distress. In their work, Wang et al. (2021) focused on the calculation of MIDEA and used this index to predict and evaluate the performance of businesses in two periods: 2015–2018 and 2019–2022.

1.2 Methods for selecting features

Apart from selecting an appropriate model for predicting company bankruptcy, the selection of suitable features for bankruptcy prediction holds significant importance. Various methods exist for feature selection in this regard. Two main approaches can be identified in this domain, one of which involves the use of domain knowledge (DK) derived from financial and accounting information. The authors who favoured this approach include for example Tsai and Hsu (2013). Another approach involves the selection of features through more scientific methods. In this regard, two common methods are the 'filter' method

and the 'wrapper' method (Kirkos, 2015). The filter method assesses attributes based on measures that are independent of the learning algorithm to be employed. On the other hand, the wrapper approach evaluates a subset of indicators based on the specific learning method to be utilized. This approach is referred to as 'wrapper variables' (Kirkos, 2015). The LASSO method is one of the techniques employed in feature selection, as demonstrated by Tian et al. (2015) in their selection of relevant characteristics for the bankruptcy prediction model.

Considering the aforementioned research motivation, the MIDEA method was employed due to its underutilization in this research domain. The MIDEA method offers an advantage as a non-parametric approach that does not necessitate the fulfillment of prerequisites typically required in other methods, like DA. By employing the DEA method, it becomes feasible to identify companies experiencing financial distress as they lie on financial distress frontier. In contrast, the DA method rarely produces such outcomes. The application of MIDEA in predicting corporate bankruptcy is considered innovative due to its infrequent usage. One of its notable advantages is its dynamic approach to evaluating financial issues within companies, enabling the quantification of changes in technical efficiency and technological advancements. Employing MIDEA can be seen as bridging a gap in addressing the given problem, as prevailing methods such as discriminant analysis, logistic regression, and various genetic algorithms dominate the current research. One drawback of these methods is their inability to compare two years at the same time and uncover changes in both technical efficiency and technological advancements over the observed period. Moreover, an innovative aspect of this research lies in comparing the results of models that employ different features selection methods, namely domain knowledge (DK) and LASSO. This pioneering approach represents a new and innovative solution for predicting bankruptcy among companies in the Slovak construction industry. The main objective was to utilize the dynamic MIDEA approach for bankruptcy prediction. One of the sub-objectives was to compare the bankruptcy outcomes of companies using DK and LASSO features. Features were selected from financial indicators utilized in previous bankruptcy prediction studies or through the implementation of the LASSO method.

The structure of the paper is as follows: In the "Methods" section, the research sample is defined, two sets of features are introduced based on DK and LASSO approaches, and the methodologies of LASSO and MIDEA are explained. The "Results" section presents the performance results of MIDEA models constructed using DK and LASSO features. The "Discussion" section provides discussion to the obtained results. The "Conclusion" section offers conclusions, limitations and future research.

2. Methods

The Malmquist index (MI) was applied to predict corporate bankruptcy. Färe et al. (1984) presented a decomposition of MI into a catch-up effect and a frontier shift effect. These components correspond to two "movements in time", towards or away from the efficiency frontier, i.e. efficiency change (ECH) and movement of the frontier itself (frontier shift - FS), i.e. change in technology and introducing innovation. When interpreting, ECH, FS or $MI > 1$ mean an improvement over time.

Suppose that each decision making unit $DMU_j (j = 1, 2, \dots, n)$ uses a vector of inputs $x_j^t = (x_{1j}^t, \dots, x_{mj}^t)$ to produce vector of outputs $y_j^t = (y_{1j}^t, \dots, y_{mj}^t)$ at each period of time $t, t = 1, \dots, T$. Efficiency of DMU_0 can change or the frontier can shift or both changes may occur in the same time. The MI based on the DEA approach can be written as follows (1) (Zhu, 2014):

$$MI_o = \left[\frac{\theta_o^t(x_o^t, y_o^t)}{\theta_o^t(x_o^{t+1}, y_o^{t+1})} \cdot \frac{\theta_o^{t+1}(x_o^t, y_o^t)}{\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1})} \right]^{\frac{1}{2}} \quad (1)$$

where MI_o measures the productivity change between the periods t and $t + 1$. $\theta_o^t(x_o^t, y_o^t)$ is calculated by comparing x_o^t to the EPF (Empirical Production Frontier) at time t with the use of input oriented CRS DEA model, while $x_o^t = (x_{1o}^t, \dots, \dots, \dots, x_{mo}^t)$ and $y_o^t = (y_{1o}^t, \dots, \dots, \dots, y_{so}^t)$ are the input and output vectors of DMU_0 among others. Similarly $\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1})$ is calculated by comparing x_o^{t+1} to the EPF at time $t+1$, $\theta_o^{t+1}(x_o^t, y_o^t)$ by comparing x_o^t to the EPF at time $t + 1$; and $\theta_o^t(x_o^{t+1}, y_o^{t+1})$ is calculated by comparing x_o^{t+1} to the EPF at time t applying input-oriented CRS DEA model.

Research sample consisted of 231 companies doing a business in the construction industry within SK NACE 42. Data from financial statements of individual businesses for the years 2019 and 2020 were obtained from Slovak Analytical Agency CRIF - Slovak Credit Bureau, s.r.o. Despite the various economic impacts in the field of private and public investments in recent years, the construction industry is still considered one of the most important sectors of the Slovak economy (MTSR, 2019).

Two groups of bankruptcy prediction features were chosen for the research. The first group was created from features, the selection of which is based on the results of previous studies (DK approach) aimed at predicting bankruptcy. The second group of features was chosen based on the LASSO regression introduced by Robert Tibshirani in 1996. In this paper LASSO Logit model was used. The penalized logarithmic likelihood function of LASSO logistic regression that needs to be maximized can be written as (2) (Pereira et al., 2016):

$$l_{\lambda}^L(\beta) = \sum_{i=1}^n [y_i x_i \beta - \log(1 + e^{x_i \beta})] - \lambda \sum_{j=1}^k |\beta_j|, \quad (2)$$

where $\lambda \geq 0$ is the penalty parameter, β is the column vector of the regression coefficients, x_i are the independent variables, y_i is the binomial dependent variable, n is the number of observations, and k is the number of variables.

The penalty parameter λ was determined based on the minimum prediction error in cross-validation (λ_{\min}). When performing LASSO regression, assumption about whether businesses are prosperous or not needs to be taken into account. In this paper assumption about the prosperity was made based on the criteria proposed by Bakeš and Valášková (2018). According to these authors non-prosperous businesses achieve Earnings after taxes lower than 0, Current ratio lower than 1 and equity to debt ratio lower than 0.08.

Features that are different when selecting them based on DK and LASSO method are listed in table 1.

Table 1. Different indicators when comparing DK and LASSO indicators` selection

	DK	LASSO
Different indicators	Cash flow/ Assets, Cash flow/ Liabilities, Collection period ratio, Credit period ratio, Current ratio, EBIT/ Assets, EAT/ Sales	EAT/ Costs, Current liabilities/ Total assets, EAT/ Total assets

Source: authors (2023)

3. Results

Descriptive statistics results of the first sample of indicators selected by DK are listed in Table 2.

Table 2. Descriptive statistics of DK indicators

Variable	Mean	Median	Minimum	Maximum	Std. Dev.
Current ratio	3.62	1.54	0.02	336.27	16.05
Working capital/total assets	0.97	0.94	0.00	1.75	0.34
EBIT/total assets	0.28	0.26	0.01	1.02	0.14
EAT/equity	0.98	0.94	0.00	4.73	0.33
EAT/sales	0.61	0.60	0.00	1.18	0.09
Assets turnover ratio	1.83	1.45	0.01	27.44	2.02
Retained earnings/total assets	0.31	0.24	0.00	2.57	0.31
Cash flow/liabilities	1.53	1.83	0.01	10.26	1.04
Cash flow/assets	0.30	0.29	0.01	0.94	0.13
Liabilities/total assets	0.54	0.56	0.01	0.99	0.27
Debt to equity ratio	4.13	1.28	0.01	163.13	13.57
Collection period ratio	0.39	0.24	0.00	20.93	1.27
Credit period ratio	0.54	0.26	0.00	43.66	2.16
Inventory turnover ratio	0.42	0.01	0.00	84.78	4.82

Source: authors (2023)

The results of descriptive statistics of the second sample of indicators, selected by LASSO method, are listed in Table 3.

Table 3. Descriptive statistics of LASSO indicators

Variable	Mean	Median	Minimum	Maximum	Std. Dev.
Working capital/total assets	0.97	0.94	0.00	1.75	0.34
Assets turnover ratio	1.83	1.45	0.01	27.44	2.02
EAT/total assets	0.26	0.25	0.01	0.18	0.00
EAT/equity	0.98	0.94	0.00	0.00	0.33
EAT/costs	0.39	0.37	0.00	1.29	0.10
Retained earnings/total assets	0.31	0.24	0.00	2.57	0.31
Liabilities/total assets	0.54	0.56	0.01	0.99	0.27
Debt to equity ratio	4.13	1.28	0.01	163.13	13.57
Current liabilities/total assets	0.44	0.43	0.00	0.99	0.25
Inventory turnover ratio	0.42	0.01	0.00	84.78	4.82

Source: authors (2023)

Business bankruptcy prediction models with input selection using DK and LASSO approaches have provided interesting results in the field. They can also be the basis for further research. The results using DK indicators` selection for the analyzed sample of businesses are presented in table 4. These results are the averages of MIDEADK (Malmquist index DEA domain knowledge) outputs.

Table 4. Results of MIDEADK

Variable	Descriptive Statistics DK					
	Valid N	Mean	Median	Minimum	Maximum	Std. Dev.
MIDK	231	2.70	1.74	0.04	61.63	5.42
ECHDK	231	1.69	1.01	0.07	39.03	3.36
FSDK	231	1.56	1.65	0.12	3.08	0.37

Source: authors (2023)

Results of MIDEADK using selected DK data shows that the productivity of businesses (MIDK) is high. as the average value of this indicator reaches 2.7. This result is due to the value of ECHDK as an improvement in efficiency (average value 1.69). as well as the technology change coefficient (FSDK). which reached 1.56.

Results of MIDEALASSO listed in Table 5 shows that the analyzed sample of businesses is doing well in terms of its financial health. The average value of ECHLASSO is 1.77. This value indicates an improvement in the financial health of companies. However, FSLASSO shows that the shift of the efficiency frontier is below 1, so the innovation adoption process stagnates compared to DK indicators selection (FSDK).

Table 5. Results of MIDEALASSO

Variable	Descriptive Statistics LASSO					
	Valid N	Mean	Median	Minimum	Maximum	Std.Dev
MILASSO	231	1.77	1.15	0.03	47.39	3.68
ECHLASSO	231	2.02	1.25	0.06	52.21	4.16
FSLASSO	231	0.89	0.89	0.05	1.64	0.67

Source: authors (2023)

A graphic comparison of the average values of efficiency indicators is shown in figure 1.

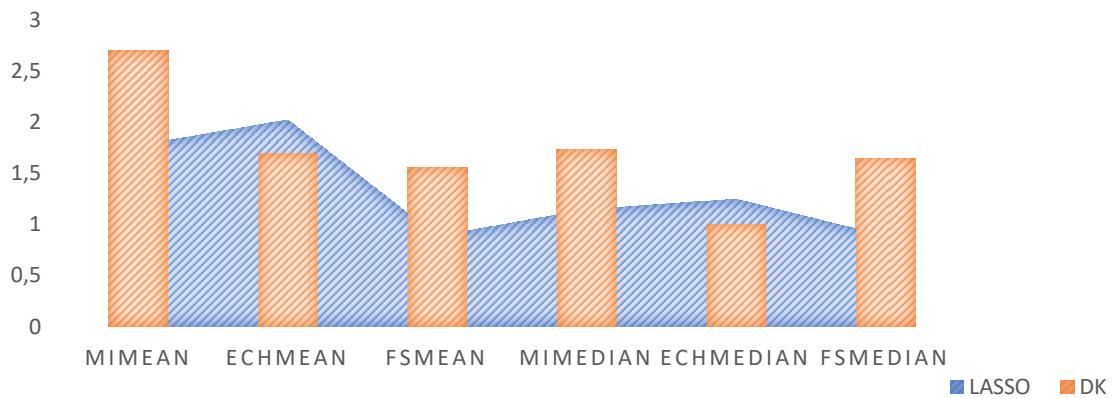


Figure 1. Comparison of average values of efficiency indicators
Source: authors (2023)

It is clear from the figure that in the case of selecting inputs using LASSO, there are problems with the introduction of new technologies and innovations.

4. Discussion

When we look at the specific results of MI, they are different. When applying the DK indicators, there are 36 inefficient businesses in the analyzed sample that are at risk of bankruptcy. In the case of the MILASSO calculation, there are 77 such businesses. This is mainly due to what was mentioned above, namely the stagnation in the introduction of new technologies, but also the selection of input parameters to MI using LASSO,

A comparison of the number of businesses, according to the Total factor productivity (TFP) scale calculated using MI is presented in figure 2.

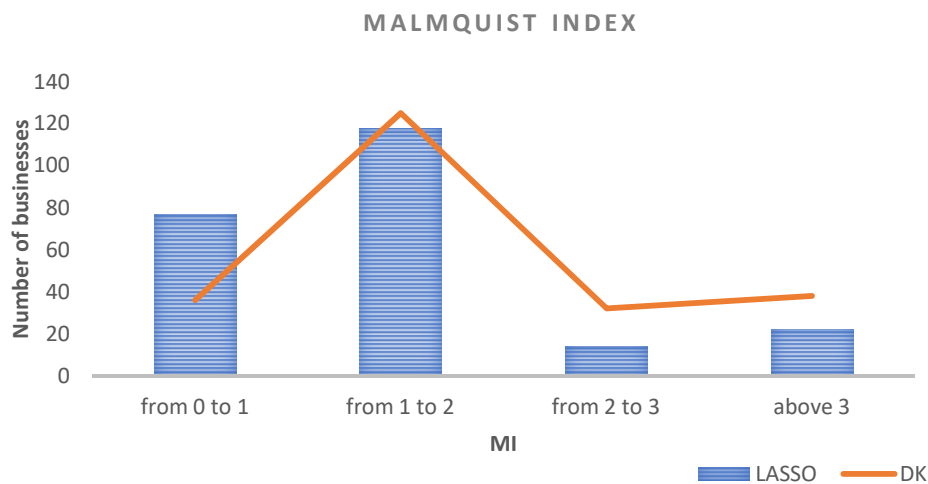


Figure 2. Results of MI using DK and LASSO indicators selection
Source: authors (2023)

Figure 3 shows that more businesses identified as inefficient and bankrupt were confirmed in the case of the selection of indicators by the LASSO method. On the contrary, a larger number of efficient and non-bankrupt businesses was confirmed when selecting indicators using DK. The number of inefficient and bankrupt enterprises when selecting indicators using the LASSO method was 77, while in the case of DK it was 36.

Since MI is composed of two indices, it is possible to analyze the results in more detail. The change in technical efficiency can be seen in Figure 3.

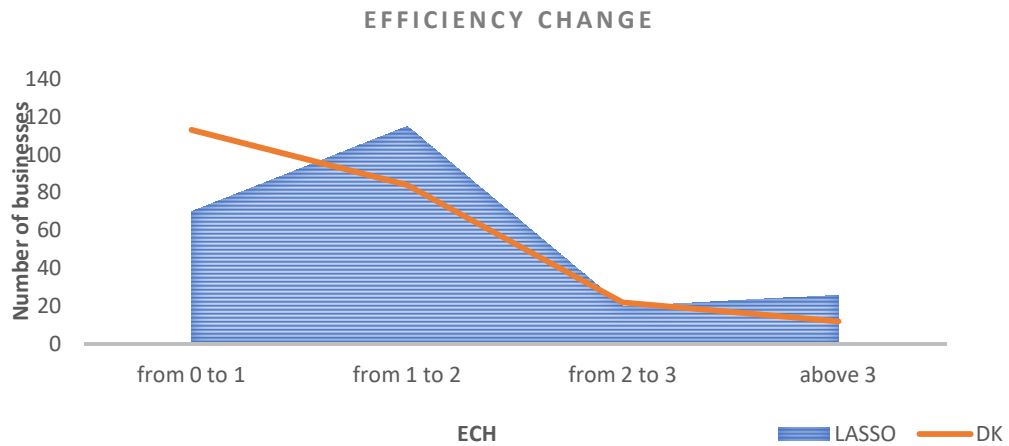


Figure 3. Results of ECH using DK and LASSO indicators selection
Source: authors (2023)

Figure 4 shows that when applying DK indicators, more enterprises were identified compared to the LASSO selection, in which there was no increase in efficiency and the effect of catching up the efficiency frontier did not occur. On the contrary, when applying indicators selected by the LASSO method, 115 businesses were confirmed, which lie on the efficiency frontier or exceed it, and also 46 businesses, which are high above the efficiency frontier.

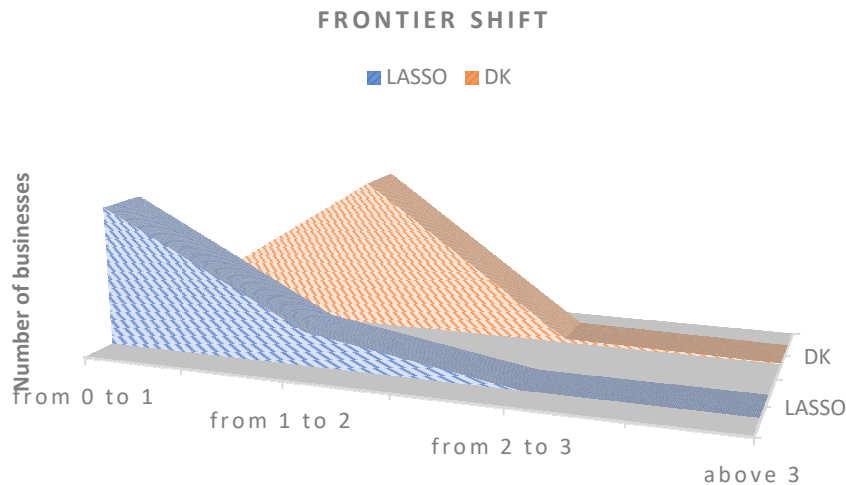


Figure 4. Results of FS using DK and LASSO indicators selection
Source: authors (2023)

A completely different situation occurred in the case of FS, i.e. shift in the efficiency frontier, namely through the introduction of new technology or innovations. In this case, when selecting indicators according to LASSO, 186 businesses were identified for which no shift in the efficiency frontier was recorded, i.e. no technological change was implemented. While when applying the indicators selected by DK, only 25 such businesses were identified. In the case of DK application, 200 businesses experienced a significant technological change in the given time period.

Figure 5 shows the distribution of businesses in 3D space with the application of DK indicators. It is clear from the graph that MIDK achieves significantly higher values compared to MILASSO, which can also be seen in figure 6. It means that more businesses were identified as efficient and well-performing applying this selection of indicators.

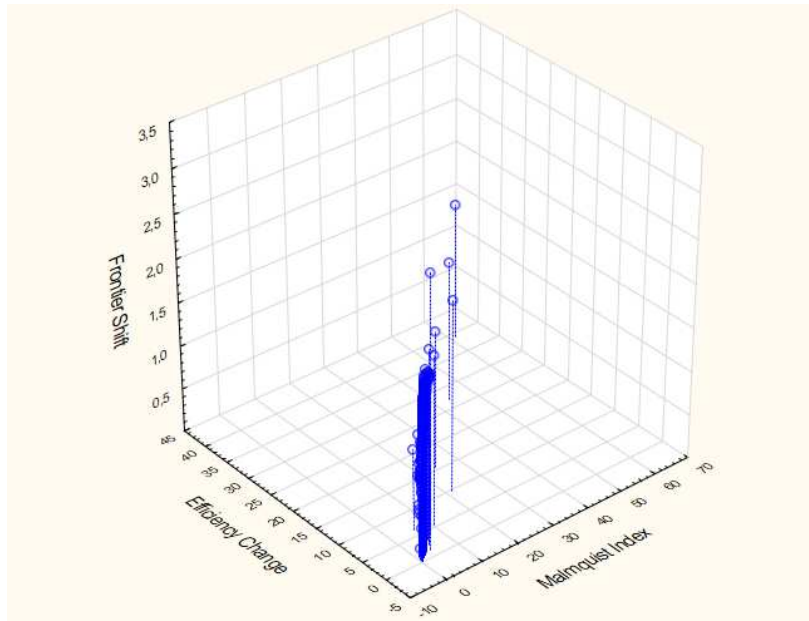


Figure 5. Scatterplot of FS against MI and ECH - DK selection of features
Source: authors (2023)

When selecting features according to LASSO, the share of efficient businesses in the total number of businesses is lower than in the case of the application of DK features. When applying features selected by DK, the increase in technical efficiency was significantly confirmed. The increase in technological change was more significant when applying features selected by LASSO.

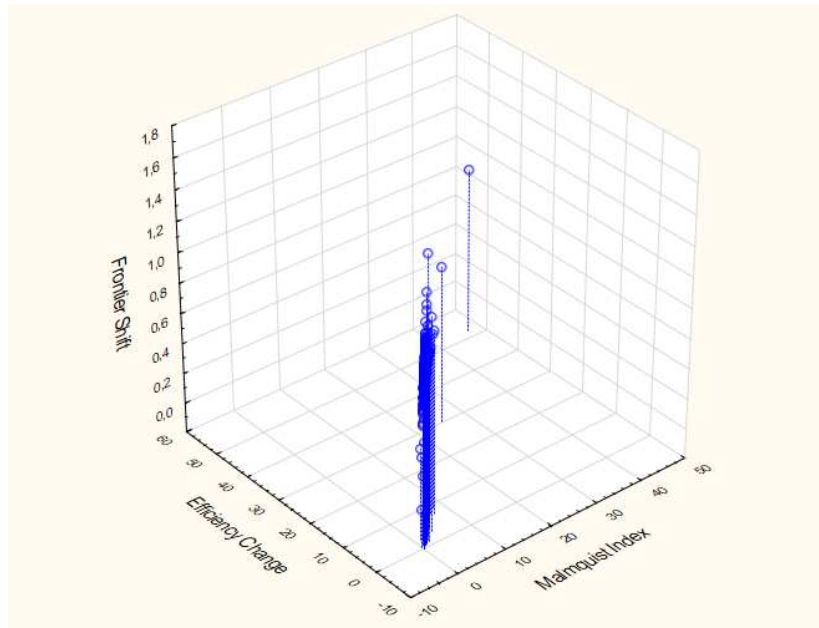


Figure 6. Scatterplot of FS against MI and ECH - LASSO selection of features
Source: authors (2023)

MIDEA index was used in the study by Li et al. (2017). These authors analyzed data of 742 Chinese business units over a ten-year period. The results of their investigation revealed that MIDEA offers valuable insights into a company's competitive position and facilitates accurate predictions of financial distress based on the DEA efficiency measures.

Conclusion

In this paper, the dynamic approach to businesses' bankruptcy prediction was applied using Malmquist index based on the DEA approach. The use of this method enabled to assess the change in

efficiency of businesses over time. It also made it possible to monitor not only the efficiency results measured by the Malmquist index, but also more deeply analyze its two components, the change in the technical efficiency and frontier shift. When selecting features, two approaches were used - approach based on experts opinion (DK) and one of the data mining techniques (LASSO regression). Important finding is that when selecting features according to LASSO, the share of efficient businesses in the total number of businesses is lower than when selecting features with the use of DK. The main contribution of the paper is finding that increase in technical efficiency was significantly confirmed in the case of DK features selection, while increase in technological change was more significant in case of LASSO features selection. Limitations of the research were connected with the fluctuation of businesses within the construction industry. Therefore it was not possible to obtain a larger sample of businesses for two years. Future research will be aimed at the comparison of the results of other innovative methods which can be used for features selection, for example decision trees or genetic programming. Managerial implications of the research lies in the fact that selected features can help managers of construction businesses to better identify the impending bankruptcy, However, they have to be selected for a larger sample of companies from the given industry.

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Resources

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Financial Auditors' Perspective on Environmental, Social and Governance Non-financial Data Dissemination by Bulgarian Companies Participating in Global Value Chains

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Abstract

Research background: Sustainable public and private sector development is constantly changing. One of the possibilities for enterprises to reduce their costs and gain innovativeness through technology diffusion is to participate in a Global value chain (GVC). However, recent studies are indicating that Bulgarian enterprises refrain from such participation. The adaptation of business processes to unforeseen circumstances such as COVID-19, international wars, and others has an additional negative impact on the entity's financial situation. Due to these circumstances, compliance with the rules and policies of corporate social responsibility is not entirely sufficient. Textual disclosures, such as ESG, in the financial statements of entities are factors for the sustainability of micro- and macro-level throughout the industry, especially globalized ones. However, due to the wide variety of disclosures, there is a lack of textual homogeneity in published data related to non-financial textual disclosures. The financial auditor has an essential role in the disclosure of data's reliability.

Purpose of the article: The purpose of the paper is to present the importance of auditors' involvement in auditing non-financial information (with a main focus on ESG) to companies participating in a Global Value Chain in Bulgaria.

Methods: The adopted research methods are logical, deductive, and comparative methods, methods of analysis and synthesis, as well as the method of desk research. To collect primary data individual interviews with independent financial auditors, who are auditing Bulgarian companies in GVC, are presented.

Findings & Value added: The paper presents data related to the requirements for carrying out auditing procedures by financial auditors related to the check of the ESG disclosure data. Emphasis is set on the importance of risk assessment and to what extent this method has been implemented in Bulgaria. The answer to such questions could improve the level of reliable disclosure and hence the overall financial situation of the companies. This, on hand, can improve the participation of enterprises in GVC.

Keywords: management, audit, global value chain, environmental and social perspective, governance perspective

JEL classification: G32, M42, M40

1. Introduction

European law requires large and public interest listed companies (with certain exceptions) to publish information on social and environmental (ESG) issues and their risks and impacts on people and the environment. The disclosure of ESG data is believed to improve the financial performance of enterprises (Kumar & Firoz, 2022; Mario et al., 2021), increase stock market returns (Weber, 2014), reduce credit risk (Barth et al., 2022) and has an impact on investor decisions. Among the main purposes of the disclosures is to present true and fair information for economically justified and objective decisions by the data users from the financial statements of the enterprises. However, as a result of the wide variety of

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disclosures, there is no narrative consistency of published data, which creates international disharmony (Stolowy & Cazavan-Jeny, 2001). There is also a risk of information asymmetry and even publication of false, misleading data or information that can be characterized as an enterprise secret. The existence of such risks depends on the managerial attitudes towards ESG, the person preparing such kind of information for the financial statements and the appropriate control over the published data. Such control is provided to the fullest extent by the independent financial auditor. According to IFAC data (Corporate decision-making, 2023, p.3), CPAs account for a majority of all assurance reports on ESG. 70% of the ESG assurance reports provided by audit firms were done by the same firm as the statutory auditor for the same reporting entity. In addition, it is emphasized that the auditor knows the business processes and financial risks and can provide assurance regarding ESG. In this respect, independent financial auditors have an essential role in ESG disclosure.

Even though the topic of social and environmental policies of enterprises is not new for science and business, seeing to what extent the independent financial auditor should be perceived as a tool for the control and management of ESG risk has not been sufficiently analyzed in Bulgaria. The purpose of the paper is to present the vision of the independent financial auditors in Bulgaria regarding their participation in the review of published non-financial information (with a main focus on ESG) to companies, participating in Global Value Chains (GVCs). The adopted research methods are logical, deductive, and comparative methods, methods of analysis and synthesis, as well as the method of desk research. To collect primary data individual interviews with independent financial auditors, who are auditing Bulgarian companies in GVC, are conducted. The results of the research support the literature in the field by presenting information about the attitude of the Bulgarian financial auditors towards their commitments regarding the ESG policies of the enterprises.

2. Literature review

The audit helps to reduce information asymmetry and improve the effectiveness of ESG policies of enterprises (Agyei-Mensah, 2018). It is believed that voluntary disclosure of more reliable non-financial information, including ESG data, can be ensured through qualitative audits (Ammar Zahid et al., 2022, p. S203). This requires auditors to put more effort into reducing the risk of a bad ESG reputation for companies with poor ESG performance (Asante-Appiah, 2020). Wang et al. (2023, p. 14) argue that when the quality of financial reporting of companies with good ESG performance improves, it influences the financial auditor's opinion. D. Georgieva, in a study on the factors that have an impact on the disclosure of non-financial information in Bulgaria, calculated an average statistical relationship between external audit control and staff-related disclosures (Georgieva & Georgieva, 2020). In addition, the author considers that the degree of disclosure of non-financial information is influenced by the presence of foreign participation in the capital of enterprises and whether the entity can be perceived as a global enterprise.

World trade and production are increasingly dependent on global value chains, representing "the full range of activities by firms and workers to bring a product from the conception of its creation to its consumption and subsequent disposition" (Gereffi & Fernandez-Stark, 2011). GVC is characterized by related activities of companies in different countries. Some of them are characterized by the participation of a large number of small firms, each of which carries out specific activities coordinated through horizontal transactions. Others involve many activities that are internationalized through large multinational companies (Strange, 2020). The participation of enterprises in such chains leads to an increase in the demands of investors for more reliable financial and non-financial reporting, as well as to the strengthening of control as a result of the different reporting requirements in the different countries in which the individual activities of the enterprise are positioned. In this context, the requirements for financial audit engagements are also increasing.

Without generalizing, the auditing profession in Bulgaria is over-regulated. This is because auditors must comply with every change of regulations against the specifics of the business and public pressure, such as the General Data Protection Regulation (GDPR), counteracting money laundering risk assessment, publication of non-financial information and others. For an audit to be of added value, a well-developed strategy is needed. The transition to ESG starts with the writing of relevant non-financial information. In 2011, the Organization for Economic Co-operation and Development (OECD) issued guidelines emphasizing the auditor's role and choice regarding non-financial information. Enterprises are required to apply high-quality standards related to accounting practices, and financial and non-financial disclosure, including environmental and social reporting. An annual audit should be

conducted by an independent, competent and qualified auditor. It is so to provide an external and objective assurance that the financial statements fairly represent the financial position and performance of the enterprise (OECD, 2011, p. 28).

Auditing the non-financial information in the financial statements was also a challenge for the auditors. The reason is the innovative standards that have been developed for auditors to carry out their procedures and risk assessments. Since July 2012 the International Federation of Accountants has developed: International standards for quality control, auditing, review, other assurance engagements and related services of the International Auditing and Assurance Standards Board. According to Peycheva and etc. (Peycheva et al., 2016, p. 393), the Institute of Certified Public Accountants in Bulgaria (ICPA) has an essential role in the correct implementation of audit procedures, as it translates the standards from English into Bulgarian language. Currently, there are legislative reforms worldwide, which have also been introduced in Bulgaria regarding non-financial information and are included in:

- Handbook of International Quality Control, Auditing, Review, Other Assurance, and Related Services Pronouncements Version 2021;
- International Quality Control, Auditing, Review, Other Assurance, and Related Services Pronouncements Version 2021, Part II;
- International Quality Control, Auditing, Review, Other Assurance, and Related Services Pronouncements Version 2021, Part III;
- Handbook of the International Code of Ethics for Professional Accountants) – Version 2022.

The global ESG standards are expected to officially come into force at the start of the fiscal 2024 year and to be published by enterprises in 2025 (Global ESG Reporting Rules Could Be Imposed From Fiscal 2024). This requires auditors and accountants in Bulgaria to comply with the formation of an International Sustainability Standards Board and the SEC's work to prepare a climate risk disclosure rule. At the European level, this process has already started with the introduction of the Corporate Sustainability Reporting Directive (CSRD) at the beginning of 2023. CSRD includes new challenges regarding climate change and other sustainability issues. At that moment an advisory group is in the process of developing European Sustainability Reporting Standards (ESRS). Large public-interest companies (like listed companies, banks, insurance companies and others) will be required to comply with these regulations. The ESG disclosure requirement also applies to small and medium-sized enterprises, for which a grace period of 1 year is provided and under reduced requirements. In the member states of the European Union, there will be a period of adaptation for each country, as well as the development of guidelines and rules regarding the refinement of emerging ESG risks. At the moment, the Republic of Bulgaria and ICPA have not created such a methodology. However, its development and implementation may take considerable time, taking into account the current situation of political uncertainty in the country. This can lead to delays and even a lack of basic training and experience related to ESG for the auditors.

3. Methodology

To collect primary information about the opinion of certified public accountants (CPAs), an author's questionnaire of 7 open questions was prepared. Data from the ICPA's Public Register was used to identify potential respondents. From a total of 731– CPAs, members of the Institute of Certified Public Accountants in Bulgaria, were sent invitations to 100 potential respondents. The selected are financial auditors of enterprises involved in the global value chains. Hence, it is considered that they will have better knowledge and experience related to ESG. Based on the respondent method, 7 CPAs were finally interviewed. The low response rate is considered by the authors as a limitation of the study. However, it provides some signs regarding the view of the auditors towards the subject under analysis.

Interviews were conducted over the telephone during the period April-May 2023 with an average duration of 25 minutes. The purpose of the interviews was to outline the attitudes and views of the interviewed experts regarding:

- the measures and procedures they carry out about the verification of non-financial information, subject to publication in the financial statements of the enterprises;
- the influence of the measures and procedures carried out by the auditors about the verification of non-financial information on the financial condition and reputation of the enterprises;
- the understanding of the importance of the ESG data and the measures the auditors have taken to be prepared for the new regulations in the field.

3.1 Survey results and discussions

From a socio-demographic point of view, the interviewees were from big cities, mostly female (86%) with experience in the field over 10 years (71.43%). All the interviewees claim that they are familiar with the national and European requirements regarding the disclosure of non-financial information. The verification procedures carried out by them are aimed at verifying if the disclosure follows the obligatory standards data and if the deadlines for their submission to the national authorities are complied with. „To the extent that non-financial information disclosed can be measured and verified, we apply customary procedures. Concerning additional asset impairment risks due to green technologies and/or requirements, we make investigative inquiries about management's plans to implement new technologies, decommission existing assets, analysis of management assumptions and other“. When asked if the auditors are preparing for the expected regulatory requirements and changes in ESG policies and disclosures, only about 40% say they have started looking for training in the field.

However, the interviewees indicate that, to a large extent, non-financial information incl. ESG data is written by the accountants of the companies, with managers very little involved in this process. However, accountants are not fully competent in matters concerning the environment and social environment of the enterprise, which makes the disclosed data irrelevant and even useless. The main reason for such a negative trend in Bulgaria is the fact that the management perceives the disclosed non-financial data as part of the financial statements of the enterprises, for which accountants are primarily responsible. As a result, it is important for managers that the deadlines are met and that the enterprise comes to "expected" accounting and tax results, and not so much what is disclosed as non-financial information, as long as it does not negatively affect the reputation of the enterprise.

According to the majority of interviewees (nearly 60%), auditors are gradually beginning to gain knowledge about the multiple aspects of reporting and the impact of sustainable development on business. „Discussing with the client the individual manifestations both at the level of financial statement and at the level of reporting of non-financial information helps speed up the process of forming an understanding and applying the requirements“. Nevertheless, "the developing, compliance and disclosure of such policies and measures by enterprises are rather only on paper“. In this respect, none of the respondents considers that the applied audit measures and procedures about non-financial information have an impact on the reputation, profitability and economic condition of the enterprises.

To a large extent, the consideration of the questioned auditors is in the direction of inefficiency and the lack of understanding of the disclosed policies and measures, which can be traced from the managers and accountants and by the auditors themselves. A specific example was given of an entity publishing non-financial data only to have published it to comply with legal requirements. At the same time, however, some of the information can even be interpreted as "risky" for the enterprise. However, the need for the accountant to "satisfy" the management's requests to publish information to increase the prestige of the enterprise can have a negative result, especially due to the lack of competencies in the field of ESG. At the same time, the performance of "atypical" functions for accountants is a "usual" practice in Bulgaria, especially for accountants of micro and small enterprises. Although accountants realize that this can lead to asymmetric information, they often feel "squeezed by the managers“. In this case, however, the auditor is only obliged to ascertain the existence of such information, and not to give an opinion on its usefulness.

The data collected and analyzed by the auditors that were interviewed gives us reason to argue that the review of ESG disclosures is perceived as a "presence finding" rather than an essential part of reporting. In this case, a question can be raised whether and to what extent the nature of such disclosures was understood by the auditors? Although auditors primarily have a control function, they indirectly have a significant impact on the strategic decisions of management. The lack of understanding of the importance of ESG reporting along the manager-accountant-auditor chain can lead to an incorrect introduction of a methodology for specifying emerging ESG risks, and from there to its incorrect application. To support ESG-related activities, the management of companies must initiate the writing of such a report before it is audited by financial auditors.

4. Good practices in the audit field for sustainable business

Development and implementation of a suitable methodology for the disclosure of ESG information in Bulgaria should not be done in isolation, without prior analysis of best practices. One of the notable best practice examples is given by the globally recognized auditing company from the Big 4, Ernst & Young (E&Y) (EY sustainability and ESG leaders share insights on how organizations can

embed sustainable business practices into their operations). Its representatives share the view that although the last letter in the "ESG" acronym is related to governance, which is fundamental, effective governance is not possible if there is weak oversight from government authorities. Therefore, businesses must engage in dialogue with the government. Another representative from the auditor's company, Kristen Gray, also presents an important benefit for businesses from the implementation of ESG. He gives the example of the US law which has implemented the Inflation Reduction Act. This Act is designed to support investment in energy transition and renewable technologies. Hence, new tax provisions can help enterprises. In this respect, it is appropriate and beneficial to propose tax incentives for enterprises that implement and disclose ESG policies. Of course, such incentives should be tied to specific measurable indicators that allow an assessment of the effectiveness of the measures undertaken by the enterprises and their sustainability over time. When taking into consideration such a statement we should take into account that companies expect state involvement in ESG and require legislative changes, especially in taxation (Skýpalová & Kučerová, 2014, p. 1413). Even though companies don't sufficiently know and understand the basic principles of the CSR and ESG concept they could become more demanding in the process of developing governmental policies which could lead to inappropriate practices.

If we conduct a more in-depth analysis of best practices regarding ESG audits, it is appropriate to consider Thomson Reuters' research titled „Understanding ESG audits: Checklist and best practices“. According to this research, auditors should pay attention to 5 main components - Assess the ESG landscape, Choose an ESG reporting format (standards), Prepare for ESG engagements, Integrate ESG into an annual audit plan, and Implement audit software and guidance. These components fully outline the main processes within the scope of ESG data audits and could be implemented in Bulgarian audit practices.

Factors that may influence ESG audits are also important. On one hand, according to A. Dennis (2021) factors that would affect the financial reporting of the company depend on the business sector, location, key transactions of the company, forecasted risks, and others. On the other hand, these factors are divided into physical risks – how meteorological conditions would affect the business and the useful life of assets that align with ESG requirements. Such factors also require specific knowledge on the part of the auditor, which cannot always be acquired through general training in the field. In this regard, it is necessary to also pay attention to the specific competencies of the auditor by introducing certain non-discriminatory requirements. Additionally, the information from the ESG report is of great interest to stakeholders, requiring auditors to ensure the appropriateness of the information to be harmonised with the financial statements.

Conclusion

Within the conducted study, it was found that independent financial auditors in Bulgaria, analyzed in the paper, are not fully prepared for the implementation of ESG reporting requirements and disclosure. There is a lack of understanding in the manager-accountant-auditor chain regarding the benefits and risks of such publishing.

Bulgaria has not yet taken specific legislative measures, which is why the current implementation of the new ESG requirements is limited to general training and acquiring basic knowledge by the auditors. However, this will not be sufficient in the context of the increasing importance of ESG data.

ESG leads to a fundamental change in terms of business sustainability and every stakeholder involved in it. The financial sector has undergone a complete transformation related to ESG practices. The legislation imposes regulatory requirements that accountants and auditors will need to adapt to. To have a smoother transition to ESG, it is reasonable to improve our knowledge in this area and adapt it to our professional activities. Every participant in the global supply chain has a role to play in this adaptation, including financial experts.

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Financial Anxiety in the Context of Income, Age and Education

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Abstract

Research background: Financial anxiety is a prevalent and enduring type of stress experienced globally. It can be described as a condition of concern, unease, or emotional strain arising from financial matters, including money-related issues, debt, and upcoming or ongoing expenses.

Purpose of the article: This study explores the prevalence of financial anxiety among males and females in Slovak republic and investigates its possible relationship with monthly net income, age groups and educational level.

Methods: Data for this study was collected through a survey where respondents were asked about their feelings of anxiety regarding their finances in the current socio-economic and political situation. The survey encompassed various demographic factors, including gender, age group, education level, monthly net income etc. Correspondence analysis was used to explore the relationships between educational level, monthly net income and inclination to financial anxiety.

Findings & Value added: We find that financial anxiety is more prevalent among females, with 70.4% reporting feeling anxious about their finances compared to 46.3% of males. Both genders experience financial anxiety, and the percentages vary mainly based on monthly net income. As monthly net income increases, the percentage of individuals feeling anxious decreases for both genders. Financial anxiety is more likely to be present in cases of individuals with secondary education with matriculation exam and monthly income between €1001 - €1500, second university degree-educated individuals earning between €500 - €1000 and individuals with a 1st university level education and monthly income between €1500 - €2000.

Keywords: financial anxiety, financial literacy, net income, gender differences

JEL classification: G50, G53, G59

1. Introduction

According to Huston (2010), literacy refers to a person's ability to read and write (Zarcadoolas, Pleasant and Greer 2006). The standard definition of literacy developed the use of printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential" (Kirsch, 2001). In its widest sense, literacy consists of the use, ability to write, read and count of materials and comprehension of information and documents. The idea of literacy has been over time extended to the study of specific skill sets, such health literacy, computer literacy, statistical literacy, financial literacy, environmental literacy, legal literacy, digital literacy media literacy and so forth. Financial literacy is a knowledge, skills, and understanding of financial concepts that enable individuals to make informed and effective decisions about their personal finances. It involves having the ability to manage money wisely, budget effectively, and make informed choices about saving, investing, and spending.

In this paper we will focus on one of the financial literacy components, financial stress/anxiety. Firstly, financial literacy is the ability and knowledge of proper management of money and financial

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resources, thus ability to understand financial concepts, manage money effectively, plan a budget, invest, understand risks and debts, and understand the basics of economics. These competences allow individuals to make more informed decisions about their finances, helping them achieve financial stability and better long-term outcomes. Financial stress, or anxiety is a condition when an individual, or household increased pressure in connection with financial matters. This condition can be caused by various factors (financial factors, emotional stress, increase of debts, impoverishment, health problems) and can have different levels of intensity.

According to OECD/INFE 2020 International Survey of Adult Financial Literacy which surveyed 26 countries and economies financial stress is a common phenomenon. According to findings, 42% of individuals worry about everyday living expenses and 37% of the sample reported that they are just getting by financially. Given numbers suggest significant part of the individuals experience financial anxiety and came across financial worries in everyday life (OECD/INFE 2020). As far as overall financial literacy is concerned, survey revealed that financial literacy was relatively low in all 26 countries. Individuals scored an average of 12.7 points, what is 61% of the maximum possible financial literacy score. The average value of the OECD countries in the survey was only slightly higher, 13.0 points. The highest score in financial literacy was achieved by Hong Kong (China) - 14.8 points, while Italy was the worst with 11.1 (OECD/INFE 2020).

Huston (Huston, 2010) outline the thought that establishment of financial education programs designed specifically to increase financial literacy is seen as a solution to alleviate the financial problems faced by individuals and families. On the other hand, research brings mismatched evidence about the measurable benefits of education on financial literacy provides measurable benefits (Huston, 2010; Fox, Bartholomae, and Lee 2005; Lusardi 2003; Mandell 2005; Willis 2008). Willis (2008) argues that the costs of financial education programs may outweigh the benefits. Some literature suggests that financial education does not have a significant effect on the improvement of the financial knowledge of high school students in the United States (Mandell 2005).

Nowadays is characterized by growing anxieties due to socio-economic, political, or interpersonal relations. We can also perceive anxiety in relation to finances and financial worries in everyday life. According to the American Psychological Association's 2022 Stress in America Survey (American Psychological Association, 2022), 87 % of people who responded listed inflation as a source of significant stress, followed by the economy (69%) and money (66%) as a significant source of stress. Financial anxiety can have a negative effect on mental health but also for financial decisions. Financial literacy and knowledge in this area could also help.

Jung et al. (2022) investigated the link between the financial impact of COVID-19 and the psychological well-being of South Korean adolescents. The results indicate that the economic hardships resulting from COVID-19 are strongly connected to increased financial anxiety among adolescents, particularly among females and those with lower incomes. To address this issue, the researchers suggest implementing a combination of psychiatric support and relevant financial education. Shih and Ke (2014) found that money anxiety is particularly prevalent among low-risk investors. Financial literacy affects consumer financial behaviour and demographic variables play a segmentation role. Financial anxiety is not experienced by investors who take higher risks. Adamus and Ballová Mikušková (2022) concluded that people experiencing financial anxiety and considering their economic status to be lower are more pessimistic in several ways, whether it concerns the development of the economy as a whole or their private development. Such people are more often subject to conspiracy theories and more often support them. They are less prone to adapt to changes and make adaptive economic decisions that could alleviate their uncertainty and anxiety. Financial anxiety and related low financial literacy contribute negatively to the financial system.

The aim of the paper is to reveal possible socio demographic characteristics that have influence on the financial anxiety of Slovakian inhabitants. To do so, we run questionnaire query which is described in more details in methods section. Paper is organised as following. In second part methods and data are described, followed by results part. Discussion and concluding remarks are presented in the final part of the paper.

2. Methods

The data presented in this paper is derived from a study conducted on financial literacy in Slovakia. The study involved collecting data through a questionnaire survey from a sample of 400 respondents across Slovakia. The data was collected online, following the methodology of the Organization for Economic Cooperation and Development - International Network on Financial Education (OECD/INFE) and its Toolkit for measuring financial literacy and financial inclusion. Additionally, the survey included

some additional questions, one of which focused on financial anxiety. The question asked was: "Do you feel anxious about your finances due to the current socio-economic and political situation?" The respondents could answer either "yes" or "no" to this question. Along with this, information about the survey respondents' demographic, social, and economic status was also gathered. In the following section, the article presents the results regarding the respondents' financial anxiety in relation to their demographic, social, and economic status.

3. Results

First, we note that that financial anxiety is more prevalent among females than among males. 70.4% of females and only 46.3% of males answered that they feel anxious about their finances due to the current socio-economic and political situation? In table 1 we present the gender differences in financial anxiety related to the respondent's monthly income. The data indicates that both males and females experience financial anxiety, but there are some differences in the percentages. First, we note that there is a clear trend in the relationship between monthly net income and feelings of anxiety about finances. As the monthly net income increases, the percentage of people feeling anxious decreases. This trend can be observed for both genders. Interestingly, among respondents with a monthly net income over €2000, the majority (63.3%) of females still feel anxious about their finances, while the majority (78.9%) of males in the same income bracket do not feel anxious. In the low-income interval of "Less than €500" a higher percentage of females (20.0%) do not feel anxious compared to males (30.0%). In the middle-income intervals ("Between €500 and €1000" and "Between €1001 and €1500"), there is a relatively even distribution between males and females as far as financial anxiety is concerned, but males seem to be more resistant to financial anxiety as compared to females.

Table 1. Financial anxiety and monthly income

Gender	Monthly net income	Do you feel anxious about your finances due to the current socio-economic and political situation?	
		No	Yes
Female	Less than €500	20.0%	80.0%
	Between €500 and €1000	16.7%	83.3%
	Between €1001 and €1500	29.0%	71.0%
	Between €1500 and €2000	41.7%	58.3%
	Over €2000	36.7%	63.3%
Male	Less than €500	30.0%	70.0%
	Between €500 and €1000	50.0%	50.0%
	Between €1001 and €1500	48.6%	51.4%
	Between €1500 and €2000	44.9%	55.1%
	Over €2000	78.9%	21.1%

Source: own processing (2023)

Secondly, we are interested in the matter of age on the financial anxiety. Table 2 presents data on gender, age groups, and feelings of anxiety about finances due to the current socio-economic and political situation. There is a noticeable variation in the levels of financial anxiety among different age groups for both genders, especially in case of females.

Among females, the age group that experiences the highest level of financial anxiety is the "50-59" group, with 88.9% responding "Yes" to feeling anxious. The "40-49" and "60+" age groups also show significant percentages of respondents feeling anxious about their finances (82.0% and 80.0%, respectively). Among males, the "20-29" and "30-39" and "40-49" age groups have the highest percentages of respondents answering "No" to feeling anxious about their finance. In contrast, the "50-59" age group shows the highest percentage of males feeling anxious about their finances (45.5%). The data suggests that in almost all age groups, a higher proportion of females feel anxious about their finances compared to males. In case of females, the financial anxiety increases with aging.

Table 2. Financial anxiety and age

Gender	Age	Do you feel anxious about your finances due to the current socio-economic and political situation?	
		No	Yes
Female	20-29	33.9%	66.1%
	30-39	34.7%	65.3%
	40-49	18.0%	82.0%
	50-59	11.1%	88.9%
	60+	20.0%	80.0%
Male	20-29	52.9%	47.1%
	30-39	54.3%	45.7%
	40-49	55.2%	44.8%
	50-59	54.5%	45.5%
	60+	50.0%	50.0%

Source: own processing (2023)

To reveal possible relationship between education level and monthly net income in context of financial anxiety we run correspondence analysis. Correspondence analysis (Benzécri, 1973) is a visual technique that allows the graphic presentation of rows and columns of a pivot table (Heijden& Leeuw, 1989). Correspondence analysis brings similar results to factor analysis and measures the possible relationship between categorical variables. Figure 1 displays results of correspondence analysis where only individuals that revealed financial anxiety enter. We observe some insights from the correspondence analysis. Financial anxiety occurs habitually in cases where following combination of education and monthly income meet. Firstly, financial anxiety occurs in cases of individuals with secondary education with matriculation exam and monthly income 1001 € -1500 €. Secondly, we observe presence of financial anxiety when second university degree educated individuals which earns 500 € - 1000 € are considered. Financial anxiety also occurs in cases when individuals with 1st university level education and earnings between 1500 € - 2000 € are considered. Presented results are more precise for females, as in case of males we detect much lower degree of collinearity between rows and columns.

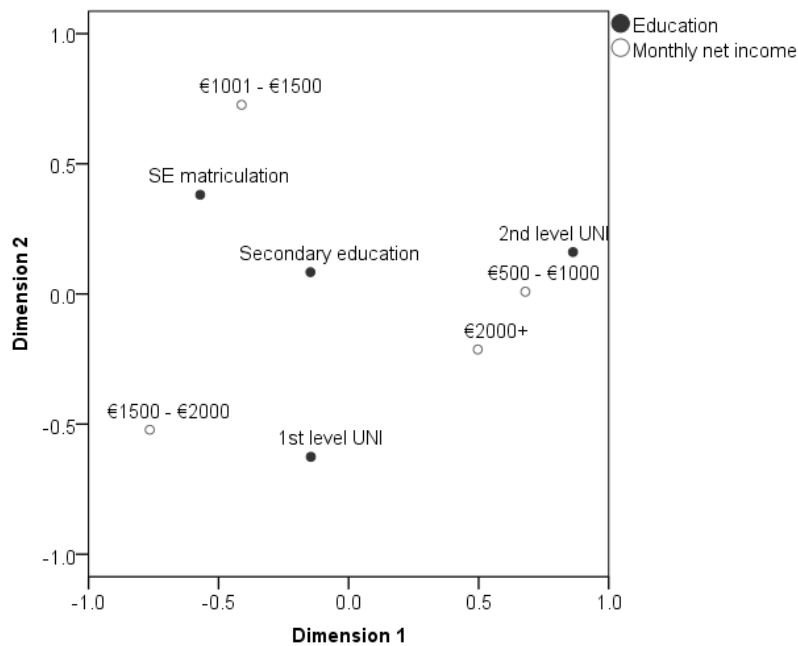


Figure 1. Correspondence analysis - Education and Monthly net income
Source: own processing (2023)

4. Discussion and Concluding remarks

Financial anxiety is a prevalent concern in today's socio-economic and political context. It affects individuals' psychological well-being and decision-making as well. This study aims to examine the gender differences and age group influence on financial anxiety, exploring the relationship between monthly net income, education level, and the likelihood of experiencing financial anxiety. The results revealed that financial anxiety is more prevalent among females, with 70.4% reporting feeling anxious about their finances compared to 46.3% of males. Both genders experience financial anxiety, and the percentages vary based on monthly net income. As monthly net income increases, the percentage of individuals feeling anxious decreases for both genders. However, among respondents with a monthly net income over €2000, a significant proportion (63.3%) of females still reported feeling anxious about their finances, whereas most males (78.9%) in the same income bracket did not. As for the age, females aged "50-59" years exhibits the highest percentage of feeling anxious about their finances, followed by the "40-49" and "60+" age groups (82.0% and 80.0%, respectively). In contrast, among males, the "20-29" and "30-39" and "40-49" age groups show the highest percentages of individuals reporting no financial anxiety. The "50-59" age group stands out with 45.5% of males experiencing financial anxiety. Correspondence analysis revealed that financial anxiety tends to occur among individuals with specific combinations of education and monthly net income. Specifically, financial anxiety is more likely to be present in cases of individuals with secondary education with matriculation exam and monthly income between €1001 and €1500. Additionally, second university degree-educated individuals earning between €500 and €1000 and individuals with a 1st university level education and monthly income between €1500 and €2000 also exhibit a higher likelihood of experiencing financial anxiety. The results were more precise for females, indicating a stronger association between education level, income, and financial anxiety in this gender.

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5. Regional Development Management

Selected Sustainable Development Goals of Agenda 2030 in V4 countries

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Abstract

Research background: The goals of sustainable development are firmly embedded in European treaties and important projects and policies. Inclusive economic growth is necessary for the benefit of the entire population and future generations. Education is a key tool for achieving sustainable development and supporting the economic growth of society.

Purpose of the article: The article specifies the goals of sustainable development in terms of quality education, work, and economic growth in the V4 countries, which represent a new universal standard for the development of the world's inhabitants and their significance for Slovakia from the perspective of globalization.

Methods: We analyzed data primarily from the European Union's Statistical Office databases, focusing on sustainable development goals in the 2030 Agenda. Specifically, we concentrated on two key indicators: education, employment, and economic growth progress in the V4 countries. Our analysis employed Pearson's correlation coefficient, and our goal selection was deliberate.

Findings & Value added: The results of our research show that each country has its weaknesses, but also strong points. The Czech Republic received the best rating from us, as it achieves the best results in most cases in terms of these goals. Slovakia also had better and worse results compared to other countries. Among the better results are: Population by level of education, gender and age (less than primary, primary and lower secondary education) From this we can see that in Slovakia it is in the interest of people not to settle for less than secondary education and to complete more than compulsory school attendance. However, there are cases when our country ranks among the selected states. The worst results are seen in the unemployment rate in the 15-74 age group, which is related to the overall state policy.

Keywords: goals of sustainable development, United Nations Organisation, Agenda 2030, globalization, Slovakia

JEL classification: R11, Q56

1. Introduction

Today, humanity faces major environmental, social and economic challenges globally. In order to address these global challenges at an international level and create a more sustainable and better future for all, the United Nations adopted 17 Sustainable Development Goals (SDGs) in 2015. (Weiland et al., 2021) Each of the goals has indicators that are used to measure progress towards the goals. (Poliak et al., 2021) The goals do not stand alone, rather they interact with each other and are closely interlinked. Each goal addresses environmental, social and economic issues. (Hickmann, 2021) Peace, diplomacy, and international cooperation are essential conditions for the world to make progress towards the SDGs by 2030 and beyond. (Galvão & Zeferino de Menezes, 2021). Global cooperation and commitment to the core principles of sustainable development - social inclusion, clean energy, responsible consumption and universal access to public services - are needed more than ever to respond to the major challenges of our time, including security crises, pandemics and climate change. (Zeigermann, 2021) Despite these difficult times, the SDGs should remain the roadmap for achieving sustainable development to 2030 and beyond. It

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is particularly important how the SDGs are perceived, accepted and valued by people around the world. A top priority of recovery plans and reforms of the international development finance system should be to restore and accelerate progress on sustainable development in all countries, including the poorest and most vulnerable. (Štrba et al., 2020)

1.1 Sustainable development objectives and concept

We live in a society that is progressing and changing every day. There are those among people who do not care about relationships with people or with the environment and destroy everything around them recklessly. But there are also those who are the opposite and strive for a good quality of life in the environment in which we live. It is these people who are leading our society forward in a good way, and we hope there will be more and more of them. It is a worldwide trend that we need to preserve. The Sustainable Development Goals (SDGs) set out in the 2030 Agenda (Figure 1), otherwise known as the Global Goals, are a set of targets within the universal agreement to end poverty, protect everything that makes the planet habitable, and ensure that all people enjoy peace and prosperity, now and in the future. (Matusik et al., 2021) There is still much debate about the concept and practicalities of sustainable development. The Sustainable Development Goals are the most focused attempt to date by the international community to set out what sustainable development means in practice for all nations, rich and poor alike. The Goals were adopted by all United Nations member states formally to address the overwhelming empirical and scientific evidence that the world needs a radically more sustainable approach. (Hickel, 2019) The Goals provide a well-consulted framework, are sufficiently scientifically robust, politically acceptable and publicly intuitive. The goals provide the best chance to ensure the necessary collaboration and alignment to implement global approaches to ensure a just, healthy and prosperous future for all. (Huang et al., 2022)

The definition of "sustainability" is the study of how natural systems function, remain diverse, and produce all that the ecology needs to remain in balance. It also recognizes that human civilization requires resources to sustain our modern way of life. (Offertaler, 2017) There are countless examples in human history in which civilization has damaged its own environment and severely affected its chances of survival. Sustainability considers how we might live in harmony with the natural world around us and protect it from damage and destruction. (Mason, 2020) The concept of sustainable development can be interpreted in many different ways, but at its core is an approach to development that seeks to balance different and often competing needs in light of the environmental, social, and economic constraints we face as a society. Through sustainable development, we can recognise that what we do today to improve our lives should not have a negative impact on our children or their children. (Blanc & Cotella, 2022) An example of this is how we rely on fossil fuels with providing heat and light in our homes and offices causing climate change. Climate change will limit lifestyle options for future generations and can have devastating consequences worldwide. (Sustainable Development Commission, 2020)



Figure 1. UN Graphical Illustration of the 17 SDGsA

Source: www.sd-commission.org.uk (2020)

1.2 The education system and sustainable development

The education system has an important role to play in raising awareness of the SDGs and in teaching skills and values that lead to more sustainable behaviour. The United Nations Educational, Scientific and Cultural Organization has therefore developed educational goals for the SDGs to support teachers and students. (UNESCO, 2020) Achieving inclusive and quality education for all reaffirms the belief that education is one of the most powerful and proven means of sustainable development. It also aims to ensure equal access to affordable vocational training, eliminate gender and wealth disparities, and achieve universal access to quality higher education. (Juuti et al., 2021) Tertiary education institutions are particularly important in this regard, as they are educating the next generation of decision-makers who will have a decisive influence on the future. Through their education and influence, universities directly contribute to the achievement of a range of Sustainable Development Goals In recent years, there has been a significant increase in sustainability programmes at universities, with a particular focus on student attitudes (Rodríguez-García et al., 2019); however, there is a great deal of variation between programmes. Despite the recent increase in sustainability in higher education, students generally have limited knowledge of the SDGs. (Zamora-Polo et al., 2019) Higher education institutions, such as universities, have a special responsibility worldwide as they shape future leaders, decision-makers, professionals (Kioupi & Voulvoulis, 2020), and intellectuals across various academic fields. In addition to the growing number of sustainability-focused courses, there should be a greater emphasis on the interconnectedness of different layers of the SDGs. Each SDG should pay attention to highlighting the social, environmental, and economic components and emphasizing the close relationship among these pillars (Hanspach et al., 2020). This approach enables the acknowledgment of the importance of all three components within each SDG when addressing current issues. These interconnections should be addressed and emphasized in environmental education courses. Particularly, political or educational activities, such as highlighting the global significance of economic goals within the context of education, should be given special importance. The fact that sustainable development goals are rated lower on average in wealthier countries with higher education indices indicates the need to improve related knowledge in these countries. It also highlights the importance of institutions of higher education focusing specifically on content related to sustainable development goals. In this context, it is not sufficient to teach only basic scientific knowledge; rather, education should primarily focus on other factors such as attitudes and values. The importance of sustainable development goals should be considered not only at the country level but also in an international and global context. These topics could be incorporated into the curricula of universities and schools to enable students, as future decision-makers in society, to act as multipliers and convey the significance and importance of sustainable development goals in society. The importance of sustainable development goals, regardless of the sustainability pillar (social, economic, environmental), is considered important by students in environmental and sustainability science courses in various countries (Rodríguez-García et al., 2019).

1.3 Economic growth of the society and sustainable development goals

Promoting inclusive and sustainable economic growth, employment, and decent work for all is one of the goals of sustainable development (Poliak et al., 2021). The COVID-19 pandemic has triggered the worst economic crisis in decades and has reversed progress towards decent work for all. Although the global economy started recovering in 2021, bringing some improvements in unemployment, the recovery remains transient and fragile (Lu et al., 2021). By the end of 2021, the recovery of the global economy was hindered by new waves of COVID-19 infections, rising inflationary pressures, significant disruptions in the supply chain, political uncertainty, and persistent labor market challenges. As the global economy continues to recover, we see slower growth, deepening inequalities, and a lack of job creation to keep pace with the growing workforce (Blanc & Cotella, 2022).

The tourism industry is one of the economic sectors affected by the COVID-19 pandemic due to border closures, travel bans, and lockdown measures (Vašaničová et al., 2021). Due to travel restrictions, international travel arrivals in 2020 decreased by 60 to 80 percent compared to 2019 (Vargas-Sanchez et al., 2019). One possible solution to address the issue could be providing youth with the best opportunity for transitioning into decent work, which requires investment in high-quality education and vocational training that equips young people with skills aligned with the demands of the labor market, granting them access to social protection and basic services regardless of their employment contract type, so that everyone can attain productive employment regardless of their gender, income level, or socio-economic background (Streimikiene et al., 2021). Governments can function by building a dynamic, sustainable, and

innovative people-centered economy, supporting youth employment, as well as the economic status of women and decent work for all (Wang et al., 2020). Implementing adequate measures to promote health and safety, supportive work environments, and quality living conditions is the foundation for protecting the safety of workers and those providing essential services for further economic development (Rigelsky et al., 2022).

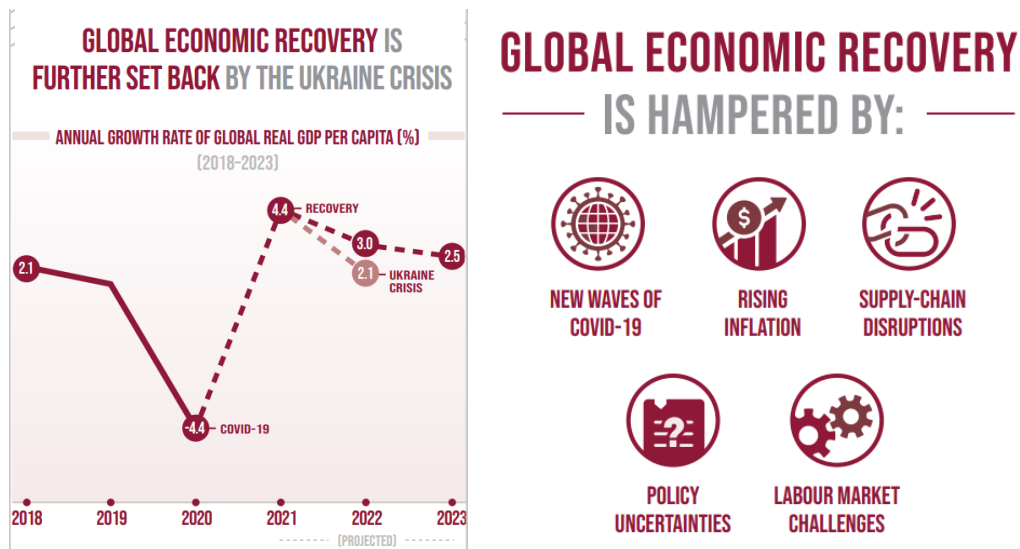


Figure 2. Global economic recovery
Source: www.sd-commission.org.uk (2020)

2. Methods

Currently, the development of international cooperation and understanding in the fields of social and natural sciences, education, culture, information, computer science, communication, and the environment represents an important aspect that led to the establishment of the 17 Sustainable Development Goals (SDGs). The objective of this contribution is to specify the goals of sustainable development in terms of quality education, decent work, and economic growth in the V4 countries, which represent a new universal standard for the development of the world's population and their significance for Slovakia from the perspective of globalization.

The Visegrád Group (V4) is an alliance of Central European countries, including the Czech Republic, Poland, Hungary, and Slovakia, reflecting the efforts of these countries to cooperate in various areas of common interest within the framework of European integration.

We obtained data for analysis from the Statistical Office database and focused on the period from 2008 to 2018. For the application of higher statistics, we selected two indicators - the fourth and eighth goals - and formulated hypotheses. We calculated the selected indicators using the Pearson correlation coefficient in the Gretl program. The results were processed and presented clearly using tables and graphs.

Quality education

The goal of this indicator is to ensure lifelong education for everyone, as well as fair and quality education. One of the partial goals of this indicator is to ensure that children complete free and quality primary and secondary education, which is equal for girls and boys (Wailand, 2021). In this section, we compared "population by level of education, gender, and age in selected countries."

Data from Eurostat provide us with an insight into the highest level of education successfully completed by individuals in the population. The classification of educational activities is based on the International Standard Classification of Education (ISCED). In general, the online database includes three aggregates, which are:

- Less than primary, primary, and lower secondary education
- Upper secondary and post-secondary education
- Tertiary education.

We have selected the first level, which includes less than primary, primary, and lower secondary education for the age group of 15 to 64 years. As can be seen from Graph 1, the highest number of people who completed less than primary, primary, or lower secondary education was in Hungary, while the lowest was in the Czech Republic throughout the observed period. The highest number of people was in 2008 (25.8% - Hungary), and the lowest was in 2017 and 2018 (12.1% - Czech Republic). As we can see, the data from Slovakia, the Czech Republic, and Poland are relatively close to each other, especially in the last three years.

Slovakia shows the second-lowest percentage in the years 2008-2016, but in the last two years, Poland has achieved better results in terms of completion of education. Slovakia shows a yearly decline in the data, except for the year 2014.

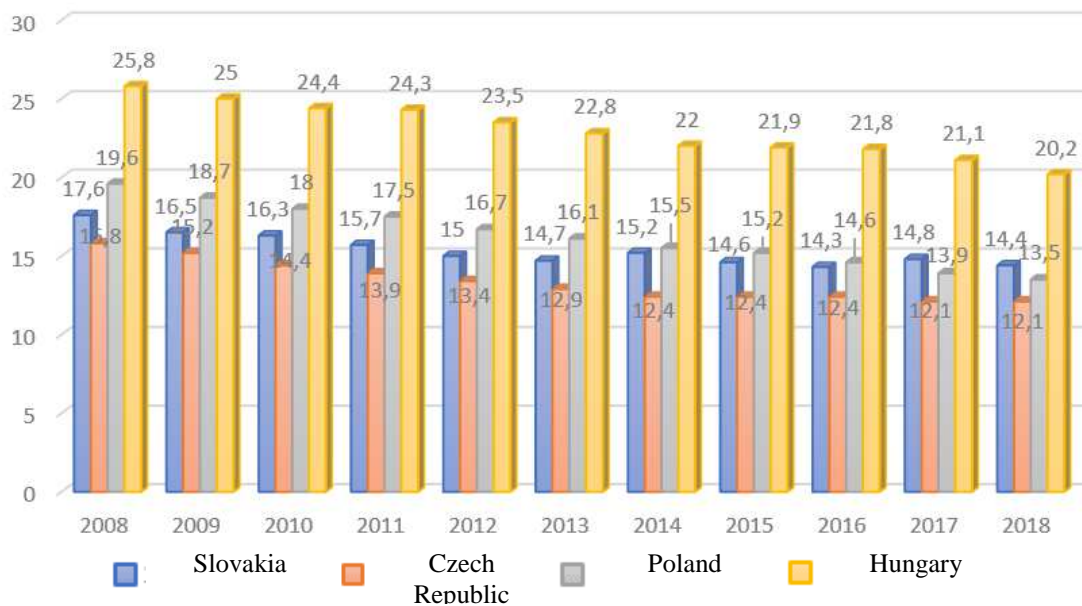


Figure 1. Population by educational attainment (below primary, primary, and lower secondary education) in V4 countries from 2008 to 2018.

Source: own processing (2022)

Labor and Economic Growth

The main objective of the mentioned indicator is to ensure an adequate number of job positions and support sustainable economic growth (Wailand, 2021). To secure employment for everyone, including individuals with disabilities and young people, as well as promote equal pay for equal work, we have chosen the „unemployment rate for the age group 15-74“ as our indicator.

The unemployment rate, obtained from Eurostat, represents the percentage of unemployed individuals as a proportion of the labor force. The labor force comprises the total number of employed and unemployed persons. Unemployed persons include individuals between the ages of 15 and 74 who were:

- Without work during the reference week,
- Currently available for work, i.e., available for paid employment or self-employment within the next two weeks following the reference week,
- Actively seeking employment, i.e., taking specific steps in the four weeks preceding the reference week to seek paid employment or self-employment, or those who have found a job to start within the next three months.

According to Graph 2, it can be observed that the highest unemployment rate throughout the entire period was in Slovakia. The highest percentage is seen in 2010 (14.4%), while the lowest was in the Czech Republic in 2018 (2.2%). The Czech Republic consistently exhibited the lowest unemployment rate among the countries examined. The lowest unemployment rate can be observed for each country in 2018.

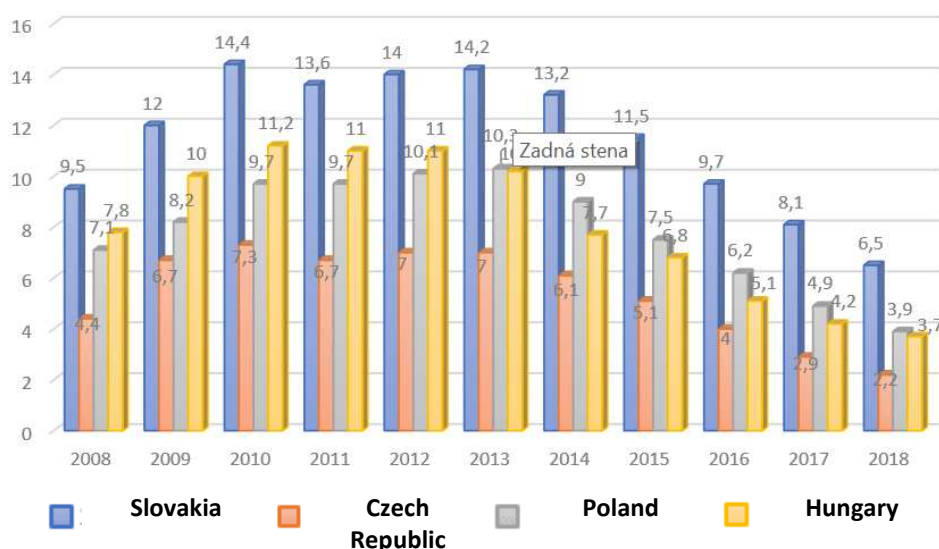


Figure 2. The unemployment rate for the age group 15-74 in V4 countries from 2008 to 2018
Source: own processing (2022)

3. Results

We have established the following hypothesis within the Quality Education indicator for the facts being explored before us:

H1: We assume that there are statistically significant correlations in the development of completion rates of education below primary, primary, and lower secondary levels during the observed period among the selected V4 countries.

Table 1. Results of hypothesis testing regarding completion of education below primary, primary, and lower secondary levels in V4 countries

A pair of variables	p-value	Pearson's correlation coefficient	Association between variables	The magnitude of the strength of the relationship
Slovakia and the Czech Republic	0,0008	0,8778	it exists	big
Slovakia and Poland	0,0020	0,8474	it exists	big
Slovakia and Hungary	0,0041	0,8141	it exists	big
Czech Republic and Poland	0,0001	0,9404	it exists	big
Czech Republic and Hungary	0,0001	0,9305	it exists	big
Poland and Hungary	0,0000	0,9892	it exists	big

Source: own processing (2022)

During the testing of the given hypothesis, the p-value for all variable pairs is less than the specified significance level $\alpha = 0.05$. Therefore, we can conclude that there is a statistically significant correlation in the development of completion rates of education below primary, primary, and lower secondary levels across the observed period between each pair of countries. The highest correlation coefficient value ($r = 0.9892$) was observed between Poland and Hungary, while the lowest but still high value ($r = 0.8141$) was found between Slovakia and Hungary.

Based on our results, we confirm Hypothesis 1. The positive values of the correlation coefficient indicate a direct relationship, suggesting that when there were high values of the completion rate indicator below primary, primary, or lower secondary levels in one country, there were also high values of the indicator in the other country, and vice versa. The direction of the indicator's development over time is the same in this case. Based on these values, we can observe low percentages, with each year staying below

30%. In several countries in Europe, the values range around 30% or higher, with the highest values reaching above 70%.

Within the indicator of Labor and Economic Growth, we have tested the following hypothesis:

H2: We assume that there are statistically significant correlations in the development of unemployment rates among individuals aged 15-74 years during the observed period among the selected V4 countries.

Table 2. The results of hypothesis testing regarding the unemployment rate among individuals aged 15 to 74 in the V4 countries

A pair of variables	p-value	Pearson's correlation coefficient	Association between variables	The magnitude of the strength of the relationship
Slovakia and the Czech Republic	0,0000	0,9770	it exists	big
Slovakia and Poland	0,0000	0,9852	it exists	big
Slovakia and Hungary	0,0001	0,9084	it exists	big
Czech Republic and Poland	0,0000	0,9740	it exists	big
Czech Republic and Hungary	0,0000	0,9582	it exists	big
Poland and Hungary	0,0000	0,9374	it exists	big

Source: Source: own processing (2022)

In all pairs of variables, the p-value is lower than the specified level $\alpha = 0.05$, indicating a statistically significant relationship in the development of unemployment rates among individuals aged 15 to 74 in the observed period between each pair of countries. The highest correlation coefficient value ($r = 0.9852$) was recorded between Slovakia and Poland, while the lowest, but still high value ($r = 0.9084$), was observed between Slovakia and Hungary.

Based on our results, we confirm hypothesis 2. Positive values of the correlation coefficient indicate a direct relationship, meaning that when the unemployment rate was high among individuals aged 15 to 74 in one country, it was also high in the other country, and vice versa. The direction of the indicator's development over time is the same in this case.

The unemployment rate is higher in the observed period than it could be, with each of our monitored countries having a value above 5% on average. However, compared to other countries in Europe, these values can be considered normal. The highest values in Europe reach even above 30% in some years.

4. Discussion

In our contribution, we addressed the 2030 Agenda for Sustainable Development, specifically two goals, and analyzed and compared selected indicators within the Visegrád Group countries using higher-level statistics.

For each of the indicators, we stated hypotheses and processed the data using the Pearson correlation coefficient, utilizing the Gretl program. We found that there is a statistically significant relationship in the development of values among the following indicator pairs:

- Population by level of education (less than primary, primary, and lower secondary education),
- Unemployment rate among individuals aged 15-74.

We conclude that the mentioned indicators are interconnected, and it is necessary to monitor their development. This is because education is linked to job opportunities in the labor market, and ultimately, the unemployment rate in the Central European region of the V4 countries. It is crucial for these countries to remain competitive and ensure a standard of living and environment that their citizens deserve.

Based on our results, we have found that each country has its strengths and weaknesses. According to our analysis, the Czech Republic has achieved the best results among the V4 countries. However, our focus was on the development in Slovakia, which showed comparatively poorer results, particularly in the area of the unemployment rate among individuals aged 15-74. Regarding the goal of Population by level of education, gender, and age (less than primary, primary, and lower secondary education), we observe stagnation. Our results indicate that it is in the best interest of people in Slovakia not to settle for less than secondary education and to complete more than compulsory schooling. However, there are instances where our country is ranked among selected states. The worst results are observed in the unemployment rate among individuals aged 15-74, which is related to the overall state policy.

We conclude that it is in the best interest of people in Slovakia not to settle for less than secondary education and to complete more than compulsory schooling.

Conclusion

Agenda 2030 inspires us to think creatively and utilize innovative approaches to critically reconsider the way we approach the challenges of today's development. Advocacy and raising awareness are crucial for mobilizing support for the achievable and attainable goals of the Agenda. However, to create lasting change, raising awareness and advocacy alone are not enough. In-depth knowledge about the breadth and depth of the Agenda will be key to realizing the Sustainable Development Goals. By adopting the Agenda, UN member states committed to ambitious action plans that require alignment of efforts from all segments of society, including civil society, development experts, the private sector, and academia. Each of us, according to our individual capacities, must also take concrete steps towards sustainability. A commitment to lifelong learning is necessary to drive the transformative agenda that lies ahead of us.

Countries around the world must strive for continuous improvement in their performance to remain competitive and ensure their citizens a standard of living and environment they deserve. In a country where people live well, citizens themselves will take action to improve their situation. While this may not be possible in every case, it is undeniable that the involvement of citizens is crucial, and likewise, the state cannot overlook the importance of its citizens.

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Efficiency of the Introduction of Businesses' Digitalization Elements in EU Countries – Dynamic Approach

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Abstract

Research background: In today's era of rapidly growing competition and customer demands, it is necessary to increase the efficiency and competitiveness of ongoing business processes. This is also the main goal of the digital transformation of businesses. As part of this process, it is necessary not only to introduce new elements of businesses' digitalization, but also to effectively use those that have been already introduced into businesses.

Purpose of the article: The aim of the paper is to assess the efficiency of the introduction and use of digitalization elements of businesses over time.

Methods: To evaluate the efficiency, the elements of digitalization listed in the Digital Intensity Index (DII) were used. The Malmquist index – Data Envelopment analysis approach (MIDEA) was applied to assess the efficiency of the digitalization process of businesses. This approach makes it possible to evaluate the change in the technical efficiency and frontier shift of the introduction and use of the digitalization elements of businesses.

Findings & Value added: The finding is that the position of individual countries in the digital transformation ranking using the MIDEA method is different compared to the results of the DESI index. This finding is particularly true for the introduction of digitalization elements into businesses in individual EU countries. From the point of view of the MIDEA index, Slovakia occupied the 12th position. Based on it, it can be assumed that Slovakia achieves a significantly better position in introducing businesses' digitalization elements than in the DESI index.

Keywords: businesses, digitalization, efficiency, Malmquist index, dynamic approach

JEL classification: O11, O33, C44

1. Introduction

Digitalization stands as one of the primary objectives for the European Union (EU) countries. The term "digitalization" emerged in the mid-20th century (Shpak et al., 2020). It has been recognized as one of the primary trends shaping both present and future society and business (Kääriäinen et al., 2017). Digitalization and innovation have become instrumental in propelling organizations forward while transforming their operations (Kraus et al., 2021). The interest in researching these areas, particularly the digitalization industry, has seen an upsurge, as evidenced by Matt et al. (2023) study, which offers a comprehensive literature overview and contributions in this domain. There are two fundamental approaches to defining digitalization. The first refers to digitization as the process of converting analog data into a digital format, also known as digital enablement (Gartner, 2023). The second aspect of importance pertains to digitalization, representing the integration or increased usage of digital technology by organizations, industries and countries (Gorenšek, Kohont, 2019). Legner et al. (2017) share a similar outlook on the concept of digitalization, which encompasses describing diverse sociotechnical phenomena and the widespread adoption and usage of these technologies. In the same vein, Vial (2019) views digitalization as encompassing efforts towards organizational transformations through the acceptance of digital technologies.

Digitalization, however, extends beyond mere technology implementation; it involves fundamental changes that can reshape "organizational strategy, business processes, organizational knowledge, and the

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entire socio-technical organizational system" (Alsufyani and Gill, 2022, p. 1). Authors Brennen and Kreis (2016), along with Unruh and Kiron (2017), define digitalization as a process that drives the restructuring of the economy, institutions, and society at a systemic level.

The objective of digitalization is not solely to increase the number of introduced digital elements but also to enhance the efficiency of utilizing those already in place. This highlights the need to focus on measuring the efficiency of using digitalization elements and their impact on the performance and efficiency of countries and companies. Measuring the level of the digital economy poses challenges, but several studies exist that assess the efficiency and advantages of digitalization for businesses in EU countries.

In the context of the current research, it is relevant to reference the study conducted by Inel (2019). In this study, the author utilized the Data Envelopment Analysis (DEA) method to assess the efficiency of the digital transformation in EU countries. The findings suggest that certain countries such as Denmark, Italy, and the United Kingdom demonstrate relatively high efficiency, while the Netherlands and Germany exhibit lower efficiency levels (Inel, 2019). Georgescu et al. (2022) also performed the Data Envelopment Analysis non-parametric test to measure the digitalization efficiency or inefficiency of EU Member States. They found out that only 8 out of 27 countries can be considered efficient in the digitalization process during COVID-19 pandemic. Efficient countries were Belgium, Denmark, Estonia, Finland, Italy, Latvia, Lithuania and Malta. These countries could be considered benchmarks for the inefficient ones.

Thanh's (2022) study is groundbreaking as it empirically investigates the relationship between digital transformation and financial development. The research underscores the relevance of digital transformations in both business and the public sector. The authors emphasize the need to measure the short-term and long-term impacts of digitalization, revealing that e-commerce and e-government exert positive long-term influences on financial markets and the performance of financial institutions.

In his research, Yalcin (2021) examined the efficiency of digitalization of EU countries. The aim of the research was to identify countries that transformed digitalization into their growth and employment rates (ER) in the period 2015-2019. The results of the study show that "in countries such as Bulgaria, Cyprus, Hungary and Romania, the effective use of DESI indicators, which are considered a measure of digitalization, has a one-on-one effect on the GDP and ER values. DESI indicators are not used effectively in the GDP and ER values of countries like Denmark, Finland, and Spain. In general, in terms of digitalization, it has been revealed that developing countries use digitalization more effectively in terms of economic growth and job creation" (Yalcin, 2021, pp. 323).

Given its role as a novel business driver, digitization should be incorporated into performance measures and indicators (Fernández-Portillo et al., 2017). Similarly, Zhai et al. (2022) substantiated the influence of the digital transformation process on business performance. Jardak and Ben Hamad (2022) examined the effect of digital transformation on firm financial performance. They found out that "in the short term firms undertaking digital transformation will face some financial difficulties which affect negatively their ROA and ROE, but in the long term they can maximize their performance (captured by Tobin's Q) and improve their market value" (Jardak and Ben Hamad, 2022, p. 329).

Rejman Petrovic et al. (2022) measured the efficiency of the use of information and communication technologies in businesses in order to assess the intensity and success of their digitalization process. To analyze the efficiency of digital business transformation the DEA was applied, while for the robustness analysis of values of average efficiency they used bootstrapping method. They revealed that the process of digital business transformation in the Republic of Serbia is relatively efficient. The efficiency of e-commerce in businesses in most years was over 80%, on the other hand the use of software packages was insufficient. Kao et al. (2022) also applied DEA to investigate efficiency in implementing digital transformation in Taiwanese firms. According to Zhang et al. (2021), digital technology has been verified to bolster corporate production efficiency through cost reduction and increased innovation. Correspondingly, Lin and Xie (2023) confirmed the comparable influence of incorporating and utilizing digitalization elements on power enterprises' efficiency.

Based on the information presented earlier, the research objective was established, focusing on evaluating the efficiency of implementing specific digital elements in businesses across EU countries.

The paper is organized as follows: The "Methods" section outlines the data and their sources, providing a comprehensive description of the Malmquist index measurement method using Data Envelopment Analysis (MIDEA). In the "Results" section, the study presents its findings and analyses

of the efficiency of implementing digitalization elements in the EU business landscape. "Discussion" section provides a more detailed discussion of the achieved results. Lastly, the "Conclusion" section encapsulates research conclusions, contributions, limitations, and recommendations for future research endeavors.

2. Methods

For the research in the given area, the Malmquist index was applied. This index is based on the application of DEA models over time. It measures the change in the Total Factor Productivity (TFP) between two periods based on the principle of calculating the ratio of the distances of each data point relative to a common technology. The index is based on the use of distance functions, which allow to describe production technology with multiple inputs and outputs without the need to specify the objectives of the company's behavior. It is possible to define both input and output distance functions (Fandel, 2002).

Several methods can be used to estimate distance functions, which are the starting point for calculating TFP. Linear programming is most often used, especially the Data Envelopment Analysis (DEA) method proposed by Färe, Grosskopf, Norris and Zhang in 1994 (Fandel, 2002). The use of DEA models to calculate TFP is related to the assumption that homogeneous data are available over several periods. Calculating the change in efficiency requires solving four linear programming problems, assuming the use of technology with constant returns to scale (Fandel, 2002).

Suppose that each $DMU_j (j = 1, 2, \dots, n)$ uses a vector of inputs $x_j^t = (x_{1j}^t, \dots, x_{mj}^t)$ to produce vector of outputs $y_j^t = (y_{1j}^t, \dots, y_{mj}^t)$ at each period of time $t, t = 1, \dots, T$. Efficiency of DMU_0 can change or the frontier can shift or both changes may occur in the same time. The Malmquist Productivity Index is then defined as follows (1) (Zhu, 2014):

$$MI_o = \left[\frac{\theta_o^t(x_o^t, y_o^t)}{\theta_o^t(x_o^{t+1}, y_o^{t+1})} \frac{\theta_o^{t+1}(x_o^t, y_o^t)}{\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1})} \right]^{\frac{1}{2}}, \quad (1)$$

where MI_o measures the change in productivity between the periods t and $t + 1$. $\theta_o^t(x_o^t, y_o^t)$ is calculated by comparing x_o^t to the EPF (Empirical Production Frontier) at time t with the use of input oriented CRS DEA model, while $x_o^t = (x_{1o}^t, \dots, \dots, x_{mo}^t)$ and $y_o^t = (y_{1o}^t, \dots, \dots, y_{so}^t)$ are the input and output vectors of DMU_0 among others. Similarly $\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1})$ is calculated by comparing x_o^{t+1} to the EPF at time $t+1$, $\theta_o^{t+1}(x_o^t, y_o^t)$ by comparing x_o^t to the EPF at time $t + 1$; and $\theta_o^t(x_o^{t+1}, y_o^{t+1})$ is calculated by comparing x_o^{t+1} to the EPF at time t applying input-oriented CRS DEA model.

This model is also available in its modified form (2) (Zhu 2014):

$$MI_o = \frac{\theta_o^t(x_o^t, y_o^t)}{\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1})} \times \left[\frac{\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1}) \theta_o^{t+1}(x_o^t, y_o^t)}{\theta_o^t(x_o^{t+1}, y_o^{t+1}) \theta_o^t(x_o^t, y_o^t)} \right]^{\frac{1}{2}} \quad (2)$$

According to Fandel (2002) the term (3) represents the change in technical efficiency, it is the efficiency known according to Farrell (1957). The change in efficiency is equivalent to the ratio of Farrell's efficiency at time t and at time $t + 1$ (technical efficiency change between periods t and $t + 1$). Usually, this term expresses the improvement, deterioration or stability of technical efficiency.

$$\frac{\theta_o^t(x_o^t, y_o^t)}{\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1})} \quad (3)$$

The term (4) represents the frontier shift (FS) in the EPF between periods t and $t + 1$ (Zhu, 2014).

$$\left[\frac{\theta_o^{t+1}(x_o^{t+1}, y_o^{t+1}) \theta_o^{t+1}(x_o^t, y_o^t)}{\theta_o^t(x_o^{t+1}, y_o^{t+1}) \theta_o^t(x_o^t, y_o^t)} \right]^{\frac{1}{2}} \quad (4)$$

The research data were obtained from a database focused on the collection of the data on the digitalization process taking place in EU countries (Eurostat, 2022). As inputs were used indicators for which data for the years 2019, 2020, 2021 and 2022 were available. Inputs were as follows: E-commerce sales, Use of computers and the internet by employees, Type of connections to the internet - Enterprises use DSL or other fixed broadband connection, Enterprises having received orders online, Use

of mobile connections to the internet and Security policy: measures, risks and staff awareness. GDP per capita and unemployment rate were used as outputs. EU member states data for the period 2019-2022 were used.

3. Results

Table 1 shows descriptive statistics results of digital transformation indicators of businesses operating in EU-27 Member states. Businesses achieve the best results in the indicator Type of connections to the internet - Enterprises use DSL or other fixed broadband connection, in this area it is up to 94% coverage. The area with the lowest share of digitalization elements is Security policy - 15.5% coverage.

Table 1. Descriptive statistics of EU-27 Member States` indicators in the period 2019-2022

Variable	Descriptive Statistics					
	Valid N	Mean	Median	Min.	Max.	Std.Dev
E-commerce sales	108	19.37	18.00	5.4	38.0	7.65
Use of computers and the internet by employees	108	55.25	53.25	29.0	86.5	12.53
Type of connections to the internet	108	92.22	94.0	77.1	100.0	5.41
Enterprises having received orders online	108	20.55	19.25	7.4	38.4	7.94
Use of mobile connections to the internet	108	76.77	78.65	46.0	97.7	11.31
Security policy: measures, risks and staff awareness by size class of enterprise	108	20.04	15.50	2.8	70.6	14.55

Source: authors based on data from Eurostat (2022)

Figure 1 illustrates digital intensity of businesses in EU countries for the year 2022. Results show that Denmark is the leader in the given area, while Romania is a significantly lagging country. Slovakia reaches digital intensity 2.9, which is approximately at the level of Italy, France and Luxembourg. Based on the comparison with other EU countries, Slovakia achieves a low value of the given index.

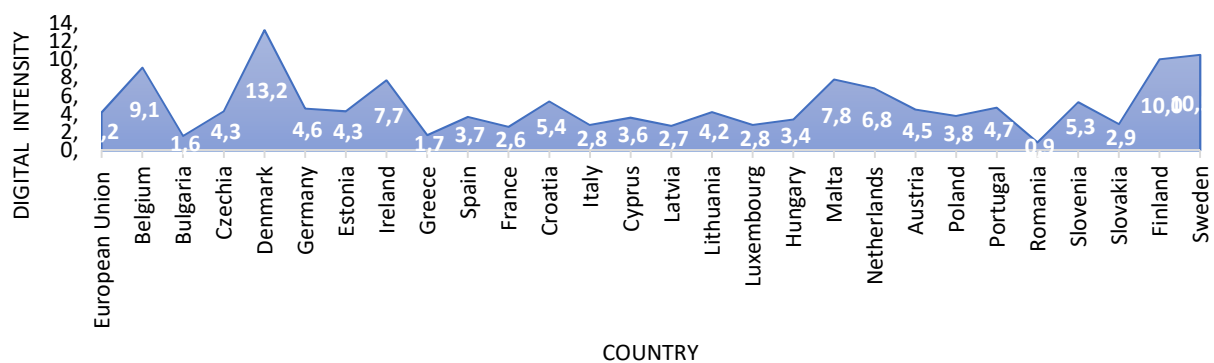


Figure 1. Digital intensity in EU countries

Source: authors (2023)

The E-commerce indicator is also included in the DII evaluation criteria. Since this indicator significantly affects the results of the DII index, it is necessary to state its results achieved by individual countries. The results of E-commerce sales are shown on figure 2. In this area, the best results are achieved by Ireland (33.2%) and the worst by Cyprus (5.4%). Slovakia reaches 22.7%, which means that it can be included among the countries that use e-commerce more significantly.

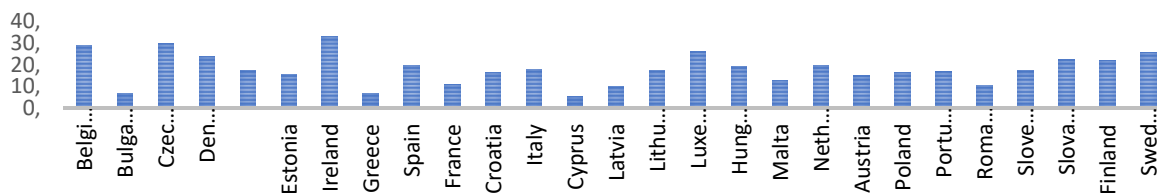


Figure 2. E – commerce sales in the EU countries
Source: authors (2023)

The Malmquist index (MIDEA) was applied to assess the efficiency of digitalization of business environment in EU countries. The results are presented in Table 2. The column MI 19-20 expresses the efficiency of the digital transformation in EU companies for the years 2019-2020. Similarly the column MI 20-21 shows mentioned results for the year 2020-2021 and the column MI 21-22 shows the results for the year 2021-2022.

Table 2. Results of measuring the efficiency of digitalization process in businesses

DMU	MI 19-20	MI 20-21	MI 21 - 22	19-20	20 - 21	21 - 22
Belgium	1.02	1.00	0.99	stability	decline	decline
Bulgaria	1.13	1.12	1.09	stability	stability	stability
Czechia	1.04	1.00	0.92	stability	decline	decline
Denmark	1.01	1.00	0.98	stability	decline	decline
Germany	1.05	1.00	1.08	stability	decline	stability
Estonia	1.03	1.00	0.98	stability	stability	decline
Ireland	1.01	1.00	0.96	stability	decline	decline
Greece	1.10	1.02	0.90	stability	stability	decline
Spain	1.02	1.00	1.03	stability	decline	stability
France	1.02	1.00	1.01	stability	decline	stability
Croatia	0.99	1.00	0.93	decline	decline	decline
Italy	1.03	1.00	1.03	stability	decline	stability
Cyprus	1.05	1.00	0.79	stability	decline	decline
Latvia	1.11	1.01	0.93	stability	stability	decline
Lithuania	1.12	1.01	1.18	stability	stability	stability
Luxembourg	1.08	0.96	1.48	stability	decline	stability
Hungary	1.07	1.06	1.12	stability	stability	stability
Malta	1.03	1.00	0.98	stability	decline	decline
Netherlands	1.06	1.00	1.05	stability	decline	stability
Austria	1.04	1.00	0.93	stability	decline	decline
Poland	0.99	1.00	1.01	decline	stability	stability
Portugal	1.05	1.00	1.09	stability	decline	stability
Romania	1.07	0.98	1.09	stability	decline	stability
Slovenia	1.12	1.24	1.02	stability	stability	stability
Slovakia	1.04	0.99	1.06	stability	decline	stability
Finland	1.03	1.00	0.97	stability	decline	decline
Sweden	1.02	1.00	0.99	stability	decline	decline

Source: authors (2023)

Explanatory notes	decline	stability	growth
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When comparing the efficiency of the use of digitalization elements in 2019 and 2020, an increase in efficiency was recorded in almost every analyzed country, which could be caused by the Covid-19 pandemic. When comparing the years 2020 and 2021, stable development was recorded in 16 companies, i.e. efficiency neither decreased nor increased. 8 countries achieved an increase in efficiency, while 3 countries recorded a decrease. Slovakia was among the countries in which a decrease was recorded. In 2022, 14 countries achieved higher digitalization efficiency and the remaining 13 achieved lower digitalization efficiency, which could also be due to the slowdown after the Covid-19 pandemic. An increase in efficiency in all monitored periods was recorded only in Bulgaria and Slovenia.

Table 3 shows the change in the technical efficiency of EU countries with regard to enterprises' digitalization elements. Most countries achieved the technical efficiency of introducing digitalization elements in enterprises in the period 2020-2021, except for Estonia, Latvia and Poland. The value of technical efficiency is the result of the efficiency of the application of already established digitalization elements in enterprises in EU countries.

Table 3. Technical efficiency of introducing digitalization elements

<i>DMU</i>	<i>19-20</i>	<i>20-21</i>	<i>21-22</i>
Belgium	0.98	1.00	0.96
Bulgaria	1.00	1.00	1.00
Czechia	0.98	1.00	0.89
Denmark	0.98	1.00	0.97
Germany	0.99	1.00	1.03
Estonia	0.96	0.99	0.94
Ireland	0.99	1.00	0.98
Greece	1.02	1.00	0.86
Spain	0.97	1.00	0.99
France	0.97	1.00	0.89
Croatia	0.93	1.00	0.91
Italy	0.96	1.00	0.91
Cyprus	0.97	1.00	0.91
Latvia	1.03	0.99	0.95
Lithuania	1.00	1.00	1.00
Luxembourg	1.00	1.00	1.00
Hungary	1.00	1.00	1.00
Malta	0.97	1.00	0.94
Netherlands	0.97	1.00	0.99
Austria	0.99	1.00	0.93
Poland	0.93	0.99	1.00
Portugal	0.95	1.00	0.97
Romania	0.97	1.00	1.00
Slovenia	1.00	1.11	0.90
Slovakia	0.98	1.00	0.96
Finland	0.99	1.00	0.99
Sweden	0.98	1.00	1.04

Source: authors (2023)

Technical efficiency decreased in the period 2021-2022. This decrease is noticeable in almost all analyzed countries. The increase occurred only in Germany and Sweden. Slovakia achieved stable results in the period 2020-2021, while in the periods 2019-2020 and 2021-2022 there was a decline in the technical efficiency of introducing selected digitalization elements in Slovak businesses. Bulgaria, Lithuania, Luxembourg and Hungary achieved the same technical efficiency throughout the analyzed period. Comparing the years 2021 and 2022, Germany and Sweden achieved the best technical efficiency. Figure 3 shows the frontier shift caused by technological changes. The largest shift (1.47) is recorded in Luxembourg when comparing the years 2021 and 2022.

Frontier Shift

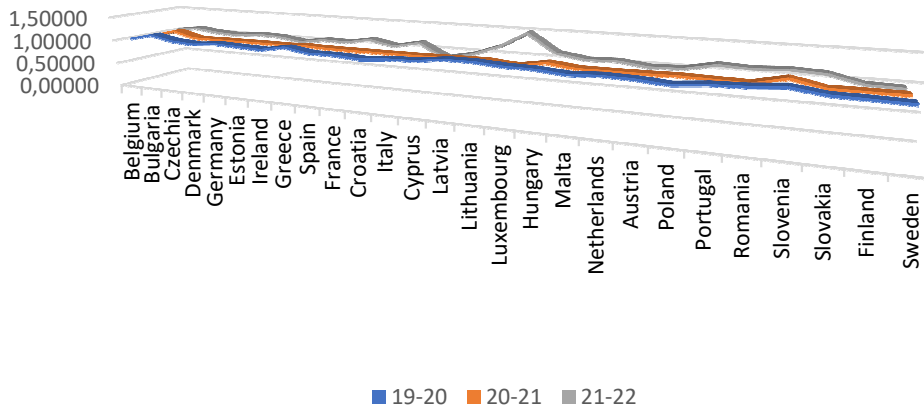


Figure 3. Level of technological change in businesses in EU countries
Source: authors (2023)

In the field of technological change, most countries reached a value above 1, i.e. there was a frontier shift thanks to the introduction of new technological solutions. In particular, the comparison of the years 2019 and 2020 indicates a shift, which may again be a consequence of the Covid-19 pandemic. In this period, only Poland and Croatia do not show the value of FS equal to 1 or above 1. When comparing the years 2020 and 2021, Slovakia also did not reach the value of FS equal to 1. However, when comparing the years 2021 and 2022, FS, i.e. technological changes in the business environment of Slovakia, occurred again.

4. Discussion

In order to detect changes in MI, it was necessary to look in more detail at the development of selected digitalization factors. This analysis recorded growth especially in the Use of computers and the internet by employees and the Use of mobile connections to the internet, in almost all EU countries. The Use of computers and the internet by employees is one of the significant digitalization factors. Development of its introduction is shown on figure 4, while the best results achieved Finland and Denmark.

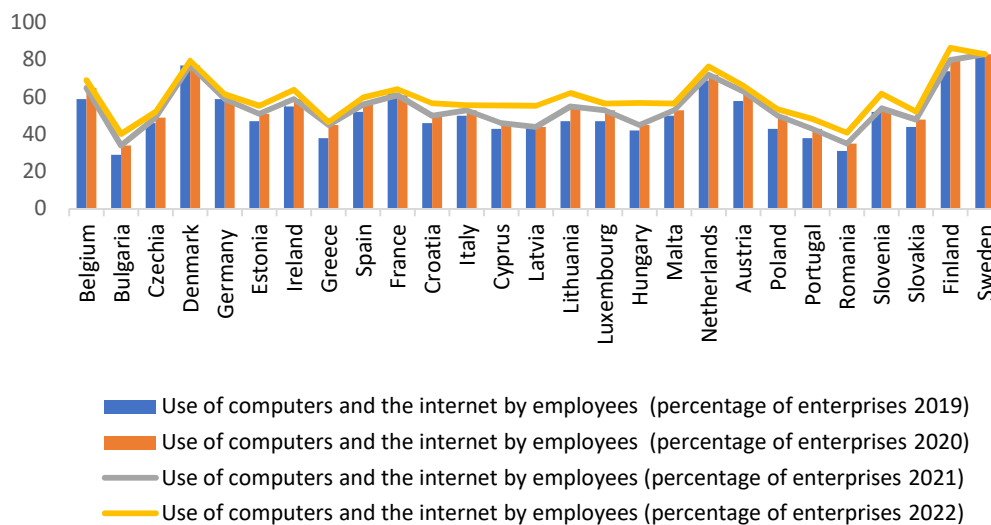


Figure 4. Development of the introduction of the Use of computers and the internet by employees
Source: authors (2023)

The results of Use of mobile connection to the internet achieved in individual EU countries are balanced. However, the leader in this area is Sweden. The results can be seen on figure 5.

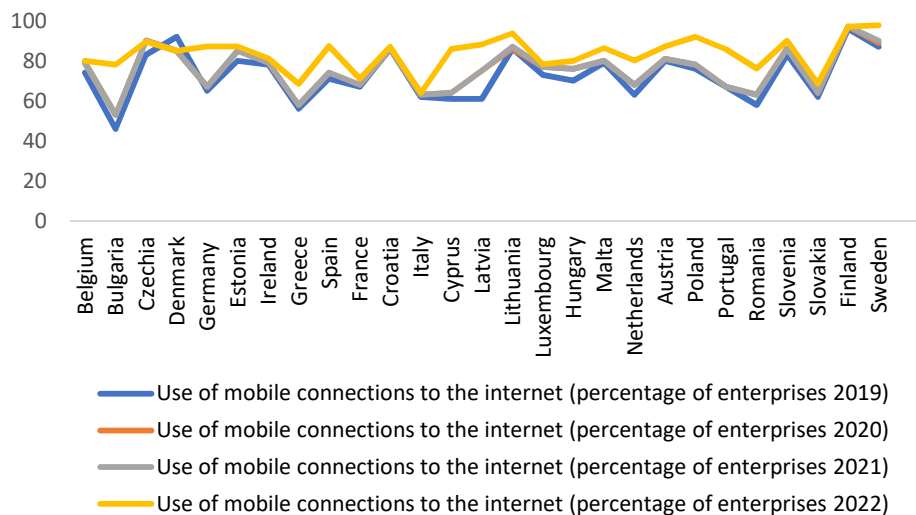


Figure 5. Development of the introduction of the Use of mobile connection to the internet
Source: authors (2023)

It can be clearly confirmed that the best results in the field of introducing new technological solutions were achieved when comparing the years 2019 and 2020. The change in technical efficiency increased especially in 2021 compared to 2020, which is the result of better use of already introduced technological changes in 2020. The results indicate that less developed countries do not lag behind more developed countries in the efficiency of the digitalization process. The MI result indicates that Bulgaria, Lithuania, Hungary and Slovenia belong to the more efficient countries during the years 2019-2022. In these countries, the MI was higher than 1 in all monitored periods. In Germany, Spain, France, Italy, Netherland and Portugal, a stable development, without growth, was recorded when comparing the years 2020-2021. In other countries, a decrease in efficiency was recorded in some of the periods, such as in the case of Slovakia in 2020-2021. In the comparison of the years 2021-2022, there is a decrease in Finland and Sweden. The best MI value in the last analyzed year was achieved by Luxembourg. These results correspond with the study of Inel (2019) and Yalcin (2021). The results of the change in technical efficiency indicate that stable development is mainly in Bulgaria, Hungary, Luxembourg, Lithuania. Slovakia achieved the best results in 2020-2021. The leader in the recent period is Germany, despite the fact that the overall result of MI efficiency was not the best. Frontier shift increased in the last period in almost all countries except for Sweden and Finland, which also caused their decline in overall efficiency. Similarly, Cyprus, Ireland, Austria and Latvia do not reach the required value 1. The rating of countries using these results confirmed Luxembourg as the leader in the given area. Surprisingly, Bulgaria is in 3rd place, Slovakia in 12th place. These are favorable results, as Slovakia's position in the DESI index is 23rd.

It is difficult to compare the results of this research with the results of other studies, since the Malmquist index has not been applied in the studies published in this field so far. It represents a gap in this research.

Perhaps it is possible to mention the study by Inel (2019), which investigated the efficiency of the digital transformation of EU countries using the DEA method. In his study, he surprisingly found that Germany and the Netherlands do not achieve the required efficiency of digital transformation.

Conclusion

In this research, the Malmquist index based on the DEA method was applied. The results of MI, ECH and FS were different in individual years and individual countries. The benefit of the research is the application of MIDEA and the dynamic assessment of the efficiency of digital transformation. The main contribution of the paper is finding that by applying this method, it is possible to find out how the efficiency of digital transformation has developed over several years in individual countries. This approach does not evaluate the % share of companies that have introduced individual digitalization elements, but it evaluates the above mentioned efficiency of their use and development of efficiency over time. In addition, it allows to evaluate the technical efficiency itself and the development of technological changes. With the use of this method surprising results were achieved in the positions of some countries.

The limitation of the given research was the missing data on individual digitalization elements of the business environment of EU countries. Another limitation was the fact that only 9 digitalization elements could enter the DEA model, and therefore the analysis was focused on the business environment. It would be appropriate to calculate MIDEA for other areas of digitalization as well, based on the DESI index, and to compare the results. Accordingly, future research will be focused on the calculation of MIDEA with different input variables and their comparison and creation of country ratings. The research will also focus on more detailed data collection. Managerial implications of the research point out the importance of applying individual elements of digitalization by businesses' managers, as it is clearly confirmed that digitalization affects the performance of companies and thus also the performance of EU countries. MIDEA method of measuring the efficiency of digital transformation can be a suitable tool supplementing the evaluation of companies in individual countries by the DII index.

Acknowledgements

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Analysis of the Assessment of Digital Performance and Sustainability of Economic Development within the EU-27 Countries

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Abstract

Research background: The digital competitiveness and sustainability of countries is an important concept that is constantly evolving and is often considered a driving force for economies. Competitive national economies are able to catch and promptly respond to new strategic opportunities and threats, constantly adapting to the rapidly changing conditions of the dynamic market. The level of competitiveness and sustainability reflects the country's success in international operations in relation to other market participants.

Purpose of the article: The aim of the paper is to evaluate the development of digital competitiveness and sustainability of the EU-27 countries using selected indices of the global assessment of digital competitiveness (DESI) and sustainability of economic development (GSCI) for the period 2016-2020 and to reveal the influences among the analyzed indices and their dimensions or pillars.

Methods: We used quantile regression to reveal the mutual influences of the individual pillars of the GSCI index on the change in the value of the global DESI index in the group of EU-27 countries.

Findings & Value added: We can state that the Nordic countries (Finland, Sweden and Denmark) are among the leaders in the assessment of digital and sustainable competitiveness. The worst ranking was achieved by Romania for the DESI and Cyprus for the GSCI. The results of the quantile regression confirmed that Social Capital has the most significant influence on the change in the value of the DESI index, followed by Resource Efficiency, Intellectual Capital and Natural Capital, but no influence was confirmed for Governance alone.

Keywords: digital performance, sustainability of economic development, Digital Economy and Society Index (DESI), Global Sustainable Competitiveness Index (GSCI), quantile regression

JEL classification: O30, O57

1. Introduction

Competitive national economies are able to quickly respond to emerging strategic challenges and opportunities by quickly adapting to constantly changing market conditions. Compared to other market players, a country's performance is reflected in its level of sustainability and competitiveness.

The constant impact of scientific and technological development, or the introduction of modern ways of doing business, forces national economies that enter international markets to adapt their activities to these changes in order to ensure sustainability and improve the country's competitive position (Jednak & Kragulj 2015). Ensuring economic development, well-being and a higher standard of living is the priority of every country. Nowadays, in addition to achieving favorable and stable values of these key areas, it is also important to achieve their long-term sustainability, which is generally associated with the efficient use of resources (Širá et al. 2020).

Currently, concepts such as sustainability and sustainable development as well as competitiveness are becoming topics of fundamental importance for academics, business work as well as for governments

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of economies (Secundo et al. 2020). Sustainable development is increasingly seen as a driving force behind many economic policies, as it encompasses the achievement of social, environmental and economic sustainability goals. Researchers have emphasized the importance of achieving sustainability to guarantee a country's long-term competitiveness, as competitiveness is considered the basis of national social and economic development (Balkyte & Tvaronaviciene, 2010). The concept of sustainable competitiveness, which encourages countries to meet the needs of the current generation of citizens while maintaining and increasing future national wealth without draining and degrading social and natural capital, is attracting increased attention as reported by Solability (2021). Measurement, evaluation and subsequent implementation of steps to improve the competitiveness and sustainability of countries is extremely important in the conditions of globalization. The analysis of these properties is carried out using globally recognized tools and indexes, which approach the given issue from different points of view.

There are currently studies comparing EU countries in terms of the transformation of economies into a digital environment (Huňady et. al., 2022, Andrei et al., 2022, Malkovska et. al., 2021). The data show (Aluculesei et al., 2020, Skare et al., 2023) that the level of digitization in the EU member states is far below their potential, with visible differences between individual states, which requires sustained efforts to eliminate the differences between states and making progress across the European Union.

The inspiration for processing our paper was the results of a research study by the authors Šofranková et al. (2022), which examined the interrelationships between digital and innovation performance of EU-27 countries using selected global indices (DESI, GII and SII). The results of the analyzes confirmed that a higher statistically significant positive relationship was identified between the digital performance of the EU-27 countries and their innovation performance assessed using the SII compared to the innovation performance using the GII. We focused our next research direction on the analysis of the mutual influence between the assessment of digital performance and the sustainability of economic development within the EU-27 countries, which we address in more detail in this paper.

1.1 Digital Economy and Society Index and its description

The Digital Economy and Society Index (DESI) according to the European Commission (2021) summarizes European indicators of digital performance and tracks the progress of the countries of the European Union. The European Commission (2021) has been monitoring the digital progress of Member States through DESI index reports since 2014. Each year DESI contains country profiles that support Member States in identifying areas requiring priority action, as well as thematic chapters offering analysis of key digital areas at European level, which it is essential to support political decisions.

The European Commission annually monitors the progress and level of development of Europe's digital competitiveness in individual member countries using the DESI index, which uses a combination of 33 indicators in the main measurement dimensions. Compared to previous years, the European Commission made changes to the indicators in the index and at the same time reduced the number of areas for monitored indicators, which are now structured around the 4 main areas of the Digital Compass: human capital, connectivity, integration of digital technologies, digital public services.



Figure 1. Structure of DESI

Source: processed according to European Commission (2021)

1.2 Global Sustainable Competitiveness Index and its description

The Global Sustainable Competitiveness Index (GSCI) measures the true competitiveness of nations. The GSCI is based on 120 purely quantitative indicators, derived from reliable sources (World Bank, UN agencies, the IMF), grouped in the 5 pillars of national competitiveness : natural capital, resource efficiency, social capital, intellectual capital and governance. The GSCI is the most comprehensive measurement of the competitiveness of nation-states and their future potential (Solability 2021).

GSCI is based on a pyramid system, i.e. each level of the index (pillar) affects the immediately following one and is necessary to support the higher level.



Figure 2. Structure of GSCI
Source: processed according to Solability (2021)

2. Methodology

The aim of the paper is to evaluate the development of digital competitiveness and sustainability of the EU-27 countries using selected indices of the global assessment of digital competitiveness (DESI) and sustainability of economic development (GSCI) for the period 2016-2020 and to reveal the interrelationships between the analyzed indices and their dimensions or pillars.

We have chosen countries of the European Union for our analyses. These countries currently form a group of 27 countries, and the length of the time period (5 years) was influenced by the availability of secondary data. We obtained secondary data from the annual reports published by the European Commission (2017, 2018, 2019, 2020, 2021) – DESI index and Solability (2017, 2018, 2019, 2020, 2021) - GSCI index for the years 2017 to 2021. Considering, that the data entered for the evaluation of the analyzed indices are often from the previous year than the year of publication annual report, we decided to mark the analyzed period as 2016 to 2020.

The results of the descriptive statistics of the analysed indices of the EU-27 countries for the period 2016 to 2020 are presented in Table 1.

Table 1. Descriptive statistics of analyzed indices and their dimensions or pillars

Variable	DESI	DESI_D1	DESI_D2	DESI_D3	DESI_D4	GSCI	GSCI_P1	GSCI_P2	GSCI_P3	GSCI_P4	GSCI_P5
Mean	40,513	11,2714	8,4616	7,0005	13,7804	53,0586	46,824	49,3444	52,8333	54,3869	59,5958
Median	40,5181	10,8422	8,2464	6,9779	13,9898	53,0027	46,2307	49,3437	53,1641	53,8199	59,6998
Minimum	19,3991	6,8691	3,168	2,5298	1,8531	42,276	20,4285	32,2852	37,7249	35,1633	49,1778
Maximum	65,2503	17,6315	18,029	13,3526	21,5644	62,0999	63,8376	68,2823	62,3976	70,7835	73,1727
Std. Dev.	9,56109	2,30689	2,4627	2,37066	3,98604	3,76577	9,40134	7,53838	4,99707	6,97632	5,06325

Source: authors' own processing

The main goal was fulfilled with the help of the following partial goals:

- *partial objective 1* → to evaluate the development of digital competitiveness and sustainability of the EU-27 countries using the DESI and GSCI global indexes for the period 2016-2020,
- *partial objective 2* → to identify the existence of mutual influences between the analyzed indices and their dimensions or pillars.

To estimate the determinants of the global DESI index, we apply linear and quantile regressions, which are commonly used in the literature for the analysis of economic phenomena. On the one hand, the main shortcoming of classical linear regression is the estimation of the average relationship between the dependent variable and a set of explanatory variables based on the conditional expected function, and thus such parameter estimation is only one value. On the other hand, quantile regression (Koenker & Hallok, 2001) examines the relationship between the dependent variable and the explanatory variables at different quantiles of the conditional distribution of the explanatory variable. The application of quantile regression is appropriate, as it is likely that the effects of independent variables are different in individual quantiles compared to the average estimates from linear regression. In addition, quantile regression is a more robust method, as it is not sensitive to the normality of the distribution of random errors, nor to extreme values occurring in the data.

We can write the quantile regression model in the following form:

$$y_i = x_i \beta_{\theta} + \varepsilon_{\theta i} \quad (1)$$

where y_i represents the investigated response, x_i is a set of explanatory variables, β_{θ} represents a parameter in the θ -th quantile of the distribution of the dependent variable, and $\varepsilon_{\theta i}$ is a random error. A specific feature of quantile regression is that the estimated coefficients of the independent variables, β_{θ} ,

may differ significantly in different quantiles, which may indicate a non-homogeneous conditional distribution of the dependent variable.

The conditional quantile regression function can be written in the following form:

$$Q_Y = (\theta | X = x) = x_i' \beta_\theta \quad (2)$$

Subsequently, the parameters of the conditional quantile regression can be estimated by solving the following optimization problem:

$$\hat{\beta}_\theta = \arg \min \sum_{i=1}^n \rho_\theta (y_i - x_i' \beta) \quad (3)$$

Since equation (3) does not have an explicit form, the estimation from the quantile regression is performed by minimizing the objective function using the simplex method in the form:

$$Q(\beta_\theta) = \sum_{i: y_i \geq x_i' \beta_\theta} \theta |y_i - x_i' \beta_\theta| + \sum_{i: y_i < x_i' \beta_\theta} (1 - \theta) |y_i - x_i' \beta_\theta| \quad (4)$$

Since this is a primary linear programming task and its description is quite extensive, we do not elaborate on the method further in this text.

The basic questions that the authors of the present study asked in connection with partial objective 2 are:

RQ1: *In what way do the pillars of the global index GSCI influence the change in the value of the global index DESI?*

The second research question, which is complementary to the first, is:

RQ2: *Does the influence of the pillars of the global GSCI index on the change in the value of the DESI index depend on its value itself?*

To answer these basic research questions, we used quantile regression analysis as the most appropriate method. In the first step, it is necessary to analyze the basic researched relationship (1) in a general form, using linear regression analysis using the method of least squares. This will give us a fundamental insight into the investigated dependence, which will allow us to understand how the individual pillars of the global GSCI index influence to change the value of the DESI index:

$$DESI = f(GSCI_P1, GSCI_P2, GSCI_P3, GSCI_P4, GSCI_P5) \quad (5)$$

3. Results

In the following part of the paper, we present the results of our analyzes resulting from partial objective 1, in which we focused on the evaluation and mutual comparison of the development of digital competitiveness and sustainability of the EU-27 countries using the average total score of the DESI and GSCI indices for the individual years 2016 to 2020. Average total the DESI score of the EU-27 countries had an increasing trend, reaching a high of 35.07 in 2016, but its score increased by 34.97% to 47.64 in 2020. The annual growth of the mentioned index gradually increased and ranged from 6.2% to 10.13%. We noted a fluctuating development for the development of the overall average score of the GSCI index of the EU-27 countries, which reached 51.71 in 2016 and reached its maximum in 2019, when it grew by 5.34% year-on-year and its score was 55.01. In 2020, it decreased by 1.68%, while the value of the average total score was only 54.08%.

As part of further analyses, we focused our attention on a mutual comparison of the average total score of the analyzed indices among the 27 selected countries of the European Union for the years 2016 to 2020 compared to the average European score (AVG EU-27), which we present in the following Figure 3.

The leader in the digital competitiveness of the EU-27 countries, evaluated using the average total score of the DESI index, is Finland (54.79), followed by Denmark (53.69) and Sweden, which reached an average score of 52.53. Also in the rankings using the GSCI index, the leaders are the same countries as in DESI, but in a different order. The leader is Sweden with an average GSCI score of 61.15. The second place in the ranking belongs to Finland (59.33), followed by Denmark with a score of 58.50. We recorded the lowest average DESI score for Romania, which was only 22.93. Cyprus ranked last with an average GSCI score of 45.47. It is also interesting that Greece ranks second to last in the assessment of digital competitiveness and sustainability. (AVG_DESI_{CY}=26.30, AVG_GSCI_{CY}=48.27).

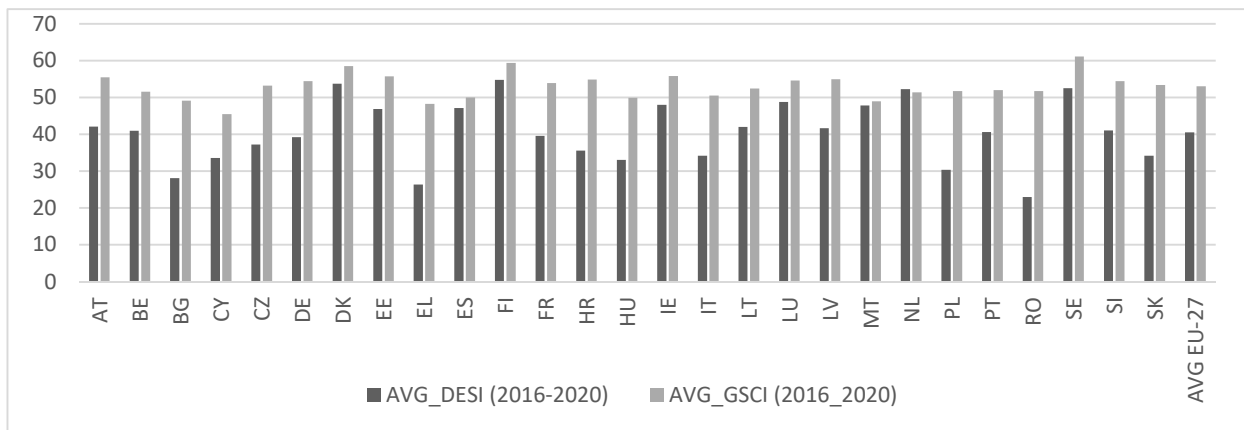


Figure 3. Comparison of the average total score for the years 2016 to 2020 of the analyzed indices of the EU-27

Source: authors' own processing

At the end of our comparative analyzes focused on 27 European countries, we provide an overview of the average total score of the analyzed indices, as well as their average score of the dimensions of the DESI index and the average score of the pillars of the GSCI index. In the table, it is also possible to find the minimum and maximum values for the analyzed indicators together with the country that achieved this result.

Table 2. Overview of min, max and average score of analyzed indices and their dimensions or pillars

	DESI	DESI_D1	DESI_D2	DESI_D3	DESI_D4	GSCI	GSCI_P1	GSCI_P2	GSCI_P3	GSCI_P4	GSCI_P5
min	22,93 (RO)	7,10 (RO)	5,24 (EL)	3,04 (BG)	3,11 (RO)	45,47 (CY)	29,15 (CY)	42,15 (SI)	44,81 (BG)	40,04 (RO)	53,50 (CY)
avg EU27	40,51	11,27	8,46	7,00	13,78	53,06	46,82	49,34	52,83	54,39	59,60
max	54,79 (FI)	16,72 (FI)	11,93 (DK)	10,93 (FI)	19,11 (EE)	61,15 (SE)	62,73 (SE)	57,04 (FR)	59,62 (SE)	68,71 (SE)	68,36 (IE)

Source: authors' own processing

In this part of our contribution, we present the results of our analyzes with a link to partial objective 2, which is aimed at identifying the existence of mutual influences between the analyzed indices and their dimensions or pillars.

The basic analysis of model (5) is given in Table 3. It is clear from the above table that model (5) is significant at the selected significance level $\alpha = 0.05$, that is, within the model there is at least one estimate of the regression coefficient that is statistically different from zero.

Table 3. Parameters of the linear model of the investigated dependence (1)

Source	SS	df	MS	
Model	6720,3113	5	1344,0623	Number of obs = 135 F (5,129) = 31.3600 Prob > F = 0.0000**
Residual	5529,2322	129	42,8623	R-squared = 0.5486 Adj R-squared = 0.5311
Total	12249,5436	134	91,4145	Root MSE = 6.5469

DESI	Coefficient	Std. err.	t	p	[95% conf. interval]	
GSCI_P1	0,0927	0,0620	1,4900	0,1380	-0,0300	0,2154
GSCI_P2	0,2989	0,0768	3,8900	0,0000**	0,1468	0,4509
GSCI_P3	0,9682	0,1352	7,1600	0,0000**	0,7007	1,2358
GSCI_P4	0,3161	0,0902	3,5000	0,0010**	0,1377	0,4946
GSCI_P5	0,0936	0,1216	0,7700	0,4430	-0,1469	0,3342
_cons	-52,5033	8,8897	-5,9100	0,0000**	-70,0917	-34,9148

Source: authors' own processing

Table 3 further shows that the modified index of determination, as a measure of the ability to test selected predictors (pillars of the GSCI index), the variability of the investigated DESI response has a

value of 53.1100%. Another conclusion is that when using a linear regression analysis, the change in the value of the studied variable DESI does not have a significant impact on the chosen significance level of the *GSCI_P1 (Natural Capital)* pillar ($p=0.1380$), while its share in the change in the value of the DESI index is 6.558%, as is the *GSCI_P5 (Governance)* pillar ($p=0.4430$) with a share in the change in the value of the investigated response at the level of 3.389%. The greatest influence on the change in the value of the investigated DESI index has the values of the predictor *GSCI_P3 (Social Capital)* ($p=0.0000$) with 31.514% influence, followed by pillar *GSCI_P2 (Resource Efficiency)* ($p=0.0000$) with 17.121% influence and pillar *GSCI_P4 (Intellectual capital)* ($p=0.0000$) influence for a change of 15.405%. Within the framework of model (5), there is also an absolute member of the model (*_const*) to change the value of the investigated response, the DESI index. Its share in the change in the value of the DESI index is 26.012%. The interpretation of the meaning of the absolute member is on two basic levels. From a mathematical point of view, the absolute member of the model represents the average value of the DESI index if all regressors (pillars of the GSCI index) are zero. However, from a practical point of view, this situation will never occur, because the individual pillars of the GSCI index always have a non-zero value, and their value is given by the very nature of the GSCI index. Therefore, it is correct to interpret the absolute member of the model (*_const*) as the influence of factors, predictors that we did not consider in the analysis, but have an impact on the change in the value of the investigated response. The basic model of linear regression analysis using the method of least squares is that the estimate of the regression coefficients is constant throughout the studied response interval (DESI). This fact and at the same time the second research question that

Before the analysis itself, it is necessary to define the limit values of the quantiles of the amount of the tax gap, for which the analysis will be carried out. For the purposes of the study, the following quantiles and corresponding values of the DESI global index were chosen as the investigated response: quantile $Q\ 0.1 = 28.0446$, where it is possible to include the countries BG (28.0417), EL (26.2984) and RO (22.9296); quantile $Q\ 0.2 = 32.1693$, where we can include PL (30.3124); quantile $Q\ 0.3 = 35.4790$ with countries like CY (33.5207), HU (33.0223), IT (34.1269) and SK (34.1714); quantile $Q\ 0.4 = 37.8573$ with the countries CZ (37.2253) and HR (35.5322); quantile $Q\ 0.5 = 40.5181$ with countries DE (39.2448), FR (39.5402); quantile $Q\ 0.6 = 43.3570$ with countries AT (42.0332), BE (40.9427), LT (41.9859), LV (41.5941), PT (40.5702) and SI (41.0666); quantile $Q\ 0.7 = 45.8587$; quantile $Q\ 0.8 = 48.0124$ with countries EE (46.8202), ES (47.0895), MT (47.7928) and quantile $Q\ 0.9 = 53.1537$ with countries DK (53.6888), FI (54.7909), IE (48.0133), NL (52.2450) and SE (52.5301). The basic results of the quantile regression analysis for the selected values of the quantiles $Q\ 0.1$, $Q\ 0.3$, $Q\ 0.5$, $Q\ 0.7$ and $Q\ 0.9$ are shown in summary Table 4.

Table 4. Results of quantile regression analysis

<i>Term</i>	<i>Q 0.1</i>	<i>Q 0.3</i>	<i>Q 0.5</i>	<i>Q 0.7</i>	<i>Q 0.9</i>
<i>_const</i>	-71,3666**	-59,2411*	-51,6471**	-51,3027**	-32,9803
	(-94,6410; -48,0921)	(-79,7575; -38,7247)	(-73,2353; -30,0589)	(-80,3056; -22,2997)	(-70,3815; 4,4209)
<i>GSCI_P1</i>	0,1599	0,1680*	0,2017**	0,1906	0,0213
	(-0,0025; 0,3224)	(0,0249; 0,3112)	(0,0511; 0,3524)	(-0,0118; 0,3929)	(-0,2397; 0,2823)
<i>GSCI_P2</i>	0,3303**	0,2872**	0,2910**	0,2759*	0,1505
	(0,1292; 0,5315)	(0,1099; 0,4646)	(0,1044; 0,4776)	(0,0253; 0,5267)	(-0,1728; 0,47379)
<i>GSCI_P3</i>	0,8575**	1,0388**	0,9679**	1,1088**	0,9142**
	(0,5035; 1,2115)	(0,7268; 1,3509)	(0,6396; 1,2963)	(0,6676; 1,5499)	(0,3453; 1,4831)
<i>GSCI_P4</i>	0,5630**	0,2619*	0,2158	0,1329	0,1402
	(0,3269; 0,7992)	(0,0537; 0,4701)	(-0,0033; 0,4348)	(-0,1614; 0,4271)	(-0,2393; 0,5197)
<i>GSCI_P5</i>	0,0757	0,0850	0,0838	0,1015	0,2934
	(-0,2426; 0,3940)	(-0,1956; 0,3656)	(-0,2114; 0,3791)	(-0,2952; 0,4982)	(-0,2181; 0,8049)

* - significant at the significance level $\alpha = 0.05$, ** - significant at the significance level $\alpha = 0.01$.

Source: authors' own processing

It is clear from Table 4 that the very height of the value of the investigated response, the DESI index, affects the effect of the predictors (pillars of the GSCI index). First of all, the absolute member of the model (*_const*). If we understand the absolute term of the model as influences that we did not consider

in the analysis, then its contribution to the change in the DESI value is significant in the entire interval of the used DESI values. Its influence gradually decreases, from a value of 28.5647% for countries that achieved a DESI index of Q 0.1 (DESI = 28.0446) to a value of 22.1374% for countries with a DESI index of Q 0.9 (53.1537). The change in the value of the individual estimates of the regression coefficients of the pillars of the GSCI index as predictors that influence the change in the value of the examined response, the DESI index, depending on the individual quantiles of the DESI index are shown in Figure 4. In this figure, the estimate of the regression coefficients obtained by linear regression analysis using the method of least squares is shown by a dashed line.

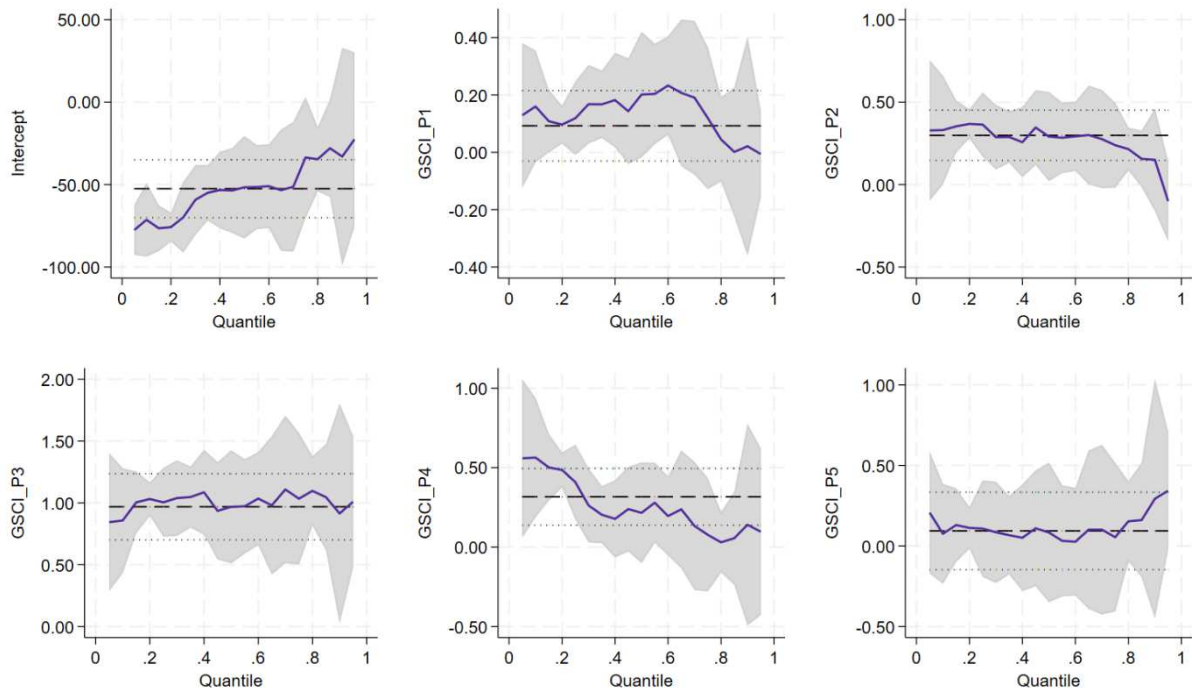


Figure 4. Change in the values of regression coefficient estimates for individual quantiles of the DESI index

Source: authors' own processing

The first conclusion of the performed quantile regression analysis is the fact that the regressor *GSCI_P5 (Governance)* does not have a significant influence on the change of the DESI value in the entire range of values of the DESI index at the chosen level of significance $\alpha = 0.05$. The impact of the *GSCI_P5 (Governance)* pillar on the change in the value of the DESI index varies from a value of 2.2118% for countries with a DESI index of Q 0.1 to a value of 3.6664% for a DESI index of Q 0.7 (45.8587). A more pronounced change in the influence of the *GSCI_P5 (Governance)* pillar occurs at the value of the DESI index at the level of Q 0.8 (48.0124%), where its share is 7.3663% with an increase to the value of 14.3766% for the countries with the highest value of the DESI index (Q 0.9; 53.1537), as documented in Figure 5.

The most important predictor that significantly affects the change in the value of the DESI index in the entire interval of its values is the *GSCI_P3 (Social Capital)* pillar. As can be seen in Figure 5, its influence on the change in the value of the DESI index for countries at the level of Q 0.1 (28.0446) represents 22.5412% ($p=0.0000$). According to Figure 5, increasing the influence of the *GSCI_P3 (Social Capital)* pillar on the change in the value of the DESI index is up to the level of Q 0.4 (37.8573), when its influence represents 35.3837% ($p=0.0000$). For countries with a value of the DESI index at the level of Q 0.5 (40.5181), the share of influence of the *GSCI_P3 (Social Capital)* pillar decreases to the level of 30.9942% ($p=0.0000$) with a subsequent increase in the influence on the change in the value of the DESI index up to Q 0.8 (48.0124), where it reaches its maximum value at at the level of 47.4268% ($p=0.0000$). For the countries with the highest value of the DESI index at the level of Q 0.9 (53.1537), the contribution of the *GSCI_P3 (Social capital)* pillar to the change in the DESI value is at the level of 40.4580% ($p=0.0020$).

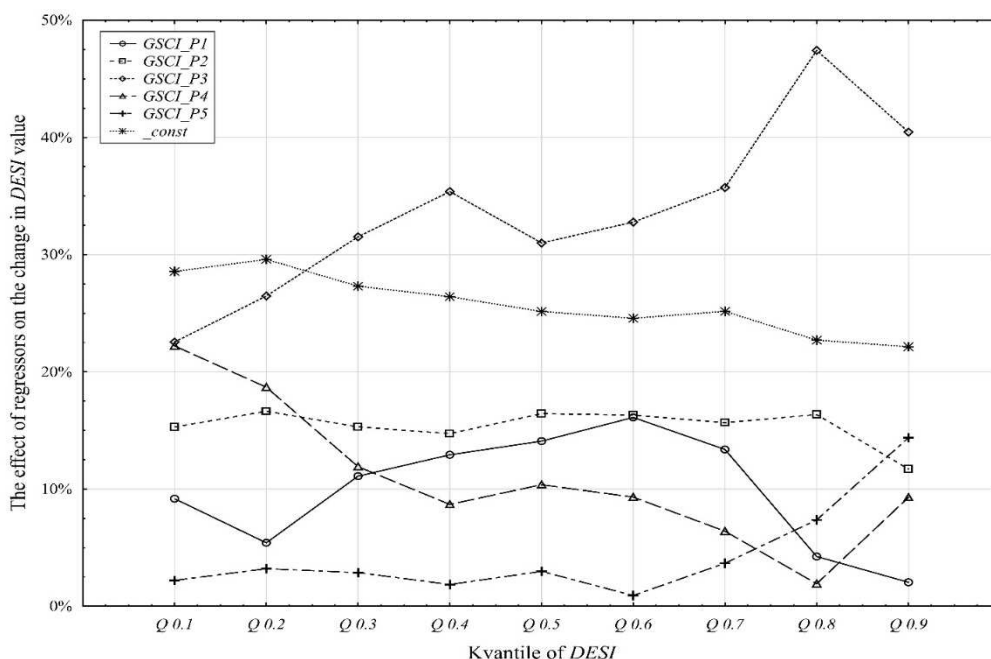


Figure 5. The influence of the individual pillars of the GSCI and the constant on the change in the value of the DESI

Source: authors' own processing

The second most important predictor that affects the change in the value of the DESI index is the *GSCI_P2 (Resource Efficiency)* pillar. Its influence on the change in the value of the DESI index oscillates (Figure 5) from a value of 15.2941% ($p=0.0010$) for countries with a value of the DESI index at the level of Q 0.1 (28.0446) to a value of 15.6772% ($p=0.0310$) for countries with an index value of DESI at the level of Q 0.7 (45.8587) with its maximum value at the level of 16.4274% ($p=0.0020$) at the value of the DESI index at the level of Q 0.5 (40.5181). The influence of the *GSCI_P2 (Resource Efficiency)* pillar for countries with a DESI index value higher than 48.0124 (Q 0.8) is no longer significant ($p=0.1070$). The influence of the *GSCI_P4 (Intellectual Capital)* pillar is significantly manifested only in countries that have a DESI index value at the level of Q 0.1 (28.0446) to Q 0.3 (35.8573), while the influence of the *GSCI_P4 (Intellectual Capital)* pillar is at the level of 22.1118% ($p=0.0000$) at Q 0.1 to 11.9082% ($p=0.0140$) at Q 0.3. The *GSCI_P1 (Natural Capital)* pillar, on the other hand, is significant only for countries with a DESI index value in the interval from Q 0.3 (35.4790) to Q 0.6 (43.3570). The influence of the *GSCI_P1 (Natural Capital)* pillar in this interval ranges from 11.0952% ($p=0.0220$) to 16.1064% ($p=0.0230$). Thus, for countries with a DESI index value in the interval 28.0446 (Q 0.1) to 32.1693 (Q 0.2) and in the interval 45.8587 (Q 0.7) to 53.1537 and higher (Q 0.9), the *GSCI_P1* pillar no longer has a significant impact on the change in the DESI index value.

4. Discussion

In this part of our contribution, we present several research studies in which the authors devoted themselves to a mutual comparison of the assessment of digital competitiveness in connection with other instruments for the assessment of the sustainability of economies. Jovanović et al. (2018) examined the relationship between digitalisation (DESI) and sustainable development (economic, social, and environmental components). The study explored the correlations of DESI and other composite indices (Global Competitiveness Index, Global Innovation Index, Gross Domestic Products, Global Entrepreneurship Index, The Good Country Index, Sustainable Development Goal Index, Sustainable Society Index) and examined the relationships between Hofstede's cultural dimensions and digital performance. Jenčová et al. (2023) concluded that the assessment of digital performance using DESI achieved a statistically significant correlation in the rankings of EU countries between the analyzed years 2016-2020. Among the countries of the European Union, there are internally homogeneous and externally heterogeneous groups of countries in terms of ranking within the DESI dimensions. Quantifying and comparing the position of the 28 countries of the European Union in the

international space using DESI can help to identify and improve the digital competitiveness of the countries of the European Union. Knowing the five dimensions of DESI, its specific sub-dimensions and indicators can help to identify controversial areas to which the state should pay attention. Esses et al. (2021) examined interconnections between the dimensions of the DESI and the indicators of the Sustainable Development Goal (SDG) targets together in the V4 countries. The results show the extent of digital performance in individual countries and the relationship between their digital performance and sustainability indicators.

At the end of our paper, we present the following summary of the achieved results of quantile regression. The influences that influence the change in the value of the DESI index, which we did not consider in the study and are represented by the absolute member of the model (*_const*), are significant in the entire range of values of the DESI index and their influence gradually decreases from the value of 28.5647% to 22.1374%. The most significant predictor that affects the change in the value of the DESI index is the GSCI_P3 pillar – *Social capital*, while this pillar significantly affects the change in the value of the investigated response. Its influence is maximum for countries with a DESI index value of 48.0124 with a value of 47.4268%. The second most significant predictor that affects the change in the value of the DESI index is the GSCI_P2 pillar – *Resource Efficiency*, while the influence of this index is statistically significant only for countries with a DESI index value of up to 45.8587. The third most significant predictor is the GSCI_P4 pillar – *Intellectual Capital*, which, however, significantly affects the change in the DESI value only for countries with a DESI index value in the interval 28.0446 to 35.4790. The fourth most significant regressor, which significantly affects the change in the value of the DESI index, is the GSCI_P1 pillar – *Natural Capital*, while a statistically significant effect is manifested only in countries with a value of the DESI index in the range of 35.4790 to 43.3570. The GSCI_P5 pillar – *Governance* does not have a significant impact on the change in the value of the DESI index.

Conclusion

The competitiveness and sustainability of countries is an important concept that is constantly being reassessed and developed, and is often considered the driving force of economies. Competitive national economies are able to catch and promptly respond to new strategic opportunities and threats, constantly adapting to the rapidly changing conditions of the dynamic market. The level of competitiveness reflects the country's success in international operations in relation to other market participants.

At the end of our contribution, we can state that the Nordic countries (Finland, Sweden and Denmark) are among the leaders in the assessment of digital and sustainable competitiveness. The worst ranking was achieved by Romania for the DESI index and Cyprus for the GSCI index. From the results of the quantile regression, we conclude that 4 pillars of the GSCI index (*Social Capital, Resource Efficiency, Intellectual Capital and Natural Capital*) have a significant impact on the change in the value of the DESI index, but only one pillar of the GSCI (*Governance*) does not have a significant impact on the change in the value of the index DESI. The most significant predictor that affects the change in the value of the DESI index is the *Social Capital pillar*, which focuses on the assessment of health, safety, freedom, equality and life satisfaction and the facilitation of development.

During the realization of our analyses, we also noted several limitations, such as the different number of evaluated countries (DESI – only EU countries, GSCI – 180 countries of the world) and also differences in the number of input indicators included in the individual dimensions and pillars of the analyzed indices (DESI – 33 indicators, GSCI – 120 indicators). The mentioned limitations have a significant impact on the achievement of relevant results for individual countries and also affect the further direction of our research analyses. We can see the further direction of the research in a more detailed analysis of the individual indicators entering the dimensions or pillars of the analyzed indices, as well as revealing the mutual relations between them and their influence on other areas of the evaluation of the competitiveness and sustainability of the selected countries.

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Support of Investors Located in the Banská Bystrica Region through Regional Investment Aid

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Abstract

Research background: Slovak regions can be characterized through different level of their economic development. These disparities can be eliminated through a set of various tools, one of them is regional investment aid as a specific type of state support. It is designed for domestic and foreign companies that are already located in Slovakia or those that only will become a part of Slovak economy. The aim to align regional disparities is emphasized mostly in last few years and it means that nowadays applicants for this type of support will be entitled to obtain more financial resources in case that they will be situated in less developed Slovak regions.

Purpose of the article: The aim of this paper is to prove that the Banská Bystrica Region belongs among less developed Slovak regions through the analysis of economic indicators from this region and their comparison with the average values in Slovakia. Secondly, the aim of this paper is to monitor and identify the development of provision of (regional) investment aid to this region and its comparison with the other regions of Slovakia.

Methods: The paper is using secondary data obtained from the Statistical Office of the Slovak Republic and the Ministry of Economy of the Slovak Republic with the help of mathematical and statistical methods used for the verification of the settled assumptions.

Findings & Value added: The findings indicate that in last few years the inflow of regional investment aid to the Banská Bystrica Region is not so strong compared with more developed regions of Slovakia.

Keywords: investors, regions, economic development, regional investment aid

JEL classification: F21, R12, R58, P45

1. Introduction

It is generally accepted that foreign direct investments (FDI) represent an important driver of economic development of emerging as well as developed countries. One of the main positive effects of FDI is the increase in labour productivity and its contribution to the national income of the host country. Foreign investors add value to inputs and generate profits, from which they pay taxes, thereby contributing to the GDP. Higher productivity is a result of more focused specialization, better capital equipment, and improved management and marketing practices by foreign companies. (Tsinaridze & Makharadze, 2023).

Foreign direct investments also facilitate technology transfer between partner countries, especially between developed and transitioning economies. Domestic firms enhance their efficiency by adopting more effective technologies from foreign companies operating in the local market. These technologies encompass various aspects, such as product design, production processes, management techniques (e.g., supplier management, production management, marketing, and sales skills), and research and development. While the mentioned factors positively influence growth and productivity, it is the influx of new modern technologies that serves as the fundamental driving force behind economic growth, significantly contributing to increased productivity. As a result, technological development is perceived as the most critical factor determining the pace and character of the economy. This leads to an increase in the technical level of production, product quality, and the qualifications of the workforce. Due to

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these advantages, associated business entities of multinational companies generally report higher levels of productivity compared to their domestic competitors. (Gelitashvili & Dzhvarsheishvili, 2021)

Further positive effects, as described by Milovanovic & Markovic (2022), include increasing and maintaining employment, boosting exports, improving the institutional environment, investing in education, and enhancing access to foreign capital. The effect of increasing and maintaining employment is accompanied by modernization within companies, the creation of new jobs, expanding production, improving product quality, and achieving better sales performance. Increased productivity also positively impacts the average monthly wage, which tends to increase with productivity growth. Although the influx of FDI may initially result in the import of foreign goods, machinery, intermediate products, and greater utilization of foreign services, in the long term, it is expected to have a positive effect on export growth. This is attributed to the improved access of subsidiary companies to foreign markets, which is secured by international corporations. The presence of multinational companies also leads to an improvement in the institutional environment, offering better protection and enforcement of property rights.

The main goal of home countries' measures is to support the flow of Foreign Direct Investment (FDI) into developing countries, assisting them in attracting FDI and maximizing its beneficial impact. Home countries adopt various approaches to influence the volume and quality of FDI flows, including the liberalization of outward FDI, removing barriers to foreign direct investments, collaborating with agencies that provide technical advice, organizing seminars, and similar initiatives. (Michalek, 2023) They also support technology exports and incentivize companies investing abroad through financial and fiscal benefits. Additionally, home countries minimize risks by offering investment insurance against political or other non-economic risks. Furthermore, home countries exercise control over multinational enterprises by implementing regulatory and sanction measures to ensure their compliance with legal and ethical obligations while conducting business. Failure to meet these obligations may involve practices such as corruption, fraud, improper accounting, or environmental pollution (Tsinaridze & Makharadze, 2023).

Effective state support for foreign direct investment leads, on one hand, to stabilization in public functions by increasing tax revenues and reducing the amount of resources allocated to unemployment benefits, assuming that FDI creates new job opportunities. On the other hand, if the inflow of FDI is driven by state support in the form of investment aid, the economy incurs costs in providing this assistance, as well as costs associated with supporting measures and administrative expenses. When considering the provision of a certain type of investment aid, it is essential to keep in mind that granting significant advantages to foreign investors may have adverse effects on the national economy. On one hand, there is a risk of corruption and clientelism, and on the other hand, significant disadvantages for domestic entrepreneurs do not contribute to the development of the domestic economy. (Narteh-Yoe, Djokoto, & Pomeyie, 2023) According to Ferencz et al. (2019), state aid consists of measures that meet cumulative criteria, which are the advantage granted or implemented from public funds and attributable to the state, an economic benefit for the recipient of the support, impact on economic competition, and effect on the internal market of the European Union. A similar view is held by Wishlade (2003), who states that state aid is provided from state resources and can take any form. However, for the aid to be applicable, it must distort economic competition by favouring certain companies. Regional aid promotes the economic, social, and territorial cohesion of Member States and the European Union as a whole and aims to assist the development of disadvantaged areas by supporting investments and job creation in the context of sustainable development. Thus, the objective of regional aid is to reduce the disparities in socio-economic development between the various regions of the European Union by supporting the least economically developed regions. (Ambroziak, 2022) By reducing disparities in the level of development of individual EU regions, EU economic and social cohesion is achieved. (Podsiadlo, 2016) By targeting regional aid toward the least developed (most disadvantaged) regions in the EU, the impact on trade and competition is minimized. The main objective of regional aid is to promote the investments in regions where the level of economic development is below a certain EU average. (Wróblewska, 2022; Ramboer, & Reynaerts, 2020)

Currently, the provision of investment aid in the Slovak Republic is regulated by Act No. 57/2018 Coll. on regional investment aid, which repealed the previous Act No. 561/2007 on investment aid. The Act on regional investment aid governs the provision of investment aid from both accounting and tax perspectives. It establishes the rules for granting regional investment aid, the rights and obligations of the aid recipients, and the responsibilities of state administration bodies concerning its provision and

monitoring of its use. (Novackova & Saxunova, 2020) Regional investment aid can be granted under precisely defined conditions to support the implementation of investment intentions in industrial production, technological centres, and enterprise service centres. Based on the regulations of Act No. 57/2018 Coll. on regional investment aid, investment aid is provided in the form of subsidies for tangible and intangible fixed assets, income tax relief, contributions to created new jobs, or transfer of immovable property and rental of immovable property for a value lower than the appraised value determined by an expert. According to this act, subsidies for tangible and intangible assets, as well as contributions for creating new job positions, belong to the direct forms of regional investment aid, on the other hand, income tax relief and the transfer of immovable property or rental of immovable property for a value lower than the appraised value determined by an expert represent indirect forms of regional investment aid.

Regional investment aid is a form of investment assistance aimed at supporting competitiveness and reducing regional disparities. The Ministry of Economy of the Slovak Republic supports investments that utilize smart industry technologies and contribute to research and development within the country. Additionally, a priority is given to supporting job creation in the least developed districts. Any registered business entity in Slovakia whose investment plan meets the criteria for receiving investment aid according to the Act on regional investment aid can apply for regional investment aid. (Fabus & Csabay, 2018) The providers of investment aid can include various entities in the Slovak Republic, such as Ministry of Economy of the Slovak Republic, Ministry of Finance of the Slovak Republic, Ministry of Labor, Social Affairs, and Family of the Slovak Republic, owners, or administrators of real estate within the functional scope of public administration bodies, and Slovak Land Fund. Additionally, this form of investment aid can also be provided by municipalities, higher territorial units, or organizations under their supervisory authority. The main goal of regional investment aid is to reduce regional disparities. The maximum amount of investment aid in all types of projects is determined by the maximum percentage of eligible costs that can be approved for the investor in the form of investment aid. However, it is worth noting that the Bratislava Region is excluded from receiving investment aid. The following image shows the maximum intensity for the year 2023. (Ministry of Economy of the Slovak Republic, 2023)

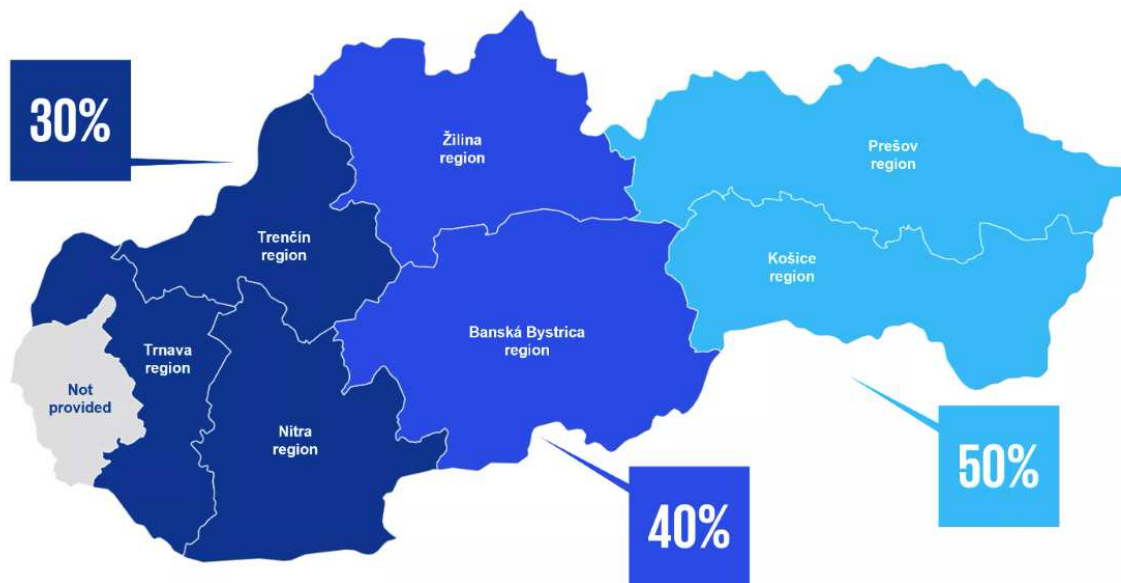


Figure 1. Maximum intensity for regional investment aid in Slovakia
 Source: Ministry of Economy of the Slovak Republic (2023)

As seen in the image, the percentage values of regional aid intensity are divided according to the individual regions of Slovakia. It is evident that the Bratislava region is excluded from receiving this aid, while the intensity increases towards the eastern parts of the country. Compared to the previous year, the overall intensity of aid has increased, particularly in the eastern regions of Slovakia. In comparison to the year 2021, the aid intensity in the central and western parts of Slovakia has increased by 5%. However, in the eastern region, there has been a significant increase of up to 15% in aid intensity.

2. Methods

The aim of the paper is to prove that the Banská Bystrica Region belongs among less developed Slovak regions and to monitor and identify the development of provision of (regional) investment aid to this region and its comparison with the other regions of Slovakia. For this purpose, two types of secondary data were utilized: information about selected economic parameters available from the DATAcube database of the Statistical Office of the Slovak Republic, and the database of the Ministry of Economy of the Slovak Republic, containing data on provided (regional) investment aid. Regarding the DATAcube database, the most recent available data for the year 2021 was used for the analysis of the position of the Banská Bystrica Region in the Slovak economy, specifically the characteristics of the economy, the GDP per capita, the amount of added value, labour productivity per hour worked and per employed person, average gross wage, and unemployment rate.

The Ministry of Economy's database includes information about individual investment projects, providing detailed identification of the country of origin of the investor, eligible investment costs, the planned number of created jobs, and the forms of (regional) investment aid approved for the companies. In terms of time, the analysis covered the investment aid granted to investors from 2002 (when investment aid was launched as a form of state aid) until May 2023. As the aim of the paper is also to examine the development of (regional) investment aid over time, the analysed period is subsequently divided into two periods – 2002-2017 (support provision regulated by the Act on Investment Aid) and 2018-May 2023. During the latter period, the provision of aid is regulated by the Act on Regional Investment Aid, with a stronger emphasis on supporting less developed regions of Slovakia. The analysed data is current as of May 2023.

3. Results

According to reports from the Slovak Investment and Trade Development Agency (2022) and the Statistical Office of the Slovak Republic (2023), the Banská Bystrica Region is characterized by several dominant sectors, namely industry, wholesale and retail trade, public administration, and healthcare. In terms of the industrial sector, the most prevalent sub-sectors in the Banská Bystrica Region are the production of metal products, food and beverages, and instruments and equipment. However, despite these circumstances, the region's industrial sector only generated revenues of 5.7 billion euros from its own goods in 2021, making it the lowest among all regions. Additionally, the number of individuals employed in the industrial sector stood at 50.7 thousand, also the lowest compared to other regions. Notable foreign investors in the region include companies such as Continental Automotive, Kronospan, and Nematik. Agricultural land occupies 43.1% of the Banská Bystrica Region's total area. The southern part of the region is predominantly dedicated to agriculture, focusing on the cultivation of grains, corn, and vines. The northern part, characterized by meadows and pastures, plays a vital role in livestock farming, particularly cattle and sheep. The region stands out at a national level due to its extensive forested area, covering almost half of its territory. Its timber production significantly surpasses that of other regions. Despite Banská Bystrica's historical candidacy as the official centre of Slovakia, the region currently focuses on trade and services.

Strong aspects of the region include a substantial workforce, a well-educated population, abundant reserves of key materials suitable for various industries, a favourable location for exporting metals, wood processing, clay, and chemicals, favourable conditions for establishing industrial parks, a positive climate, and a rich cultural environment that supports the growth of tourism. According to Economic and Social Development Program of the Banská Bystrica Self-Governing Region for the years 2022 – 2030, the Banská Bystrica Region is characterized by many small villages, which hinders their ability to meet all original and transferred responsibilities and achieve sustainable growth due to limited financial and human resources. The region faces challenges related to a crisis in human potential caused by the departure of productive-age citizens, low natural population growth, and a high number of unemployed individuals. The main reason for the outflow of residents from the region is the low productivity and performance of the economy, which limits the creation of attractive professional opportunities. This, in turn, accelerates the overall aging of the population and places increased pressure on the allocation of healthcare and social services.

3.1 Regional economy of the Banská Bystrica Region

In 2021, the economically active population accounted for 51% of the total population. The employment rate reached 71.3%, while the unemployment rate stood at 10.2%. However, despite these

positive indicators, the average monthly nominal wage was 1,250 euros, which was the second lowest among all regions. In comparison to the national average in Slovakia, the nominal monthly wage was lower by 11%. In the Banská Bystrica Region, individuals were most employed in the industrial sector, accounting for 26% of the workforce in 2019 (newest data). Other sectors with a significant number of employed residents in the Banská Bystrica Region included wholesale and retail trade (13%), public administration and social security (13%), education (12%), and healthcare and social work (9%). Approximately 11% of the population worked in various other activities such as art, entertainment, recreation, administrative services, professional and technical activities, real estate, financial and insurance services, information and communication, and accommodation and food services. However, individually, these activities did not exceed a 2% share.

In 2021, the Banská Bystrica Region created a regional GDP of 8,694 million euros at current prices, representing 8.8% of the national GDP. As there are eight NUTS 3 regions in Slovakia, the even share would be 12.5% per region, so the Banská Bystrica Region was lagging behind the average by 3.7 percentage points. Other selected indicators of regional economy of NUTS3 region in Slovakia presents table 1.

Table 1. Selected indicators of regional economy of NUTS 3 regions in Slovakia in 2021

	GDP per capita (€)	Gross value added (€)	Labour productivity per employed person (€)	Labour productivity per hour worked (€)	Average gross wage (€)	Unemployment rate (%)
Bratislava Region	38,761	24,907	45,598	28.4	1,767	4.38
Trnava Region	19,415	9,777	35,773	22.3	1,331	4.16
Trenčín Region	15,313	7,848	27,049	17.3	1,317	4.28
Nitra Region	14,893	8,953	28,376	17.6	1,266	4.80
Žilina Region	15,922	9,796	26,832	17.4	1,308	5.32
Banská Bystrica Region	13,949	7,744	26,192	16.9	1,246	9.01
Prešov Region	11,114	8,003	24,920	16.1	1,153	10.75
Košice Region	15,418	10,726	30,952	20.2	1,333	9.98
Slovak Republic	18,098	10,969	30,711	19.53	1,340	6.76

Source: own processing based on data from the Statistical Office of the Slovak Republic (2023)

Per capita, the regional GDP lagged behind the national average by 23%, amounting to 13,949 euros at current prices. The Banská Bystrica Region had the second lowest GDP per capita among all regions. Considering the regional gross value added (GVA), the position of the Banská Bystrica Region was even worse. The GVA in 2021 was the lowest in Slovakia lagging over 30% behind the national average. The primary contributors to the regional gross value added were the industrial sector, public administration, defence, healthcare, and social assistance, accounting for 18.1%. Trade, transport, accommodation, and food services accounted for 16.9%. Effectivity of using the labour force in particular regions in 2021 showed, that average labour productivity indicator per employed person in the Banská Bystrica Region was only 26,192 €, the average labour productivity per one hour worked was 16.9 €. There was only one region (Prešov) which had even lower values of both indicators. The national average of labour productivity per employed person was in 14.5% higher. Consequently, the average regional gross wage in 2021 was only 1,246 €. It was only 8% below the national average, but still the second lowest among all NUTS 3 regions. The Banská Bystrica Region had the third highest unemployment rate among NUTS 3 regions in Slovakia, which was over 33% higher than the national average. According to the values of the analysed indicators we can confirm, that the Banská Bystrica Region belongs among less developed regions in Slovakia. This is also confirmed by the identification of the Slovak Investment and Trade Development Agency (2022) that has identified the least developed districts – most of them are situated in the Banská Bystrica Region, the Prešov Region, and the Košice Region. (Beresova, 2018)

3.2 Regional investment aid in Slovakia

Since the establishment of investment aid in 2002, a total of 256 companies from different countries have chosen to avail themselves of this form of state aid. However, not all of them met the prescribed criteria, leading to the cancellation of investment aid for 27 companies. Therefore, the total amount of investment aid granted was €1,993,427,985 distributed over 229 instances. The average value of the granted investment aid was €9,140,555. As was mentioned above, investment aid is provided in four forms – tax relief, contribution for creating new job positions, subsidy for tangible and intangible assets, and transfer of assets at a price below market value – that can be also combined. The most common form of assistance was tax relief, it was granted 196 times, with an average value of €5,154,643. The next form of assistance was the subsidy for tangible and intangible assets (granted 87 times), which accounted for a total expenditure of €843,616,063. Following that, there was the contribution for creating new job positions, amounting to €140,053,230. This form of assistance was granted 71 times, with an average value of €1,972,580. The lowest amount of assistance was provided through the transfer of assets at a price below market value, which was given to two business entities, totalling €46,695,530.

The majority of investors who applied for investment aid in Slovakia come from European countries, specifically Germany, Austria, the Netherlands, Switzerland, and Italy. Germany had the highest number of companies, with a total of 56, followed by 25 companies from Austria and 22 companies from South Korea. Additionally, 17 companies originated from the Netherlands and the United States. Luxembourg and France had the fewest investors. It is worth noting that the analysis reveals investment aid was also granted to Slovak companies, with a total of 37 benefiting from it. This confirms that while foreign investors may seem to dominate, local businesses have also received support.

The following table provides an overview of the volume of (regional) investment aid granted, categorized by individual regions of the Slovak Republic, with the aim of creating a certain number of job positions and subsequent calculation of average costs per job position created.

Table 2. (Regional) investment aid according to Slovak regions (2002 - May 2023)

	Value of investment aid (€)	Number of jobs created	Average cost per job (€)
Bratislava Region	52,906,417	3,007	17 594.42
Trnava Region	408,970,373	9,430	43 369.07
Trenčín Region	209,641,133	11,357	18 459.20
Nitra Region	365,794,418	10,767	33 973.66
Žilina Region	421,410,316	7,640	55 158.42
Banská Bystrica Region	126,028,997	6,245	20 180.78
Prešov Region	96,451,645	3,073	31 386.80
Košice Region	312,224,686	11,809	26 439.55
Slovak Republic	1,993,427,985	63,328	31 477.83

Source: own processing based on data from the Ministry of Economy of the Slovak Republic (2023)

The data from the table 1 indicates that the highest amount of investment aid flowed into the Žilina and Trnava regions since 2002, accounting for approximately 21% of the total financial resources. The Nitra Region followed closely with 18% of the investment aid, while the Košice Region received 16% of the investment aid. Among the regions receiving the smallest amount of this state support, we can include the Banská Bystrica Region with 6%, the Prešov Region with 5%, and the Bratislava Region with 3%. The reason why the Bratislava region received the least amount of (regional) investment aid is that it is one of the most developed regions in Slovakia, therefore, foreign investors likely prioritize less developed regions due to the availability of greater investment aid. In terms of the number of jobs created (a significant criterion in providing investment aid as it contributes to reducing unemployment rates), the leading regions are primarily the Košice and Trenčín regions, accounting for 18% share of the total number of jobs created. On the other hand, the Bratislava and Prešov Regions have the smallest share in this indicator (5%). The Banská Bystrica Region ranks sixth in terms of the share of jobs created since it saw the creation of more than 6,200 job positions during the observed period. Since 2002, the Slovak Republic has created over 63,000 jobs through the provision of investment aid. When providing state support, it is crucial to consider

not only the number of created jobs but also their relation to the financial resources allocated to individual enterprises. In this regard, significant variations can be observed among different regions. The average cost of creating one job ranged from approximately €17,594 in the Bratislava region to €55,158 in the Žilina Region. Evaluating the situation in the Banská Bystrica Region, it can be confirmed that it ranked third in terms of the cost of creating one job, with an investment aid value of approximately €20,180.

3.3 Regional investment aid in the Banská Bystrica Region

When analysing the situation in the Banská Bystrica Region in more detail, the total sum of the (regional) investment aid was €126,028,997 provided for 32 investors. When comparing this region with other Slovak regions according to the total amount of provided investment aid we can confirm that the Banská Bystrica Region is on the 6th place from total 8 regions. This region witnessed the highest number of Slovak companies (11) applying for (regional) investment aid. Among the foreign investors in the Banská Bystrica Region who sought investment support, four originated from Austria and Germany, while two each came from the USA, Italy, and Spain. Other countries, such as Poland, Ukraine, Belgium, Sweden, and South Korea, had only one investor each. This indicates that there has been a relatively low number of foreign companies seeking investment aid in the Banská Bystrica Region since 2002.

For a better representation of regional investment assistance in the Banská Bystrica Region, we have decided to provide a graphical visualization showing the specific districts to which the regional investment support was directed (figure 2).

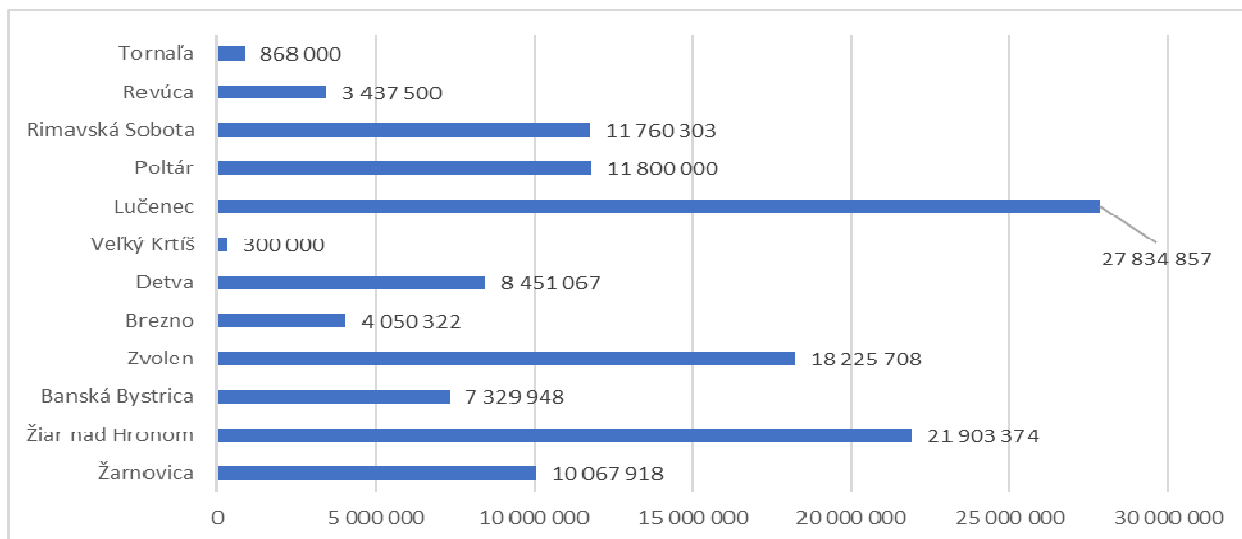


Figure 2. Regional investment aid in the Banská Bystrica Region – districts

Source: own processing based on data from the Ministry of Economy of the Slovak Republic (2023)

The figure illustrates that a significant share of (regional) investment aid was directed towards the southern part of the Banská Bystrica Region. This was mainly due to the presence of one of the least developed districts, Lučenec, which accounted for 22.08% of the investment share within the Banská Bystrica Region. Following Lučenec, the district of Žiar nad Hronom received 17.37% of the investment assistance. The Zvolen district ranked third in terms of investment volume, with 14.46% directed towards it. On the other hand, the districts of Veľký Krtíš, Tornaľa, and Revúca received the smallest share of regional investment assistance, with allocations of 0.24%, 0.69%, and 2.73% respectively.

The following figure characterizes the development of investment aid provision in the Banská Bystrica Region from 2002 to May 2023, based on data from the Ministry of Economy, together with values of average costs per created job.

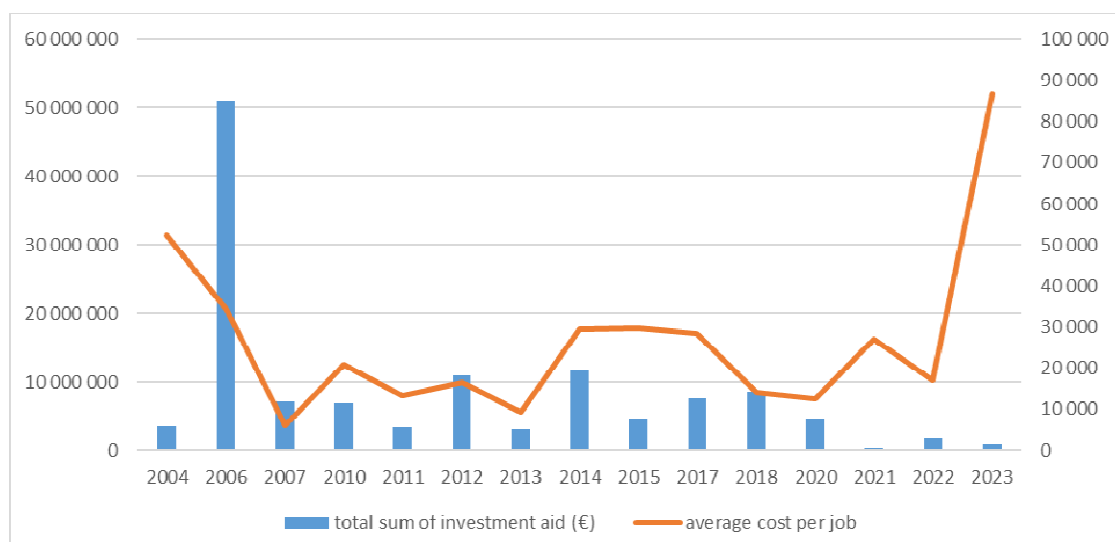


Figure 3. Regional investment aid and average cost per job in the Banská Bystrica Region during 2002 – May 2023

Source: own processing based on data from the Ministry of Economy of the Slovak Republic (2023)

Based on the analysis of the provided data, we can confirm that investment aid did not flow into the examined region every year during the observed period, and its amount varied significantly. The highest value was recorded in 2006 when €51,076,600 was provided for 6 investment projects, while the lowest value occurred in 2021, with almost €270,000 granted to a single investor. Furthermore, when considering the average costs per created job, we observed considerable differences. The "most expensive" investment aid was provided in 2023 to an investor creating 10 job positions, amounting to an average of €86,800 per job. In contrast, the "cheapest" investment aid was granted in 2007 to an investor who committed to create 1,200 jobs in connection with the project, resulting in an average cost of approximately €5,924 per job.

4. Discussion

The main objective of the legislative change in providing investment aid in 2018 was to place stronger emphasis on supporting less developed regions and encouraging investors to invest in those specific areas. As a result, this contribution also focuses on analysing the development of the situation during the observed period, which is further divided into two distinct periods: before and after 2018. The table below presents information about the total amount of investment aid allocated to individual regions over the entire period. This data is then categorized into the two aforementioned periods for a more detailed examination. Since the second period was considerably shorter, we have decided to use not only absolute but also relative values and the percentage share of each region in the overall value of state support acquired through this instrument.

Table 3. Development of (regional) investment aid according to Slovak regions

	total sum of (regional) investment aid	% share	investment aid in 2002-2017	% share	regional investment aid in 2018-2023	% share
Bratislava Region	52,906,417	2.65	52,906,417	3.15	0	0.00
Trnava Region	408,970,373	20.52	365,671,197	21.75	43,299,176	13.88
Trenčín Region	209,641,133	10.52	191,682,228	11.40	17 958,905	5.76
Nitra Region	365,794,418	18.35	224,634,668	13.36	141,159,750	45.26
Žilina Region	421,410,316	21.14	408,998,261	24.32	12,412,055	3.98
Banská Bystrica Region	126,028,997	6.32	110,125,094	6.55	15,903,904	5.10
Prešov Region	96,451,645	4.84	52,164,637	3.10	44,287,008	14.20
Košice Region	312,224,686	15.66	275,336,909	16.37	36,887,777	11.83
Slovak Republic	1,993,427,985	100.0	1,681,519,411	100.00	311,908,575	100.00

Source: own processing based on data from the Ministry of Economy of the Slovak Republic (2023)

During the period from 2002 to 2023, a total of 229 investment incentives were approved, with 175 of them approved before 2018. In terms of the number of supported projects in this period, the Košice Region stood out with a dominant share of 24% of the total projects. It was followed by the Trenčín, Nitra, and Žilina regions, each with a relatively balanced share of approximately 14-15%. In this case, we can positively evaluate the high proportion of projects in the Košice Region since, as mentioned earlier, it belongs to the less developed regions. However, the situation changed significantly in the period from 2018 onwards. Out of a total of 54 projects, the Prešov Region accounted for the largest share, with 13 projects representing approximately 24%. The Košice Region ranked second, receiving 12 projects with a share of approximately 22%, and the Banská Bystrica Region received 10 projects (the third largest number with a percentage share of approximately 18.5%). Evaluating this period confirms that the policy of regional investment aid successfully supported less developed regions. Nevertheless, it is important to note that not only the number of supported projects matters but also the amount of financial resources provided through investment aid. In this case, we can refer to the data presented in Table 3, which indicates that during the period from 2002 to 2017, the largest amount of financial resources flowed to the Žilina Region (approximately 24% of the total amount of supported projects), followed by the Trnava Region (almost 22%) and the Košice Region (approximately 16%). However, the situation changed in the period from 2018 onwards, as the largest amount of funding was allocated to investors who invested in the Nitra region (over 45%), with significantly lower shares going to the Prešov Region (approximately 14%) and the Trnava region (almost 14%) in subsequent positions. In the case of the Banská Bystrica Region, the situation can be evaluated as follows: concerning the number of supported projects, its situation improved in percentage terms from 2018 onwards. However, when analysing the volume of provided funds and the region's share of these funds, the situation worsened.

Our findings can be supported by the results of other conducted research studies, e. g. Košdy (2023) has confirmed that based on a spatial distribution analysis focused on the least developed regions, it can be concluded that the level of support in most of these areas is insufficient. Other authors suggest on the base of their research that state aid should primarily be provided for small and medium-sized enterprises as the beneficiaries of the aid achieve good economic results and their competitiveness on the market is enhanced. (Paskrtova, Novackova, & Stachova, 2019) The research of this topic can be extended by further analysis on macro and micro level in area of effectiveness of (regional) investment aid, some findings of other authors suggest that investment aid and the creation of new jobs supported by it cannot be considered as an effective tool for reducing unemployment or stimulating wage growth. The results of the research carried out at the micro level show that investment aid in terms of the creation of new jobs is in most cases ineffective for the state. On the other hand, there are indicated certain positive effects of new jobs for the state, but these are achieved only under the restrictive assumption that these new jobs are occupied by unemployed persons, which, however, often does not correspond to reality. (Hintosova, Bruothova, & Barlasova, 2021)

Conclusion

Reducing regional disparities is one of the primary tasks of the state, aiming to achieve economic balance among its regions. Currently, the Slovak Republic exhibits significant economic differences between its various regions, resulting in several issues such as higher unemployment rates and lower levels of gross domestic product and value-added. To address this, one potential tool that can be employed is providing investment incentives through the Act on Regional Investment Aid. However, the analysis conducted suggests that the existing rules favouring investments in less developed regions of Slovakia do not strongly motivate both domestic and foreign investors to consider locating their investments in these areas. Therefore, it becomes essential for the state to reassess the current regulations governing the provision of regional investment aid. The goal should be to modify these rules in a way that better aligns with their primary objective of fostering economic development in the less-developed regions.

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History, Perspectives, Environmental and Sport Benefits of City Bicycle Road Investment in Large Cities

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Abstract

Research background: Urban traffic congestion is a nuisance for both city dwellers and car drivers. The city's residents suffer from traffic congestion, car noise, and air pollution. Furthermore, city captains and planners choose different methods to manage urban transportation to create as spacious an environment as possible for residents. In this research, we will explore the multifaceted challenges posed by pollution's long-range transport, focusing on the necessity for regional cooperation and its ecological repercussions. It aims to contribute valuable insights for crafting effective policies and strategies to combat the far-reaching impacts of pollution in an increasingly interconnected world by conducting a historical analysis of dealing with traffic congestion in large cities.

Purpose of the article: Managing traffic jams in urban areas is a difficult and complex task in urban areas worldwide. The current study aims to obtain tools to deal with traffic congestion in the city by examining the urban history dealing with traffic congestion around the world.

Methods: The research is based on a comprehensive literature review of the history of traffic jams and dealing with them.

Findings & Value added: This research enriches the understanding of how cycling infrastructure, subway systems, and freeway networks intersect with urban sprawl. By offering tangible findings and value-added insights, the research contributes to the advancement of sustainable urban planning strategies that prioritize efficient transportation and mitigate the adverse impacts of urban sprawl.

Keywords: cycling, urban sprawl, subway, freeway

JEL classification: R1, R2, R3, R4, R5

1. Introduction

This article examines the historical context of commuting problems and the importance of well-designed and properly maintained infrastructure in managing urban traffic. By examining the experiences of several cities, including Amsterdam, Copenhagen, and Utrecht, valuable insights emerge into the positive impact of investments in bicycle infrastructure. Examples show that cities with extensive bicycle infrastructure have less congestion, better air quality, and a higher proportion of active road users. In addition, the case studies emphasize the importance of continued infrastructure development and maintenance to ensure its effectiveness in promoting sustainable urban mobility. The findings underscore the need for policymakers and urban planners to prioritize investments in bicycle infrastructure and integrate multimodal transportation systems that promote a shift away from car dependence. Overall, the commute story underscores the critical role that well-designed and properly maintained infrastructure plays in managing urban traffic and creating a more livable and sustainable urban environment.

1.1. The late 19th

Amsterdam's cycling infrastructure has a long history, with significant developments over several decades. Although it is difficult to pinpoint an exact date for each aspect, Amsterdam began building dedicated bicycle lanes, called "cycle tracks" or "bike lanes," in the late 19th century to separate bicycle

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traffic from other roads. These paths were initially separated from the main roads and were often made of asphalt or cobblestones (Feddes, de Lange & te Brömmelstroet, 2020).

1.2. The beginning of the 20th

In the 20th century, Copenhagen, Denmark, faced the problem of traffic congestion and urban sprawl. In response, the city implemented the "Finger Plan" in the mid-20th century. This urban development strategy focused on creating a series of radial corridors extending from the city center. The plan included efficient transportation infrastructure, including highways and rail lines, to provide residents with a sustainable commute to work (Knowles, 2012). Copenhagen also has a long history of bicycle culture. As early as 1900, bicycles were a popular means of transportation. During that time, the city began developing basic bicycle infrastructure, including segregated bike lanes (Carstensen et al., 2015).

The Paris Métro, inaugurated in 1900, was an early example of a well-designed public transportation system tailored to commuter problems efficient, comprehensive, and well-connected Métro network provided an alternative to crowded streets. The Métro system played an important role in shaping urban development and reducing traffic congestion (Vuchic, 2002). New York City's subway system, established in 1904, revolutionized commuting in one of the busiest cities in the world. With an extensive underground rail network, the subway provided a reliable and efficient transportation option that reduced congestion on city streets. Today, the subway still plays an important role in New York City's transportation infrastructure (Wang & Ross, 2019).

In 1939 the Arroyo Seco Parkway, also known as the Pasadena Freeway, opens as the first freeway in the Los Angeles metropolitan area. It connects downtown Los Angeles with Pasadena and serves as a major transportation corridor. In the 1940s a major air pollutant of smog, known as photochemical smog, was first described in Los Angeles. In the 40s and 50s construction begins on several major freeways around Los Angeles, including the Hollywood Freeway (US 101), the Santa Monica Freeway (Interstate 10), the San Bernardino Freeway (Interstate 10), and the San Diego Freeway (Interstate 405) (Goodwin, 1965).

1.3. The mid 20th

In the 50s and 60s, London was famous for its thick smog and its winter 'pea soupers' which culminated into lethal acidic smogs in 1952, 1956, 1957 and 1962. The first severe smog episode of lethal acidic of 1952 made London experience thousands of deaths and widespread health problems. One of the contributing factors was the high concentration of commuter traffic that relied on coal-burning vehicles and poorly designed road infrastructure. This event prompted the city to invest in greener transportation such as electric buses and improved road layouts to reduce pollution and congestion in the future (Antipova, 2018).

In 1965, in United States, the Century Freeway (Interstate 105) project begins to connect Los Angeles International Airport (LAX) with the Norwalk area and was completed in the 1990s (Hestermann et al., 1993).

In Europe, the 60s and 70s, Copenhagen experienced a surge in car use, leading to increased traffic congestion and concerns about air pollution. In response, the city government prioritized investment in bicycle infrastructure to provide alternative transportation options. Dedicated bike lanes were upgraded to increase safety for cyclists (Gössling, 2013).

In Asia, Tokyo experienced a sharp increase in commuter traffic in the 60s as the population grew rapidly. The city responded by building the Shuto Expressway, a network of elevated roads around central Tokyo. This well-designed infrastructure project provided alternative routes for commuters, reduced congestion on the roads and improved traffic flow in the urban area (Shibata, 2007).

1.4. The late 20th

In the 70s, Amsterdam's bicycle infrastructure experienced a major boom. The city introduced a comprehensive plan known as "Stop de Kindermoord". This initiative aimed to improve road safety and give priority to non-motorized modes of transportation, especially bicycles. The city began installing a network of bike lanes to increase safety and comfort for cyclists. At the same time, Utrecht, like many other Dutch cities, began to prioritize bicycle infrastructure in response to increasing car use and traffic congestion. This was the beginning of a dedicated effort to develop a comprehensive network of bicycle lanes in the city (Feddes, de Lange, & te Brömmelstroet, 2020).

In South America, Curitiba, Brazil, struggled with increasing traffic congestion and air pollution in the 70s due to its growing population and reliance on cars. In response, the city implemented a well-designed integrated transportation system. This system combines dedicated bus lanes, well-organized bus stops, and efficient scheduling to provide fast and reliable public transportation. This approach has significantly reduced traffic congestion, improved air quality, and influenced urban planning strategies in other cities (Newman, 2021).

In the 80s, in Europe, Copenhagen introduced the concept of a "green wave" for cyclists. This system synchronized traffic lights along popular bicycle routes so that cyclists could maintain a steady pace and no longer had to stop at red lights. The introduction of the "green wave" improved the efficiency and comfort of cycling in the city. The 90s marked an important turning point in Copenhagen's commitment to becoming a bicycle-friendly city. The city introduced the Bicycle Account, a comprehensive survey and analysis of bicycle conditions and infrastructure. The Bicycle Account enabled the city to assess the needs of cyclists and make informed decisions about infrastructure improvements. In the mid-90s, Amsterdam introduced innovative bicycle infrastructure, such as color-coded bike lanes, red asphalt surfaces, and clear signage. These improvements further separated bike lanes from car lanes and increased cyclist visibility and safety (Feddes, de Lange, & te Brömmelstroet, 2020).

1.5. The beginning of the 21st

In the early 2000s, Copenhagen further expanded its cycling infrastructure. The city invested in creating more dedicated cycling lanes, separated bike paths, and cyclist-friendly intersections. These improvements aimed to increase safety and convenience for cyclists and encourage more people to choose cycling as their preferred mode of transportation. Amsterdam continued to expand its bicycle infrastructure, especially in the city center and suburbs. More bicycle-specific measures were introduced, including traffic lights synchronized with cyclists' speed, bicycle-friendly traffic circles, and improved intersection designs that prioritize cyclists' safety. And Utrecht increased its focus on bicycle infrastructure. The city introduced innovative concepts such as the "fietsstraat" concept or bike lanes that gave cyclists priority over motor vehicles. These bike lanes were installed at various locations and provide a safer and more pleasant cycling experience (Feddes, de Lange, & te Brömmelstroet, 2020).

In the United State, in 2004, construction began on the Metro Gold Line Eastside Extension. This light rail line, which opened in 2009, extends the Gold Line from downtown Los Angeles to East Los Angeles and provides an alternative to the freeway system (Murthy & Mori, 2010).

In Asia, China's 21st-century investment in high-speed rail has fundamentally changed commuting problems in China. The extensive network of high-speed rail lines connects major cities and reduces reliance on air travel and private vehicles for long-distance trips. These investments in infrastructure have not only improved connections between cities but also resulted in less congestion and shorter travel times for commuters (Dong, 2018).

At the same time, Tokyo has consistently expanded its rail network to accommodate the city's growing population and handle commuter traffic. Projects such as the construction of new subway lines and the expansion of existing rail lines, such as the Yamanote Line, have increased capacity and improved connectivity. These investments in rail infrastructure have helped reduce congestion and improve mobility in the city (Cao, 2022).

1.6. Recentt years

In 2013 the world's largest bicycle parking garage is inaugurated in Utrecht, known as "Bicycle Parking Utrecht" or "Stations Plein West" - The parking garage under Utrecht Central Station has space for around 12,500 bicycles and provides safe and convenient parking for cyclists (Daris, 2020).

In Copenhagen the investment in bicycle-friendly infrastructure continued. The city has expanded its network of bike lanes, improved bike parking facilities, and introduced innovative designs for bicycle infrastructure. For example, in 2014 Copenhagen opened the Cykelslangen – the Bicycle Snak, an elevated bicycle bridge that provides cyclists with a direct and safe route across the harbor (Galal, 2023).

In 2015, Utrecht hosted the start of the Tour de France, demonstrating the city's commitment to cycling and its investment in cycling infrastructure. The event highlighted Utrecht's efforts to promote cycling on an international level (Hull & O'holleran, 2014).

In 2017, IRIS Smart Cities launched the "Horizon 2020" project to improve urban life and ensure sustainable and affordable energy. The "lighthouse cities" chosen for the project were - Gothenburg in Sweden, Nice Cote d'Azur in France, and Utrecht in the Netherlands. "These cities have been acting as

living laboratories for demonstrations, integrations, and implementations of innovative energy-efficient areas, flexible smart energy solutions and applications, and incrementing the utilization of renewable energy sources and smart energy storage solutions (Paalosmaa & Shafie-khah, 2021).

In the recent years, Seville, Spain, has experienced a cycling revolution by investing in an extensive bicycle infrastructure network. The city introduced a bike-sharing system, built dedicated bike lanes, and implemented traffic-calming measures to promote cycling. Seville's efforts have led to a significant increase in cycling and a reduction in traffic congestion (Wałdykowski, Adamczyk, & Dorotkiewicz, 2021). And in Portland, Oregon, United States, has made significant efforts to prioritize bicycling and develop comprehensive bicycle infrastructure. The city has an extensive network of bike lanes, dedicated bike lanes, and bike boulevards. Portland's commitment to bicycling has resulted in a strong bicycle culture, reduced traffic congestion, and improved air quality (Geller & Marqués, 2021).

Nevertheless, while efforts to reduce smog and pollution in major cities have shown some success, pollution's long-range transport can lead to its appearance in previously unaffected areas like the pollution growth in formerly pristine areas like Cape Cod and the Great Smoky Mountains, in United States, that suffer from acid rain (Lu et al., 2011) highlights, in our opinion, the complexity of environmental challenges and that regional solutions and global cooperation are essential to address pollution's far-reaching effects, protect ecosystems, and secure a sustainable future for the planet.

1.7. Plans for the future

The development of the Los Angeles freeway system, for example, is an ongoing process, with expansions, improvements, and additions being made over time to meet the region's growing transportation needs. It is also important to note that the transformation of Copenhagen into a bicycle-friendly city has been a gradual and ongoing process, with continuous investments and improvements over many decades. The city's commitment to cycling infrastructure has resulted in high cycling rates, less traffic congestion, and a more sustainable urban environment. Moreover, while some of these dates mark important milestones on the road to becoming bicycle-friendly cities it is important to note that the development of bicycle infrastructure is an ongoing process. Utrecht, for example, continues to invest in improving bicycle infrastructure, with plans and initiatives evolving over time to support sustainable transportation and prioritize the needs of cyclists.

The history of commuting problems shows the importance of a well-designed and well-maintained infrastructure. Cities must invest in robust transportation networks, including streets, highways, bridges, and mass transit systems. Sufficient capacity, efficient connections, and strategic expansion plans can help avoid congestion. And efficient and reliable public transportation systems play an important role in managing urban traffic. Historical examples show that cities with well-developed public transportation networks, such as subways, light rail, and buses, can significantly reduce congestion by providing commuters with alternative modes of transportation. Investments in public transportation infrastructure and services can help reduce the number of private vehicles on the road.

2. Method

The research methodology for this study focuses on gaining insights into the intricate relationship between urban sprawl, urban traffic congestion, and the strategies historically employed to alleviate congestion. The primary aim of this research is to investigate the historical dynamics of urban sprawl, its contribution to urban traffic congestion, and the historical strategies that have been utilized to mitigate congestion challenges. A rigorous and comprehensive literature review method was chosen as the cornerstone of this research. The literature review encompassed three main areas of focus:

Urban Sprawl: Extensive research was conducted to identify historical literature addressing the phenomenon of urban sprawl. This included scholarly articles, books, urban planning reports, and relevant government publications. The review encompassed a wide temporal scope, tracking the evolution of urban sprawl theories, definitions, and historical context. This historical analysis allowed for a nuanced understanding of the origins and manifestations of urban sprawl.

Urban Traffic Congestion: A dedicated examination of historical literature concerning urban traffic congestion was undertaken. This review phase included a comprehensive survey of academic studies, transportation reports, and policy documents.

Historical Congestion Mitigation Strategies: Historical strategies spanning transportation infrastructure development, policy initiatives, and technological advancements were meticulously analyzed. Both successful and unsuccessful strategies were scrutinized to draw meaningful insights. The

literature review covered a broad temporal spectrum to trace the historical evolution of urban sprawl, traffic congestion, and mitigation strategies. Geographical diversity was also considered to capture regional variations and trends.

Urban Traffic Congestion Literature Review: A focused examination of historical literature related to urban traffic congestion was undertaken. This involved a comprehensive survey of academic studies, transportation reports, and policy documents. The review aimed to elucidate the development of urban traffic congestion as a byproduct of urban sprawl, tracking its historical evolution, contributing factors, and associated challenges.

Historical Strategies for Congestion Mitigation: A critical component of the research involved identifying and analyzing historical strategies employed over the years to address urban traffic congestion. This encompassed various interventions, including transportation infrastructure development, policy initiatives, and technological advancements. Case studies and historical analyses of successful and unsuccessful congestion mitigation strategies were examined to extract valuable insights into their effectiveness and impact.

Comparative Analysis: A rigorous comparative analysis was conducted to discern patterns, trends, and shifts in urban sprawl, traffic congestion, and mitigation strategies across different periods and geographical regions. The goal was to identify commonalities and differences in the historical development of urban areas, the emergence of congestion challenges, and the adaptation of strategies to address these challenges.

Synthesis and Framework Development: The findings from the historical literature review were synthesized to develop a conceptual framework that elucidates the complex interactions between urban sprawl, traffic congestion, and mitigation strategies. This framework serves as the basis for the research's conclusions and recommendations, providing a structured understanding of the historical context and implications of congestion in urban areas.

3. Results

The comprehensive review of historical literature on urban sprawl, urban traffic congestion, and congestion mitigation strategies has yielded valuable insights into the intricate relationship between these factors. The results of this research highlight the multifaceted nature of urban sprawl, traffic congestion, and congestion mitigation. They underscore the potential of strategies such as cycling infrastructure, subway systems, lifestyle changes, and multimodal transportation in managing these challenges. Furthermore, the importance of technology and global cooperation in addressing contemporary urban issues becomes evident through historical analysis. These findings provide a solid foundation for informed urban planning and transportation policies in the modern era. We will present here key findings that shed light on historical trends, challenges, and strategies employed over the years.

Cycling Infrastructure and Urban Sprawl: The research revealed a compelling correlation between well-designed cycling infrastructure and the reduction of urban sprawl. Cities that strategically invested in cycling infrastructure, including dedicated lanes and bike-sharing programs, witnessed a substantial decrease in short-distance car commuting. This finding underscores the potential of cycling to promote localized living and counteract the outward expansion of urban areas.

Subway Systems as Urban Sprawl Mitigators: Robust subway systems emerged as effective tools in curbing the negative impacts of urban sprawl. Areas adequately served by subway networks exhibited lower vehicle ownership rates and reduced traffic congestion. Commuters' preference for subway travel was pivotal in fostering higher population density around transit hubs, encouraging denser and more sustainable urban development.

Freeway Networks' Dual Role: When strategically designed and seamlessly integrated with efficient public transportation systems, freeway networks demonstrated the capacity to counterbalance the adverse effects of urban sprawl. The research highlighted the importance of well-planned freeway systems in reducing the need for long-distance car commuting. Proper integration of freeways with mass transit options encouraged commuters to opt for public transportation, thereby mitigating urban sprawl's impact.

Lifestyle Changes and Congestion Mitigation: The historical literature review emphasized the role of lifestyle changes in congestion mitigation. Notably, a small reduction in legal speed limits was found to conserve fuel and significantly reduce NOx emissions with minimal increases in hydrocarbon emissions. Furthermore, increased utilization of public transportation emerged as an effective strategy for reducing photochemical smog.

Multimodal Transportation Approach: The research underscored the value of adopting a multimodal transportation approach that combines various modes of transportation, such as buses, trains, bike lanes, and pedestrian paths. This approach enhances mobility, reduces traffic congestion, and promotes a more balanced and sustainable transportation system. It aligns with the evolving psychological flexibility of contemporary urban populations.

Leveraging Technological Solutions: Historical analysis indicated that technological advances are crucial in effective traffic management. Intelligent traffic management systems, real-time navigation applications, and vehicle-to-vehicle and vehicle-to-infrastructure communications offer opportunities for optimizing traffic flow and enabling dynamic traffic management.

The Importance of Global Cooperation: The research findings stress the significance of global cooperation in addressing environmental challenges like pollution and urban sprawl. Cross-border collaboration through international agreements and partnerships can be instrumental in mitigating the global impacts of these challenges.

4. Discussion

The results of this research illuminate the complex interplay between urban sprawl, urban traffic congestion, and historical strategies for congestion mitigation. These findings offer valuable insights into the challenges posed by urbanization and the potential avenues for addressing them. The findings from this research emphasize the multifaceted nature of urban development and the diverse strategies employed to address its associated challenges. To build more sustainable and livable cities, it is essential to consider a holistic approach that integrates cycling infrastructure, public transportation, lifestyle changes, and technology. Moreover, the significance of global cooperation in addressing urban and environmental issues calls for concerted efforts on an international scale. These insights provide a foundation for informed decision-making in contemporary urban planning and transportation policies.

In this discussion, we delve deeper into the implications of these results and their relevance for contemporary urban planning and transportation:

Lifestyle Changes for Pollution Control: The historical emphasis on lifestyle changes as a means of congestion mitigation is noteworthy. Small adjustments, such as reducing speed limits, can substantially impact emissions and air quality. Additionally, the increased use of public transportation can significantly contribute to reducing environmental pollution. These findings suggest that individual choices and government policies play a pivotal role in shaping the environmental impact of urban areas. Lu and colleagues (2019) advocate a range of strategies to control the formation of photochemical smog. Notably, "Lifestyle Changes" is a viable influence. Santos and colleagues (2020) claim that even small reductions in "Legal Speed" can lead to fuel conservation and a significant reduction in NOx emissions, with only a negligible increase in hydrocarbon emissions. Additionally, increased utilization of public transportation has been shown to reduce photochemical smog effectively.

Leveraging Technology for Traffic Management: The historical analysis underscores the transformative potential of technology in traffic management. Intelligent traffic systems, real-time navigation apps, and vehicle-to-vehicle communication efficiently optimize traffic flow and address congestion. Embracing these technological advancements is crucial for modern cities seeking to alleviate traffic-related challenges. Technological advancements offer new opportunities for efficient traffic management. Innovations like intelligent traffic management systems, real-time navigation apps, and vehicle-to-vehicle and vehicle-to-infrastructure communications provide real-time data and the ability to optimize traffic flow. These technologies enable dynamic traffic management, enhancing urban mobility and reducing congestion (Whabby, 2023).

The Role of Cycling Infrastructure in Sustainable Urban Development: The correlation between well-designed cycling infrastructure and reduced urban sprawl underscores the significance of promoting non-motorized transportation options. Investments in cycling lanes and bike-sharing programs have the dual benefit of reducing traffic congestion and promoting localized living. This finding underscores the importance of integrating cycling infrastructure into urban planning to encourage active and sustainable modes of commuting.

Subway Systems as Catalysts for Denser, Sustainable Cities: The effectiveness of robust subway systems in mitigating urban sprawl is a compelling argument for investment in mass transit. Lower vehicle ownership rates and reduced traffic congestion in subway-served areas demonstrate that public transportation can foster higher population density around transit hubs. This encourages more sustainable and environmentally friendly urban development patterns.

Freeway Networks and Public Transportation Integration: The research highlights the potential of well-planned freeway networks combined with efficient public transportation systems. This integration reduces the need for long-distance car commuting, promoting a balanced urban development approach. However, it also underscores the importance of careful urban planning to ensure freeway systems do not exacerbate sprawl.

Multimodal Transportation for Urban Mobility: The concept of multimodal transportation, combining various modes like buses, trains, cycling, and walking, emerges as a key solution for addressing congestion and promoting sustainable urban mobility. This approach provides commuters flexibility, time and cost savings, and improved health while reducing traffic congestion. It aligns with the evolving preferences of urban populations for diverse transportation options.

Global Cooperation for Global Challenges: The importance of global cooperation in addressing environmental challenges like pollution and urban sprawl cannot be overstated. Pollution and congestion are not confined by geographic borders, necessitating international collaboration through agreements and partnerships. This global perspective is essential for mitigating the far-reaching impacts of these challenges.

Conclusions

The research presented here has delved into the intricate relationship between urban sprawl, urban traffic congestion, and the historical strategies employed to address congestion challenges. The research findings underscore the complexity of urban development and the interrelated challenges of sprawl and congestion. By embracing sustainable transportation options, encouraging lifestyle changes, leveraging technology, and fostering global cooperation, cities can pave the way for more livable, efficient, and environmentally conscious urban environments. The historical context serves as a guide, reminding us that thoughtful, holistic urban planning is essential for shaping the cities of the future. In conclusion, the synergy of lifestyle changes, multimodal transportation, technology, adaptive traffic management, and global cooperation holds the potential to create more livable, efficient, and sustainable urban environments. These findings offer valuable insights relevant to contemporary urban planning, transportation, and environmental management. By embracing these conclusions, cities can pave the way for a brighter and more environmentally conscious urban future.

As we draw this research to a close, several key conclusions emerge:

1. **Embracing Sustainable Modes of Transportation:** Investing in sustainable modes of transportation, such as cycling infrastructure and robust subway systems, is paramount for managing urban sprawl and congestion. These options reduce traffic congestion and promote healthier, more environmentally friendly urban environments.

2. **Leveraging Technology for Traffic Management:** Technology is pivotal in effective traffic management. Adopting intelligent traffic systems, real-time navigation apps, and vehicle-to-vehicle communication can optimize traffic flow, reduce congestion, and enhance urban mobility.

3. **The Importance of Lifestyle Changes:** Lifestyle changes, even modest ones such as reducing speed limits and promoting public transportation usage, can significantly impact congestion and environmental pollution. Encouraging these changes can contribute to healthier and more sustainable urban living.

4. **Global Cooperation for Global Challenges:** The global nature of environmental issues, including pollution and urban sprawl, necessitates international collaboration. Pollution and environmental issues transcend geographic boundaries, making global collaboration vital in combatting climate change and preserving the planet's health. Global cooperation through agreements and partnerships is essential to address these challenges effectively and plays a crucial role in mitigating pollution's global impacts.

5. **The Need for Holistic Urban Planning:** Holistic urban planning that considers cycling infrastructure, public transportation, technology, and lifestyle changes is crucial for addressing the multifaceted challenges of urban sprawl and congestion. Such planning should prioritize sustainability, environmental conservation, and the well-being of urban residents.

6. **The Historical Context as a Guide:** Understanding the historical context of urban development and congestion provides valuable lessons for contemporary urban planning. Both successful and unsuccessful historical strategies offer insights that can inform modern approaches to urban challenges.

7. **Adaptive Traffic Management for Changing Urban Landscapes:** Recognizing that traffic patterns and commuter flows evolve is crucial. City agencies must continuously review and adapt their traffic management strategies to address changing needs, accommodate population growth, and harness new

technologies. Regular monitoring, data analysis, and stakeholder engagement are essential for effective decision-making.

8. Promoting Multimodal Transportation for Urban Sustainability:

The concept of multimodal transportation, which combines various modes, stands out as a solution for improving urban mobility, and combining bicycles and public transportation has gained prominence in recent years (Liu & Lin, 2019). This approach aligns with the evolving psychological flexibility of the current generation (Fuchs & Fuchs, 2023). Cities can create more balanced and sustainable transportation systems by providing commuters with flexibility and reducing traffic congestion.

This approach offers several benefits:

Flexibility: Commuters can tailor their journeys according to their specific needs and preferences, choosing when and where to cycle and when to rely on public transportation.

Time and Cost Savings: Cycling to a public transportation station eliminates the need to find parking, reduces travel time, and can lead to cost savings. It also is a cost-effective alternative to driving a private vehicle for the entire journey.

Health and Sustainability: Incorporating cycling into commutes promotes physical activity, leading to health benefits. Moreover, increased use of public transportation reduces individual car usage, contributing to environmental sustainability and reducing traffic congestion.

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Strategic City Management in the Digital Era: Fostering Sports and Sports Tourism for Comprehensive Urban Development

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Abstract

Research background: Research has consistently highlighted the negative impacts of sedentary lifestyles linked to increased screen time on health and social interactions. Concurrently, studies have emphasized the positive effects of nature exposure on well-being and the importance of integrating cultural heritage with tourism experiences. These findings serve as a foundation for Ein Qiniyya's approach to promoting sports tourism to address these challenges while embracing the village's unique cultural and natural attributes..

Purpose of the article: The purpose of this article is to explore the potential of promoting sports tourism in Ein Qiniyya to revitalize well-being and social bonds amidst the Age of Screens.

Methods: This article is grounded in a comprehensive literature review that encompasses research on sedentary lifestyles, the impact of screen-based interactions, nature's influence on well-being, cultural heritage in tourism, and sustainable practices. Through this review, a nuanced understanding of the challenges posed by the Age of Screens and the potential of sports tourism in Ein Qiniyya has been developed.

Findings & Value added: Findings suggest that by leveraging Ein Qiniyya's unspoiled nature and vibrant cultural heritage, sports tourism can counter sedentary lifestyles, foster face-to-face interactions, and offer authentic experiences that resonate with visitors. In conclusion, the development of internal and external sports tourism in Ein Qiniyya presents significant economic growth and recognition potential. However, addressing challenges such as infrastructure development, funding, stakeholder engagement, and marketing strategies is imperative for success. Overcoming these obstacles will position Ein Qiniyya as a thriving sports tourism destination, yielding economic growth and a heightened reputation. Embracing sports education and tourism can strategically transform Ein Qiniyya into a vibrant city that values active lifestyles, community cohesion, and its unique identity.

Keywords: school management, classroom management, elementary school, self-regulation, cognitive behavioral theory

JEL classification: L83, Z32, Z20

1. Introduction

As mayor of Ein Qiniyya, a Druze village at the foot of Mount Hermon in the Golan Heights of Israel, I find myself running a city in a very unique era - the age of screens (Tooth et al., 2021). Our world is increasingly connected through technology, and digital platforms have transformed the way we communicate, access information and make even our most personal decisions (Fuchs, 2000). In the midst of this digital revolution, however, we can also recognize some worrisome trends emerging – First of all, people are not physically moving like they used to, leading to sedentary lifestyles and health problems and the prevalence of screen-based human interactions has led to a decline in face-to-face interpersonal communication (Tooth et al., 2021). In this regard, I believe that it is crucial for me as mayor to address these challenges and revitalize the welfare and social fabric of our municipality. Ein Qiniyya, with its

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unspoiled nature and vibrant cultural heritage, offers the perfect opportunity to promote sports tourism to revitalize the body and promote direct communication between people.

Sports tourism is an effective antidote to the sedentary habits that are prevalent in the age of screens. By encouraging our residents and visitors to be physically active, we can offset the negative effects of a technology-driven lifestyle. Physical activity not only improves physical health, but also mental well-being and overall quality of life (Fuchs, 2023; Marquez et al., 2020). In addition, sports activities provide people with a platform for face-to-face communication. In a world where virtual interactions have become the norm, it is important to create opportunities for real human contact. Sports tourism brings people together and allows them to bond over shared experiences, teamwork, and friendly competition. Sports activities facilitate interpersonal communication and allow people to interact beyond the confines of the screen, sharing ideas and building lasting relationships (Theodorakis et al., 2019).

Therefore, in this paper I try to show that promoting internal and external sports tourism in our village is not only a way to showcase our cultural heritage and natural beauty, but also a means to create a vibrant and cohesive community that values physical activity, human relationships, and the incomparable beauty of Ein Qiniyya.

1.1 Sports & Holistic Tourism

In 1982, the World Tourism Society (WTS) established two basic elements to define tourism activities. First, tourism includes transient, short-term travel to destinations that are not close to home or work. Second, it includes the activities that people engage in at a destination, whether for leisure, business, or other purposes (WTS, 1982 in Robinson, 2012, p. 45). In recent years, a new form of leisure and entertainment has emerged, sports tourism, which combines the thrill of sports with the excitement of travel (Su, 2012). Sports tourism has quickly become a significant segment within the broader tourism industry. It includes travel to attend or observe sporting events, as well as sports-related activities at various destinations (Radicchi, 2013; Schumacher, 2015). Sports tourism has proven to be a catalyst for destination improvement, employment growth, and tourism infrastructure development (Mashiach, 2021). In 2011 alone, for example, the sports tourism industry generated an incredible \$7.68 billion in revenue worldwide (Schumacher, 2015). This surge in popularity can be attributed to a variety of motivations, including the desire for physical challenge, cultural discovery, and the opportunity to meet like-minded people (Nordin, 2005; Šimková & Holzner, 2014; Dolinting, Yusof, & Soon, 2015).

Leisure, recreation, sports, and tourism play an important role in modern societies. They contribute to economic development, improving quality of life, promoting social cohesion, preserving cultural heritage, and promoting environmental sustainability (Roberts, 2006; Kelly, 2012; Butler, 1999) and psychological flexibility (Fuchs, 2023).

In recent years, tourism behavior has changed. Sports tourism and active vacation tourism are no longer limited to the younger generation. Activities such as hiking, mountain biking, car navigation, off-roading, safaris, and winter sports have gained popularity among people of all ages (Mashiach, 2021). This trend has created new opportunities for destinations to attract visitors and compete for hosting sporting events (Schumacher, 2015; Donner, 2011).

In the field of tourism, the concept of holistic tourism has gained importance. Holistic tourism involves the construction and operation of a destination, be it a city or a small town, with emphasis on the organic integration of regional resources, industrial development, social cooperation, and coordinated economic and social growth (Li, 2016). The focus is on utilizing local resources, offering comprehensive products and services, and meeting the diverse needs of tourists (Li, 2016).

1.2 The Location

The Golan Heights, covering an area of 1,250 square kilometers, offers a rich variety of attractions and activities for a wide range of interests. The region's unique geography is a playground for outdoor enthusiasts and adventure seekers. Mount Hermon, located in the northern part of the Golan, is the highest mountain in Israel. Its snow-covered slopes and well-developed ski resorts make it an enticing destination for winter sports tourism. Skiing, snowboarding and other exciting winter activities attract enthusiasts from near and far. The combination of challenging slopes and breathtaking views offers an unforgettable experience for thrill seekers and nature lovers alike.

To the west of the Golan lies the famous Sea of Galilee, a paradise for water sports enthusiasts. The huge lake attracts with its calm waters and offers an ideal environment for swimming, sailing, kayaking and fishing. The Sea of Galilee has become a well-known center for water sports activities and attracts

tourists seeking both relaxation and adventure. In the southern part of the Golan, the Route 98 trails are a paradise for cycling enthusiasts. This extensive network of roads and trails winds through the region's picturesque landscapes, offering an exciting experience for cyclists of all levels. The hilly terrain and breathtaking views along the route make Golan Heights an ideal destination for cyclists seeking both physical challenges and natural beauty.

The abundance of natural treasures located near each other has cemented the Golan's reputation. And can become a paradise for sports tourists. From winter sports on Mount Hermon to water sports on the Sea of Galilee to exciting cycling adventures along Route 98, the region offers a wide range of interests and preferences.

Ein Qiniyya is a small Druze village in the southern foothills of Mount Hermon in Israel. The village was granted local council status in 1982, signifying its administrative autonomy within the Israeli governmental system. Ein Qiniyya population in 2019 was 2,098 according to Israel Central Bureau of Statistics (ICBS, 2019). The population of Ein Qiniyya is growing steadily with an annual increase of 1.6%. Although the village is relatively small, it occupies an important place in the ranking of municipalities and is ranked 249th in Israel. Education plays an important role in the village, as evidenced by the high percentage of 12th grade students who successfully obtain the national Bagrut High School diploma. In the 2019-2020 academic year, the rate of students earning this diploma reached an impressive 95.5%, reflecting the commitment to academic excellence and the high value placed on education in the community.

In terms of economic indicators, the average monthly salary of an employee in Ein Qiniyya in 2022 is approximately 1,644 EURO. It is important to note that this figure is slightly lower than the national average income for an individual in Israel, which is approximately 2,618 EURO (ICBS, 2022). These statistics shed light on the economic landscape of the village and provide insight into the income levels and economic opportunities of the residents.

Ein Qiniyya has immense potential for the development and management of sports tourism. The topography of Ein Qiniyya is built on a steep slope. The upper houses of the village are 850 meters above sea level and the lower houses of the village are 600 meters above sea level. A difference in altitude of 150 meters, which corresponds to the horizontal distance between them about 750 square meters. By taking advantage of the natural beauty of the region, the cultural heritage of the village, and the increasing popularity of sports tourism, Ein Qiniyya can position itself as a unique and attractive destination for sports enthusiasts and travelers. By examining the challenges, opportunities, and strategies for success, we can unlock the full potential of sports tourism for the village, its residents, and the region.

1.3. Reasons for Promoting Internal and External Sports Tourism

Promoting internal and external sports tourism in Ein Qiniyya can be considered the best way to fulfill the role of a mayor in the age of screens for several reasons:

Promoting sports tourism can provide opportunities for residents to connect with each other, socialize, and strengthen the community (Struthers, 2011; Gibson, Kaplanidou, & Kang, 2012). It has the potential to bring Ein Qiniyya local community together, encourage participation, and foster a sense of belonging.

The city can promote its identity and create a positive image that resonates with both residents and potential visitors by using sports tourism showcases offerings, share success stories, generate interest, leveraging natural landscapes, cultural heritage, and sports facilities (Hargrove, 2017). Sports tourism can serve Ein Qiniyya as a platform to highlight Ein unique features and attractions.

In the age of screens, physical inactivity and screen addiction have become major problems (Kardefelt-Winther, 2017). By promoting sports tourism, the city can promote physical activity, health, and wellness among residents and visitors. By using digital platforms, Ein Qiniyya can disseminate information about sports activities, provide training resources, and facilitate virtual engagement in sports-related initiatives, motivating people to lead more active and balanced lifestyles.

1.4. Obstacles Promoting Internal and External Sports Tourism

The development of internal and external sports tourism in Ein Qiniyya has great potential, but there are some obstacles that we must address.

It is critical to the success of sports tourism initiatives that the city has the necessary resources to meet the facilities needs of participants and visitors (Gibson, 1998; Weed & Bull, 2012; Higham & Hinch, 2018). One of the main obstacles that Ein Qiniyya is facing is the need for adequate infrastructure and

facilities to support sports tourism. This includes the construction or renovation of sports facilities, accommodations, internet and transportation systems.

Securing sufficient funding and investment for sports tourism development can be a significant barrier. The costs associated with infrastructure development, marketing campaigns, event organization, and ongoing maintenance can be significant (Heydari et al., 2022). There is a need to develop various sources of funding, such as government grants, private sponsorship, and partnerships, to ensure the financial sustainability of sports tourism efforts.

Engaging and mobilizing diverse stakeholders, including residents, community organizations, sports associations, and government agencies, is essential to the success of sports tourism initiatives. Effective communication, collaboration, and negotiation are necessary to build consensus, address concerns, and ensure that all stakeholders are aligned in their vision and commitment to Ein Qiniyya sports tourism (Gjertsen, 2022).

Effective marketing and promotion strategies are needed to promote sports tourism destinations. The challenge of establishing a recognized and desirable location for sporting events and activities can include targeted advertising campaigns, participation in industry trade shows and exhibitions, use of digital marketing channels, and building partnerships with tourism agencies and sports organizations (Yamashita & Takata, 2020). The seasonality of sports tourism and the potential impact of weather conditions can be challenging. The location of Ein Qiniyya near Mount Hermon means that certain sports and activities may be limited to certain seasons or weather conditions. Developing a diverse range of sports that can be enjoyed throughout the year and contingency plans for bad weather will be critical to attracting visitors and ensuring economic stability (Mesci et al., 2021).

2. Methodology

The combined methodology of a comprehensive literature review and assumptions development provides a robust foundation for the research, enabling a deeper understanding of the challenges of the Age of Screens and the potential of sports tourism as a comprehensive urban development strategy in Ein Qiniyya.

2.1. Methodology: Literature Review

The research methodology is founded on a rigorous literature review approach. This methodology aims to establish a robust theoretical framework and gather essential insights into several key domains, including sedentary lifestyles, screen-based interactions, well-being influenced by nature exposure, cultural heritage in tourism, and sustainable tourism practices. The comprehensive literature review involves the following steps:

The literature review begins with formulating a structured search strategy. This strategy defines the scope of the research and specifies the key terms and phrases related to the study's focus areas. Boolean operators, such as AND, OR, and NOT, are employed to refine search queries and maximize the relevance of sources.

Inclusion and exclusion criteria are established to ensure the relevance and quality of sources. Only peer-reviewed articles, academic papers, books, and reports published in reputable journals and publications are considered. Primary sources with empirical data and secondary sources with theoretical contributions are included.

Each source is critically evaluated for its relevance, credibility, and quality. Relevant information is extracted from the sources, including key concepts, methodologies, findings, and recommendations. A structured framework categorizes the information according to the study's focus areas.

The information extracted from the selected sources is synthesized to develop a comprehensive understanding of the subject matter. Common themes, trends, and key findings are identified through qualitative analysis. Connections between sedentary lifestyles, screen-based interactions, well-being, cultural heritage, and sustainable tourism are explored.

2.2. Methodology: Assumptions Development

Based on the insights and findings gathered during the literature review, a set of assumptions is systematically formulated. These assumptions serve as guiding principles for the research and contribute

to developing the study's objectives and strategies. The process of assumption development involves the following steps:

Identification of Key Insights: The key insights and findings extracted from the literature review are carefully reviewed and analyzed. Concepts related to sedentary lifestyles, screen-based interactions, nature's influence on well-being, cultural heritage in tourism, and sustainable tourism practices are considered.

Formulation of Assumptions: Assumptions are developed based on the identified insights. These assumptions encompass the potential of sports tourism to address sedentary lifestyles, enhance social bonds, promote cultural heritage, and contribute to well-being. They are formulated in clear, concise statements aligning with the research objectives.

Validation: The formulated assumptions are critically evaluated to ensure they accurately represent the insights gained from the literature review. They are validated through logical reasoning and supported by evidence from the reviewed sources.

Integration into Research Framework: The validated assumptions serve as foundational elements for the research framework. They guide the development of research objectives, strategies, and the overall research design.

3. Results

The comprehensive literature review conducted for this study has yielded valuable insights into the multifaceted dynamics of sedentary lifestyles, screen-based interactions, well-being influenced by nature exposure, cultural heritage in tourism, and sustainable tourism practices. The reviewed literature has emerged as a transformative approach for this municipality underscored the detrimental effects of sedentary behaviors and excessive screen time on physical health and social interactions, echoing concerns raised in contemporary research (Tooth et al., 2021). Conversely, the positive impact of nature exposure on overall well-being has been consistently documented, emphasizing the therapeutic value of natural environments (Marquez et al., 2020). Moreover, the significance of integrating cultural heritage with tourism experiences has emerged as a pivotal driver of destination attractiveness and visitor engagement (Hargrove, 2017). Sustainable tourism practices are vital for long-term destination development, fostering economic growth, and preserving cultural and natural assets (Carneiro et al., 2016).

These findings collectively lay the groundwork for understanding the unique challenges of the Age of Screens and the potential of sports tourism as a holistic urban development strategy in Ein Qiniyya. The literature review highlights the critical need to counter sedentary lifestyles and the erosion of face-to-face interactions and underscores the role of sports tourism in achieving these objectives. In the following sections, these insights will be translated into concrete strategies and recommendations to leverage Ein Qiniyya's natural beauty and cultural heritage as catalysts for revitalization, community cohesion, and enhanced well-being in an age marked by digital screens.

4. Discussion

The findings derived from the comprehensive literature review underscore the urgency of addressing the challenges posed by the Age of Screens in contemporary society. Sedentary lifestyles and screen-based interactions have become prevalent, leading to adverse effects on physical health and a decline in face-to-face interpersonal communication (Tooth et al., 2021). In this context, the role of Ein Qiniyya as a Druze village nestled amid the unspoiled nature of the Golan Heights takes on new significance. The village's unique combination of natural beauty and vibrant cultural heritage provides a promising foundation for promoting sports tourism as a multifaceted solution.

One central discussion that emerges from the literature is the potential of sports tourism to counteract sedentary habits and encourage physical activity. Physical activity, as highlighted in previous research, is crucial for improving physical health and plays a pivotal role in enhancing mental well-being and overall quality of life (Marquez et al., 2020). Sports tourism can be a powerful tool to inspire residents and visitors to engage in active lifestyles, offsetting the negative consequences of excessive screen time.

Furthermore, the literature emphasizes that sports activities inherently facilitate face-to-face communication and the building meaningful relationships. In a digital age where virtual interactions have become the norm, the value of creating opportunities for genuine human contact cannot be overstated. Sports tourism has the potential to bring people together, fostering community engagement, shared experiences, teamwork, and friendly competition (Theodorakis et al., 2019). It transcends the

confines of screens, allowing individuals to interact authentically, exchange ideas, and build lasting connections.

Conclusion

The discussion on sports tourism in Ein Qiniyya extends beyond its immense potential for economic growth and recognition. It becomes a strategic pathway for promoting physical activity, strengthening community bonds, showcasing cultural identity, driving economic development, and prioritizing the health and well-being of residents and visitors alike. This holistic approach to urban development aligns Ein Qiniyya with the changing needs of a digitally connected society, ensuring that it thrives as a vibrant, active, and culturally rich destination in the age of screens.

Embracing sports education and tourism is a strategic move for the Mayor of Ein Qiniyya and a transformative one. By promoting physical activity, fostering community engagement, showcasing the city's identity, driving economic development, and prioritizing health and well-being, the Mayor can lead Ein Qiniyya toward a brighter and more prosperous future. With careful attention to addressing the obstacles and leveraging the immense potential of sports education and sports tourism, the Mayor can create a dynamic and thriving city that values active lifestyles, strong community bonds, and the unique charm of Ein Qiniyya.

However, several obstacles need to be addressed to exploit this potential fully. Adequate infrastructure and facilities must be developed or improved, including sports facilities, accommodations, internet connectivity, and transportation systems. Securing sufficient funding and investment through various sources will be crucial for the financial sustainability of sports tourism initiatives. Engaging and mobilizing diverse stakeholders is essential for building consensus and ensuring a shared commitment to Ein Qiniyya sports tourism. Effective marketing and promotion strategies are needed to establish Ein Qiniyya as a recognized sports tourism destination. Addressing the challenges of seasonality and weather conditions through developing a diverse range of sports and contingency plans will attract visitors and ensure economic stability.

By overcoming these obstacles, Ein Qiniyya can position itself as a thriving sports tourism destination, reaping the benefits of increased tourism, economic growth, and enhanced reputation. Incorporating these principles will enable leading the village towards a prosperous future. By harnessing the power of sports and tourism, the city can flourish by promoting physical activity, community engagement, economic development, and well-being, all while maintaining its cultural authenticity. Together, Ein Qiniyya can stand as a shining example of a city thriving in the age of screens.

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6. Tourism, Hotel Management and Spa Industry

Digital Marketing in Tourism Industry as a Tool to Sustainable Future of the Cities in Post Pandemic Period

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Abstract

Research background: The direction of the tourism industry towards digital change is a particularly hot topic of many discussions. Especially during the pandemic, the initiatives started to be strengthened for the accelerated development of digital elements that will be able to support the tourism industry, especially in the post-pandemic period. Destination try to refresh their action by using several digital marketing tool to attract tourist after so difficult period.

Purpose of the article: The purpose of the contribution is to bring closer the perception and use of digital information as a means of digital marketing as well as the digital offer itself as a way of sustainability of the chosen tourism destination, using the example of the town of Prešov in the Slovak Republic. The conducted research investigates the behaviour of the modern digital tourist with regard to the digital offer provided to him through modern technologies.

Methods: Digitally oriented research was based on author's questionnaire research, the results of which were evaluated using several methods. As the main methods of evaluating the research result were Kruskal-Wallis and Chi-square test.

Findings & Value added: The results of the conducted research showed that digital information plays a dominant role in information in the tourism industry. Its participants are moving towards transformations and to a profile of distinctly digital tourist. It relies on modern technologies and therefore it is essential that individual tourist destinations also adapt to this digital trend and develop digital services for the benefit of future sustainability.

Keywords: digital marketing, digital tourism, smart cities, digital tourist, sustainable tourism

JEL classification: M31, L83

1. Introduction to the digitalization of tourism sphere

The world of digital media is constantly changing and shifting. Evolving technologies and the way people use them is transformed not only to access information but also a way of processing information in a variety of interactive channels (Slivka, 2015; Rajnoha et al., 2019). Rapid emergence and evolution of digital technology have created an enormous opportunity also for the tourism industry to transform itself due to the increasing number of travellers and the changing requirements of travellers' organizations (Puri et al., 2023; Stefko, Bacik et al., 2022).

Tourism is one of the most dynamic sectors and a way to connect these two worlds, entails a new form of communication with travellers - the tourists (Slivka, 2015). Over the last decade, advances in digital technologies are creating new opportunities for services by proposing not only new platforms to increase value delivery and creation but also new ways of providing offerings to customers (Sklyar et al., 2019; Stefko et al., 2020). Digitalization accelerates the need of tourism and hospitality ecosystems to reframe business models in line with a data-driven orientation that can foster value creation and innovation (Troisi et al., 2023).

Digitalization of tourism sector is closely related to digital marketing (Heckova, Kubak, Marková et al., 2021). Migration movements and tourism in general, together with the improvement of new technologies, have meant an increase in the availability and ease of information related to tourism. At the same time, the use of artificial intelligence has opened up new horizons in which digital marketing strategies associated with tourism can improve this industry and thus offer more possibilities in the short

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term (Lacarcel 2022). In similar context Perinotto and de Siqueira state, the dynamics and changes that constantly occur in this market lead the tourist activity to constant renewal. The development of the tourism market brings a new challenge to the tourism sector, which points out that the tourist is increasingly informed and independent. A consumer who has immediate access to information via digital platforms, he feels able to offer himself services that companies do not offer as part of destination products. With this challenge to overcome, it is necessary to know the potential consumer in order to create marketing strategies that will either attract or convince them to travel. Closest communication with this public and understanding of its needs a desire is possible through digital marketing (Perinotto, de Siqueira, 2021). Many destinations are fiercely fighting for their visitors precisely by using digital marketing tools that increase awareness of their existence and bring the potential to motivate future travelers to visit them. In the modern sense, these tools are also defined as smart elements that bring new ways of participating in tourism. Valeri & Baggio mentions that smart technologies are composed of a cohesive system of several digital tools. These are mainly cloud computing technologies, social networks, IoT and mobile applications. These tools can enhance the interactions between actors. On the other hand, they support the human-technology interaction and information exchange by providing the possibility to establish real-time communication, personalized interactions and to increase engagement which is extremely important in the tourism industry (Valeri & Baggio, 2021).

In connection with tourism, the digital development of destinations is also closely connected. It involves the application of new elements and trends, hand in hand with modernization in digitalization (Dzurov Vargová, et. Al., 2020). As claimed by Huang et al. (2023), smart tourism destinations are another emerging topic that needs to be explored more deeply. Also, the authors Bastidas-Manzano et al. (2021), mention that the concept of smart tourism destinations has emerged in tourism research, few studies have delved deeply into the topic, and the little research focused on the topic has not offered an overview of its development, current scope and potential areas of interest. However, they point to the fact that the topic of digitization of tourism destinations is dominated by studies based mainly on technologies. Up to their results, smart tourism destinations can shape tourist behaviour through technology, culminating in sustainable destination development and the formation of smart cities (Šenková et al., 2020). The authors Schönherr et al. (2023) also agree in their opinion, when argue that digital transformation also provides opportunities for sustainable tourism development. Due to the fact that the tourism sector is a sector of the tertiary sector based on the provision of services, additional specifics have arisen for this sector in connection with digitalization. The combination of services and digitization also gave rise to the concept of servitization. It was also described, for example, by the author collective Kowalkowski et al. (2017), who define the term digital servitization as that which refers to the utilization of digital tools for the transformational processes whereby a company shifts from a product-centric to a service-centric business model and logic. The servitization literature has evidenced that the development and provision of Smart Product-Service Systems usually happen through collaborative ecosystems, but little is known about the different arrangements that ecosystem's actors can follow to provide digital solutions (Dalenogare et al., 2023).

The use of digital marketing by tourism has an increasing importance, since most of the time, it is through digital marketing that it is possible to obtain information about tourists or make them reach information (Arantes, Sousa 2021). While technology has been advancing significantly and becoming increasingly widely adopted amongst visitors over the decades (Vasanicova et al., 2021), the application of digital technologies by Destination Management Organisations to fulfil their management role has been generally limited (Estêvão et al. 2020). The tourism industry in current status should adopt new strategies and innovations to keep up with post pandemic recovery and maintain healthy competition in its ecosystem (Aitken 2016 in Puri et al., 2023).

2. Methods

The theoretical background of the study (scientific abstraction method) formed the fundamental basis for obtaining new knowledge, resulting in the author's questionnaire research, which was necessary for the fulfilment of the established research goal. The aim of the study *was to bring closer the perception and use of digital information as a means of digital marketing as well as the digital offer itself as a way of sustainability of the chosen tourism destination, using the example of the town of Prešov in the Slovak Republic*. The conducted research investigates the behaviour of the modern digital tourist with regard to the digital offer provided to him through modern technologies.

In order to fulfil the goal, an author's questionnaire was compiled, which was focused on the digital tourist and the offer of digital tourist products in the town of Prešov that can be a proper fundamental of

future sustainable development of tourism in the town. Questionnaire questions were open, where respondents could express their opinion in closed questions (choice type) and scaled questions set on a Likert scale (from 1 = absolute agreement to 5 = absolute disagreement). 178 respondents participated in the questionnaire, while the inquiry took place exclusively in the town of Prešov - through personal contact. The places of contact were cultural monuments (museums, galleries, selected historical and modern sights), tourist information centres and selected restaurants and cafes. The study presents the evaluation of the questionnaire by cumulative frequency, selected methods of descriptive statistics, while selected results are also presented using graphs and tables made in the MS Excel program. The period of data collection through the questionnaire survey in the tourism destination of the town of Prešov was spring months of year 2023, in concrete March to May 2023 (i.e. the post-covid research period).

As part of the "age" variable, the initial investigation was carried out with an open question to enable the evaluation of the variable with descriptive statistics. Subsequently, age intervals were chosen and the respondents were classified into seven intervals 19-25; 26-35; 36-45; 46-55; 56-65; 66-75 and 76-86 years old.

As part of the research, hypotheses were established, which were subsequently verified or falsified using appropriate mathematical and statistical methods at the level of significance (alpha) $\alpha = 0.05$, i.e. j. at 95% probability.

Hypothesis 1: There is a relationship between the attractiveness of the product for the digital tourist and the location of the search for digital information about the tourism destination.

Hypothesis 2: There is a difference between the preferred way of searching for digital information about a tourism destination and the age of the digital tourist.

If the p-value of the selected mathematical-statistical test was less than the set level of significance (α), the null hypothesis ($H_1 : \mu = \mu_0$) was rejected and an alternative hypothesis was accepted, i.e. original hypothesis ($H_1 : \mu \neq \mu_0$).

3. Results

From the basic description of the respondents, resulting from the questionnaire research, it can be stated that 178 respondents participated, while 49% of the research sample were women and 51% were men. The average age of the respondents was 38.5 years. Based on the standard deviation, which is 14.57, it can be seen how widely the values of the variable "age" are distributed in the research sample. The youngest research participant, (the minimum age) was 19 years old. The oldest research participant (the maximum age value) was 86 years old.

The largest group of respondents consisted of respondents with a secondary education, 51%, followed by respondents with a completed second-level university education, 31%. Respondents also selected first (bachelor) and third level university education (doctoral- PhD), each group 9%.

The current respondents' status was most often stated as an employee by up to 60%, entrepreneur was stated by 13% of the respondents, 10% of the respondents were pensioners. There were only 8% of students, 5% of respondents were not currently working and 4% indicated another possibility, being a parent on maternity leave or a disabled person.

Respondents stated that 59% currently visit the town of Prešov with their family, 22% with their partner, 13% with friends, and 6% of respondents stated that they usually travel alone.

For 34% of the respondents, the main activity during their stay in the town of Prešov was getting to know the culture, 24% nature or sports activities, 15% of the respondents indicated participation in events held in the town and 11% of the respondents come for clerical tourism. Entertainment was mentioned as the main motive by 9% of respondents and 7% of respondents come for the purpose of shopping tourism.

From the results of the questionnaire, which was focused on digital means used in tourism and the evaluation of the digital product of the town of Prešov by tourists, it is possible to state the following findings:

- evaluation of the respondents' answers regarding obtaining information about the destination with regard to the age categories into which they were additionally classified, it can be stated, which also follows from Table 1, that the respondents tend to search for information mainly in the form of recommendations and information from acquaintances and friends and in digital form. The category Tourist Information Centre (TIC) was presented rather as an additional choice/ option (the most preferred answers are marked in dark font).

Table 1. Contingency table of the mean of the variables "age category" and "obtaining information about the destination“

Age category	Digital information	Tourist information board	Family, relatives	Printed materials
19-25	2.12	4.78	2.26	4.27
26-35	1.55	4.23	1.27	3.55
36-45	1.67	3.74	2.16	2.61
46-55	2.45	2.91	2.34	2.71
56-65	2.71	2.12	2.15	2.11
66-75	2.89	1.79	2.58	2.56
76-86	3.56	3.09	2.48	1.92

Source: own processing 2023

- Obtaining the information in a digital form is the key to obtaining information about the destination (the answer is "absolutely prefer") for respondents aged 26 to 35 (64%) and from 26 to 45 (58%), while the given method of searching for information was also strongly preferred by respondents from 19 to 25 years old (47%), while the mentioned age category minimally uses tourist information services (81% - cumulative answers I rather do not prefer, I absolutely do not prefer). Respondents in the second half of the productive age (the answer "rather prefer") expressed a positive opinion about the obtaining the information. In concrete it was 43% of respondents in the age range of 46 to 55 years and 37% of respondents in the age range of 56 to 65 years. Respondents in the age category of 76 to 86 years most often stated the option "rather I don't prefer" (61%). Within the last category, respondents preferred information about the destination obtained through print materials (79%) and subsequently based on recommendations from their family and relatives (42%), who usually had previous personal experience with the destination and its services.
- The most frequently preferred elements of digital tourism marketing (either when obtaining information or tourist products) were social networks by 34% of women and 41% of men. Within the age category, it is preferred by 36 to 45-year-old respondents (39%), the digital tool web was popular among respondents, even though it reached an average value. It is most preferred by women (28%) with secondary education (24%), within the age category 46 to 55 (31%). Mobile applications are preferred by men 47%, which is +12% more than in the case of women. The digital guide is preferred by respondents aged 26 to 35 (47%), who always access it and 23% who almost always download it and draw information from it. In terms of gender, it can be stated that there was a percentage agreement between the respondents in the answer. Influencers as a source of evaluated information in tourism were accepted by respondents from 19 to 25 years old (75%), while as the age of respondents increases, the influence of influencers decreases slightly up to the age limit of 45 years, and in the case of older respondents, the percentage of influence is minimal or zero (76-86 years).
- The respondents indicated as a source of digital information regarding the destination subcastes, which dominate in the age categories 35 to 45 years (39%) and 46 to 55 years (35%), while these were mainly respondents with higher education (I, II., and III degree). Digital animations dominated the youngest age group of 19 to 25 years (41%), while respondents with secondary education (38%) and students (31%) prevailed.
- Visitors to the town of Prešov, who more often used digital technologies to search for information about the destination, i.e. respondents from 26 to 45 years old (answer "always") were more critical of this type of tourism product (65%), indicating that this type of product is few (45%), poorly advertised (78%). Respondents expressed dissatisfaction with the quality of the product (cumulatively 61% rather dissatisfied and dissatisfied). Satisfaction with the quality of digital products of the city of Prešov was expressed by 45% of respondents in the age category of 56-65 years. Respondents in the age category 19-25 years (34%) and 56-65 years (31%) single out digital tourism products as attractive.
- Respondents perceive a connection between sustainability and digital elements of marketing that are applied in tourism, while the dominant "smart elements of tourism" were the digital guide

(82%), mobile applications (e.g. Booking, TripAdvisor, Trivago, etc.) (63%), it is possible to assume that they often prefer them to printed materials.

As part of the first hypothesis, the connection between the attractiveness of the product for the digital tourist and the place of obtaining the digital information about the destination from the point of view of visitors to the town of Prešov was determined.

To verify the hypothesis, a statistical method was chosen for non-parametric data of several groups (unpaired variables), Kruskal-Wallis test (Table 2).

Table 2. Kruskal – Wallis test H_1

K	4.99
[K]	9.49
DF	4
p-value	0.29
α	0.05

Source: own processing 2023

The results shown in Table 2 show that the calculated K value (4.99) was less than the critical value of IV. degree (DF) of the test (9.49) and the calculated p-value (0.29) was greater than the established alpha significance level (0.05). In view of the above mentioned, it was possible to accept the null hypothesis, which discussed statistically insignificant differences, and in which the assumption was made that "there is no statistically demonstrable connection between the opinion on the attractiveness of the product for the digital tourist and the place of obtaining the digital information about the tourism destination" at the example of the town of Prešov.

Hypothesis 2: There is a difference between the preferred way of searching for digital information about a tourism destination and the age of the digital tourist.

As part of the verification of the second hypothesis, it was determined whether there is a connection between the preferred method of obtaining the information and the age category of the visitor to the town of Prešov.

To test the hypothesis two, respondents' responses were evaluated in relation to the demographic variable "age". Respondents' answers to the opened age question were additionally divided into seven age categories.

For a closer specification, a table 3 explaining average values of responses to the method of searching for digital information about the destination town of Prešov was compiled within individual digital options (social networks, mobile applications, web sites, audio guides).

Table 3. Average values of the answers "digital information search" depending on the "age category"

Age category	Social networks	Mobile app	Web	Audio guide
19-25	2.02	3.18	2.44	3.18
26-35	1.94	2.95	2.32	3.26
36-45	1.94	2.64	2.57	2.93
46-55	2.30	2.75	2.44	2.71
56-65	2.28	2.94	2.50	2.45
66-75	2.57	2.43	2.43	2.87
76-86	3.00	4.00	3.00	2.00

Source: own processing 2023

The question focused on the preferred method of searching for digital information about the tourism destination was formulated on a scale of options: always; often; sometimes; rarely; never. It was the basis for the verification of the hypothesis, through the χ^2 test method (chi-square test- Table 4).

Table 4. Chi-square test of destination information obtaining depending on age category

χ^2	63.16
$|\chi|$	38.64
df	24
p-value	0.00
α	0.05

Source: own processing 2023

The results shown in Table 4 showed that the calculated chi-square value ($\chi^2 = 63.16$) was greater than the critical chi-square value of the 24th degree of freedom $\chi^2 (0.05) (24) = 38.64$ and at the same time the calculated p - the value (0.00) was less than the established level of significance ($\alpha = 0.05$). Based on the results, it is possible to accept an alternative hypothesis and confirm a statistically significant difference that "there is a difference between the preferred method of obtaining the digital information and the age of the digital tourist".

From the given results and the performed chi-square test, it follows that the differences in the obtaining the information about the destination in relation to the age categories of the visitors were confirmed.

4. Discussion

Based on the presented results, it can be stated within the studied sample that respondents from 19 to 55 years of age, regardless of gender, with university and secondary education, within the economic status of employment, had a high potential to be addressed by digital marketing. The stated findings show a positive correlation with the study of Tajtáková 2020.

From the results of the mentioned research, it can be observed that visitors to the town of Prešov, who often used digital technologies and preferred digital obtaining of information about the tourism destination (while answering "always" on the Likert scale) were more critical of this type of tourism product. There are several explanations for this dependency:

- higher expectations – visitors who rely heavily on digital technologies tend to have higher expectations of digital products. The higher level of use of digital tools can also be related to their higher expected quality and functionality of digital tourism products. If these expectations are not met, it can lead to more criticism,
- more experience – more frequent use of digital technologies can mean that visitors have more experience with different digital products. In case of negative experiences with some products of the mentioned type, it may lead to greater criticism of new digital products, including digital tourism products.
- more informed - visitors who prefer digital search for destination information are likely to be better informed about the destination's leisure options and services. Growing awareness can increase visitors' perception of digital tourism products as they have a better idea of what to expect.

As part of testing hypothesis H1, the product for the digital visitor was assessed separately, as it is possible to agree with the above-mentioned authors that digitization will be a significant part of tourism services. Hypothesis H1 was not confirmed. In the basic evaluation of the respondents' answers from the questionnaire, it was found that visitors to the town of Prešov, who more often used digital technologies and preferred digital search for information about the destination (answer "always"), were more critical of this type of tourism product. Considering the above result for frequent users of modern technology, it would be advisable to improve the quality of the given product and make the product offer more attractive in relation to the "digital tourist" segment.

Hypothesis H2, examining the connection between the preferred way of searching for information and the age of the respondent, was confirmed. As important findings, it can be stated that digital information about the destination is most often acquired by the generation aged 26-45 (1.94). The 66-75 age group most often visits the tourist information centre (2.43). The 26-35 age group (2.32) gets advice from family and friends most often, and the 76-86 age group (2.0) uses print material most often.

Conclusion

Since the time of improvement and promotion of digitization, as well as competition, i.e. the offer of digital products in the tourism industry, is increasing, it is necessary to vary and expand the offer for the digital tourist. Author Troisi also mentions that digital transformation forces companies to increase agility and proactivity, implement constant changes and constantly adapt strategies to market demand (Troisi et al., 2023). It is therefore necessary that not only destination management workers (i.e. workers of the regional tourism organization) collaborate on the preparation of the digital product of a modern tourism destination, but that part of the creation is entrusted to experts in digital technologies and digital marketing.

It is necessary to start investing in modern digital products to achieve higher goals of tourism development. There is need to set logical and modern structure of it and identify the key key entities of future management. The importance of investing in digital innovations in tourism in destinations is also confirmed by a British study that points to, „demonstrable need for increased investment in digital technologies as a way to collaborate and work more efficiently in the future” (Llewellyn, 2021, p. 5).

In the context of digital marketing, the connection with the sustainable growth of a tourist destination can be supported by a well-known personality promoting a dominantly ecological way of travel. The thematic alignment between the area in which the influencer operates and the digital tourism product presented by him is an important element in building credibility and the success of a marketing campaign. At the same time, if an influencer talked about an environmental and sustainable topic related to nature conservation, responsible travel or other topics related to sustainable tourism before being approached in a marketing campaign related to the promotion of digital tourism products, this can have a positive impact on perception of its connection with a digital tourism product that emphasizes these values.

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Pottery in the Destination Gemer and Its Potential for the Development of the Creative Tourism Offer

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Abstract

Research background: Creativity is now the driving force behind the development of modern society and an integral part of the strategies to increase economic growth and promote innovation within it. Destinations across the world are beginning to replace or supplement culture-led development tourism strategies with creative tourism. The starting platform for developing creative tourism is cultural tourism, which is dominant globally and within tourism in Slovakia.

Purpose of the article: The paper discusses the specific potential that Slovakia disposes of from the point of view of culture in the example of pottery. Our paper aims to present pottery as a potential tool in the development of tourism in the Gemer region.

Methods: We apply an interdisciplinary approach in the preparation of the paper. We collect and analyze the necessary information from primary and secondary sources. Data was collected from visitors to Gemer using a questionnaire survey.

Findings & Value added: Based on the questionnaire survey, we formulate the characteristics of a creative tourist in Gemer. Tourism stakeholders can work with the results achieved. They are important for their activities, targeted offers and the development of an attractive creative tourism offer for visitors to the region.

Keywords: creative tourism, cultural tourism, Gemer, pottery, sustainable development

JEL classification: Z32

1. Introduction

Creative tourism is a new form of tourism which has the potential to change the existing models. If we diversify and innovate we can expand the tourist experience. By doing so, creative tourism can help to stimulate local economic, social and cultural development (Richard, 2009).

Destinations across Slovakia are constantly looking for new ideas that will help attract tourists by being both competitive and sustainable at the same time. Especially in the last two decades, creativity has also found its place in tourism, with experiential learning, fun, self-realisation, interaction, active participation, authentic experiences and the development of the cultural tourist's manual skills being its characteristic features.

This content of creative activity is cross-sectionally present in different types of tourism such as cultural tourism, gastronomic tourism, rural tourism, thematic tourism and recreational tourism. Creativity is on offer in various tourism enterprises. Using a programme of cultural activities at their facilities to eliminate the holiday stereotype in addition to the traditional cultural facilities (e.g. community centres, outreach centres, observatories, galleries, libraries, etc.) and cultural-historical objects (e.g. open-air museums, castles, chateaux, traditional architecture objects, etc.). Visiting these institutions is a frequent motive for culturally oriented tourists. In general, these attractions are faced with the challenges of diversifying from the norm. Updating educational services and making them more attractive to the general public.

Cultural tourism is very important for tourism in Slovakia. It includes and develops from passive observation and cognition of culture to a more active and intensive experience, by promoting active involvement of the visitor in traditional activities. The need for self-fulfilment is a strong motive for

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participation in cultural tourism (Richard, 2011). The starting point for creative tourism is cultural tourism, developed in locations rich in cultural heritage, with cultural and historical links to traditional crafts.

In Slovakia, pottery has a rich tradition and excellent conditions thanks to the presence of multicoloured clay deposits and sufficient wood for firing products in kilns. Pottery was one of the most widespread crafts in Slovakia from the Middle Ages until about the middle of the 20th century. There are known areas of production in Western Slovakia (e.g. Veľké Leváre, Stupava, Modra, Senica), Central Slovakia (e.g. Pukanec and surroundings, Banská Bystrica and surroundings, Horná Nitra and Turiec, Orava, Liptov, Novohrad and Hont, Gemer) and Eastern Slovakia (e.g. Pozdišovce, Bardejov, Prešov, Snina) etc. (The Centre for Folk Art Production, 2023).

The rich cultural heritage of the Gemer region and its strong creative tradition reflect not only the past but also shape the future. On this unique basis and by developing the strengths of the Gemer destination, this less developed region can meet the challenges of today's demand for creative tourism.

In line with the trend of creative tourism product development, this paper focuses on the potential of pottery as part of the creative tourism offer in Gemer. The creative base of this destination includes handicraft production like pottery, which has the potential to attract artistic visitors. It will meet the specific needs within the framework of creative tourism as a modern sustainable tourism development path in the selected destination Gemer.

1.1 Literature review

The starting platform for the development of creative tourism is cultural tourism, which is dominant both globally and within Slovakia. The major difference between cultural and creative tourism lies in the resource base of both variations and in the tourists' motivation to participate in the activities on offer. Cultural tourism mostly focuses on exploring cultural and historical heritage, tangible and intangible cultural heritage, historic and biographical artefacts, descriptions, legends, as well as different art forms. However, the consumption of cultural products passively takes place. In contrast, the main goal of creative tourism is to experience things first-hand. Experiencing new emotions, and acquiring new knowledge and skills through creative activities shared with fellow tourists, and through interaction with the locals. (Pine and Gilmore, 2019; Richards and Wilson, 2007).

The roots of the creative tourism concept go back to the mid-1990s when a group of researchers and practitioners were looking at ways to enhance the sales of craft products to tourists. The first craft experiences were related to the production of textiles within the project Eurotex. Many visitors were interested in seeing how craft products were made, and many wanted to learn craft skills for themselves (Richard, 2009). We started to gain knowledge on the use of creativity in tourism when studying the research papers of Richard and Raymond (2000), which focus on creativity as a factor in destination development.

Creative people, who according to Florida (2012) represent the creative class, are naturally attracted to diverse and vital places that have become popular and prosperous thanks to the presence of the creative sector. Creative tourism means tourism that offers visitors the opportunity to develop their creative potential through active participation in courses and learning activities that are specific to the destination in which they take place (Richards, 2011). Creative development strategies linked with tourism can provide a „creative atmosphere" in specific areas making them attractive to the creative class, as well as to others (Richards, 2020).

Destinations specialising in creative activities and experiences are attractive to the mobile creative class, both for creative entrepreneurs and visitors. In this context, Duxbury (2019) points to the importance of deeply embedding place specificity in creative tourism activities and experiences and the importance of networks as a means to generate creative experiences. A highly networked environment in tourism destinations enables tourists to create peer-to-peer relations with the local creative people (artists, craftsmen etc.) and to gain the co-creation of their experiences. This is the characteristic feature of Creative Tourism 4.0 by Duxbury and Richards (2019). According to the study by Remoaldo et al. (2020), cultural tourists increasingly seek to experience cultural events actively and to directly engage in creative activities. Empirical knowledge about the creative tourist extends with the characteristics of the profile of creative tourists: Novelty-Seekers, Knowledge and Skills Learners, and Leisure Creative-Seekers.

The role of creativity in generating social and economic development of regions worldwide has caught the attention of many experts in a wide range of fields of study. The strong relationship between

tourism and creative industries has been recognized not only by many researchers but also by policy-makers (Csapó, 2012).

The political, legal and programmatic basis for the promotion of creativity at the European level is currently provided by the European Commission's Creative Europe programme 2021 to 2027 and its sub-programme Creative Europe Culture strand. The Culture strand encourages cooperation and exchanges among cultural organisations and artists within Europe and beyond (European Commission, 2023).

The interest in the perspective field of creative industries and their socioeconomic spillovers can be traced in Slovakia as well. Support for creativity, culture and cultural heritage is also declared in the Creative industries development strategy in the Slovak Republic (Ministry of Culture of the Slovak Republic, 2023).

In Slovakia, research on creative tourism was conducted by Csapó, Palenčíková and Csóka (2022), who provide a comprehensive view of the current conditions for the development of creative tourism. They point out the key importance of cooperation and networking between different stakeholders in Slovak tourism. The activities of creative artists in Slovakian tourism are examined by Hudáková and Korenková (2020), who conclude that the number of creative artists and craftspeople has been increasing in recent years. They are very important as they transmit the cultural expression of the nation in the form of traditional crafts and contribute to the dissemination of cultural heritage.

The Centre for Folk Art Production (ÚĽUV) has a mission to safeguard and develop traditional crafts and homemade production in Slovakia. It focuses mainly on looking for, mapping out and protecting crafts that are dying out. It then develops them using various activities, connecting the information and skills of the best producers with the knowledge of ethnologists and the vision of designers. The result is an original artist's work which respects traditional craft processes, patterns and materials.

The ÚĽUV's database provides a detailed overview of the most important traditional crafts and home-made products. Pottery is the production of ceramics (vessels and objects) from fired clay, originally by modelling in the hand, later using a potter's wheel or by modelling with moulds (The Centre for Folk Art Production, 2023).

The topic of pottery in Gemer and Malohont is dealt with by the author Bodorová (1952, 2019) in the work *Hrnčiarstvo v Šiveticiach: východný Gemer-Malohont* and also in the publication *Hrnčiarstvo v Suchánskej doline*. She describes the technological process, and artistic expression, and lists the craftsmen in each locality, manufactories, sales and sales methods up to the disappearance of the craft due to industrialisation. It lists the last artisan potters who are preserving this cultural heritage.

Regional activities, events and activities with the theme of pottery are also presented by cultural tourism organisations in Gemer, especially the Gemer-Malohont Museum in Rimavská Sobota, The Gemer's Culture Outreach Centre in Rožňava, House of Traditional Culture of Gemer in the East Slovak Museum in Košice, the DMO Gemer, DMO Banská Bystrica Region Tourism and DMO Košice Region Tourism.

1.2 Pottery as a part of the tourism offer for visitors to the tourism destination Gemer

The Gemer region is located in the south of central Slovakia and borders the Republic of Hungary. As a tourist region according to the Regionalisation of Tourism in Slovakia (2005), it consists of the districts of Rimavská Sobota, Revúca and Rožňava. It coincides with the cultural region of Gemer and Malohont. Malohont is a territory that has been connected to Gemer since 1803. It represents the western part of the region with its centre in Rimavská Sobota.

Gemer and Malohont was a region rich in pottery production. Thanks to the quality of the material, potters worked in almost 40 important localities. There were urban (Jelšava, Revúca, Rimavská Sobota, Rožňava, etc.) and village workshops (Držkovce, Meliata, Šivetice, Licince, Hrnčiarska Ves, Hrnčiarske Zalužany, etc.). Potters made plates, bowls, crocks or 50-litre containers from high-quality clay. It was also used by tile makers and manufacturers of tiles and bricks. Sometimes it was even used to make clay whistles, various figurines and, for a time after the Second World War, even souvenirs for visitors to the Domica cave and the Číž spa. The clay from the Gemer fields itself was also an export commodity (The Centre for Folk Art Production, 2023).

The peak period of classical pottery in Gemer and Malohont was the 19th century. Potters sold their products by wagonload from village to village, at fairs and later by rail. At the beginning of the 20th century there was a decline in production due to mechanisation, the development of new products

made of glass or enamelware, changes in the way of life, and the kilns were gradually replaced by stoves.

Pottery production gradually disappeared. Today, only the last two potters, Danka Bakšová and Paulína Kortišová, are active in the region, preserving the tradition of this craft in Hrnčiarské Zalužany. Danka Bakšová has also been a holder of the Regional Product of Gemer-Malohont regional label since 2015 (Region Gemer, 2023).

The theme of pottery as a creative activity is addressed in its diverse activities by institutions in the Gemer region, aimed at documenting the development of this craft from the earliest times to the present day. In addition to permanent exhibitions, various events, guided tours, lectures, courses, workshops and excursions related to pottery are prepared for the public. Other strategies being used by these institutions to obtain repeat visitors from the general public include mainly cultural and educational events for kindergartens and primary and secondary schools in the region. The programme for schools is called „Crafts in a Cube“.

Table 1. Tourist attractions related to pottery and a calendar of events and exhibitions in the destination

Name of the attraction, event, exhibitions		Date
Pottery Memorial Room Cultural House Sušany	Permanent exhibition and guided tour	Monday – Friday or by agreement 7.00 – 12.00, 13.00 – 15.30,
House of Traditional Culture Pottery Workshop Cultural Outreach Centre Rožňava	guided excursion creative workshops, max.10-12 pers. Courses (8 lessons)	Monday – Friday 8.00 – 15.00
Gemer – Malohont Museum Rimavská Sobota	Courses Teaching Lessons Permanent Exhibition	Tuesday – Friday by agreement 9.00 – 17.00
Jelšava Town Museum	Permanent Exhibition	
House of Crafts Kránohorská Dlhá lúka	Creative workshops Artisan market, Antiques Exchange	Weekends in autumn April - October

Source: author’s elaboration (2023)

To attract visitors and build relationships with the public, these cultural institutions now use a standard way of promoting their activities - websites. It is also possible to obtain interesting information about pottery from radio or television in the form of various documentary programmes and interviews (e.g. Slovakia in Pictures, RTVS, Košice online) and as part of news reporting from regional print media. An exceptional activity is the issuance of a banknote as a sovereign with a value of EUR 0 on the occasion of the 140th anniversary of the foundation of the Gemer-Malohont Museum. The main motive of the banknote is the building of the museum itself and a typical clay pot of the Gemer-Malohont pottery called "posed'an" with one ear decorated with a specific large-area wave, it comes from Sušany in Suchánská Valley and dates from 1920 (Gemer-Malohont Museum, 2023). The programme for visitors is also diversified by the event Night of Museums, during the XVIII. year, the Geme-Malohont Museum prepared a programme with the dominant theme of pottery as a traditional craft, as well as blacksmithing and the production of wooden toys in cooperation with traditional craftsmen (Rimava.sk, 2023).

To support the development of craftsmen, the Handicraft Incubator Gemer operates, which is a specialized form of support for folk craftsmen and folk-art producers. It is a unique tool for creating favourable conditions for the development of traditional craftsmanship in the territory of the Košice Region.

It helps beginners as well as experienced craftsmen who want to improve the marketing and presentation of their work. Also, they get assistance in areas of current legislation, production, sales and business. They can also learn more about the historical development of the craft and supplement their knowledge and skills with traditional techniques, technologies and production procedures about the aesthetics and functionality of the products (Rink, 2023).

Table 2. Web pages with Tourist information about the Pottery in the destination Gemer

Keyword: pottery in Gemer	Language version
https://gemer-malohont.sk/	slovak
https://www.kosiceregion.com/sk/	Slovak, English, German, Hungarian, Polish
https://gmmuzeum.sk/	Slovak, Hungarian
https://www.regiongemer.sk/	Slovak, English, German, Hungarian
http://www.gomorikezmuvesek.sk/	Slovak, Hungarian
https://www.regionalnepulty.sk/	Slovak

Source: author's elaboration (2023)

Further information about pottery in Gemer can be obtained through the social network Facebook DMO Gemer, a mobile application of the local government "Virtualne", which involves the town of Rimavská Sobota.

1.3 Visitation to the Destination Gemer

We found the number of visitors to the region from available secondary sources provided in the database of the Statistical Office of the Slovak Republic. The table shows the number of tourists accommodated in the Gemer region for the period from 2018 to 2022, the number of overnight stays, and the average length of overnight stays.

Table 3. Number of tourists accommodated in the Gemer region

Year	2018	2019	2020	2021	2022
Indicator					
Number of tourists	65 004	76 673	33 514*	29 053*	50 973
Number of overnight stays	176 092	212 112	112 404*	92 229*	141 306
The average number of overnight stays	2,63	2,66	3,25*	3,05*	2,70
Share of guests in Slovakia in %	1,16	1,19	1,04*	1,07*	1,05

Source: author's elaboration (Statistical Office of the Slovak Republic, 2023)

*data for the districts of Rimavská Sobota and Rožňava

The number of overnight stays and the number of guests decreased in the Gemer region for the years 2018 - 2022. The decrease was particularly noticeable in 2020 when the global pandemic COVID-19 broke out. The average length of an overnight stay in the region is more than 2.5 days. The year-on-year decrease between 2018 and 2022 in the number of guests is -27.53% and in the number of overnight stays is -24.62%. Revúca district did not publish statistical data on the number of visitors for the years 2020 and 2021. The number of foreign visitors could not be registered due to the lack of statistical data on foreign visitors, which were given as D "dôverný" (confidential), for the years 2018 - 2022, in all districts.

2. Methods

We apply an interdisciplinary approach in the preparation of the paper. Our paper aims to present pottery as a potential tool in the development of tourism in the Gemer region. To achieve the main objective of this article, we worked with the collected primary and secondary data. We studied the theoretical background from the available literature. We used sources of domestic and foreign authors devoted to creativity, creative tourism and cultural tourism, mentioned in the literature resources. We draw information from publications on the historical context of pottery as a traditional craft in Gemer. We used available statistical data from the Statistical Office of the Slovak Republic as a central body of state administration of the Slovak Republic for the field of statistics. From secondary sources, we found out what is the current offer of creative activity in tourism products in Gemer, who are the local traditional artists who are engaged in pottery.

The primary research was carried out in March and April 2023. Data was collected from visitors to Gemer using a questionnaire survey processed by Google Forms. It investigated the current state of awareness, interest, needs, expectations and ideas of the visitors about the creative product using pottery. Through the survey we want to get answers to these research questions: What is the demand for tourism in Gemer? What is the visitor's attitude towards creative tourism? What is the profile of the target group of

creative tourism relating to pottery in Gemer? The questionnaire was distributed to respondents through a social network. In total 120 answers were collected. The data obtained were processed using quantitative statistical methods, mainly descriptive ones.

3. Results

A Creative tourist is the key element of the demand for creative tourism. They decide where, when and how to spend their leisure time and what activities to undertake to gain an engaging creative experience. Creative tourists have their own perceptions of creativity and creative experiences (Tan, Kung, & Luh, 2013), they will not be satisfied with common cultural spectacles and are looking for active participation. A “presumption”, not a consumption, means tourists become producers of the products and experiences they consume (Tan & Tan, 2019). Understanding the needs, motives and preferences of creative tourists is a prerequisite for the development of creative tourism in destination Gemer.

Before getting into details, the general data of the respondents should be introduced. During the survey, the research group received 120 responses, out of which 29 % were male and 71 % female. Gender representation is rather disproportionate. The age composition of the research group is represented by age categories as follows: 18 years and under (3 %), between 19 – 30 of age (43 %), between 31 – 50 of age (30 %), between 51 – 65 of age (14 %), 66 years and more (10 %). The active working age generation has the highest representation by age in this survey. According to the achieved education level, most of the respondents had upper secondary education ending with a school leaving examination (43 %), followed by having a Master’s degree university diploma (54 %). Only 3% of respondents declare primary education, these are the youngest age group in the survey. The distribution of the achieved sample according to regions covers the whole of Slovakia, with the largest representation of the Banská Bystrica Region (34 %), followed by the Bratislava Region (14 %) and Košice Region (16 %). Ratios of the other regions were significantly smaller and are represented as follows: Žilina Region (10 %), Trnava Region (10 %), Prešov Region (9 %), Nitra Region (5 %) and the fewest responses were collected in the Trenčín Region (2 %). The distribution of the respondents is well balanced according to the economic activity since the largest group of the respondents were employees (40 %), followed by students (37 %) and retired persons (11 %), but self-employed entrepreneurs (8 %), unemployed (1 %) and homemakers (currently on maternity or paternity leave 3 %) were also targeted. By marital status, the sample is characterized by the distribution of single (54 %), married (30 %), divorced (12 %) and widowed (4 %).

We also focus our attention on the interpretation of the results of the primary analyses in connection with the consumer habits of creative tourists in the destination. The following part of the content contains the interpretation of the results of the primary analyses. This is based on the results of the previously introduced questionnaire survey on the demand side of the visitors in Gemer. It intends to survey consumer habits and trends related to travel and the use of services in the destination in the Gemer Region.

Hotel-type accommodation enterprises are preferred by 73% of respondents, the rest (27 %) spend their holidays in so-called para-hotel accommodation enterprises. Catering services are preferred by visitors directly in accommodation enterprises (51 %), a part of respondents (37%) are in various catering enterprises and the rest (12 %) consume their prepared food. When asked which mode of transport they use, their transport dominates (72 %), followed by the option of public transport (22 %) and the rest transport arranged through travel agents and agencies (6 %). Visitors in the research sample visit the destination continuously throughout the year, but most in summer (40 %), in autumn (21,88 %) and in spring (21,25 %), least in winter (16,87 %). All seasons are balanced. The most represented length of stay in the survey in Gemer is 1 to 3 days (69 %), followed one day trip visitors (15 %), 4 to 6 days (12 %), and at least long-term visitors for more than 4 days (4 %). When asked with whom tourists visit Gemer, they answered that with a partner (34 %), with friends (20 %), as a family (33 %), alone (10 %) and as a business trip (3 %). In the survey, we were curious about the average amount a visitor spends in Euros during a short-term holiday. According to the answers, visitors spend an amount of money on their stay from 150 to 300 € (56 %), up to 150 € (21 %), from 300 to 500 € (16 %), from 500 to 700 € (5 %), and the rest (2 %) more than 700 €. Respondents report that their highest expenses are for accommodation, catering, cultural attractions and events, transportation, sports activities, and the purchase of souvenirs and local products.

The question of what activities visitors look for when travelling gave the following findings with the following percentages of responses: rest and recreation (26,27 %), visiting cultural and historical sites (20,37%), entertainment activities (11,26 %), sporting activities (10,18 %), learning about local culture (9,65 %) and attending events (9,65 %), and visiting relatives (6,70 %). Creative activities specifically

sought during the stay occur in 1,16 % of the responses, educational activities in 2,41 % of the responses and nature in 2,35 %. The popularity of the attractions visited is fairly balanced; 51 % of visitors consider the cultural heritage (e.g. Betliar, Muráň castle, Gothic sacral road) and 49 % of visitor natural heritage listed in brackets to be the most popular (Muráň National Park, Slovak Karst National Park, caves, gopher meadow). Visitors get information through websites (28,13 %), social networks (22,92 %), friends based on recommendations (19,09 %), travel agents and agencies (3,12 %), by email (2,08 %) and telephone (2,44 %), online booking portals (22,22 %). Respondents also indicated more than one possible answer. In the open-ended questions for suggestions and tips for improving the destination, respondents state that there is a need to improve the quality of the tourism superstructure in the destination and the awareness of tourism services in general.

The following part of the paper contains the interpretation of the results from the primary analyses. These are based on the results from the previously introduced questionnaire survey on the demand side of the visitors. The attention is to survey the consumer habits and trends related to creative tourism and in particular pottery in Gemer. Our first question intended to reveal the respondent's relation to folk crafts. A positive relationship is declared by the majority of respondents (52 %), a negative relationship by a minority (7 %) and a neutral relationship by the rest (41 %). In the next question, we asked how many times they engaged in a creative activity during their holiday. They actively engaged in creative activity 1-2 times (43 %), 3-5 times (4 %), not once yet (41 %), 6 times or more (2 %), and only passively as an observer (10 %). We were curious to understand the reason why some respondents did not participate in creative activities at all. They cited either a lack of supply or even a perception of disinterest. Visitors in our survey are most interested in the following activities related to the traditional craft of pottery: guided tour (24,42 %), visit to an event with active participation (23,50 %), creative workshops (22,12 %), interactive exhibition (18,43 %), stay with a course (11,53 %). Up to 71 % of respondents are interested in buying local products, the rest gave a negative answer. When asked how much money they are willing to spend on a creative activity, they responded as follows: the majority of respondents up to 49 % from 21 to 50 €, up to 20 € (32 %), from 51 to 80 € (11 %), the rest of the respondents report different amounts. The next question of the survey is intended to reveal what the creative activity should be. Respondents could indicate more than one answer. A creative activity should be interesting and inspiring (21,39 %), fun (20,59 %), relaxing (17,91 %), authentic (15,24 %), educational (14,97 %), eco-friendly and sustainable (8,29 %), challenging (1,61 %). We also wanted to know who would like to practice or with whom the (possible) tourists would like to practice certain activities. That is, we intend to reveal in the next question, how the respondents would like to take part in creative activities during their holiday. Participation with a partner (34 %), with family and children (32 %), or with friends is preferred (20 %), which stems from the very nature of the creative activity, which is characterised by collectivity and sociability. Only 10% of respondents can imagine participating in a creative activity individually and 4 % with colleagues. Respondents have a clear preference for summer as the season during which they like to participate in a creative activity (63 %), followed by spring/autumn (26 %) and the holiday season (10 %). Winter was identified by only 1 % of all respondents. In the survey, we were interested in how much time they would spend on a creative activity. Respondents would most like to spend half a day (49 %) or less than half a day (28%) on a creative activity. A full day would be the preference of 18% of respondents. The remainder would prefer more than 1 day (5 %). The last question gauged respondents' interest in receiving targeted information about a creative activity related to pottery. More than half of the respondents agreed (56%) and the remainder disagreed.

4. Discussion

Based on our survey, we can characterize visitors to Gemer as individual travellers searching for this destination mainly because of its rich natural and cultural heritage with a preference for rest, recreation, visiting cultural and historical monuments, attending events and staying in nature. In terms of age composition, we can say that all generations are represented, which we refer to as the so-called "baby boomers", X, Y, Z. Also represented is the Alpha generation, which is presumably not travelling alone, thus representing the segment of families with children. Baby boomers, as active seniors, although less technologically savvy, are highly skilled with a positive attitude toward manual labour. Generation X and Y have good purchasing power because they are of active working age. Millennials and Zoomers are technologically savvy, have high expectations, and are open to new ideas. This characteristic of the age group needs to be worked with when developing a creative product.

According to the information from the survey, visitors do not purposely search for creative activities as they do not have enough information about them in advance. The source of information is the internet, especially websites, social networks and WOM. Tourists reach their travel destinations by car mainly during the summer season, preferring to stay in hotel-type accommodations with catering services. The average length of stay at the destination is 1-3 days and the average cost is €300. Visitors have a strong interest in buying local products. Visitors consider the weaknesses of the destination to be the lack of information about the region and a lacklustre marketing campaign, as well as the insufficient offer of tourism services of lower quality compared to other tourism regions.

The Gemer region has a wonderful landscape for active and meaningful leisure time. Due to its exceptional natural beauty and this region's relationship with pottery Visitors declare a positive attitude towards the craft. Pottery as a traditional craft of Gemer represents a competitive advantage and an opportunity to create creative tourism products with added value. The attractiveness of the market with a strong cultural and historical reference to pottery predisposes the region to creative tourism. This is provided that there is synergy between marketing, information technology and sufficient support for distribution. This will result in The creation and implementation of a thematic product with the quality of the tourism services provided at all stages.

In the process of creating the offer, it is important to identify and approach key tourism stakeholders in Gemera for cooperation. The Gemer region is applying elements of creativity in the development of its programmes at its cultural facilities. Examples of this are thematic exhibitions, workshops, creative workshops or programmes for primary and secondary schools. Despite this Gemer is not able to attract a significant number of visitors.

At the same time, visitors are highly interested in visiting cultural and historical monuments, various events, etc. Changing the passive participation of tourists into an interactive one through creative activities such as traditional pottery crafts can bring an authentic experience. As the results of our survey show, the current visitor to the Gemer region expects entertainment and an authentic, interesting, inspiring original and unconventional experience with a connection to cultural heritage and history. According to the results of the survey, this is a visitor with an interest in exploration, meaningful use of leisure time and time spent with their partner, family and friends. Women are more highly represented and motivated to forget about their daily routines and stereotypes through creative activities related to pottery. There is therefore a high expectation that they will be motivated to actively participate in various creative and educational activities. They show an interest in creative courses, guided tours, visiting events with active participation and workshops that are based on learning about the local culture. The creative activity should be timed to retain its element of fun and authenticity. The optimal time is half a day. Such a solution would suitably break up the daily holiday routine and remove stereotypes. When developing a creative offer, it is necessary to think about visitors who are satisfied with passively watching a traditional craft such as pottery.

To better exploit the potential for the creation of a creative tourism offer with the application of the traditional craft of pottery, measures need to be taken in the following key areas of tourism management:

- *Close and effective cooperation and partnership between the private sector, public sector and public-private sector (DMOs).* It is about the communication of typical tourism actors such as destination management organisations, tourism and related services entrepreneurs, development agencies, local self-government and state government, operators of monuments, cultural and natural heritage sites, event organisers, tourist information offices, tour operators and travel agencies, media, marketing companies, operators of reservation systems etc., while the product must have added value for all actors. Stakeholder cooperation and partnerships are a tool for aligning interests in a destination to ensure its success, competitiveness and sustainability, while at the same time ensuring optimal use of primary and secondary tourism market supply. Local and regional development strategies that use traditional folk crafts and skills as the potential for economic development.
- *The use of regional development grants in 2023.* As already mentioned, the tourist region of Gemer represents the districts of Rožňava, Rimavská Sobota, and Revúca, which since 31.12.2015 are on the list of the least developed districts (Office of Labour, Social Affairs and Family, 2023) within the meaning of Act 336/2015 Coll. on support for the least developed districts and amendments and supplements to certain acts as amended, eligible applicants may apply for a regional contribution in tourism within the framework of the activities of the development plan. Activities related to the creation of cultural tourism, sightseeing tourism, sustainable tourism, and rural tourism, as well as the implementation of destination marketing, improving the accessibility of districts, the creation of

sustainable facilities for the stay of visitors are defined (Office of Deputy Prime Minister of the Slovak Republic for Investment and Informatisation, 2023).

- *Support for the family business in region Gemer.* In many countries around the world, family businesses are the pillars of the economy and the dynamics of their development are astonishing. They pay close attention to regional and local conditions. They are a source of employment and economic growth, contributing significantly to GDP. They give a chance to the people who live in the region by paying taxes, building value and creating new jobs. They offer opportunities for young people at home, support regional development and thereby demonstrably increase the purchasing power of the population. The money saved is used for social programmes; to ensure sustainable development, stability of the business environment and the loyalty of business operators to their region. (Peráček, Vilčeková, Strážovská, 2020).
- *Use of information technology, and digitalization.* The current development of information technology is the driving force behind the development of destinations. This is due to the changes in consumer behaviour. The visitors are more sophisticated, often connected to the internet and also prefer to interact dynamically with their environment. It is essential to develop and implement the following digital tools: a single website, a mobile app, work on social networks, use of audio guides, QR codes, etc. Digital engagement of the creative tourism offer will help to attract the younger generation, who take for granted the instant use and consumption, as well as sharing the experience.
- *Interactive communication with visitors.* With the creation of one central information resource, e.g. a website with a comprehensive list of creative activities in the region. The possibility of online course booking or participation in workshops. Of course, there is information about the programme, a price list, a calendar of events and other activities.
- *Close cooperation with the community of local potters.* Designing a creative programme dedicated to pottery requires the creation of a functioning network of potters, craftspeople, enthusiasts, artists and lecturers. Using the skills of these experts to organise various traditional exhibitions will apply the creative and cultural potential of the destination and provide authentic experiences for enthusiastic visitors to fill their leisure time.

Conclusion

We are convinced that cultural heritage and the cultural and creative industries are an important part of the "social" dimension of sustainability. Gemer's wealth of monuments and sites and its creative diversity of traditions, crafts and arts is a unique asset. It enriches our lives and fosters social and cultural cohesion. It also underpins an economy generating more employment, regional development and business opportunities in a less developed region, such as Gemer. Many World and European destinations build their international success on their cultural heritage and creativity. As stated in the theoretical background of the paper and aforementioned scientific works, which we present in the literature review. At the same time, the sector of creative tourism is nurturing large numbers of dynamic small and micro enterprises, creating employment not just for young people and women, but also for people from disadvantaged backgrounds and less developed regions. At the same time, they are deploying their creativity not only to generate income but also to contribute to social and cultural sustainability. Community well-being and the projection of unique cultural values stemming from the traditional craft of pottery.

In cultural tourism, the new destination culture-based tourism products should add value to local communities, protect the environment, and create local benefits, providing visitors with an authentic travel experience (UNWTO, 2018).

As Richards and Marques (2012) enumerated, creative tourism can be a means of involving tourists in the creative life of the destination. A creative means of using existing resources. A means of strengthening identity and distinctiveness. A form of self-expression and discovery. A form of edutainment—education as self-realisation and entertainment. Source of "atmosphere" for places and a source for re-creating and reviving various locations.

Although creative tourism in Slovakia is looking for its fans, so to speak, the consumer demands of visitors are constantly changing. From the point of view of tourism management, they must make provision in their area for creative tourist destinations. They should offer the opportunity to satisfy the visitor's needs through the demonstration of traditional crafts in Gemer like pottery. The creation of a creative tourism product using pottery draws on the cultural value of the region's history. It is both an opportunity and a way of building a recognisable brand for the region. This would be based on presenting the uniqueness of their craftsmanship and highlighting home production, traditional architecture,

traditional dress, gastronomy, folklore and customs. It is traditional culture, together with the primary tourism offer, that represents the strengths of the tourism development of Slovakia's regions.

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Analysis of Trends and Changes in Travel and Vacation Spending from the Perspective of Slovak Residents with an Emphasis on the Principles of Sustainability and Digital Marketing in the Post-Pandemic Period

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Abstract

Research background: The article focuses on current trends in travel and spending vacations from the perspective of Slovak residents with an emphasis to principles of sustainability and digital marketing in the post-pandemic period. At the research level, we therefore focused on examining the development of trends in travel and spending vacations from the perspective of Slovak residents.

Purpose of the article: The aim of the paper is to identify trends in travel and vacation spending of Slovak residents over the past 10 years and current trends in travel and vacation spending on a sample of 580 Slovak residents.

Methods: Primary data collection was carried out using the CAWI (Computer-Assisted Web Interview) method on a sample of 580 respondents. From a methodological point of view, it was a matter of selecting respondents based on availability and voluntariness. As part of the analysis, we investigated the connections between trends in travel and vacation spending in terms of the age and gender of the respondents through correlation analysis.

Findings & Value added: The main finding from the research is, for example, that Slovak residents generally prefer a vacation at home to a vacation abroad. We also observe some gender tendencies in vacation spending, as Slovak women prefer vacations by the sea and Slovak men prefer vacations in the mountains. The added value of this contribution is the possibility to follow changes in the development of trends in travel and holiday spending by Slovak residents over a relatively wide period of time and the opportunity to observe current trends in travel and holiday spending by Slovak residents. At the same time, the results of the research can serve as a basis for tourism companies to create new tourist products for the Slovak resident with an emphasis on current trends.

Keywords: trends, tourism, residents, sustainability, digital marketing

JEL classification: Z32, M21

1. Introduction

The trend represents the direction of development, future expectations. Businesses operating in the tourism industry need to follow trendy developments. Some trends have a long-term effect, other trends we currently cannot predict and their occurrence is conditioned by the overall economic and social development (Slovak Business Agency 2020).

Currently, a number of authors are devoted to the development of trends in travel and spending vacations, e.g. Cakar and Aykol, 2022; Pricope and Baltsecu, 2022; Pabel and Cassidy, 2022; Ozdemir and Goktas, 2021; Stefko et al., 2020. For example, in their research, Matušíková, Šambronská & Košíková (2021) focused on changes in the consumer behavior of Slovak youth under the influence of the COVID-19 pandemic. They found that the pandemic has significantly affected youth interest, purchasing and overall travel behavior.

According to a study of the available literature on trends in travel and spending vacations in the post-pandemic period, these trends have two features in common, namely digitalization and sustainability.

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In the following table 1, we present a brief overview of the trends in tourism in the post-pandemic period with their subsequent detailed characteristics and the area to which they relate. The results in the table were processed according to the website Travel Trends 2023 and according to the authors Lebrun, Corbllel and Bouchet 2022; Bali Shrivastava and Sinha 2022; Gonzalez-Padilla 2022; Dudek, Jaremen and Michalska-Dudek 2020.

Table 1. Trends for tourism

P.č.	Trend in tourism	The area which the trend relates	Characteristic
1.	Bleisure travel	Digitization and digital marketing	Combining travel for work or business with leisure activities. The extreme in this type of travel is the travel of "digital nomads" who travel and work online.
2.	Technology of recognition	Digitization	Use of biometrics at airports, voice commands in hotels, fingerprints.
3.	Robots	Digitization	Using robots as staff.
4.	The local experience	Sustainability	The effort to find the specifics of the destination, the difference from globalization, the search for local specialties, customs and traditions, cultural experiences from the location.
5.	Artificial intelligence	Digitization	Use of chatbots, GTP chat.
6.	The internet of things	Digitization	Connecting people/devices/processes to the Internet. For example the use of various global distribution and reservation systems in hotels, gastronomy, etc.
7.	Ecological travel	Sustainability	Reduction of the carbon footprint, electric cars, eco friendly hotels, restaurants.
8.	Virtual reality	Digitization	Used for tours of historic buildings, but also for booking hotels, fitness centers, etc.
9.	Augmented reality	Digitization	Augmented reality.
10.	Healthy foods and organic foods	Sustainability	Focused on homemade food and regional dishes, specializing in diets - lactose, protein, gluten, but also reducing, vegetarian and vegan dishes.
11.	Demographic development	Digital marketing	Tourism needs to adapt not only to the young generation, which expects experiences, adrenaline, unconventional vacations that need to be addressed on social networks, but also to the aging generation, which uses a completely different tourism offer. Spa and medical stays with a rich offer of high-quality services are becoming more and more interesting for seniors.
12.	Security	Sustainability	Tourism is sensitive to events that threaten the safety of passengers. Currently, it is not only terrorist attacks, but also the migration crisis and various types of diseases. Destinations (it can even be an entire country) where terrorist attacks have taken place have seen significant numbers of tourists drop off, depending on the duration of the ongoing threat.

Source: own processing (2023)

Common features of the current trends in travel and spending vacations are the two key areas already mentioned, which, however, in a narrower sense mean the following:

- **Preparing tourism businesses for the digital future and digital marketing.** Creating a website and communicating through social media is standard for businesses in the travel industry. In this way, companies are adapting not only to the current generation, but especially to the upcoming Generation Z and Millennials, who by 2040 will form a decisive component of the participants in the tourism industry. The task of businesses in the field of tourism that want to succeed in the market in the coming years is to use digital technologies to the greatest extent possible in order to adapt to the emerging clientele. The government plays an important role in the preparation of the offer of tourism products, which mainly fulfills a supporting function. Its task should be to secure the territory with high-speed internet, support innovation, develop smart destination tourism, create and support travel-tech incubators (OECD 2023).
- **Reevaluate tourism from the point of view of sustainability.** The availability of individual travel made it possible on a mass scale. Some localities have thus become overcrowded, which can have negative consequences for nature, cultural and historical monuments, monuments, but also for the local population. In tourism, it is not only the number of visitors and the number of tourists who visit the location that is important, but also the contribution of tourists to the destination itself. Therefore, the ability to maintain a balance between the three pillars of tourism - economic, social and environmental - is becoming even more important nowadays. An important element is the cooperation of all those involved. In addition to businesses in the field of tourism, there are also voluntary, non-profit organizations, strategic visions of the city, the region and the entire state. The task of the government is to develop a future vision, based on which tourism entities know where and how to direct their activities (OECD 2023).
- **The mutual connection of these two key areas.** According to the OECD (2023), it is about creating a synergistic effect in the interaction of these two key areas. We can see this fact in the following picture.

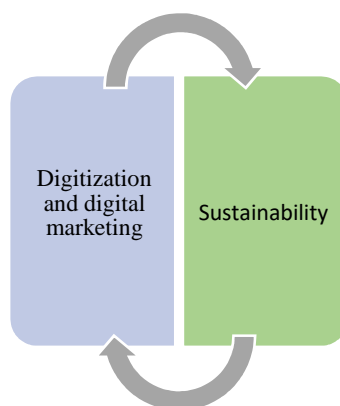


Figure 1. Interconnection of key areas influencing current trends in travel
Source: own processing (2023)

2. Methods

The aim of the presented paper is to identify the development of trends in travel and spending vacations of Slovak residents with an emphasis on the principles of sustainability and digital marketing in the post-pandemic period.

The research level of the paper is divided into two parts in terms of content. The first part of the research is focused on the analysis of trends in travel and spending vacations of Slovak residents over the last 10 years from the point of view of statistical indicators. The period 2013-2023 was taken into account. The second part of the research is devoted to the analysis of trends in travel and vacation spending of Slovak residents within the author's questionnaire survey. In the overall conclusion of the research, we compare individual findings from both research levels with the aim of detecting significant changes in the development of trends in travel and vacation spending by Slovak residents from the point of view of time, as well as from the point of view of the diversity of the research sample.

From the above, it is clear that for data collection we used a questionnaire survey aimed at obtaining the opinions of Slovak residents about trends in travel and vacation spending, constructed by the authors,

based on existing surveys with a similar theme. The survey sample of respondents was selected by random selection of Slovak residents to ensure the representativeness of the sample.

Since we combine quantitative and qualitative research in the contribution, the nature of the data we work with in the contribution also changes. In the first part of the research, we mainly work with secondary data from official institutions dealing with data collection. On the contrary, in the second part of the research, we mainly work with primary data obtained through a questionnaire survey.

As part of the research, we focused on the following two research questions:

- *Research question no. 1:* Is there a statistically significant relationship between the type of vacation that the respondents prefer with regard to the gender of the respondents?
- *Research question no. 2:* Is there a statistically significant relationship between the respondent's travel frequency and the age of the respondents?

We process individual data using appropriate mathematical and statistical methods. In addition to the basic forms of descriptive statistics used mainly in the first part of the research, we use correlation analysis through the Cramer coefficient to determine the connections between variables in the second part of the research.

3. Results

As the research level of this paper consists of two parts, we will present the results individually for each of them. First of all, we will point out the development of trends in the travel of Slovak residents over the last 10 years, which we evaluate on the basis of secondary data from various official sources dealing with the collection of statistical data and indicators in the tourism industry in Slovakia. In the second part of the research, we will point out the development of travel trends of Slovak residents based on their answers from the author's questionnaire survey and subsequent data analysis using mathematical and statistical methods.

3.1. Results from a survey of the development of trends in travel and spending holidays from the point of view of Slovak residents over the last 10 years

The development of participation in tourism for personal purposes between 2013 and 2018 has had an upward trend since 2014. The average annual increase for the years 2013 to 2018 is 5.7%. In 2018, the majority of residents were those who made only domestic trips (47.8%). 16.4% of the residents took a trip abroad, and the remaining 35.8% went on both domestic and foreign vacation trips. Correspondents preferred long-term trips to short-term ones. The total number of Slovak residents who did not participate in tourism in 2018 was 1,228,778, of which 32.6% were residents aged 65 and over. The most common reason for non-participation in tourism was insufficient financial resources. The second most common reason for non-participation in tourism was health problems. The year-on-year increase in the number of long-term trips with an overnight stay for personal purposes in 2018 is equal to 18.4%, and for short-term trips it is 13.0%. Domestic trips with overnight stays increased in 2018 compared to 2017. The main motive for these trips was a vacation trip, spending free time and recreation. The second most common purpose of trips was to visit relatives and friends. The other purpose of the trips is 14.2% for long-term trips and 2.8% for short-term trips. During long-term domestic trips with an overnight stay for personal purposes, the choice of paid rented accommodation prevailed (62.9%). During domestic short-term trips with an overnight stay for personal purposes, accommodation with relatives and friends prevailed (53.3%). More than three quarters of domestic journeys were made by car. The most common purposes of domestic trips were getting to know new cities and visiting mountainous and rural areas (Naňáková 2019).

The survey in 2020, which was carried out by the agency Median SK for the Košice self-governing region and the Košice Tourism Region, investigated the vacation plans of Slovaks based on a representative sample of 502 adult respondents. The Median SK agency found out through a survey that before the outbreak of the pandemic, 51% of respondents had already planned a vacation, of which only 29% were going to vacation in Slovakia. The results of the survey also confirmed a radical change in behavior in response to the pandemic. In the pre-coronavirus era, the strongest decision-making factor was what places we want to see and visit (68%), followed by the quality of accommodation (30%), accommodation facilities services (26%) or recommendations from acquaintances (22%). Post-pandemic decision-making factors among respondents are dominated by hygiene and health recommendations (71%), information about the country (58%) and the ability to get home in case of emergency (32%). For 23% of respondents, the availability of medical care is also important (Košický self-governing region 2023). The comparison of these facts can be found on the following graphs.

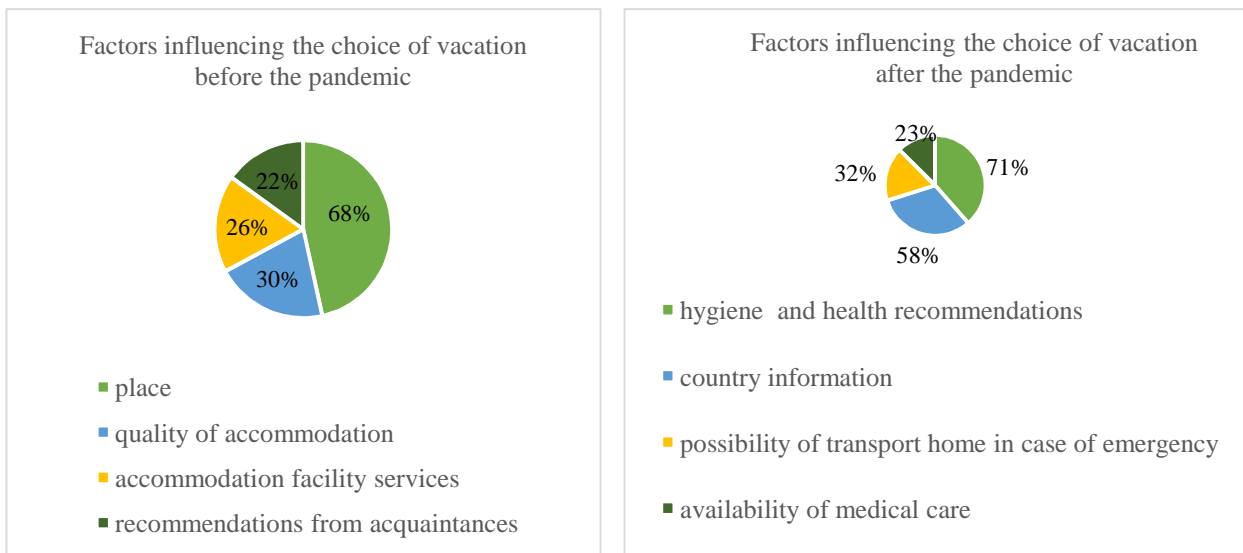


Figure 2. Comparison of factors influencing vacation choice before and after the COVID-19 pandemic
Source: own processing (2023)

The latest UNWTO expert panel survey shows a mixed outlook for 2021-2023. Almost half of the respondents (45%) predicted a better outlook for the period 2021-2023, while 25% expect a similar performance and 30% foresee a deterioration in the results in 2023 due to rising inflation rates worldwide, the military conflict in Ukraine and the energy crisis. However, the UNWTO expert group also foresees a growing demand for outdoor and nature-based tourism activities, with increasing interest in domestic tourism and "slow travel" experiences (UNWTO 2023).

3.2. Results from the author's questionnaire survey on the development of trends in travel and spending holidays from the perspective of Slovak residents and their mathematical and statistical processing

As for the results of the questionnaire survey, we present the most important findings. The survey sample consisted of a total of 580 respondents (n=580). In terms of gender differentiation, 291 women (50.17%) and 289 men (49.83%) participated in the survey.

From the point of view of age differentiation, the lowest recorded age of the respondent was 16 years and the highest age of the respondent was 78 years. The most frequent age category was respondents from 26-35 years old. The least frequent age category was respondents aged 16-20 years.

As for educational level, the largest group of respondents was made up of respondents with secondary education completed with a high school diploma (up to 46.60% of the survey sample). Within the framework of economic activity, the largest part of the survey sample consisted of employed respondents, of whom there were 300 respondents out of the total number of respondents.

The majority of respondents were residents of the Prešov region (28.60%), followed by respondents from the Trnava region (13.90%), Nitra region (12.90%), Bratislava region (11.90%), Banskobystrické region (10.70%), Košice Region (8.10%), Žilina Region (7.60%) and finally from Trenčín Region (6.40%). We note that as part of the survey, we had representation from each of the Slovak regions.

It follows from the above that the research sample is relevant, therefore it is appropriate to compare individual answers from respondents and look for connections between them through mathematical and statistical methods, specifically using the Cramer coefficient.

Since we are working with two research questions (see chapter no. 2), for each of the stated research questions we are working with a null hypothesis (H0), which assumes the absence of a connection between the variables, and an alternative hypothesis (H1), which assumes the existence of a connection between the variables. We use the Cramer coefficient to verify our assumptions. We performed the statistical analysis in the statistical program Gretl. The results of the verification of the research questions are presented in the following Table 2 and Table 3.

Table 2. Verification of research question no. 1.

Variable 1	Type of vacation
Variable 2	gender of the respondents
Absence of a statistically significant relationship	$H_0: f_i = 0$
The existence of a statistically significant relationship	$H_1: f_i \neq 0$
Significance level α	0,05
Chi-square test	1,60614
df	3
p – value	0,657999

Source: own processing (2023)

From the results presented in Table 2, it is clear that due to the p-value, which is more than the significance level α , we reject the alternative hypothesis H_1 , which says about the connection between the variables. Therefore, it follows from the above that the choice of the type of vacation is not related to the gender of the respondent.

Table 3. Verification of research question no. 2.

Variable 1	frequency of travel
Variable 2	Age of respondents
Absence of a statistically significant relationship	$H_0: f_i = 0$
The existence of a statistically significant relationship	$H_1: f_i \neq 0$
Significance level α	0,05
Chi-square test	188,77
df	180
p – value	0,312098

Source: own processing (2023)

Even in the case of verification of research question no. 2 we are dealing with a similar conclusion as in the previous question. Here, too, the p-value is higher than the level of significance, and therefore we conclude that there is no statistically significant connection between the frequency of travel and the age of the respondents.

In both cases, the assumptions about the existence of connections between the established variables were not confirmed, and therefore the frequency of travel and the type of vacation are not related to the age and gender differentiation of Slovak residents.

4. Discussion

The results of the analysis show that Slovak residents prefer vacations at home to vacations abroad in the last 10 years. At the same time, a long-term vacation is typical for a Slovak resident. The most common motive of a Slovak resident for traveling and spending a vacation is recreation and relaxation. From the first part of the survey, we found that more than 32% of Slovak residents did not take part in a vacation in the last 10 years, and this was partly related to their age, as it was the age category of 65 and over. For that reason, we decided in the second part of the research to find out the connections between the frequency of travel of Slovak residents and their age. However, assumptions about the existence of a connection between the age of the resident and the frequency of travel were not confirmed, which means that the frequency of travel of Slovak residents is not influenced by their age. Since the research sample was representative in terms of gender, we also decided to investigate the connections between the selected type of vacation and the resident's gender. Even in this case, our assumption was not confirmed and the selected type of leave is not related to the gender of the Slovak resident.

However, what needs to be included in the discussion is the fact that the research as well as the survey was focused on the development of trends mainly in the post-pandemic market environment. At the time when the data was collected, the impact of other crises (apart from the COVID-19 pandemic) that had a significant impact on the tourism industry as such had not yet been recorded. This is primarily a price increase that occurred immediately after the end of the pandemic. According to Dzvóniková (2023), there was, for example, a significant demand for short-term travel insurance in 2022, because Slovaks lost "faith" that they would be able to afford to travel several times a year due to inflation and sharp price increases. Slovaks are increasingly approaching the creation of financial reserves.

Following the above, the interest of Slovak residents in online travel insurance has increased (Wüstenrot, 2023). It is also surprising that more and more Slovak residents in the age category over 45 arrange travel insurance online, as opposed to physically obtaining insurance at a branch. Interesting findings are also related to the period of travel insurance. Up to 90% of Slovaks take out travel insurance no more than 9 days before the start of their holiday, 78% of Slovaks take out travel insurance within four days before the start of their holiday, 13% of Slovaks take out insurance within 9 days and 5% of Slovaks take out insurance within 2 weeks.

At the same time, it is necessary to take into account the impact of the ongoing military conflict in Ukraine. The fact that we are a state immediately neighboring Ukraine has significantly changed the perception of foreign visitors about the safety of their vacation in Slovakia. As for how Slovakian residents spend their vacations, the military conflict in Ukraine caused another wave of price increases, which is why Slovak residents have reassessed the frequency and duration of their vacations. In this direction, the length of vacation is significantly shortened. While before the pandemic, the average vacation time of a Slovak resident was about 14 days, currently this number of days has been halved. In 2023, the average vacation of a Slovak resident lasted only 7 days, which is a significant decrease (Dzvoníková, 2023).

Another factor that changed in the post-pandemic period was also the tourist season. Before the pandemic period, the holiday season was strongest in the months of June to September, after the cancellation of pandemic measures in 2022, the season started already in May and its peak was in August - which means that the tourist season, from the point of view of Slovak residents, started a month earlier.

Last but not least, the energy crisis affects the vacation and travel of Slovak residents. The resident is mainly affected by the price of accommodation services, which have increased due to the energy crisis. In the same way, household energy payments also increased, which is why Slovak residents began to build up financial reserves to a large extent, also for the purpose of managing this crisis.

Conclusion

The presented contribution provides a brief overview of trends in travel and spending vacations of Slovak residents with an emphasis on the principles of adaptability and digital marketing in the post-pandemic period. From the point of view of travel, sustainability is the most effective concept of tourist behavior, due to the fact that it reflects the needs of the local community, but also the current needs of the destination, in terms of the environment and the environmental impact of tourism. Today's tourist already takes into account the impact of his travel behavior on the environment.

Equally crucial is the preparation of tourism businesses and all interested parties for the digitization of processes and digital marketing, which is coming to the fore, due to the fact that a significant part of participants in the tourism industry in the coming years will be generation Y and Z, as outlined by the OECD. These generations perceive tourism products differently than Generation X. They also perceive travel trends differently. For this reason, it is important that destination management and its organizations adapt the tourism product to these two key areas. It should be a long-term priority and effort of destination management organizations to create tourism products that will have elements of sustainability on the one hand and elements of digital marketing on the other (Vašaničová et. al. 2022). Ultimately, such tourist products will be both trendy and competitive and at the same time meet the needs and requirements of the customer.

At the same time, it is important to take into account the fact that the travel behavior of Slovak residents, and thus the trends, have changed significantly as a result of the currently ongoing crises - the ongoing military conflict in Ukraine, the worldwide increasing rate of inflation and the energy crisis. Each of the crises had a significant impact on the tourism industry, and the forecasts for the further development of the tourism industry are constantly changing.

The current political situation also affects the travel of Slovaks. However, all these facts are exogenous influences that the Slovak resident cannot significantly influence. For this reason, the contribution expands knowledge in the field of analysis of trends in travel and spending vacations, while it can also serve as a basis or starting point for further research on similar trends, but only from the perspective of Slovak residents, which we also consider to be the biggest limitation of the research. The analysis of trends in travel and spending vacations from the perspective of residents of several countries (at least V4) could, with appropriately chosen methods, also bring interesting results leading to the generalization of conclusions about current travel trends, which largely depend on the consequences of ongoing crises.

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Management of the Sustainable Development of Tourism in the Horehron Region with an Emphasis on the Opinions of Residents

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Abstract

Research background: The sustainable development of tourism is particularly emphasized that its activities should be carried out with as little impact on the environment as possible. Nowadays, the attitudes of residents to tourism are very important to receive the sustainable development.

Purpose of the article: The aim of the contribution is to assess the resident's perception of sustainable development of tourism in the Horehron region.

Methods: The primary data was carried out using the CAWI method on a sample of 219 residents of the studied region. When analyzing the data, we focused on the search for statistically significant differences between the perception of a high number of tourists in the region in terms of the respondent's permanent residence and at the same time in terms of their economic activity using inductive statistics.

Findings & Value added: Survey findings were that the respondents coming from the rural environment of the region perceive the negative impact of tourism activities on the quality of the environment in the region as the number of visitors to the region increases. We also found the tendency of employed respondents not to perceive a high number of tourists only in a negative sense, but as an opportunity for the economic growth of the region. The added value of the research is reflected in its importance in the implementation of the global goals of sustainable development at the level of the region and the application of the results for further research in the field of sustainable development of tourism.

Keywords: sustainable development, Horehron region, residents

JEL classification: M21, Q01, Z32

1. Introduction

Sustainable development is about meeting the needs of present generations without compromising the satisfaction of future generations (Bedrunka, 2020). It presents a comprehensive approach that combines economic, social and environmental aspects in a way that is mutually reinforcing (Švedová, Dzurov Vargová and Gallo, 2019).

The beginnings of scientific research of tourism from the point of view of sustainable development date back to the 80s of the 20th century. At that time, the international organization UNESCO in the program "Man and the Biosphere" evaluated how over 100 years the development of tourism affected the territory of the Alps. Even then, the need to move away from mass to sustainable tourism development was being asserted. Since 1999, tourism as a factor of sustainable development has been enshrined in the third and fourth articles of the Global Code of Ethics for Tourism (UNWTO, 2023).

The 2030 Agenda for Sustainable Development, adopted by the United Nations General Assembly in 2015 in all member countries, forms a jointly developed blueprint for our future as human beings and the future of our home, planet Earth. It presents a comprehensive and universal plan of actions aimed at achieving sustainable development through a balanced process. The main intention is to leave no one behind and ensure that people of all ages and in all areas of society reach their potential so that they can lead a dignified way of life while meeting their human needs (WHO, 2023; Ocler and Ekiz, 2016).

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The Sustainable Development Goals set out in the 2030 Agenda, regardless of their level of economic and social development, apply to all countries in the world. The 2030 Agenda requires action not only from Member States, but also from individuals. All objectives are not only quality-oriented, but also quantity-oriented. It will take the next fifteen years to transform the world through seventeen headline goals and one hundred and sixty-nine sub-goals. The aforementioned SDGs must be considered comprehensive and also interrelated. The concept of sustainable development is based on the thesis that the Earth is connected to each other and this relationship is not always uniform. In the following Figure 1, we present 17 comprehensively defined SDGs internationally abbreviated as SDGs (Zajac, 2016; Lagodiienko et.al., 2022).



Figure 1. 17 Sustainable Development Goals
Source: UNWTO (2023)

Sustainable development is built on three pillars – economic, social and environmental. The environmental pillar includes 12 indicators expressing biodiversity and intensity of human stress on ecosystems, e.g. proportions of protected areas, air contamination by toxic substances, number of industrial plants exceeding pollution limit values and logging difficulty (Szabo, Csete and Palvogyi, 2008). The economic pillar is focused mainly on the transparency of the company, on good relations with stakeholders, participating in the economic principles of the company. It provides companies with new business opportunities. An essential principle in it is the effort to change the focus of companies from their short-term goals to long-term goals and from maximizing to optimizing profits. The Social Pillar calls for support in creating fair and equal conditions for societies that strive for a favorable direction of human

development and allow people to develop (Rajnoha and Lesnikova, 2022, Guzhavina and Mekhova, 2018; Uskova and Babich, 2021).

These three main pillars have an impact on each other. More favourable or unfavourable developments under one of these pillars have immediate effects on all the others. Sustainable tourism development is subsequently guaranteed while achieving a balance and the best results of all three pillars (Gajdošíková, 2019; Huttmanová and Chovancová, 2015).

In addition to initiatives by international organizations, sustainable tourism development is also addressed in theory, and its nature and significance are explored from different points of view by several authors (Butler, 1991; Ko, 2005; Choi and Murray, 2010; Gajdošík et. al., 2021; Bushra et al. 2022). In their research on sustainable development, these authors point out differences between the perception of a high number of tourists in a destination in terms of age and economic activity of the resident. Lee and Jan (2019) focused on residents' perception of community tourism sustainability based on the life cycle theory of six tourism areas in Taiwan. Martinez-García et al. (2017) found a certain development of the reactions and attitudes of residents towards tourists over time. Their research showed that in the first phases residents and tourists are in a harmonious relationship, but later with the increasing number of tourists, the attitudes of residents towards tourists become more and more negative and finally there is irritation between residents and tourists. All these results showed that residents' perceptions of economic, sociocultural and environmental sustainability varied significantly in the phases of consolidation, development and involvement in tourism development in the community and that there are differing attitudes among residents towards the development of sustainable tourism.

2. Methods

The aim of the contribution is to assess the resident's perception of sustainable development of tourism in the Horehronie region. The Horehronie region was chosen by random selection for the purpose of the survey because it is located in the middle of the Slovak Republic, specifically near the Zvolen basin, which is bordered from the west side by the Kremnické vrchy mountains. The northern horizon is dominated by the spectacular majestic scenery of the Low Tatras.

In the eastern part, it borders with the Muránska planina National Park. Thanks to its unusual natural heritage and favorable geographically advantageous location in the middle of Slovakia (see Figure 2, where the Horehronie region is marked in red), this area is one of the most visited in Slovakia. In a relatively small area there is a great diversity of natural elements - alpine landscapes, fields, forests, springs, ponds, lakes, thermal and mineral resources, caves, plants, animals - all these elements make up a number of fascinating elements of this spectacular mountain area (Slovak region, 2023).



Figure 2. Map with location of selected region
Source: Slovak region (2023)

In addition to the above, more than 40 regional products with the Horehronie region label are produced in the region (Horehronie, 2023). Due to its potential, this region has high prerequisites for sustainable development compared to other Slovak regions. We also took this into account when conducting a survey aimed at ascertaining residents' views on the sustainable development of this region. Based on the theoretical definition of the studied issue, we determined two research questions:

Research Question 1: Are there statistically significant differences between the perception of the high number of tourists in the region as a factor for environmental degradation in terms of residents' residency?

Research question 2: Are there statistically significant differences in the perception of a high number of tourists as a factor for improving the economic situation in the region in terms of current economic activity of residents?

The primary data collection was carried out using the CAWI (Computer-Assisted Web Interview) method on a sample of 219 residents of the studied region. As 300 respondents were contacted by an e-mail, the return on the questionnaire was at the level of 73%. The high return on the questionnaire was also due to its distribution using the QR code. From a methodological point of view, it was a selection of respondents based on outreach from the database of residents in Horehronie region. The primary data collection took place from 04.03.2023 to 03.05.2023 and consisted of 15 items. The questionnaire survey was constructed based on a study of the literature.

When analyzing the survey data, we focused on searching for statistically significant differences between the perception of a high number of tourists in the region in terms of respondents' permanent residence and at the same time differences in the perception of a high number of tourists in the region in terms of respondents' economic activity using inductive statistics tests.

3. Results

Through questionnaire survey we found that from total number of respondents, 219 were women (68%) and 70 men (32%). We divided the current economic activity of our respondents into five groups. The largest part were employed people, of whom there were 134 (61%), followed by students of high schools or universities in the number of 52 (24%). The survey also included 14 entrepreneurs (6 %), 10 (5 %) of respondents of retirement age and 9 (4 %) respondents who indicated the status of unemployed, which shows Figure 3.

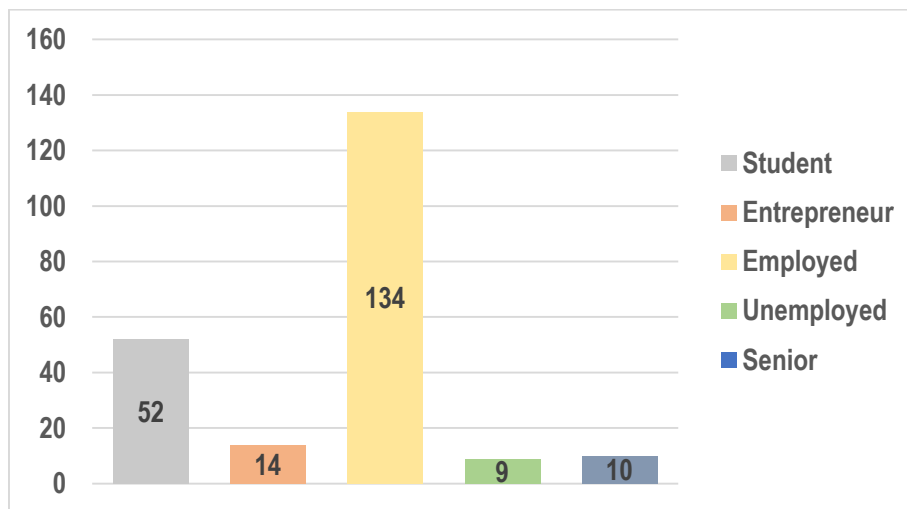


Figure 3. Actual economic activity of residents
Source: own processing (2023)

The respondents come from a total of 22 municipalities of the Horehronie region. The largest number of respondents currently resides in the village of Pohorelá, which represents up to 133 inhabitants. The second place was taken by the city of Brezno. As many as 17 respondents came from this town, followed by 15 respondents from the village of Polomka. There were 13 respondents from the village of Heľpa, 6 people from Závadka nad Hronom, 5 respondents from more eastern villages such as Šumiac and 5 people from Telgárt. The village of Bacúch was reported by 3 persons.

Currently, only 3 respondents live in the regional capital of Banská Bystrica. A total of 8 respondents live in the territory of the four mentioned municipalities Valaská, Pohronská Polhora, Čierny Balog and Zlatno, which means that there are 2 respondents per municipality. Sihla, Beňuš, Červená Skala, Horná Lehota, Nemecká, Valkovňa, Beňuš part Gašparovo and Michalová. In these municipalities, 1 respondent lives in each of them. For this reason, it can be argued that the vast majority of the residents addressed

reside in a rural municipality. The representation of residents who live in the cities of the surveyed region is in the minority.

In the survey, 172 respondents showed knowledge about sustainable development, 47 respondents had not yet encountered this term. The last part of the survey focused on expressing respondents' attitudes towards sustainable development claims using a 5-degree liquor scale. An overwhelming majority of respondents agreed with these statements. 128 respondents identify with economic development in relation to sustainable development, 80 respondents agree with the need to reduce water consumption, 91 respondents identify with nature protection, 129 respondents agree with the reduction of all types of waste, 111 respondents agree that businesses should treat their employees and customers fairly, and 141 respondents share the need to protect natural sites. Most respondents identified with the statement about the protection of natural monuments and vice versa the least with reducing the amount of water consumed.

We have recorded all the claims made by residents in the following Table 1. The figures in the table reflect the number of residents who agreed or disagreed with the statements in the survey.

Table 1. Residents' attitudes to statements about sustainable development

Statement	Totally agree	Agree	Without an opinion	Disagree	Totally disagree
Economic development is essential for sustainable development	128	78	13	0	0
Reducing the amount of water consumed is essential for sustainable development	80	78	39	16	6
Nature protection is necessary for sustainable development	91	63	9	24	32
The reduction of all types of waste is essential for sustainable development	129	69	19	6	4
Fair treatment of their employees and customers by companies is essential for sustainable development	111	83	22	3	0
The preservation of numerous natural monuments is essential for sustainable development	141	73	4	1	0

Source: own processing (2023)

From the above Table 1 we can see that most respondents care about sustainable development in the Horehronie region. This fact is expressed by agreeing attitudes to several statements about sustainable development and it means that residents are aware of the uniqueness of the territory of the Horehronie region and its wise use for future generations. These results are similar as results from study of Martínez-García et al. (2017) were resident's attitudes varied with respect to the number of tourist in destination.

Because we found in the survey that the vast majority of survey respondents resided in a rural village, we determined the first research question based on the assumption that residents who reside in rural areas feel a higher need for environmental protection than urban respondents. At the same time, therefore, this research question focuses on finding differences between the perception of high tourist numbers among urban and rural residents (Guzhavina and Mekhova, 2018; Uskova and Babich, 2021).

The same applies to the second research question, as most respondents expressed "employed" as an economic activity in the survey. The question works on the assumption that the employed are more aware that the influx of new tourists will increase incomes in the region than students who do not yet have their own income and do not perceive the need to increase the number of tourists in the region. We tried to verify these assumptions using inductive statistics tests and present the findings in the following Tables 2 and 3.

Table 2. Verification of Research Question 1.

Variable 1	perception of the high number of tourists in the region
Variable 2	permanent residence of the resident (village or city)
No statistically significant differences	$H_0: F(x) = F(y)$
Statistically significant differences	$H_1: F(x) \neq F(y)$
Significant level α	0,05
Mann-Whitney U-test	---
p – value	0,14064

Source: own processing (2023)

Due to the distribution of variables, which showed that the variables were not normal, we used a nonparametric Mann-Whitney U-test to verify the first research question.

The decision rule was as follows:

- If p -value is $\leq \alpha$, we reject the H_0 hypothesis. There are statistically significant differences between the variables.
- If the p -value is $> \alpha$, we cannot reject/reject the H_0 hypothesis. There are no statistically significant differences between the variables.

Based on a p -value that is higher than the significance level, we conclude that there are no statistically significant differences between the perceived high number of tourists in a region and the residency of a resident of that region. Thus, residents of the Horehronie region, regardless of whether their permanent residence is in the city or in a rural village, perceive the high number of tourists in the region as a factor for disturbing the typical environmental character of the Horehronie region.

Table 3. Verification of Research Question 2.

Variable 1	perception of the high number of tourists in the region
Variable 2	economic activity of the resident
No statistically significant differences	$H_0: F(x) = F(y)$
Statistically significant differences	$H_1: F(x) \neq F(y)$
Significant level α	0,05
Mann-Whitney U-test	---
p – value	0,16949

Source: own processing (2023)

Again, even in this case, the variables did not have a normal distribution, and therefore a nonparametric Mann-Whitney U-test was used to verify the differences between the variables, which confirmed the absence of statistically significant differences between the perception of the high number of tourists in the region as a factor for improving the economic situation in the region. Thus, regardless of whether the resident is a student or employed, he perceives the high number of tourists as a space for improving the economic situation in the Horehronie region. At the same time, we can argue that in both cases, on the basis of mathematical-statistical methods, we have refuted our assumptions about the existence of statistically significant differences.

4. Discussion

From the results of the survey we can conclude that the largest part of the survey sample consisted of employed residents of the Horehronie region who have permanent residence in the countryside. It was also found that the vast majority of residents were knowledgeable about sustainable development. This is positive news for all stakeholders striving for sustainable development, as the residents themselves will support this development. It was also found that the inhabitants of the Horehronie region largely express their concurring attitudes to the basic claims of sustainable development and thus are aware of the need for such development in the territory of their region, which recalls in her study Gajdošíková (2019).

Through selected mathematical-statistical methods, it was found that regardless of the resident's permanent residence, this respondent is aware that a high number of tourists can have a major impact on the environment in the region. Although it is important for this region to have a high number of tourists, it is not appropriate, taking into account sustainable development, for the situation with tourists to change into overtourism.

At the same time, we found that regardless of the economic activity of residents, these residents realize that with a high number of tourists, income also comes to the region and the economic situation in the region improves. From the above, you can observe that sustainable development encounters 2 problems in practice. On the one hand, the high number of tourists brings funds to the region, but on the other hand, it can also mean that environmental conditions are damaged or production factors are wasted (Szabo, Csete and Palvogyi, 2008).

Therefore, current concepts focus on moving from a specific problem to a solution. Currently, the concept of slow travel is coming to the fore. It is a concept that includes a whole range of activities whose aim is to prioritize quality over quantity (Reháková, 2022). At the same time, it is also necessary to realize that traveling without leaving negative traces is simply impossible. However, we can minimize these negative footprints, e.g. by choosing transport, choosing services, choosing the destination itself, etc. Even the concept of slow travel itself is built on the idea of maximizing the experience and minimizing traces.

Slow travel is not only a good concept for humans, but also for the environment itself, as tourism affects ecosystems. A person on vacation "for which he has time" can rest better and more efficiently than during a cheap vacation for which he has only a few days. The benefit of the slow travel concept is also the reduction of the carbon footprint, as this concept assumes the use of more environmentally friendly forms of transport.

Since the Horehronie region has sufficient natural potential, its territory would also be suitable for such a concept of travel. Practically, it is suitable for the application of the slow travel concept to any other region or destination, as this concept should be primarily an initiative of the tourist (Slovak region, 2023).

Conclusion

Sustainable development is a key topic in today's world and has a profound impact on society, the environment and the economy. It is a long-term process that includes measures to ensure a balance between social, environmental and economic aspects.

Efficient resource management and environmental protection are key elements of sustainable development. It is essential to implement measures to reduce greenhouse gas emissions, protect biodiversity, sustainably manage water and waste management, and use renewable energy sources.

Sustainable development requires cooperation and involvement of different actors, including government, business, civil society and individuals. It is important to promote participatory processes where all stakeholders can participate in decision-making and implementation of measures (Gajdošíková, 2019; Rajnoha and Lesnikova, 2022).

Education and public awareness are key to sustainable development. There is a need to raise awareness and awareness of the environmental, social and economic problems we face and to promote responsible behaviour. Since the survey found that the inhabitants of the Horehronie region had sufficient knowledge about sustainable development, sustainable development should also be integrated into political and economic strategies at all levels - from global to local. It is essential to create legal and regulatory framework conditions that promote sustainability and encourage innovation and sustainable development.

However, sustainable development is a long-term goal that requires sustained efforts and continuous progress. It is necessary to monitor and evaluate the results achieved and to adapt strategies according to changing conditions and knowledge. Overall, sustainable development is a key factor for the future of our planet. This is a challenge that we must accept and act on individually and collectively in order to ensure better and sustainable living conditions for present and future generations (WHO, 2023).

Sustainable development and slow travel are two concepts that are interlinked and can contribute to environmental protection and social justice. Slow travel is an approach to travel that focuses on exploring and understanding local culture, minimizing negative impacts on the environment, and supporting local economies.

Slow travel is different from traditional tourism, which is often associated with mass travel, resource consumption and mass tourism. It focuses on slow pace, active involvement in the local environment and respect for local traditions and values. Sustainable development and slow travel have the potential to change the way we travel and perceive the world. They help us connect with local culture, protect nature and support local economies. Bringing them together can lead to sustainable and meaningful forms of travel that contribute to global well-being and the preservation of our planet for future generations, which is an important fact we took into account in this survey.

We consider the survey to be limited to its focus on only one region. Analysis focused on the perception of sustainable development in other regions of Slovakia could serve as a basis for their mutual comparison within the framework of progress in sustainable development.

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Sustainability in the Corporate Strategy of European Wellness Hotels as a Generic Approach Based on the UN SDGs and the Experience of the COVID-19 Pandemic an SLR Analysis

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Abstract

Research background: The unprecedented disruptive changes in the tourism market, caused by a demand and supply shock, have also triggered the discussion about a sustainable form of the hotel industry. How can the 2015 UN SDGs be achieved and strategically implemented in the particularly energy- and resource-intensive wellness and luxury hotel industry?

Purpose of the article: This work aims to show the change in the meaning of sustainability based on the UN's SDGs for the wellness and luxury hotel industry in Europe due to the influence of the COVID-19 pandemic, and to elicit a model for the strategic implication of the SDGs. The inflationary use of the term sustainability will be critically and practically examined. Theses for further research will be derived from the current state of research.

Methods: With the help of a threefold keyword search in Web of Science, a structured literature search is carried out based on 322 hits. The aim is to conduct an evidence-based search for relevant findings to derive research hypotheses for further investigation.

Findings & Value added: The thesis presents the research gap in connection with the driving force of the hotel industry, the wellness and luxury hotel industry, and the SDGs. For this purpose, 10 theses for further research are derived and the state of knowledge confirms the increasing importance of the SDGs as well as the demand for green hotel services.

Keywords: sustainability, COVID-19 pandemics, SDGs, sustainable development goals, hospitality

JEL classification: G33, O44, Z3

1. Introduction

The COVID-19 pandemic is already considered the biggest economic crisis to affect tourism since the "Great Recession" of the 1920s (Gössling et al., 2020; Ozdemir et al., 2021; Romagosa, 2020; World Travel & Tourism Council [WTTC], 2021). Current research identifies a variety of drivers for disruptive processes in the tourism industry. First and foremost, a trend towards even more sustainable and radical ecological measures is identified. The debate goes so far that there is even talk of a war for the future of tourism ("war over tourism") (Butcher, 2020; Higgins-Desbiolles, 2021). Leading scientists argue about the question of growth and responsibility for destinations and their ecological and social environment (Butcher, 2020; Higgins-Desbiolles, 2021). With the emergence of the COVID-19 pandemic in 2020, there are unprecedented global implications and change processes for the tourism industry.

The most important sector is the hotel industry, within which luxury hotels, 4-star superior, and 5-star hotels form the spearhead and draught horses. They are the largest emitters of CO₂, especially due to their offers in the area of wellness, and are also the central greenhouse gas drivers of the tourism industry in a global industry comparison, as American studies currently prove (Gössling & Higham, 2020; Jørgensen & McKercher, 2019; Ozdemir et al., 2021; WTTC, 2021).

Political changes that will begin after the Corona crisis in 2021 and 2022 show strong restrictive tendencies within the EU, especially in Germany. As a result, the question arises as to how wellness

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hotels should comply with sustainability standards in the future and at the same time how they can continue to be managed in economic terms. The basis for the considerations and future standards are the UN's Sustainable Development Goals (SDGs), which have been ratified and are valid in the EU. These have been operational since 2015 with the climate conference in Paris and have also implemented the COVID-19 crisis and the resulting challenges (United Nations, 2015, 2022).

In the first step, this paper will review the perspective and relevance of sustainability before the COVID-19 pandemic within the hotel industry, in particular the wellness hotel industry, and, in contrast, examine the perspective after the pandemic. The UN's 17 SDGs are a valid framework for the analysis. The steadily increasing environmental protection measures and growing social standards passed by the legislators will increasingly rise the costs of hotel operations. There is a threat of a decline in the quality of service due to closed wellness areas or in some cases severely restricted usability. Furthermore, strong price increases are to be expected due to cost pressure. The question is how these costs and service savings will ultimately be paid for and accepted by consumers. Only through an existing willingness to pay, the willingness to support sustainable development, and accepting corresponding savings in service will a sustainable transformation of the wellness hotel industry be possible in the long term (Kämmler-Burak & Bauer, 2021; Namkung & Jang, 2017).

Also, there is a never-ending debate about the inflationary use of the term sustainability. There are many positive industry examples and trends towards real green hotel concepts and industry representatives, but also evidenced studies about greenwashing and the resulting damage, as well as many doubts about the fact that economic goals beat sustainable ones and are preferred to them. Nevertheless, the sector is expected to undergo a transformation process that will transform the entire industry into a sustainable driving force and set an example for all other stakeholders (Bramwell et al., 2017; Gössling et al., 2020; Namkung & Jang, 2017; Nunkoo et al., 2021).

1.1 Object of research for this paper - the wellness hotel industry

The methodology of the SLR requires a clear delimitation and definition of both the object of review and the research objective to search for research gaps and theses in a structured and evidence-based manner. The definition of wellness used in this study and the definition of the wellness hotel industry derived from it are fundamentally based on the approaches of the GWI, the DEHOGA, and the current research literature. The GWI defines wellness on its website and in its publications as follows:

„Wellness is the active pursuit of activities, choices, and lifestyles that lead to a state of holistic health.“ (Global Wellness Institute).

The holistic approach to health is decisive in the definition. This is also highlighted by the Expedia booking platform when looking at the current definition of a wellness hotel.

"A wellness hotel serves the holistic recovery of body, mind, and soul. A team of professionals - from physiotherapists to sports therapists to bath attendants and beauticians - pampers the guest in harmony with the original nature. The successful combination of wellness, cosmetics, and sports leads to a long-term recovery effect for the entire organism." (Expedia, 2019 Translated from German into English by the author).

It is worth mentioning that, in addition to the applicable holistic idea of maintaining, improving, and restoring long-term mental and physical health, harmony with nature can be identified as a central pillar of the definition. The GWI emphasizes the direct link between wellness and the SDGs, or the sustainable development of our economies and societies, in its annual report for 2022. Here, the demands of the United Nations from its annual report on the SDGs are taken up and identified as central drivers for the wellness movement. By definition, wellness stands for a holistic, sustainable approach that combines and is defined by the social, economic, and ecological dimensions of sustainable development (Global Wellness Institute; United Nations, 2022; Yeung & Johnston, 2020, 2022).

In this context, Yeung and Johnston (2022) emphasize the multidimensionality of the wellness definition and the industry itself. This can be represented as follows:

Table 1. Definition of the wellness dimensions according to the GWI

Dimension	Definition
Physical	Maintaining, preserving, and increasing physical health through exercise, nutrition, sleep, etc.
Mental	Grasp the world with the mind. Raising awareness of one's world and living more consciously accordingly.
Spiritual	Being aware of one's feelings and accepting and expressing them. To be aware of and express personal feelings and to be aware of and understand the feelings of others.
Emotional	The search for meaning and the higher goal of human existence.
Social	To connect and engage with others and society itself in meaningful ways.
Environment	Promote positive interactions between people and the natural environment or the health of the planet and people's actions, choices, and well-being.

Source: Own presentation based on (Global Wellness Institute; Yeung & Johnston, 2022).

Depending on the presentation, the literature distinguishes between six, as cited here, and nine or twelve dimensions. The dimensions and definitions of wellness given above are general in nature and are intended to define and explain in a generalist way the whole complex scope of the wellness industry. They already illustrate the connection to the SDGs and the importance of sustainability, which is inherent to the term wellness (Global Wellness Institute; United Nations, 2022; Yeung & Johnston, 2022).

However, the definition of a wellness hotel is needed for the present study, ideally with fixed criteria that are measurable. For the German hotel market, the association criteria of the IHA and DEHOGA can be cited. These have existed since 2005 and define a wellness hotel based on seven criteria, whereby only hotels from the three-star classification of the DEHOGA are taken into consideration. There are three levels for a wellness hotel, derived from the characteristics and the scope of the offer (service quality): w - ww - www, whereby the three levels are to be understood as offer characteristics for the creation of a heterogeneous comparison level (Hotelverband Deutschland [IHA] & DEHOGA Bundesverband, 2005). The following seven areas with corresponding offer criteria must be fulfilled by a wellness hotel in Germany, depending on the W-grade:

1. Close-to-nature location: www for a location in the open countryside up to the minimum criterion for a w, the abstinence from disturbing outdoor and indoor noises.
2. Environmentally conscious operation: environmental management system and other specific measures, all of which must be fulfilled.
3. Wellness-vital cuisine: predominant use of organic products, species-appropriate animal husbandry, wholefood products, and an above-average range of fresh fruit, vegetables, and vegetarian dishes.
4. Immission-free areas: Non-smoking areas, and quiet areas for guests.
5. Offer design: information about the offers, as well as a sauna, and swimming pool are included.
6. Advice and support: services provided exclusively by qualified staff, pre- and post-care advice services.
7. Spa and wellness area: location within walking distance, hygiene, and maintenance, the offer of free drinks and food, the offer of separate showers, toilets, rest areas, pool size, saunas, and other natural bathing areas as well as the number of loungers (IHA & DEHOGA Bundesverband, 2005).

It should be emphasized that here, too, the firm integration of sustainability, especially the environment, is an integral part of the criteria and thus of the definition. Thus, all individual measures must be fulfilled even for the simplest category of a wellness hotel in the area of environment. This includes the following measures in detail:

- „The guest receives advice on how to behave environmentally friendly.
- Employees receive advice and/or training on environmentally friendly behaviour.
- Use of environmentally friendly detergents, cleaning agents, and cleaning products.
- Measures to save water/energy
- Waste management:
 - Measures to avoid waste
 - Composting/waste separation
 - Recyclable material collection system (at least in the kitchen)

- Measures to minimize pollutants
- Measures to conserve raw materials and recyclable materials" (IHA & DEHOGA Bundesverband, 2005).

The definitions given here for the wellness industry and the wellness hotel industry in particular make it clear that these companies are by definition suitable for the integration and implementation of the SDGs and are thus accentuated as a subject of investigation.

1.2 Objective of the paper and research question

This paper is part of a dissertation project on the topic of sustainability in the corporate strategy of European wellness and luxury hotel companies. The explicit aim is to capture the change in sustainability in the companies driven by the socio-economic drivers of the COVID-19 pandemic and, based on the SDGs from 2015, to establish a framework for their integration into the corporate strategy.

For this purpose, the following central research question is defined:

(RQ) How does sustainability in corporate strategy based on the UN's SDGs change for the European wellness hotel industry after the COVID-19 pandemic?

The aim is to explicitly classify the change in the meaning and implementation of corporate sustainability in the European wellness hotel industry after the COVID-19 pandemic. This is recognized by experts as a so-called 'catalyst' or 'game-changer' for sustainable development in the industry. The author sees the increasing importance of an overarching regulation of the definition of sustainability and recognizes the UN's Sustainable Development Goals (SDGs) from 2015, which were originally set up for states. Here he borrows from the first works published on this and observes the trend in annual financial statements to use these SDGs as sustainability standards (Abdou et al., 2020; Barbier & Burgess, 2017; Fonseca et al., 2020; United Nations, 2015). As called for by experts and already partially considered, the SDGs are to serve as a basis for sustainable corporate strategy, but must first be translated and adapted accordingly to serve the requirements of the industry (Barbier & Burgess, 2017; Fonseca et al., 2020; Rubio-Mozos et al., 2020).

The literature review aims to answer sub-research question one:

(RQ 1) How does the importance of sustainability for wellness hotel businesses or the European hotel industry in general change after the pandemic?

The derived objective is:

To capture and identify the relevance of sustainable business management after the COVID-19 pandemic as a possible 'game changer'.

For this purpose, final theses are to be formed which will be verified in the next qualitative research phase with the help of expert interviews.

2. Methods

The basic methodological procedure of the dissertation is based on the mixed methods approach. It follows a sequential flow chart and has three central methodological building blocks:

1. A literature review on the topic, which can be methodically assigned to the procedure of systematic literature research (SLR). It serves to generate the theses that are subsequently subject to the expert survey in the second part of the research. This part of the work belongs to qualitative research.
2. An explorative research part, in which the hypotheses are searched for inductively. For this purpose, 14 experts from the wellness hotel industry will be interviewed about the SDGs and their significance in the sustainability strategy. The second research phase, like the first, is thus to be classified as qualitative research. The evaluation is carried out according to the method of Mayring (2015) with the help of the analysis software MAXQDA 2022 Analytics Pro.
3. An explanatory research part, in which the hypotheses gained are tested through deduction, and the knowledge gained is evaluated for the population of the wellness hotel industry in the EU. For this purpose, the hypotheses obtained from the second part are falsified with the help of a panel survey. In the final quantitative research phase, the data will be analyzed and evaluated with the help of the statistical software JASP and Jamovi.

Figure 1 illustrates the methodological flow chart and the planned research design. In the following, the first research phase relevant to this paper, the SLR, is described and elicited.

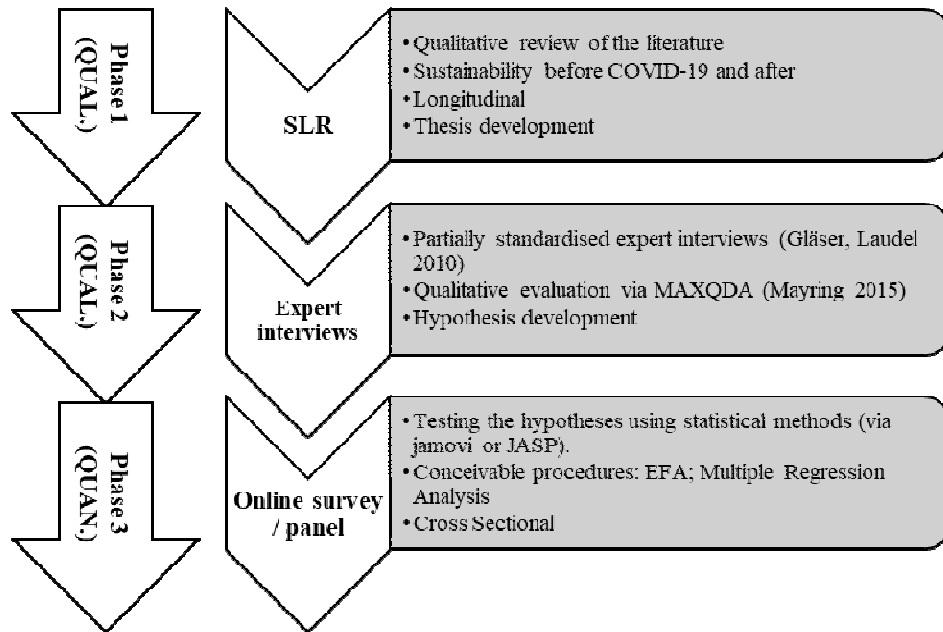


Figure 1. Research design

Source: Own presentation

The figure above illustrates that, according to the prevailing textbooks, this is a generalization design (exploratory design) with equal weighting of qualitative and subsequent quantitative research. The aim is to analyze the inflationary discussed topic of sustainability with the SLR methodology suitable for this purpose and the changes in the meaning and perception of the sustainability discussion based on the SDGs (Creswell & Plano Clark, 2018; Greene et al., 1989).

The scope and objective of the search are defined as above and thus searches are carried out in the Web of Science with various keyword combinations. After four search runs with $n > 1,000$ hits each, the final keyword combination is: "sustainable development goals and hospitality" with $n = 322$ hits. Figure 5 describes in detail the whole process of SLR (Dekkers et al., 2022). Thus, $n = 40$ papers are included in the detailed abstract analysis, of which $n = 26$ are subsequently used for the content analysis. In the first reading, the content analysis leaves 18 papers for the thesis formation. After the second reading and with the help of a backward and forward search, seven more titles can be used for the final qualitative synthesis $n = 25$ (Durach et al., 2017; Snyder, 2019; Tranfield et al., 2003). These are divided into the following SJR journal categories:

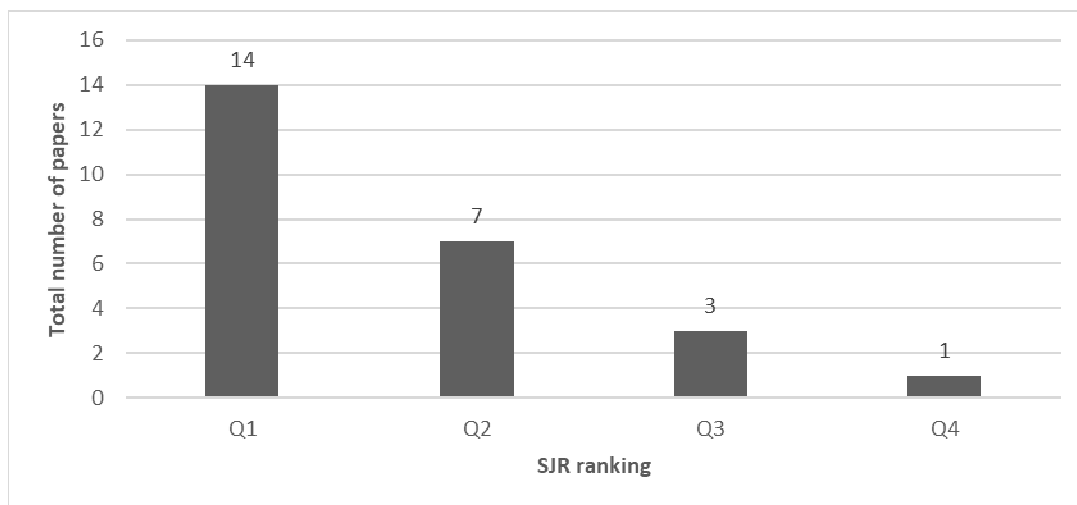


Figure 2. Journal ranking (SJR)

Source: Own presentation

Figure 2 confirms the quality of the analyzed works with a share of 56 per cent of the papers in the Q1 category. In total, 84 per cent of the papers are classified in the top two categories and are analyzed as shown below.

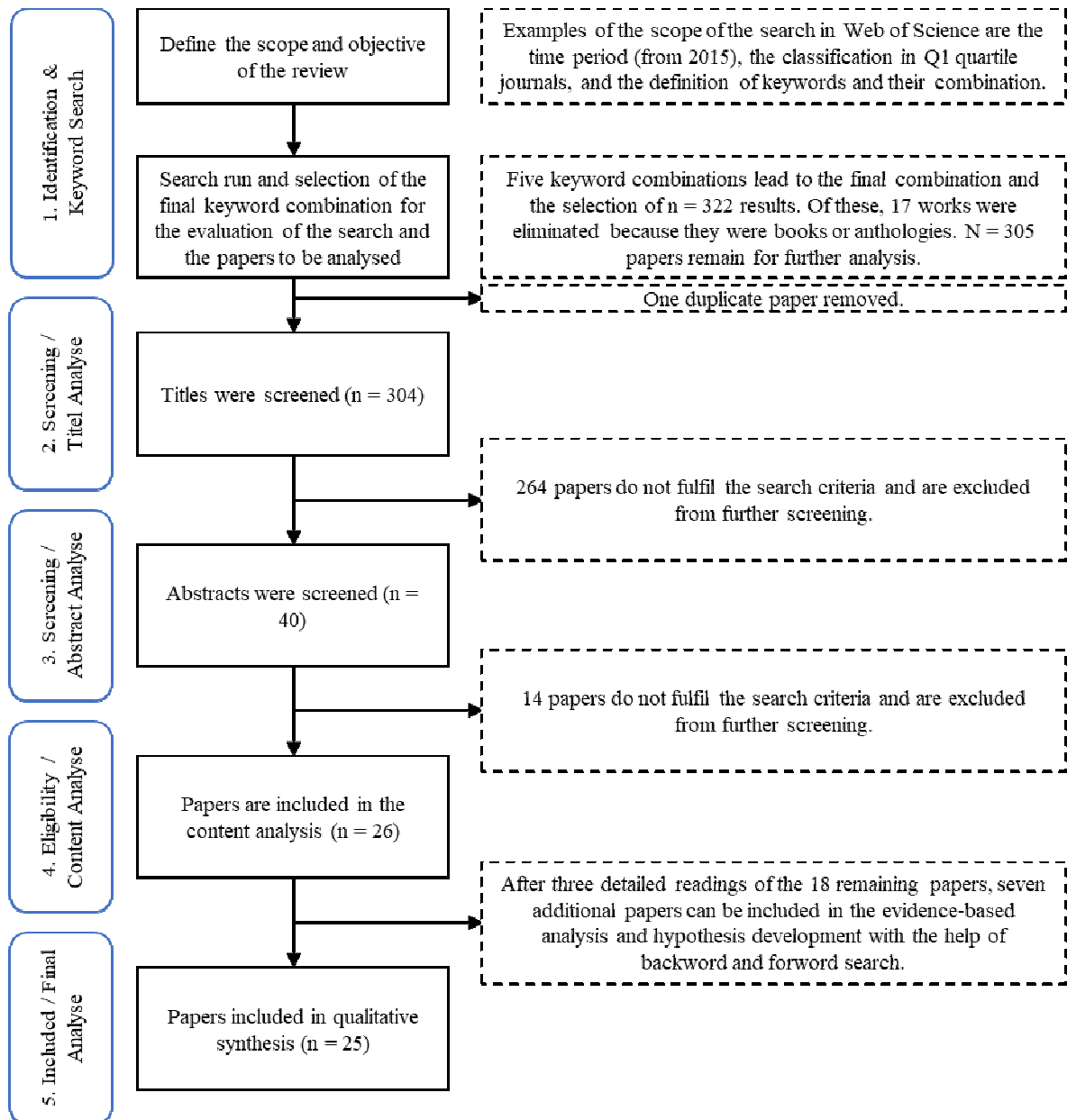


Figure 3. Flowchart of the SLR

Source: Own presentation based on (Durach et al., 2017; Rasoolimanesh et al., 2020; Tranfield et al., 2003)

The most cited journal is Sustainability (Q2) with 28 per cent, followed by the Journal of Sustainable Tourism (Q1). A further 28 per cent of the cited journals each have a paper in the analysis, which supports the diversification of the search and the required interdisciplinarity (Boluk et al., 2019; Font et al., 2019). The following diagram illustrates this relationship:

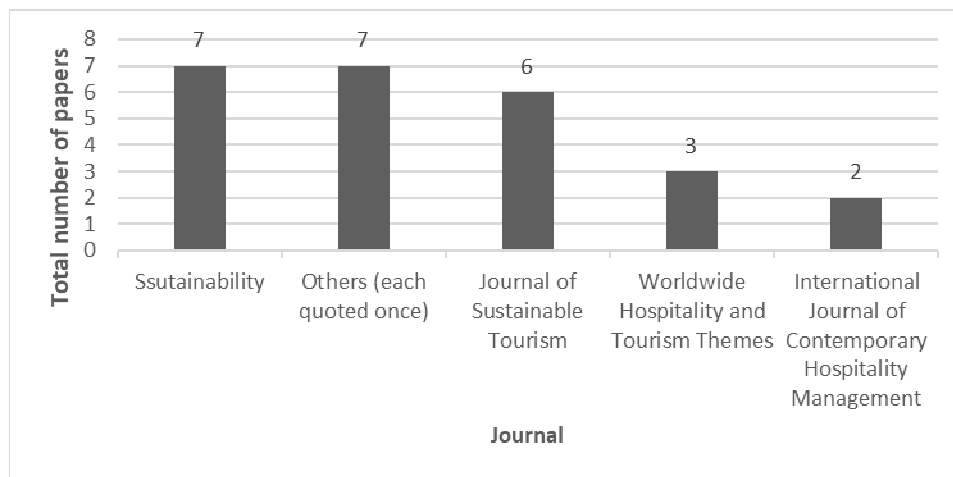


Figure 4. Most cited journals
Source: Own presentation

3. Results

Work on the implementation and target achievement of hotels about the SDGs confirms the importance and relevance of the SDGs, especially in the luxury and wellness segment. For example, in a study of four- and five-star hotels in Egypt, Abdou et al. (2020) elaborate on the environment-related SDGs (nos. 6, 7, 12, and 13) within Green Star-certified hotels that they contribute to meeting the environment-related SDGs. In their research model, the researchers show how the hotels' green practices address the SDGs and which of the individual goals are implemented downstream in the hotels or are tangential to them. However, the other SDGs are not considered in the research due to the objective and the target group (here the Green Star-certified establishments), as it is only about environmental performance. It is interesting that for the study region of Egypt, the five-star hotels indicate a significantly higher contribution to the achievement of the goals than the four-star establishments. Furthermore, the study highlights that the use of renewable energies (a central requirement of the SDGs) is not yet implemented or is primarily the focus of the hotels' environmental managers. This is consistent with a large number of other studies on this topic. Thus, long-term measures, which are also more costly and complex to implement, are the least common in practice. Here it is important to point to the use of renewable energies, intelligent proactive energy management systems, and grey wastewater (Abdou et al., 2020; Chan et al., 2020; Evans, 2016). Also highlighted is the introductory question on the motivation for the hotels' certification. Here, 52 per cent of the respondents ($n = 48$) state that they do so out of the "commitment of the hotels to ecological sustainability" (Abdou et al., 2020, p. 15).

Another study that qualitatively examines the success of measures to achieve the SDGs in Algeria in agritourism companies confirms their effectiveness (Ait-Yahia Ghidouche et al., 2021). For Europe, the work of Acampora et al. (2022) can show how important proactive communication is in addition to the implemented measures. They confirm for a sample of certified green hotels from Italy that service quality is a multivariate attribute determined by various variables (including environmental awareness and environmental protection measures). The authors also show that customers do not accept any sacrifice in service quality or amenities in hotel service. The quality of service is at the forefront of customers' preferences (Ait-Yahia Ghidouche et al., 2021; Bacari et al., 2021).

For the coast of Andalusia, Spain, researchers have studied how the formation of agglomerations affects the SDGs and the businesses as well as the destinations themselves. In the period from 1960 to 2015, the authors were able to show that the interaction between access to intact and unique nature must be protected, but that the formation of economic units into agglomerations offers economic as well as ecological and social advantages. Complex conflicts of objectives need to be balanced and resolved with the help of government control (Aragón-Correa et al., 2023).

The paper of Baum et al. (2016) uses case studies from the tourism industry to analyze how SDGs 1, 3, 4, 5, 8, and 16 are implemented and achieved at the micro (individual), meso (institutional), and macro (organizational) levels. The theses obtained are: (1) there is a lack of enlightened human resource management in tourism and (2) the tourism and hospitality workforce does not act sustainably. The authors derive therefore the need for:

„This paper endeavours to demonstrate that the tourism sector must commit to the overarching aim of sustainable employment for all tourism workers, which enshrines the protection of basic human rights, especially for women, children, minorities, and those who are less privileged in society. Such sustainability must, at its heart, address the goals set out in the UN’s Agenda for Sustainable Development.“ (Baum et al., 2016, p. 13).

Boluk et al. (2019) call in their review critical thinking regarding the SDGs and their role in tourism. They identify the following six future areas for critical thinking: (1) critical tourism research; (2) gender equality; (3) indigenous and alternative paradigms; (4) degrowth and circular economy; (5) ethical consumption and production; (6) governance issues and mechanisms.

Another review that calls for critical and preferential engagement with the SDGs in tourism, in general, is the work of Bramwell et al. (2017). The authors understand this by work that is not subject to the paradigm of narcissism or vanity financed by society, but vice versa serves practice and society and proposes solutions that can be implemented for them. In particular, the treatment of SDGs 1, 2, 3, 4, 5, 7, 10, 11, and 17, which are currently analyzed and dealt with in less depth, is called for, as is practice-oriented and business-relevant research (Bramwell et al., 2017). From a governance perspective, this is what Hall et al. (2023) call for, whereby the authors see the critical evaluation of the SDGs as a governance concept of political decision-making and address here, among other things, the neoclassical basic idea of the inherent growth imperative.

Initial publications analyzing the environmental performance of luxury hotels in Taiwan about their brand value and productivity confirm that sustainable businesses have positive effects. In particular, the fact that consumers increasingly want to pay more for sustainable hotel services (Chen, 2019). In part, this research is contradicted by recent work from Europe, at least in terms of the youth generation's higher willingness to pay. However, there is evidence of an existing preference for sustainable hotel services that are committed to the SDGs (Floričić, 2020).

Nunkoo et al. (2021) find 41 articles that address the SDGs in tourism from 2019. Most of the analyzed papers deal with one of the SDGs and none deals with more than eight SDGs. In doing so, the researchers analyzed that the SDGs should be considered as a complex network of objectives (Barbier & Burgess, 2017; Fonseca et al., 2020). They should all be considered together as one construct. Accordingly, the paper derives interdisciplinarity in SDG research and calls on academia to conduct practice-relevant and all-encompassing research. The importance of the SDGs, especially for practice, should be at the forefront (Nunkoo et al., 2021).

Another recent research that sees the strategic importance of the SDGs and the need for action in political and corporate long-term strategic planning is the research by Scott (2021). In his review of tourism and climate change as the greatest current challenge, he argues that the SDGs cannot be achieved unless climate change is recognized and addressed as a key challenge. The paper defines two key areas of action for future research and as a challenge for tourism as a whole:

1. Decarbonising tourism by 2050 with the final goal of becoming CO₂ neutral.
2. Adapting tourism to a future with climate change and promoting its resilience. Physical impacts such as increased forest fires, water scarcity, refugee surges, food shortages, and extreme heat waves (Scott, 2021).

In their literature-based study, Raub and Martin-Rios (2019) have attempted to map a model for translating the SDGs for hotel companies. In a seven-step approach, the authors derive a transformation process from the individual SDGs to company-specific and relevant goals. The approach remains general and addresses the individual and local circumstances of the companies. The approach, like the previous ones, is based on stakeholder theory and elaborates the SDGs as central overall goals for a sustainable corporate strategy or management. It is recommended that an index be used to derive the importance and feasibility of the SDGs for assessing their relevance to companies (Raub & Martin-Rios, 2019; Rubio-Mozos et al., 2020).

4. Discussion

Based on the results discussed in Chapter 3, the following table summarises the relevant literature and the theses derived from it. It should be noted that three papers do not look at the EU and most have a global horizon (n = 15). The majority of the papers (n = 19) deal with all SDGs or their importance in general, which is in contrast to the first studies that criticize only the one-sided or the consideration of a few SDGs (Bramwell et al., 2017). Seven papers belong to the Methodology Review, three have quantitative methods and seven use qualitative methods.

No.	Author	Year	Investigation region	Research object	Methods	SDGs	Classification according to Barbier, Burgers 2017	Derived thesis
1	Abdou, Hassan, et al.	2020	Egypt	4* & 5* hotels	quantitative survey	6 | 7 | 12 | 13	ecological	1
2	Acampora, Preziosi et al.	2022	Italian	two “Legambiente e Turismo” certified hotels	PLS-SEM	11 | 12 | 13 | 14 | 15	ecological	1; 7; 8
3	Ait-Yahia Ghidouche, Nechoud et al.	2021	Algeria	agritourism	qualitative expert interviews	1 | 2 | 6 | 10 | 12	social, ecological, economic	1; 6
4	Aragón-Correa, La Torre-Ruiz et al.	2023	Spain	luxury beach hotels	the dynamic evolution of agglomerations / ANOVA	all of them	social, ecological, economic	3; 8
5	Bacari, Séraphin et al.	2021	Spain	five hotels	case studies	all of them	social, ecological, economic	4; 6; 8
6	Barbier, Burgess	2017	global	SDGs	the basic equation of the theory of choice and welfare	all of them	social, ecological, economic	3; 5
7	Baum, Cheung, et al.	2016	global	tourism in general	case studies	1 | 3 | 4 | 5 | 8 | 16	social perspective	2
8	Boluk, Cavaliere et al.	2019	global	tourism in general	review	all of them	social, ecological, economic	4; 8
9	Boluk, Rasoolimanes	2022	global	10 papers for a special issue in Tourism Management Perspectives	review	all of them	social, ecological, economic	4; 8
10	Bramwell, Higham, et al.	2017	global	tourism in general	review	all of them	social, ecological, and economic perspectives	2
11	de Visser-Amundson, Anna	2020	Netherlands	Hotel industry	case studies	12 | 17	social, ecological	4
12	Floričić, Tamara	2020	Croatia	youth tourists	analysis, conceptual methodology, survey research	11 | 12 | 13 | 14 | 15	ecological	5; 9; 10
13	Fonseca, Domingues et al.	2020	global	SDGs	correlation analysis	all of them	social, ecological, economic	1; 2; 3
14	Font, Higham et al.	2019	global	scientific community esp. Journal of Sustainable	editorial	all of them	social, ecological, economic	1; 3; 4

No.	Author	Year	Investigation region	Research object	Methods	SDGs	Classification according to Barbier, Burgers 2017	Derived thesis
Tourism								
15	Hall, Seyfi et al.	2023	global	Agenda 2030	viewpoint paper/discussion paper	all of them	social, ecological, economic	6; 8
16	Le Blanc, David	2015	global	SDGs	content analysis/networking	all of them	social, ecological, economic	3
17	Nunkoo, Sharma et al.	2021	global	tourism in general	review	all of them	social, ecological, economic	3
18	Rasoolimanesh, Ramakrishna, et al.	2020	global	tourism in general	SLR	all of them	social, ecological, economic	1; 3; 5
19	Raub, Steffen P.; Martin-Rios, Carlos	2019	global	Hotel industry	review; literature-based model	all of them	social, ecological, economic	4
20	Rubio-Mozos, García-Muiña et al.	2020	global	hotel industry	qualitative semi-structured group discussion	all of them	social, ecological, economic	3; 4; 6
21	Rubio-Mozos, García-Muiña et al.	2020	Spain	4* SME Hotels in Tenerife	qualitative study	all of them	social, ecological, economic	3; 4; 6
22	Scott, Daniel	2021	global	Hotel industry	review	all of them	social, ecological, economic	1; 3; 6; 8; 9; 10
23	Singh, Dutt	2023	Dubai	Hotel industry /4* & 5* Hotels in Dubai)	qualitative study	all of them	social, ecological, economic	1; 5; 6; 8
24	Seraphin, Gowreesunkar	2021	global	Hotel industry	a qualitative study (case studies)	all of them	social, ecological, economic	3; 6; 8; 9; 10
25	Szromek, Puciato	2023	Poland	18 of the largest enterprises that conduct tourism and wellness activities in Polish health resorts	diagnostic survey - an in-depth interview.	all of them	social, ecological, economic	1; 2; 4; 5; 6

Source: own presentation

Based on the literature analyzed here, it can be assumed that the SDGs themselves as well as the importance of sustainability in the luxury and wellness hotel industry will continue to increase after the pandemic. In addition to the measures in the companies and the scientific discussion, another driver is the Ukraine war and the implied energy crisis (Sun et al., 2022; Szromek et al., 2023). Thus, the following 10 theses arise for the authors, which need to be examined in the future:

Thesis (1): Measures that fulfil or are tangential to the environmental SDGs are most frequently communicated in practice (SDGs 11, 12, 13, 14, 15).

Thesis (2): Since the beginning of the COVID-19 pandemic, measures to implement and achieve the goals of the social SDGs have increased (SDGs 4, 5, 10, 16, 17).

Thesis (3): The SDGs are to be understood as a complex network of goals that must be seen as a whole along the entire value chain.

Thesis (4): Practice does not recognize the SDGs as an overarching goal framework for corporate strategy.

Thesis (5): Economic goals (SDGs 1, 2, 3, 6, 7, 8, 9) dominate the implemented measures, especially those that lead to cost savings.

Thesis (6): Only by satisfying and cooperating with local stakeholders can the sustainability goals of the SDGs be achieved.

Thesis (7): The guests of the luxury and wellness hotel industry are not willing to accept losses in terms of performance and service quality to achieve a sustainable hotel service.

Thesis (8): Sustainability as defined by the SDGs has become more important in the luxury and wellness hotel industry since the pandemic.

Thesis (9): Guests are willing to pay a premium or higher price for green luxury and wellness hotel services than for conventional ones.

Thesis (10): A sustainable or green hotel service is preferred by the customers or is more in demand than a classic hotel service.

In addition to the research theses derived, the work identifies a research gap. There is a lack of contributions to the European wellness and luxury hotel industry on the topic of integrating the SDGs into corporate strategy, as well as the change in the meaning of sustainability for companies due to the impact of the COVID-19 pandemic. It is a paradox that the wellness hotel industry, which by definition is concerned with the balance between humans and nature and the physical and psychological health of humans, has such challenges (Boluk et al., 2019; Higgins-Desbiolles et al., 2019; Romagosa, 2020). On the one hand, it wants to sustainably connect and harmonize people and nature, which is the core of the business, on the other hand, wellness, and luxury hotels are among the largest carbon dioxide emitters in the entire industry (Abdou et al., 2020; Global Wellness Institute; IHA & DEHOGA Bundesverband, 2005; Jørgensen & McKercher, 2019; Ozdemir et al., 2021; Yeung & Johnston, 2022). This paradox also confirms the need for research as well as for practical measures.

Conclusion

As a limitation of the present work, it must be mentioned that the completeness of the literature considered cannot be guaranteed. In particular, networks and clusters of topics and authors can be concretized with the help of bibliometric analyses (Nunkoo et al., 2021). Similarly, the literature review in this paper focuses on papers and neglects conference papers and books as well as contributions to collected works. In doing so, it follows the prevailing literature. However, this is a further limitation, as these works are categorically excluded (Durach et al., 2017; Snyder, 2019).

Another future question will be at what point companies are willing to invest sustainably. For this purpose, the author proposes the return on sales value based on data from the DEHOGA, the IHA, the Federal Statistical Office (Fachserie 6 Reihe 7.1) as well as the industry indicator of the REFI industry rating Germany. The author calculates the arithmetic mean for the years 2011 to 2019, the pre-Corona year, which is three per cent (FERI Trust GmbH, 2022; Statistisches Bundesamt [Destatis], 2022).

This paper confirms the presumed research gap that there is no relevant research on the implementation of the SDGs in the European luxury and wellness hotel industry. Similarly, no work has yet established the specific link between the COVID-19 pandemic and the changing importance of sustainability for business strategy. The evidence-based literature review shows a clear increase in the importance of sustainable hotel services. Another driver is the energy crisis with the start of the Ukraine war, especially in Europe. In addition, since the pandemic, an unprecedented conflict has arisen in the tourism research community about the future and social responsibility of global tourism. Growth critics

and neo-classicists are opposing each other and challenging each other conceptually from a "business as usual" to the end of tourism. Companies, especially those offering the highest quality of service, luxury and wellness hotels, are in the midst of the "war of tourism" and must strategically decide how to position themselves in the future and which markets they want to or can penetrate (Butcher, 2020; Higgins-Desbiolles, 2021; Romagosa, 2020).

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Business Skills of Tourism University Graduates: Insights from Slovak Labour Market

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Abstract

Research background: Today's highly complex and dynamic labour market needs flexible and skilled employees. However, the environment is changing rapidly and, in addition, the young generation and students are undergoing rapid changes in their characteristic and behaviour patterns.

Purpose of the article: The need to recognize requirements of tourism businesses on soft, hard and sustainability skills, competencies and knowledge of graduate students arises. It has not been comprehensively analysed in the Slovakia, so far. The aim of the paper is to explore the requirements on the business skills, competencies and knowledge of tourism graduates on the international labour market.

Methods: The methodology consists of the identification of relevant tourism organisations in Slovakia, questionnaire survey using CAPI and CAWI method and importance-performance analysis due to its ability to clearly analyse and graphically interpret the importance and performance of skills, competencies and knowledge.

Findings & Value added: The results indicate that the soft skills, competencies and knowledge are of the greatest importance to tourism organisations, followed by hard and sustainability skills. The employers indicated that what graduates lack the most is a proactive approach to work, big data analytics and ability to make and implement a mission statement reflecting sustainability principles. The innovative approach of analysing soft, hard and sustainability skills' requirement together is considered as the basis for higher employability of graduate students. The results have high transferability potential in the area of Central European countries that can affect also wider area of the Europe by preparing graduates for the open market of the European Union.

Keywords: business skills, labour market, tourism university graduates

JEL classification: I23, J24, L83

1. Introduction

Developments in technology, climate change, and growing uncertainty caused by the recent crises put pressure on changes of the skills of university students. Smart business skills combining soft, hard and sustainability features are inevitable. Employers in the tourism sector are not only seeking individuals with technical knowledge and expertise but also those with a diverse range of skills that can adapt to the evolving needs of the industry. Identification of skills' requirements of tourism university students on today's highly complex and dynamic labour market requires knowledge of the market and examination of employers' needs. The aim of the paper is to explore and analyze the importance of soft, hard, and sustainability skills possessed by tourism students in relation to their employability in the tourism labor market. Subsequently, the findings will facilitate the implementation of revisions in syllabi and teaching methods, enabling a more effective alignment of graduates with the evolving demands of the labour market.

Tourism higher education is a major platform for human capital development for the tourism industry and had a mission to assure the quality of graduates and equip them with particular skills, competences and knowledge to enable them to function as sophisticated professionals. During the latter half of the 1950s, a systematic focus on the examination of tourism emerged, transforming it into a subject of scientific inquiry across various disciplines and a key component of higher education (Gúčík, Gajdošík, Lencséssová, 2015) A. Mariotti pioneered the field of higher education institution in tourism

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during the first half of the 20th century. In 1920/21 he taught tourism at the University in Rome. Since the 1930s, Switzerland, represented by scholars like W. Hunziker and K. Krapf, and Austria, represented by P. Bernecker, have incorporated tourism as a component of economic science in their educational curriculum. Following the Swiss and Austrian model, tourism education was established in Czechoslovakia during the 1960s at the University of Economics in Bratislava and Prague. After the social and political changes in 1989 and the subsequent transformation of Slovakia's economy from a centrally planned system to a market-driven one, the priorities in tourism research and education underwent considerable shifts. Significant changes in the content of study programs in Slovakia occurred during the academic year 1990/91, with the introduction of new subjects aimed at aligning education with the demands of the market economy.

These included subjects such as Tourism Management, Business economics in tourism or Tourism marketing. Significant efforts were also taken to internationalize the teaching process. They included the recruitment of foreign experts, mobility of students and teachers abroad (Kučerová & Gúčík, 2017).

The actual changing situation is having a major impact on the tourism and hospitality sector and this will likely affect the redesign of program curricula. The Covid-19 pandemic has brought the most significant disruption to education in history. The current crisis, dynamic and changing environment cause reshaping of higher education in tourism. The study programs should monitor changes in the industry and examine their curricula and wider approaches to learning to ensure that graduates have the necessary skills and competencies to cope and flourish in their future careers (Siow et al., 2021).

International Standard Classification of Education (ISCED) classifies Tourism as Economic Studies and marks it with the code 10 – services, in the strict sense it regards the personal services (code 101). In this group tourism is included in two study specializations: in 1013 - hotel, restaurants and catering and 1015 - travel, tourism and leisure. It is desirable that higher tourism education would be compatible with this classification. While, there is no international standard for curriculum desing of the tourism and hospitality programs, educational institutions have sought to develop their curricula based on their regional stakeholders' demand for talent and their institutional aims and intended outcomes (Wattanacharoensil, 2014). Dopson and Tas (2004) emphasize the need to add practical content to curriculum planning and development. There is a common belief that input or evaluation and feedback from the community and various stakeholders should be maintained (Tribe, 2002). Moreover, UNWTO (2019) recommends advancing research to identify skills mismatch along tourism value chain and to ensure that education and training systems are responsible to labour market needs. Nowadays there is a call for recognition of worldwide educators' concern for new skills and knowledge that students will need during the future recovery of the tourism and hospitality industry. The existing goals of the curriculum may require modification and strengthening in order to focus on students' preparedness that will help to overcome the challenges of the changing environment. Work practices and worker experiences have set a different course since the Covid-19 and will challenge many of the assumptions that have underpinned previous research in this area, stimulating the need for new research on skills, compteneces and knowledge (Ladkin et al., 2023).

Skills means the ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas, things, and/or people (Costa et al., 2020). In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments) (<https://europa.eu/europass/en/description-eight-eqf-levels>). Soft skills refer to a set of personal attributes, characteristics, and abilities that enable individuals to interact effectively and harmoniously with others in various professional settings. In the context of the tourism industry, soft skills play a vital role in delivering high-quality customer service, building strong relationships with clients, and effectively managing diverse and multicultural teams. Hard skills refer to the technical and specialized knowledge, training, and qualifications that are specific to a particular job or industry (Carlisle et al., 2021; Zaragoza-Sáez et al., 2022). While soft skills are essential for effective communication and interpersonal relations, hard skills are equally important for performing specific tasks and roles within the tourism industry (Baum et al., 2016; Siow et al., 2021). The possession of relevant hard skills increases the employability of tourism students, as it demonstrates their ability to handle job-specific responsibilities with competence and professionalism (Patacsil & Tablatin, 2017). The concept of sustainability skills has gained significant attention in the tourism industry in recent years. Sustainability skills refer to the attitudes and behaviors that contribute to the sustainable development and management of tourism destinations (Saleh et al.,

2022). With growing concerns about environmental degradation, climate change, and social responsibility, tourism organizations are increasingly focusing on sustainability practices (Wattanacharoensil, 2014).

There is no specific term or widely recognized concept of smart skills in the context of tourism. It is possible to derive the essence of smart skills from the smart technologies. The term smart technologies does not indicate that the technology itself is smart, rather individuals and industry can become smarter when using it, as it enables to quickly correspond, sensitively analyse and predict occurring situations (Lee, 2013). Thus, smart skills enable employees to become smart by applying knowledge and using know-how to communicate, analyse and anticipate in the work environment in order to complete tasks and solve problems.

Knowledge is traditionally defined as true justified belief. In other words, knowledge is a state of mind, the person ascribed knowledge can provide good reasons for the content of his/hers belief and this belief is true (Johansson, 2016). In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual (<https://europa.eu/europass/en/description-eight-efq-levels>).

Competence constitute then of the various skills and knowledge needed for performing the job (Wong, 2020). From the point of view of a student – a future employee, competences are a proof of being able to use knowledge, skills and personal, social and methodological abilities displayed at work or during learning, in professional and personal career. Competences include more than knowledge and understanding and take into account the ability to apply that when performing a task (skill) as well as how – with what mind-set – the learner approaches that task (attitude) (European Commission, 2018).

2. Methods

For the purpose of the study, skills, competences and knowledge were selected according to the previous surveys carried out in this area (Wang, 2009; Carlisle et al., 2021; Zaragoza-Sáez et al., 2022), studies aimed at the future of hospitality education and preparing students for a changing industry (Popely et al., 2021), and the future of work and skills development in tourism by UNWTO (2019). As a complement to the desk research, an analysis was conducted by examining the requirements of the most significant employers in the tourism industry as published on their websites. Based on the results of the analysis, 20 soft, 14 hard and 9 sustainability skills, competences and knowledge were identified (table 1).

Table 1. Identified skills, competences and knowledge

Category	skills, competencies and knowledge
Soft (20)	creative problem-solving, flexibility, adaptability, proactive approach to work, innovativeness, critical thinking, customer orientation, empathy, communication (face to face, online, phone, e-mail), ability to work in a team, diversity - cultural awareness, ethical conduct, being able to create a positive work environment, ability to speak foreign languages, ability to serve customers with various types and degrees of disability, market overview, knowledge of trends and actual situation, hospitality, willingness to help
Hard (14)	online marketing (e.g. SEO, search engine marketing), website analytics (e.g. Google analytics), social media analytics (e.g. Meta Business Suite), content development (copywriting), skills to monitor online reviews, (big) data analytics (machine learning, natural language processing), robotic engineering, applying digital hardware (e. g., augmented and virtual reality skills), database skills, the ability to use different hardware/ devices (computers, tablets, mobiles, Wifi), desktop publishing (for designing brochures, catalogues), office software skills (e. g., MS Word, Excel, Adobe), descriptive data analysis (descriptive statistics), tourism information system skills (e. g., hospitality PMS, GIS, GDS)
Sustainability (9)	understanding of sustainability principles, ability to promote environmentally friendly activities and products, ability to work with local producers, internal sustainability management (applying sustainability principles in a workplace), skills helping to improve the sustainability of suppliers, ability to motivate customers to make more sustainable choices, ability to deal with host-guest interactions and communities, ability to make and implement a sustainability mission statement, policy and action plan, skills related to awareness of local customs (e. g., food, arts, language, crafts)

Source: Based on Carlisle et al., 2021; Zaragoza-Sáez et al., 2022; Popely et al., 2021; UNWTO, 2019.

After the selection of relevant skills, competences and knowledge, field research was carried out. First, a database was created with the contact details of tourism businesses operating in Slovakia. A total of 1 283 contacts (1 000 accommodation facilities, 143 travel agencies, 47 destination management organisations, 92 catering facilities) were collected. Second, the businesses were contacted by email during October and November 2022. After two email rounds, 75 businesses provide information on their requirements on the graduates (table 2). The businesses were asked to indicate the importance and presence of skills, competences and knowledge on a 5-point Likert scale (1 – the least important, 5 – the most important).

Table 2. Structure of the research sample

Business	Number
Accommodation facility	37
Travel agency	18
Destination management organization	14
Catering facility	4
National tourism organization	1
Tour guide	1
Total	75

Source: authors (2023)

The collected data were analysed by importance-performance analysis (IPA) due to its ability to clearly analyse and graphically interpret the importance and performance of skills, competencies and knowledge (Azzopardi & Nash, 2013). The IPA as a powerful diagnostic tool could provide the criteria for optimal categorization of elements in IPA framework, while testing its validity and reliability (Sever, 2015). This enables decision-makers to easily choose the appropriate strategy and address the gap between importance and performance (Marasinghe et al., 2021). The proposed method set the path for reliable assistance in the decision-making process. Moreover, the qualitative analysis was done by the computer-aided qualitative data analysis (CAQDA) process by means of Atlas.ti software. The Word Cruncher Analysis was performed, in order to find out the most frequent words and word clouds were used to graphically present the outcomes.

3. Results and Discussion

The graphical interpretation of the IPA results is presented in Figures 1-3. Applying the data-centered quadrants approach, the results were analysed using the mean values of the available data. By identifying the most crucial attributes, IPA yields insights into which skills, competences and knowledge areas educators should focus. Therefore, it prioritizes actions to suggest the optimal allocation of effort in education, which would be more responsive to employers' needs and, concurrently, enhance and maintain the employability of graduates in the labour market.

Regarding soft skills, competencies and knowledge (figure 1), the most urgent are issues located in the quadrant - Concentrate here. The skills, competencies, and knowledge found in this quadrant are in high demand and hold significant importance for employers. However, the performance and proficiency of graduates in these areas are currently very low. Based on the obtained results, employers agree that critical thinking, proactive approach to work, creative problem solving, flexibility, adaptability and customer orientation should be strengthened during the teaching process. These variables also exhibit the largest gap between importance and performance, indicating that they hold significant value for employers but are the least mastered skills by students. The encouraging result is that both the importance and performance are high and thus the recommendation to keep up the good work is focused on communication, willingness to help, ethical conduct, ability to speak foreign languages, ability to work in a team and being able to create a positive work environment. Similar research (Baum et al., 2016; Hjalager, 2010) has shown that in the tourism sectors soft skills such as communication, interpersonal skills, problem-solving, adaptability and emotional intelligence are highly valued by employers.

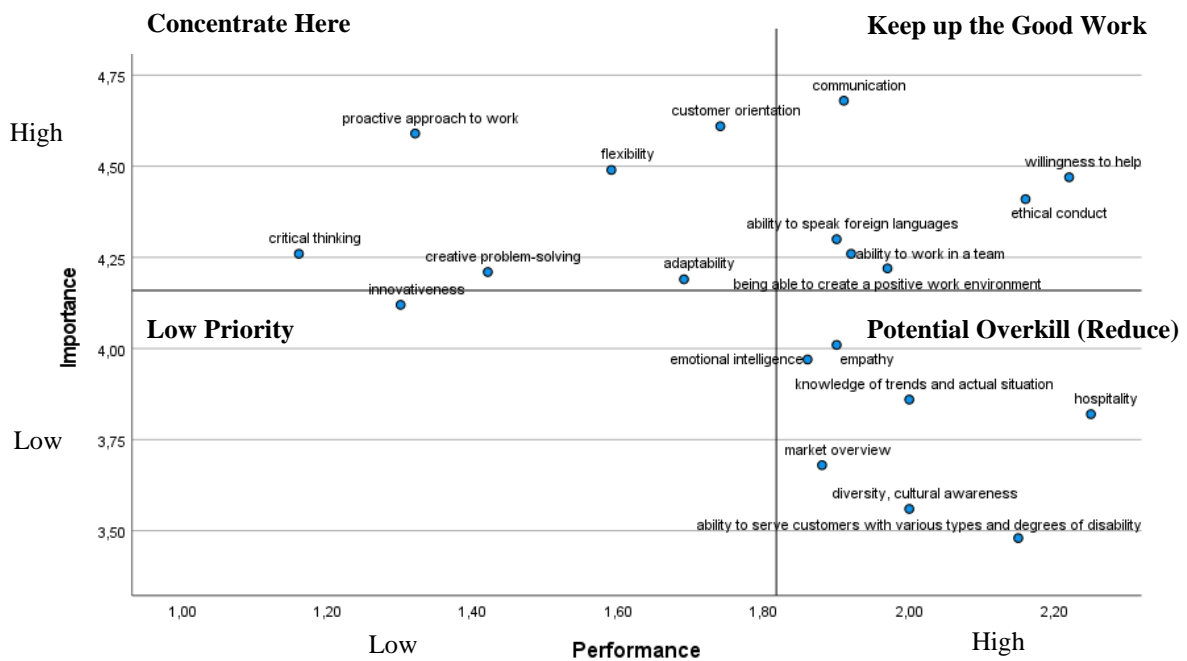


Figure 1. Importance - performance analysis of the soft skills, competences and knowledge
Source: own processing (2023)

In terms of equipping students with the necessary hard skills (figure 2), competencies, and knowledge for the labour market, the focus should be directed towards areas that exhibit the most significant gap between importance and performance, such as tourism information systems, content development, and online marketing. According to businesses, not so much attention is required in the domains of big data, website and social media analytics or descriptive data analytics. However, as UNWTO (2019) indicates, big data and data analytics, together with environmental related technologies, emerge as the most valued technologies to consider in term of future skills development. Therefore, in the near future these skills, competencies and knowledge will be more important.

Minimal attention from the point of view of the labor market, i.e. employers is needed for robotic engineering and the application of digital hardware. Graduates are well equipped with office software skills, ability to use different hardware and devices and skills to monitor online reviews.

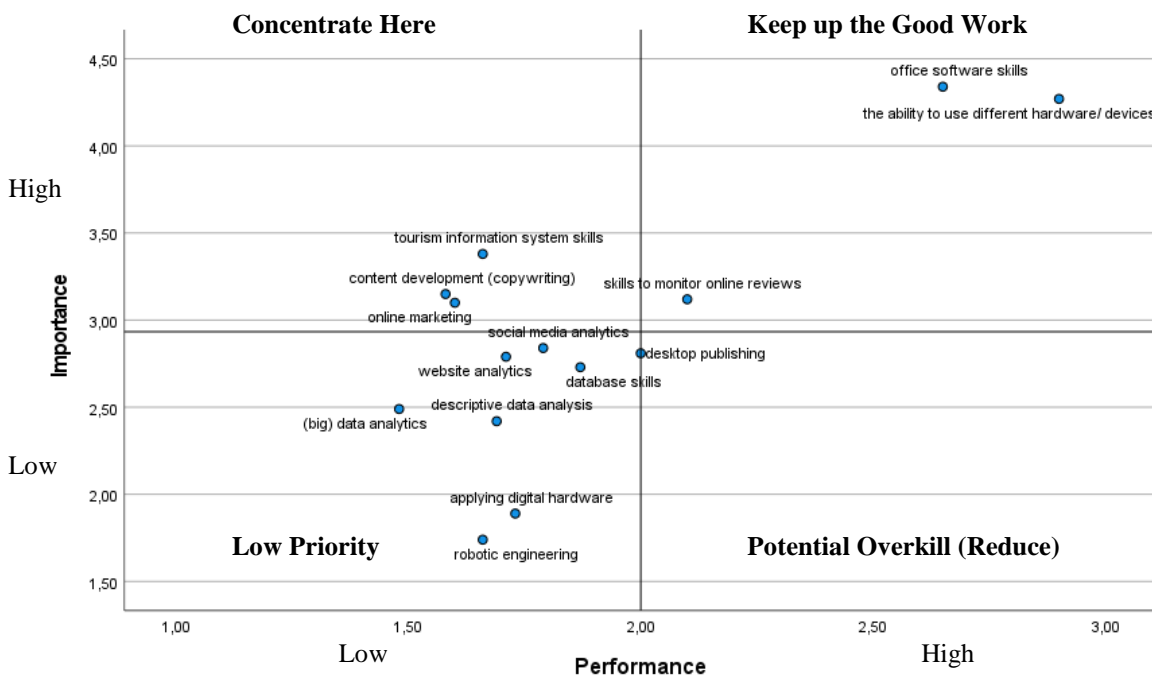


Figure 2. Importance - performance analysis of the hard skills, competences and knowledge
Source: own processing (2023)

In regards to sustainability skills (figure 3), employers currently do not place significant importance on them, as none of them fall within the concentration quadrant. Skills related to awareness of local customs emerge as the most significant for employers. The majority of variables are positioned in the low priority quadrant, indicating that employers are not yet sufficiently aware of the importance of ensuring sustainable development within the tourism industry. However, this does not imply that they should be disregarded in the teaching process. The current societal changes indicate a pressing need to direct attention towards specific opportunities for addressing the challenges associated with enhancing sustainable development. Similarly, Saleh *et al.* (2022) emphasized the significance of sustainability skills in the tourism industry, noting that employers increasingly value candidates who possess knowledge and commitment to sustainable practices.



Figure 3. Importance - performance analysis of the sustainability skills, competences and knowledge
 Source: own processing (2023)

The results indicate that the soft skills, competencies and knowledge are of the greatest importance to tourism businesses (mainly communication, customer orientation, proactive approach to work), followed by sustainability skills (mostly deal with host-guest interactions and communities, skills related to awareness of local customs, ability to work with local producers) and hard skills (notably office software skills, the ability to use different hardware, services, online marketing) and (figure 4).

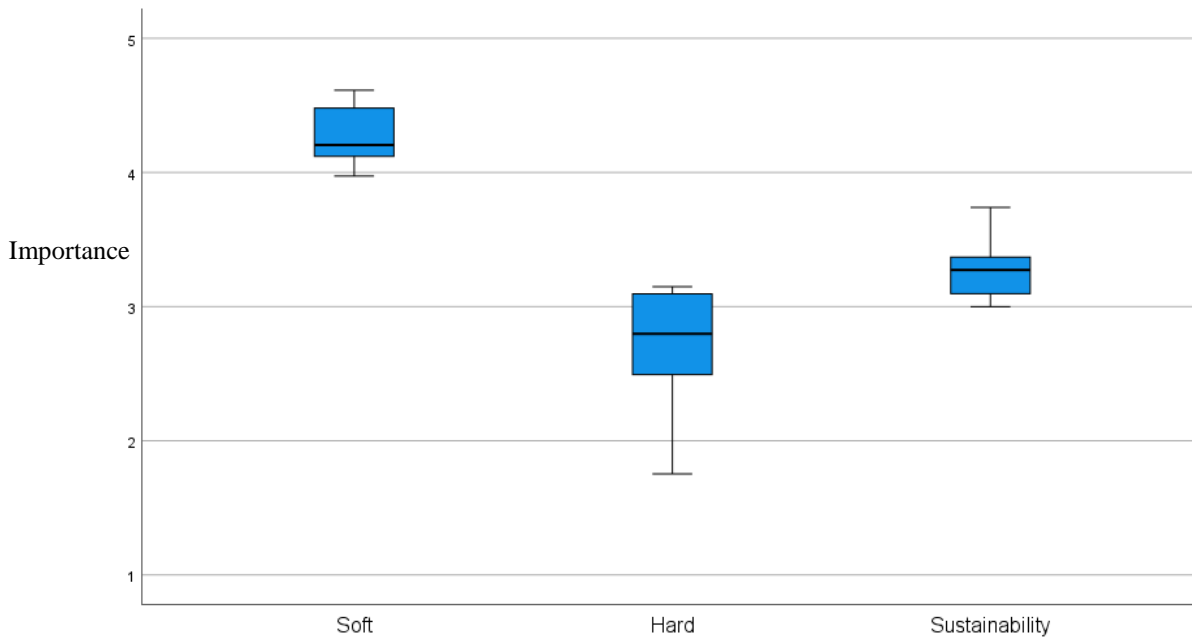


Figure 4. Comparison of skills, competences and knowledge meaning
Source: own research (2023)

Tourism businesses also expressed their requirements for an ideal employee. According to the word cloud (figure 5), the most important requirement for an ideal employee is flexibility, followed by communicativeness, multilingualism, hardwork, ability to learn and customer-orientation. These findings are in line with the research of Costa *et al.* (2017) where the characteristics of ideal tourism employee (not considering the gender) are personality profile, relevant training/ education, written and spoken English, maturity and competence, motivation, adaptability, knowledge, experience, honesty, ability to work in a team and customer relations skills.



Figure 5. Requirements for an “ideal” employee
Source: own processing (2023)

The employers characterise the university graduate (figure 6), as a person with high expectations, who can work with information and communication technologies, knows a foreign language, is professionally educated, but live in the virtual world, is non-communicative and without interest.

The acceleration method of development of transversal competences in the students’ practical training process was subject of a research held in years 2015-2018 which resulted in the implementation an innovative method of accelerating the development of transversal competences of students by improving the use of practical training (Borsková *et al.*, 2017).



Figure 6. Characteristics of university graduate according to the employers
Source: own processing (2023)

Conclusion

Value added of the research presented lies in the suggested focus of the education process that would be addressing employers' needs and at the same time enhances the employability of graduates in the future labour market.

The obtained results indicate the need for changes in teaching content as well as teaching styles, methods and techniques in order to make a fit between the graduates' skills and the real needs of the labour market represented by the employers' expectations. The obtained results can be applied to the learning process by employing carefully selected student tasks to make a progress in the required skills. Higher education institutions should focus more intensively on developing the critical thinking, proactive approach to work and creative problem solving. Flexibility, adaptability and customer orientation should be more essential part of the learning process. As far as hard skills, there is a need to prioritize the topics of tourism information systems, content development, and online marketing. Employers increasingly value candidates who possess knowledge and commitment to sustainable practices. Additionally, incorporating case studies, leveraging best practices, and engaging students in solving specific assignments and problems from industry can greatly enhance their smart skills development.

All the stakeholders engaged in skills improvement and higher employability of tourism university graduates can benefit from the research results while the authors are considering not only the present expectations but also the future of jobs features and skills needed within the tourism industry. There is a need of systematic research in the field of alumni knowledge, skills and competences in the framework of dynamically changing requirements of job supply within the tourism industry with regards to rebuilding the reputation of the industry and employer branding.

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Availability of Data on Tourism Development in Protected Areas

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Abstract

Research background: To ensure the promotion of sustainable tourism practises in natural protected areas, it is crucial to prioritise the conservation and protection of the natural environment while also considering the needs and interests of tourists, tourism businesses and local communities. This necessitates careful planning, management, and monitoring of tourism activities, as well as engagement and collaboration with various stakeholders. However, despite efforts to prioritise sustainable practises in the development of tourism in protected areas, the management of these areas often lacks sufficient information on tourism development. As a result, decisions may not be adequately substantiated and unsustainable tourism development in protected areas can occur.

Purpose of the article: The aim of this article is to examine how protected areas management perceives the availability of data on tourism development.

Methods: The study used a qualitative approach by conducting semi-structured online interviews with managers from 15 natural protected areas in Slovakia, including national parks and protected landscapes. The collected data was analysed using content analysis with the assistance of Atlas.ti 9 software. The study also provides examples of best practices in using data for tourism development by protected area management, which complements the qualitative survey.

Findings & Value added: The study's results offer valuable insights into the perception of protected area management regarding the availability of data on tourism development. The findings indicate a shortage of suitable data on tourism within protected areas, revealing that protected area management is eager to obtain comprehensive data that encompasses the broader impacts of tourism.

Keywords: data on tourism development, management of protected area, natural protected areas, sustainable tourism development

JEL classification: L83, Q26

1. Introduction

Tourism can be likened to an ecosystem due to its intricate and interconnected nature, encompassing diverse stakeholders and components that interact and depend on each other. These components include the destination and its resources, businesses and service providers, tourists, and the government and local communities (European Commission, 2022). Additionally, tourism has significant social, cultural and environmental implications as it has the potential to greatly enhance social cohesion, alleviate poverty, and preserve and promote cultural and natural heritage (Mandić, 2019). Therefore, tourism is often a significant development factor and stimulus that affects destinations, including protected areas.

Protected areas are not isolated entities; instead, they are intricately interconnected with their surrounding environments. The International Union for Conservation of Nature (In Dudley, 2008, p. 2) defines a protected area as "a clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values." Ecosystem services, linked to protected areas, refer to the various benefits that nature provides to human well-being, such as clean air and water, climate regulation, pollination, as well as recreational opportunities (Phelan, Ruhanen, & Mair, 2020). By protecting these services, protected areas contribute to the general health and resilience of ecosystems,

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benefiting both nature and society. Protected areas therefore serve as fundamental building blocks for nearly all national and international conservation strategies, receiving support from governments and international institutions and covering almost 12% of the world's land surface (Leung et al., 2018). Within the realm of tourism product offerings, protected areas hold a vital and integral position in various regions and countries. These natural areas, carefully preserved to safeguard their unique ecosystems, wildlife, and cultural heritage, serve as alluring attractions for both domestic and international tourists (Mandić, 2019; Job et al., 2021). Their preservation and responsible management remain essential to ensure their sustainability for tourists seeking unforgettable encounters with the natural world.

However, it is essential to acknowledge that tourism development can have both positive and negative social and economic effects (Buckley, 2017; Mancini et al., 2022). Although nature conservation prioritises tourism over intensive economic activities, an excessive emphasis on tourism can also conflict with conservation goals (Leung et al., 2018). This conflict can manifest in various forms, such as land encroachment, destruction of natural landscapes due to infrastructure construction, disturbances to ecosystems, excessive water and energy consumption, waste generation, light pollution, increased risk of forest fires, excessive noise, and accumulation of waste left behind by tourists (Štrba et al., 2022). Consequently, uncontrolled tourism development may have adverse impacts on the natural resources that it depends on.

To strike a balance between conservation and development, quantifying the extent of tourism development becomes crucial (Ziesler & Pettebone, 2018; Job et al., 2021). This enables a meaningful evaluation of the benefits, both positive and negative, resulting from tourism activities (Slabbert & Du Preez, 2021). Reliable data describing tourism activities, along with efficient and reliable data collection methods, are essential to support the successful management of sensitive protected areas (Slabbert & Du Preez, 2021; Huang, 2023). Data collection on tourism in protected areas usually includes indicators such as the number of visitors, the number of overnight stays, visitor expenditures, visitor behaviour, movement, experience, or ecological impact. The benefits of monitoring include identifying the most visited locations in protected areas, effectively managing visitor flows to protect vulnerable areas, improving the quality of visitor experiences, better infrastructure planning and management, raising awareness of the values of protected areas, and obtaining more funding for infrastructure in high-demand areas (UNESCO & BfN, 2021). Therefore, accurate information underpinning tourism development becomes vital (Xu, Nash, & Whitmarsh, 2020), empowering communities and destinations to unlock the benefits bestowed by the sector.

However, despite efforts to prioritise sustainable practises in tourism development within protected areas, the management of these areas often lacks sufficient information on tourism development. Consequently, decisions may not be adequately substantiated, leading to potential instances of unsustainable tourism development in protected areas (Pickering et al., 2018; Mancini et al., 2022). The availability of data on tourism development in protected areas, as well as the perception of the administration of these areas with respect to these data, remains uncertain. Existing research in this field is often fragmented and focusses primarily on methodologies addressing sociodemographic attributes of visitors, their psychographic attributes before visiting, their behaviour within protected areas, and their experiences and impacts after returning home (Levin et al., 2017; Pickering et al., 2018; Slabbert & Du Preez, 2021). To address this gap, the present study aims to examine how the management of protected areas perceives the availability of data on tourism development. The research approach employed is qualitative, involving semi-structured online interviews with managers from 15 natural protected areas in Slovakia, including national parks and protected landscape areas.

2. Methods

Study context. Currently, in Slovakia, there are special protection areas classified under the 2nd to 5th protection levels, which include various types of protected areas (State Protection of Nature of SR - ŠOP SR, 2023). Among these are nine national parks and 14 protected landscape areas, which are considered "large-size" protected areas (Figure 1). In addition, there are protected sites, nature reserves, natural monuments, and protected landscape fragments, called "small-size" protected areas. A national park (NP) is a protected area with an area of more than 10,000 hectares and represents the largest protected area within the territory of the Slovak Republic. National parks encompass ecosystems that are largely undisturbed by human activity or are located within unique natural structures, contributing to significant natural heritage. The preservation of this natural heritage has precedence over other activities.

On the other hand, a Protected Landscape Area (PLA) is an area that exceeds 1,000 hectares, comprising diverse ecosystems that play a central role in preserving biodiversity and maintaining ecological stability in the landscape. These areas may showcase distinctive landscape features or possess specific forms of historical settlement. In summary, the large-size protected areas cover approximately 23% of the total area of the Slovak Republic (ŠOP SR, 2023).

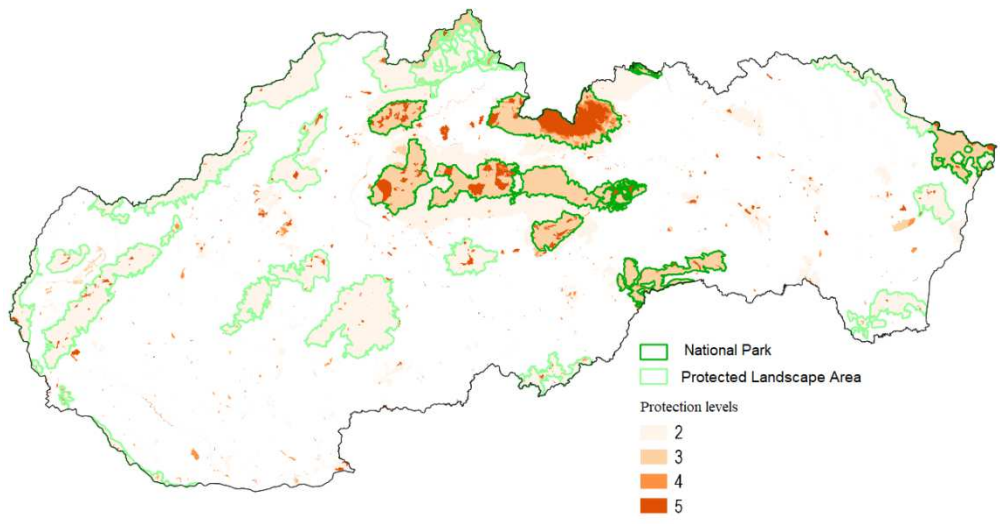


Figure 1. Large-size protected areas in Slovakia
Source: ŠOP SR (2023)

Sampling and data collection. Participants in this study were selected using a purposive sampling technique as part of a non-probability sampling method. Initially, management organisations of "large-size" protected areas, such as national parks and protected landscape areas, were identified and contacted via email to inform them about the research objectives. Once their agreement was obtained and permission to record the discussions was granted, online semi-structured interviews were conducted with 15 representatives from the protected areas between February and April 2023. It should be noted that currently the Slovak protected areas administrations do not have specific positions solely dedicated to tourism development. Therefore, study participants who represent protected area management hold various positions, including directors, environmental educators, botanists, and ecologists (Table 1). All participants recognised the participation of various aspects of tourism in their work, such as providing input on the objectives of the (tourism and recreational) projects, educating visitors, and assessing the impacts of tourism on protected areas.

Table 1. Study participants

Natural protected area	Role/Position
Tatra National Park (TANAP)	Deputy director
Low Tatras National Park (NAPANT)	Botanist/ Ecologist
Poloniny National Park	Environmental education
Slovak Paradise National Park	Environmental education
Pieniny National Park (PIENAP)	Environmental education
Veľká Fatra National Park	Director
Biele Karpaty Protected Landscape Area	Director
Cerová vrchovina Protected Landscape Area	Dendrologist
Horná Orava Protected Landscape Area	Environmental education
Kysuce Protected Landscape Area	Botanist/ Ecologist
Poľana Protected Landscape Area	Ecologist
Ponitrie Protected Landscape Area	Ecologist
Strážovské vrchy Protected Landscape Area	Botanist
Vihorlat Protected Landscape Area	Director
Východné Karpaty Protected Landscape Area	Environmental education

Source: authors (2023)

Following the guidelines of Patton (2014), a set of sixteen questions was created to form the interview protocol. The questions were formulated based on the findings of the literature review, focussing on the importance of tourism data for protected areas. They covered topics such as data collection methods to monitor tourism development, data storage and processing, and the use of data by protected area management. Two independent peers conducted a review of the questions before they were finalised. The questions followed a predetermined order, ensuring consistent wording among all participants, which facilitated the comparison of responses and minimised potential interviewer bias. These interviews were conducted in the Slovak language and had durations ranging from approximately 30 to 55 minutes.

Data analysis. The study used content analysis to examine the data obtained from semi-structured online interviews conducted with 15 representatives of protected areas. Content analysis is a research method that involves systematically evaluating the symbolic content present in various forms of communication. It is an observational approach that seeks to analyse and interpret the meanings and patterns within the collected data. The content analysis followed a six-phase procedure based on Braun & Clarke's (2006) guide, and the analysis was facilitated by the use of Atlas.ti 9 software for computer-aided qualitative data analysis. Atlas.ti is a widely-used qualitative data analysis software that offers a comprehensive suite of tools for managing and analysing qualitative data. It is popular among researchers and professionals in various fields, including social sciences, anthropology, psychology, and market research. The features and functionalities of the software enable efficient data management, coding, and visualisation, facilitating rigorous qualitative data analysis and interpretation.

The six phases of the content analysis process were as follows: (1) An initial reading of the recorded interview data was performed to familiarise with the content. (2) The data was coded using Atlas.ti 9 software, which allowed systematic organisation and labelling of the data. (3) Potential themes within the data were identified, capturing key patterns and ideas that emerged from the interviews. (4) The themes were reviewed and organised to create a coherent structure. (5) Each theme was defined and given a name to accurately represent its content. (6) The results were described and visualised, providing a clear presentation of the findings.

Furthermore, taking into account the recommendations of the study participants, the research also highlights exemplary practises employed by protected area management to use data for tourism development. These examples serve as valuable information that complements the findings of the qualitative survey, further enriching the overall understanding of the topic.

3. Results and Discussion

The national parks and protected landscape areas of Slovakia serve as decisive natural spaces where the interests of nature conservation, economic use, and tourism intersect. Alongside their primary mandate of preserving natural ecosystems, conducting research, and providing education, national parks now also strive for sustainable tourism development by promoting environmentally-friendly forms of tourism (Štrba et al., 2022). The estimated number of visitors to the Slovak national parks is approximately 6 to 8 million people per year (ŠOP SR, 2023). Hence, data that can inform and guide tourism development play a pivotal role in national parks.

On the other hand, from the perspective of protected landscape areas, tourism development does not represent a profit opportunity for their management. The management of protected landscape areas falls under the State Protection of Nature of SR (ŠOP SR), which is governed by its statutes. However, tourism is not among its goals. As a result, protected landscape areas have limited authority in guiding tourism development, despite being continuously influenced by tourism activities.

3.1 Availability of data on tourism development in protected areas of Slovakia

The administrations of protected areas, including national parks and protected landscape areas, recognise the importance of tourism development. For decades, Slovak national parks, such as the High Tatras, Low Tatras, and Slovak Paradise, have been among the most popular destinations for domestic and international tourists. However, the management of national parks had certain limitations due to the lack of legal personality, which restricted their authority in guiding territorial development, including tourism. Conversely, in 2021, a reform was adopted for national parks, granting them legal personality and empowering their administrations to actively pursue the development of tourism as one of their primary missions. As noted by Buckley (2017), the development of tourism within protected natural areas involves intricate relationships that encompass legal, political, economic, social, and environmental aspects.

Multiple stakeholders are involved, including management authorities, tourism businesses, local communities, and non-governmental organisations. Each of these stakeholders has its own interests, priorities, and approaches to data and information. In this complex landscape, understanding the various perspectives and needs related to data and information becomes necessary for effective decision-making and sustainable tourism development in protected areas.

Consequently, national parks have unanimously recognised the importance of tourism development data for their operations. As the representative of the Slovak Paradise National park stated: *“Certainly, yes. That is why we (national park – note of the authors) are a member of the DMO (Slovak Paradise & Spiš Destination Management Organisation), as well as the Park Council. We actively collaborate with local municipalities and landowners, actively participating in the planning and decision-making processes related to tourism in the area. Information about tourism is essential for our activities”*. This importance is also recognised by the administrations of protected landscape areas. In particular, the administration of the Horná Orava considers such data essential due to the considerable public demand for recreational activities and infrastructure initiatives within the protected area: *“Data are indispensable, as the majority of tourism activities in Orava occur in the natural environment within protected areas. The significant demand for new infrastructure and the absence of effective communication in tourism activity planning further emphasize the importance of data”*. Using tourism data, the administration aims to improve communication and improve tourism decision-making processes.

Although the importance of tourism development data is acknowledged, the administrations of Veľká Fatra, Nízke Tatry, and Poloniny currently do not systematically record such data. The reform of national parks has brought about changes in their organisation and management. On the one hand, they have gained more authority, but on the other hand, they have also increased their workforce and responsibilities, necessitating the achievement of personnel and managerial stability. As one director of national park concluded: *“We have not yet systematically carried out the monitoring of tourism development, statistical indicators, or impacts due to insufficient allocation of human and material resources”*. Consequently, despite their significance, tourism data are currently not used by these national parks.

Similar issues were observed by Pickering et al. (2018), as the use of suitable data to monitor the impacts of tourism in protected areas remains a significant challenge for protected area management. Mancini et al. (2022) also point out that protected area management agencies often lack expertise, resources (both human and financial), incentives, and sufficient tourism training. This deficiency leaves them vulnerable to the various pressures imposed by tourism activities.

In the Ponitrie Protected Landscape Area, tourism development data play a vital role in determining the limits of physical carrying capacity to guide tourism activities. However, there is currently a lack of suitable data for such monitoring, and monitoring relies heavily on the subjective opinions of field employees. This situation is similar to that in other protected landscape areas. The responsibilities of protected landscape areas (such as Vihorlat, Poľana, or Východné Karpaty), as defined by law and their primary objectives, do not focus on tourism development. However, they still recognise the importance of information on tourism development for the preservation of specific areas.

Various techniques are used to collect tourism data in different protected areas, with the majority of them focused on monitoring visitor numbers. For example, the Administration of the Slovak Paradise National Park uses digital counters to conduct visitor counts three times a year. Additionally, they track visitor numbers through ticket sales for rafting in the Prielom Hornádu (Hornád Gorge) and entries into the Kysel' Gorge. In the Suchá Belá Gorge, visitor numbers are monitored through a camera accessible on the park's website. They also receive data on the number of overnight stays in the national park area from the DMO Slovak Paradise & Spiš. In the Pieniny National Park, only the tourist trail of the Dunajec Gorge is physically monitored, as it is the most visited location in the area. The Administration of the High Tatras National Park conducts regular visitor monitoring through physical counting carried out by staff in the field. On a selected day at the beginning of August, tourists in mountain terrain are manually counted at the entrances to valleys or other locations. Furthermore, the High Tatras Park Administration collects visitor data from counting devices installed in 20 locations, provided by the Municipality of Vysoké Tatry.

Other studies also pointed out the focus of protected areas management bodies on visitor numbers. Job et al. (2021), in their study examining how visitation is registered in protected areas in Germany, emphasise that advances in technology have expanded the possibilities for counting or estimating visitor numbers. Automated and remote-controlled counting devices have become prevalent, offering significant opportunities for extensive counting at a relatively low cost in data collection. However, as Mandić (2019)

concludes in a review of nature-based solutions for sustainable tourism development in protected natural areas, the implementation of monitoring and visitor management solutions is often closely tied to the objectives of data collection, the unique characteristics of the park and the availability of funding. For example, the Cerová Vrchovina and Východné Karpaty PLAs monitors the density of tourists by assessing the wear and tear of trails and other technical equipment. This approach is also employed in other protected areas; however, it does not involve direct data collection on tourists. Most of the protected landscape areas, including Biele Karpaty, Kysuce, Ponitrie, Strážovské Vrchy, and Poľana, do not have a systematic data collection process for monitoring tourism development. The reason provided by the authorities is the lack of personnel, equipment, and authorisation required to collect and monitor tourism data: "*Currently, we do not have the personnel, equipment, or authorisation to collect data and monitor tourism.*"

Surveys specifically targeting visitors' opinions, such as questionnaires, are occasionally conducted in protected areas, for example, in High Tatras NP, Slovak Paradise NP, and Poľana PLA. The primary reason behind this practise is that protected areas often collaborate with external organisations, such as other institutions, universities, and DMOs, to conduct these surveys for specific purposes, such as achieving project objectives. In their survey-based research on visitor monitoring, Pachrová et al. (2020) emphasise that data collected directly from visitors serves multiple purposes. It allows the creation of accurate visitor profiles and segmentation, while providing valuable insight into their motivations to visit the area. Additionally, these data shed light on the planned (sometimes actual) behaviours of visitors, their satisfaction with their destination experience, and other relevant factors.

Some protected areas, especially national parks, also collect data on the number of visitors to tourist information centres within their territory. When evaluating tourism development, national parks and protected landscape areas often rely on "official" data provided by the Statistical Office of the Slovak Republic (SO SR). However, this data mainly focusses on guests staying in accommodation facilities and the duration of their stay. The local Destination Management Organisation (DMO) is typically responsible for collecting these data and sharing them with its members, including protected areas. However, representatives from protected areas have pointed out that the data provided by SO SR are limited to specific administrative units or, in better cases, to areas under the jurisdiction of the DMO. Therefore, it does not adequately capture the specific details of the protected areas themselves.

Considering that these data are predominantly used for tourism development purposes, some authors have stressed the importance of shifting the focus from solely counting tourists to considering broader socioeconomic and environmental aspects (e. g., Leung et al., 2018; Rasoolimanesh et al., 2023). One way to achieve this is by adopting sustainable tourism indicators that align with sustainability principles, such as the Global Sustainable Tourism Council criteria (GSTC) or the European Tourism Indicator System (ETIS). These indicators can help identify broader processes, monitor changes, and provide measurable information that is understandable to all stakeholders (Marciš & Gajdošík, 2022). However, it is important to note that collecting data for such sustainable tourism indicator systems also poses its challenges.

Data collected by protected area administrations are primarily used to formulate positions and guidelines regarding tourism development activities, including recreational constructions, event organisation, and the development of additional infrastructure. The Slovak Paradise and the High Tatras national parks use data to identify popular visitor destinations, determine the nationality of visitors, prepare information on the repair of technical equipment, and develop opinions on tourism-related activities, such as development plans and infrastructure projects. The administrations of Veľká Fatra National Park and Nízke Tatry National Park have plans to utilize tourism development data for multiple purposes. These include gaining insights into visitor profiles such as tourist flows, behaviour, and demographics, as well as using the data for planning and decision-making related to tourism development. Additionally, the data will be used for monitoring development trends, such as changes in visitation patterns, and for educational initiatives targeting residents and visitors. Natural parks recognise that these data are of utmost importance, as they form the basis for making informed decisions that can influence the development of tourism within the area.

The administrations of selected national parks and protected landscape areas express a strong desire for better access to data on tourism development. Their specific interests lie in obtaining data related to visitors, benefits for the communities, ecological performance of local actors and development of area (Figure 2).

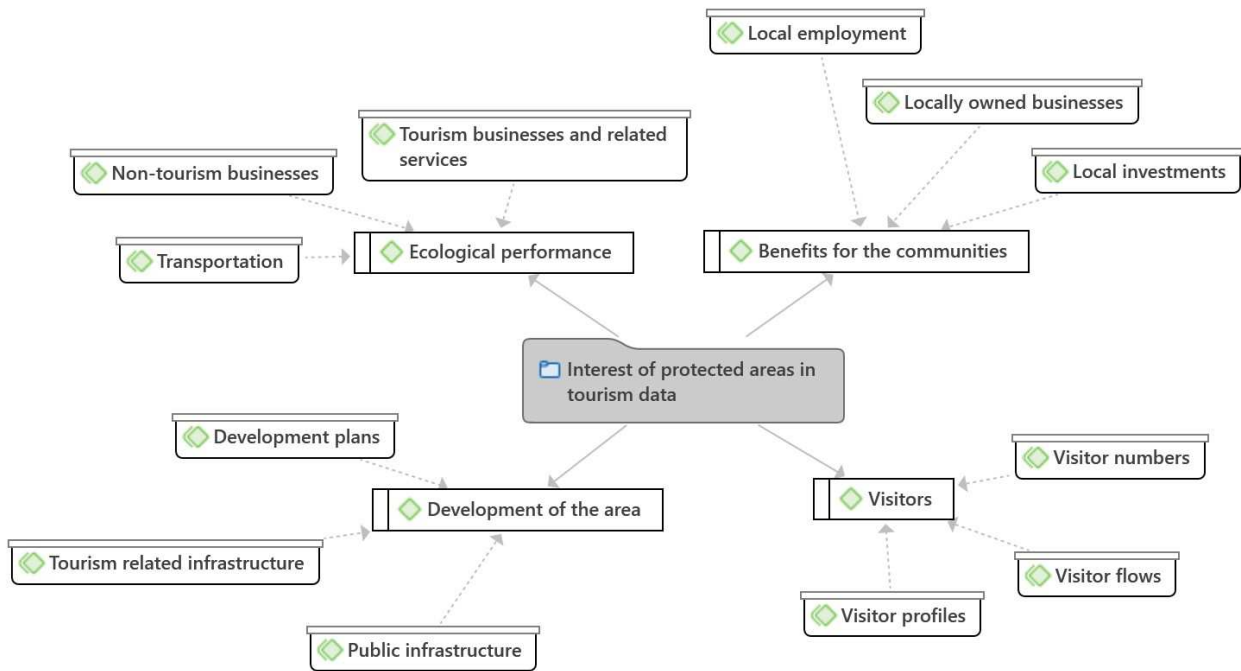


Figure 2. Interest of protected areas in tourism data
Source: authors

In addition to visitor numbers, protected areas also consider other tourism-related information essential, which encompasses the broader impacts of tourism. This includes gathering visitor profiles (characteristics and segmentation), understanding the socio-economic benefits for communities (such as employment opportunities and local investments), assessing the ecological performance of (tourism) businesses, and monitoring the infrastructural and recreational development of the area. This indicates the need for greater involvement of protected area management in broader tourism data spaces, which could combine data from various sources among different actors. However, it is worth noting that most research on monitoring tourism development in protected areas has focused primarily on visitor monitoring, such as tracking visitor flows and analysing visitor activities.

3.2 Best practices in availability of data on tourism development in protected areas

During the interview, the management of the selected protected areas highlighted examples of effective practises in using tourism development data within protected areas. These examples included, among others, the Bavarian Forest National Park in Germany, and the Šumava National Park in the Czech Republic.

The Bavarian Forest National Park is one of Germany's most popular national parks, attracting over 1.5 million visitors each year. To assess visitor numbers and behaviour within the park, park management utilised Volunteered Geographic Information (VGI) and the Global Navigation Satellite System (GNSS) to assess how visitors were spatially distributed throughout the area. This monitoring was carried out through online platforms that offer location-based services (LBS), such as well-known tourism and fitness platforms such as Outdooractive, Komoot, Strava and GPSies. These platforms enable users to connect with LBS communities, share their trips, tours, and photos related to recreational activities such as hiking, running, cycling, cross-country skiing, and mountain biking. Visitors use their smartphones or other GNSS-enabled devices to record and upload their activities. The park authorities considered GPSies, Outdooractive, and Komoot as the primary data sources because these platforms provided extensive information on the routes within the national park. In addition to the GNSS tracks, publicly available data associated with the tours were collected, including tour names, types of recreational activities, creation dates, tour lengths, and metrics such as views and downloads. This approach also allowed the identification of specific trail sections where visitors violated park regulations, enabling targeted visitor management measures both online and in the field. The data obtained from these platforms were compared with the data collected through field-counting devices. The evaluation results revealed that GPSies and Outdooractive platforms were particularly effective in determining the distribution of visitors within the

park, showing trends similar to the data obtained from the counting devices. This study highlights the potential of GNSS-based VGI data to provide detailed and comprehensive insights into visitor spatial behaviour in protected areas. However, relying solely on a single validation against the counted data is insufficient. Regular and systematic validation is desirable, considering the dynamic nature of digital data sources (Horst et al., 2023).

Socio-economic monitoring was conducted in the Šumava National Park in the Czech Republic in collaboration with the Bavarian Forest National Park. The project consisted of two main components. The first component focused on assessing visitor numbers and conducting basic surveys of visitors in the Šumava NP. To achieve this, 34 automatic counting devices of various types were installed, including those capable of distinguishing between hikers, cyclists, and vehicles. The second component involved administering questionnaires on five different topics relevant to both national parks. Key areas of interest included cross-border visitor movement, the perspectives of local residents on national parks, and the regional economic benefits resulting from visitor expenditures. The monitoring process provided the Šumava NP administration with valuable new data that can be used to address areas that received less favourable evaluations from the respondents (Dvořák, 2020).

A good example of a complex attitude to data collecting in protected areas also represents the National Park Service (NPS), USA. The NPS is the agency of the US Department of the Interior that manages the national parks of the United States. The National Park Service preserves undisturbed natural and cultural resources and values for the enjoyment, education, and inspiration of present and future generations. The NPS cooperates with different stakeholders to expand the benefits of natural and cultural resource conservation and outdoor recreation. It launched a website where all data on protected areas in the United States are collected. Visitors can find information about current events, tourism conditions, or warnings. The data further consists of basic information about protected areas, including maps of tourist attractions, accommodation options. Analysing tourism in territories, including monitoring of visitors, expenses, economic multipliers, positive and negative impacts. They also share data on how they support the development of protected areas and also the development of local tribes and communities (The National Park Service, 2023).

In general, these examples emphasise the importance of using various data sources, including digital platforms and field devices, and conducting surveys to gain complete information on tourism development in protected areas. Such data-driven approaches contribute to informed decision-making and effective management of protected areas.

Conclusion

This study examines the perception of protected area management regarding the availability of data on tourism development. The findings emphasise the value of having access to data on tourism development in protected areas for effective management and decision-making. The recent reform that granted legal personality to national parks in Slovakia has recognised the importance of tourism development and empowered their administrations to actively pursue it as one of its main missions. However, there are still limitations in systematically recording tourism data, particularly in certain national parks and protected landscape areas, due to resource constraints.

Despite the recognition of the importance of data, these protected areas face challenges in collecting and using data to monitor tourism impacts and make informed decisions. Most of the research on tourism development in protected areas has concentrated predominantly on visitor monitoring (visitors flows, visitor activities). As evidenced by this study, protected area management strives to acquire comprehensive data that encompasses the wider impacts of tourism. This includes visitor profiles (characteristics and segmentation), socioeconomic benefits for communities (i. e., employment), ecological performance of tourism businesses, and the infrastructural and recreational development of the area.

The study also identified the gap in managerial implications. There is little evidence of academic strategic management activities, despite highlighting their necessity in planning activities in protected areas (Ziesler & Pettebone, 2018; Slabbert & Du Preez, 2021). The overemphasis on visitor numbers as the primary focus of data collection highlights the need to shift towards considering broader socioeconomic and environmental aspects, for example through the adoption of sustainable tourism indicators. It is necessary to collect and utilize data that goes beyond visitor numbers and encompasses a wider range of information to fully understand the impacts of tourism.

The data collected by protected area administrations serve various purposes, including formulating positions, guiding development activities, and facilitating educational initiatives. It is essential to recognise the significance of tourism development data and address the challenges related to data collection and use. By doing so, it will contribute to sustainable tourism management and informed decision-making in protected areas. Tourism can develop and meet the needs of all stakeholders only by establishing its beneficial partnerships. Better cooperation between researchers and management of national parks can lead to evaluating the efficacy of planning development in protected areas, with the emphasis on collecting relevant data (not only) on tourism.

The study's limitation lies in its design, which is based on qualitative research and semi-structured online interviews. The reproducibility of qualitative research is constrained by its subjective nature. The results obtained from this study are specific to the analysed area and cannot be generalised to other destinations. To address this limitation, the authors suggest conducting more in-depth and large-scale quantitative or longitudinal research that considers country-specific factors and incorporates the perspectives of other tourism stakeholders.

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Principles of Sustainable Development in Accommodation Facilities in Slovakia

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Abstract

Research background: The escalating interest in sustainable development principles, coupled with the mounting pressure from media, government, and consumer entities, prompts numerous companies to progressively adopt policies that prioritize environmental friendliness. The implementation of sustainable development principles in the hotel industry in Slovakia is still in its infancy, despite the efforts not only of the European Union, but also of the states themselves to promote a sustainable environment not only in business.

Purpose of the article: The aim of this study is to understand and analyse the implementation and adherence to the principles of sustainable management in accommodation facilities with a focus on hotels and guest houses in Slovakia.

Methods: Quantitative and qualitative research methods were used in this research paper. The quantitative research was carried out in the form of a survey among owners and operators of hotels and guesthouses in Slovakia. The qualitative research was carried out in the form of semi-structured interviews with selected hotel and guest houses owners in Nitra region, Slovakia.

Findings & Value added: The introduction and compliance with sustainable management principles in accommodation facilities in Slovakia is still in its infancy. The introduction and adherence to these principles is mostly carried out by small accommodation establishments, which mainly see the use of sustainable management principles as a competitive advantage over other accommodation establishments.

Keywords: sustainable development, hotel management, tourism, hospitality management, hotel managers

JEL classification: L83, Q010

1. Introduction

The surge in interest regarding sustainable development principles has led to mounting pressure from various sources, such as media, government, European Union and consumers, compelling numerous companies to adopt environmentally-friendly policies. As a result, many businesses are now increasingly focusing on sustainable practices to ensure their long-term viability, combining profitability, environmental responsibility, and social engagement to pave the way for progressive development. In the hospitality industry, sustainable development entails exploring inventive approaches to handle rising electricity and water expenses while considering the moral, ethical, social and political aspects underlying these strategies. By aligning their operations with sustainable practices, business aim to thrive economically while also contributing positively to the environment and society. (Sloan, Legrand & Chen, 2009; Kapera, 2018)

In order to remain relevant and successful, the tourism industry must continuously adapt to the evolving expectations of consumers concerning service quality while also addressing the increasing environmental and social awareness of its customers. With consumers becoming more knowledgeable and experienced, they tend to prefer tourism service providers that have implemented environmentally responsible practices, aiming to reduce their impact on the environment. However, the tourism industry's

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response to the growing demand for accommodation, travel and entertainment has led to numerous negative consequences on natural and social environments. To mitigate these adverse effects, adopting a sustainable development (SD) orientation becomes crucial. Sustainable development, as defined in the Brundtland report, refers to a form of development that meets the present population's needs without compromising the ability of future generations to meet their own needs. Embracing this strategic orientation can enable tourism industry to minimize the detrimental impacts of its operations on natural, cultural, and social environments. By doing so, the industry can strive for long-term viability while preserving the well-being of both current and future generations. (Jiang & Kim, 2015; Prud'homme & Raymond, 2015)

Implementing the principles of sustainable development has been rising only very slowly. According to studies made the obstacles hindering the adoption and implementation of sustainable development principles in hotel industry primarily revolve around deficiencies in knowledge and expertise, limited financial and human resources, and inadequate infrastructures (Eldemerdash & Mohamed, 2013).

The existing empirical research on sustainable development practices in the hospitality industry has predominantly focused on the environmental dimension. However, the social and economic dimensions of SD concept have been overlooked in many studies. Furthermore, the few studies that have considered all three dimensions of SD have primarily aimed to address the „why“ and „what“ questions related to hotels' adoption of sustainable development, employing quantitative, survey-based methodologies. Consequently, there is a significant gap in knowledge regarding the „how“ question – the process through which a hotel establishment develops and implements its SD orientation. The current understanding of the factors influencing the development and implementation of SD practices within hotel establishments remains limited. To advance the knowledge in this area, more comprehensive and qualitative studies are necessary to uncover the intricate dynamics and influences that shape a hotel's commitment to sustainable development (Stalcupet al., 2014; Melissen, 2013; Prud'homme & Raymond, 2015).

1.1 Sustainable development and hotel industry

Research findings indicate that a significant majority, exceeding 60% of hotel guests (Kapera & Wszendybyl-Skulska, 2017) advocate for hotels to adopt pro-ecological measures associated with environmental protection, cost reduction, promotional benefits, and a positive enhancement of a hotel's public image. As consumers' understanding of the link between the environment and society grows, pro-ecological initiatives may evolve into a competitive advantage, as some consumers may increasingly prefer products with strong environmental credentials. The tourism industry may face increasing consumer demands and shifts in purchasing behavior, along with the emergence of new consumption patterns, prompting the need for adaptation. For both present and future hotel managers, understanding how to integrate sustainable management systems into hotel industry practices becomes a crucial consideration for maintaining or even enhancing financial performance. As sustainability becomes a key factor in consumer decision-making, hotels that can effectively adopt and demonstrate their commitment to ecological practices may gain a competitive edge in the market (Hendel, 2016; Hendel & Zemla, 2016; Sloan, Legrand & Chen, 2009; Kapera, 2018)

Hotel operators who are cognizant of the numerous potential economic advantages associated with adopting sustainable development principles actively advocate for their involvement in sustainable programs. They also proactively pursue various ecological certificates that can validate specific hotel functions or the overall sustainability of their operations. In 2015, the United Nations (UN) launched an ambitious 15-year plan known as the Sustainable Development Goals (SDGs), aimed at achieving specific targets by the year 2030 to tackle pressing global challenges. The SDGs call for collaborative action from all countries, irrespective of their economic status, to foster prosperity while safeguarding the planet. The goals recognize the interconnectedness of eradicating poverty and implementing strategies for economic growth, encompassing various social needs such as education, healthcare, social protection, job opportunities, while simultaneously addressing climate change and environmental preservation (United Nations, 2023). The Global Sustainable Tourism Council (GSTC) Criteria exhibit a significant correlation with the UN SDGs. Embracing the GSTC Criteria facilitates progress towards meeting the UN SDGs. The GSTC Criteria comprehensively address economic, environmental, and societal dimensions, aligning with the multifaceted objectives outlined in the SDGs. Organizations and companies seeking to contribute to the SDGs will discover that the GSTC

Criteria, alongside other GSTC Recognized Standards, provide potent tools to aid them in rising to the challenges presented by sustainable development. By adhering to the GSTC Criteria, entities can make meaningful contributions to sustainable development, supporting the broader global endeavor to create a more prosperous and environmentally responsible future (GSTC, 2023). Table 1 depicts some of the hospitality industry criteria and indicators for accommodation facilities according to GSTC Industry Criteria.

Table 1. Examples of hospitality industry criteria according to GSTC

GSTC Industry Criteria	Indicators for accommodation facilities
Sustainability management system (SMS)	The SMS is well-documented and encompasses various dimensions, including environmental, social, cultural, economic, quality, human rights, and health and safety issues. Additionally, the system takes into account risk and crises management. Evidence presented in documents indicates the implementation of the SM system. Furthermore, the SM system incorporates a process to monitor and drive continuous improvement in sustainability performance.
Sustainable practices and materials	The project incorporates local materials, practices, and crafts in buildings and design when feasible and suitable. Landscaping and decoration utilize native and endemic plants from sustainable sources, avoiding exotic and invasive species. Plant selection considers their resilience to prevailing or expected conditions, such as drought-tolerant species. Sustainable design, materials and construction practices are employed in buildings, with relevant certifications whenever possible. Furthermore, waste from construction undergoes proper sorting and environmentally responsible disposal.
Community support, local employment, local purchasing	The organization actively collaborates with the local community to identify their needs, opportunities for support and assess the potential benefits and impacts of interventions. Contribution made to local community schemes are documented and tracked by the organization. The local community provided with the chance to access tourism facilities and services offered by the organization. The organization should also measure and manage the proportion of management positions occupied by individuals from the local community. The organization conducts regular audits of its suppliers for goods and services. It measures and manages the proportion of purchases made from locally owned and operated businesses.
Minimize pollution, transport, wastewater, solid waste	Organizations review and identify the potential sources of pollution. Accommodation facilities take the action to minimize and eliminate pollution from the sources covered in the criterion. Organizations provide to guests and staff alternative transport options (e.g. bike rental, car sharing, pick-ups). They also provide and promote to customers on alternative (climate friendly) transport options, for arrival, departure and during their visit. If available, wastewater is disposed of to a municipal or government approved treatment system. Organization has a solid waste management plan. The solid waste management plan includes actions to reduce, separate and reuse or recycle food waste.

Source: Authors according to GSTC Criteria, 2023

2. Methods

The aim of this article is to analyze the compliance with the principles of sustainable development in accommodation facilities in Slovakia. To answer the research questions, qualitative and quantitative research strategy took place. The empirical research was based on a questionnaire survey, which was directed to owners and operators of accommodation facilities, specifically hotels and guest houses in Slovakia. The questionnaire was sent to 424 hotels and guesthouses located in Slovakia, in the time period from may 2022 to may 2023. The questionnaire was completed by 181 accommodation establishments, which means a return rate of 42%. The questions in the questionnaire survey focused on the implementation and adherence to the principles of sustainable management of accommodation facilities, based on the GSTC Criteria (2016). The questionnaire was divided into 4 parts. In the first part the questions are directed to the basic characteristics of the accommodation facility. In the second part we examine the environment and the minimization of negative impacts on it. In the third part, the questions are dedicated to the topic of maximizing social and economic benefits for local communities and minimizing negative impacts. In the last section, we look at the effective sustainable management of the accommodation facility.

Qualitative research was conducted in the form of semi-structured interviews with owners and operators of accommodation facilities in the Nitra region. Twelve owners/operators of hotels (8) and guesthouses (4) participated in the semi-structured interviews. Within the semi-structured interviews we focused on evaluating the results of the questionnaire survey as well as on completing the information regarding the motivation for introducing or managing the accommodation facility in accordance with the principles of sustainable management.

3. Results

There were 4829 accommodation facilities registered in Slovakia by the end of the year 2022. This means that compared to 2021, there was the increase of 6% in accommodation facilities. Thus, a total of 77 thousand rooms and specifically 222 thousand beds were provided to visitors in 2022. On average, there were 56 thousand vacant rooms per day, which represented roughly 128 thousand vacant beds for visitors. (slovak.statistics.sk, 2023)

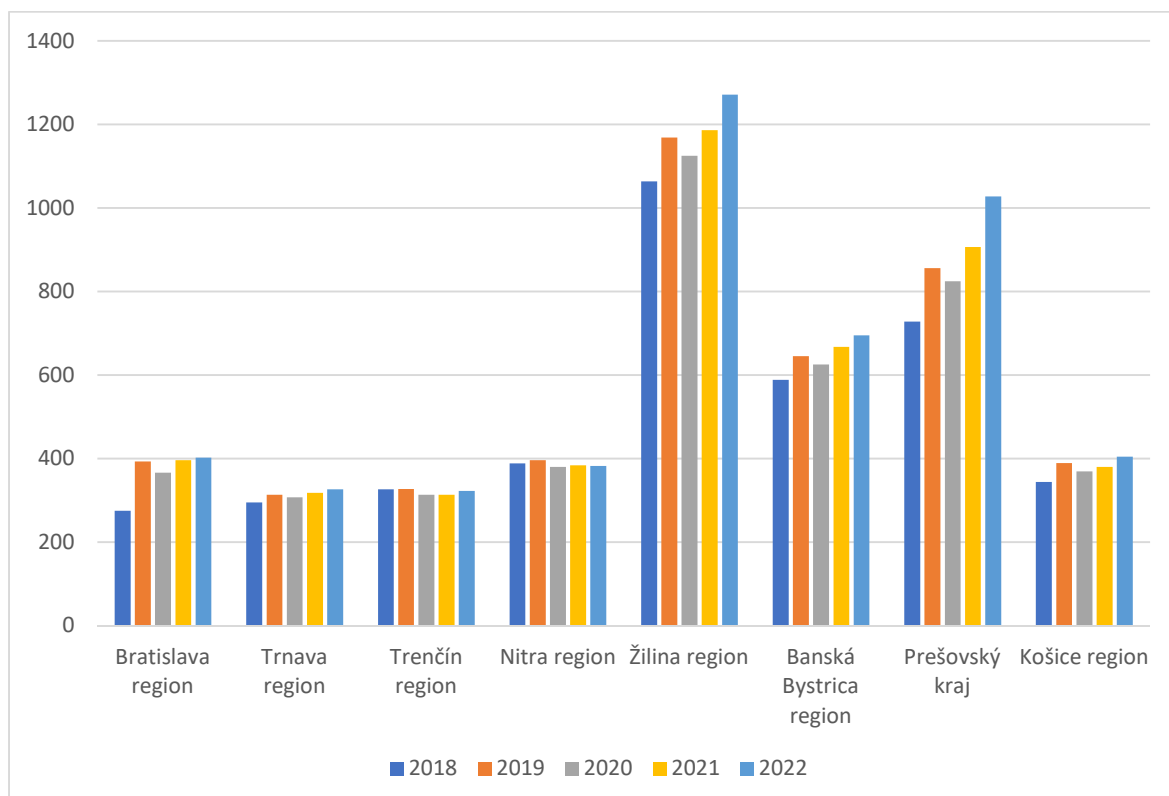


Figure 1. Number of accommodation facilities in Slovakia in 2018 - 2022

Source: own processing according to Slovak.statistics, 2023

Table 2. Basic characteristics of respondents

Class of accommodation facilities			Number of beds			Number of permanent staff		
	Number	Percentage		Number	Percentage		Number	Percentage
*	11	6%	1-20	28	15%	1-10	103	57%
**	69	38%	21-40	97	54%	11-20	48	27%
***	93	51%	41-60	42	23%	21-30	21	12%
****	8	4%	61-100	12	7%	31-40	8	4%
*****	0	0%	101-250	2	1%	41-50	1	1%
Total	181	100%	251 +	0	0%	51-100	0	0%
			Total	181	100%	101 +	0	0%
						Total	181	100%

Source: own processing, 2023

In the first section of our survey, we inquired about our respondents' preferences for environmentally friendly products that meet specific criteria, including durability, energy efficiency and non-toxicity. These products were categorized as building materials, consumer goods, or capital products. Over half of the respondents, precisely 53%, indicated a preference for eco-friendly products. They expressed a strong inclination towards items that promote sustainability, energy savings and a lack of harmful substances. The survey also shows that eco-friendly and sustainable products and materials are used more in accommodation facilities with up to 40 beds. Based on the structured interviews, we found that small accommodation establishments (up to 40 beds) consider the use of eco-friendly materials and sustainable products as their competitive advantage over larger accommodation establishments and at the same time try to use this fact to their advantage through marketing activities. Also a significant majority, as many as 73% of respondents (132 respondents) claimed active usage of natural and environment-friendly cleaning products. The findings reveal a growing consciousness about environmental sustainability and a willingness to adopt green practices in daily life of the accommodation facilities. The introduction of environmentally friendly means into the day-to-day operation of accommodation facilities is again more acceptable in smaller, independent hotels, thanks to a less rigid process of change, as opposed to large, chain hotels, which are bound by certain standards and the selection of suppliers is also a more time-consuming process. These findings were confirmed by qualitative analysis. Changing suppliers is sometimes in large, chain hotels not only a financially but also a resource-intensive process, which operators do not find economically viable, so they often prefer to stay with existing suppliers and resources.

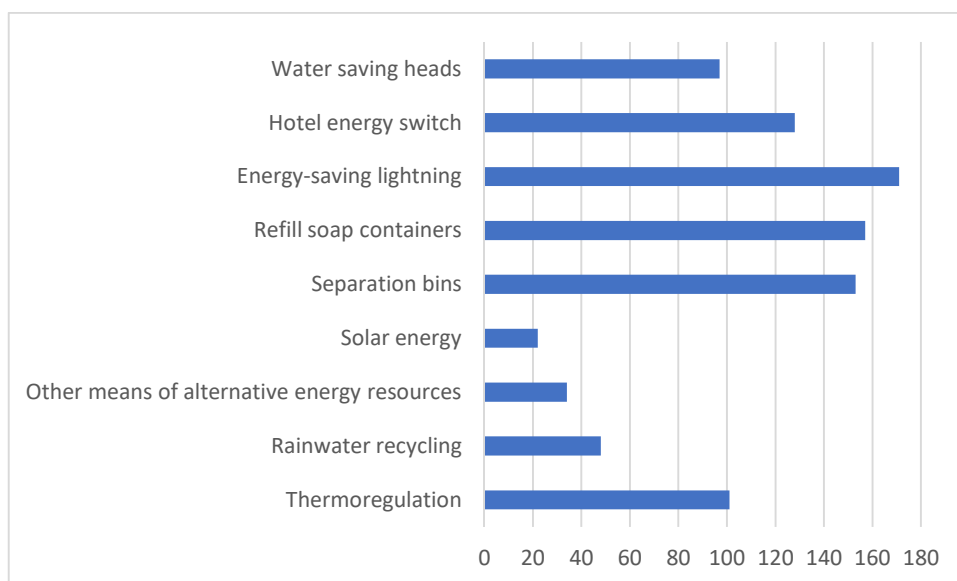


Figure 2. Means of conservation of resources
Source: own processing (2023)

As part of the questionnaire survey, we were also interested in what ways accommodation establishments save resources (Figure 2). The research showed that most accommodation facilities use energy saving lighting. The qualitative analysis showed that most of the accommodation establishments that did not use energy saving lighting have changed this due to the impact of rising energy prices in Slovakia. Relatively few accommodation establishments use alternative energy sources or solar energy and this is mainly in small accommodation establishments (up to 40 beds). The use of solar and other alternative energy sources is partly helped by the non-repayable funds under the call. Currently, small and medium-sized enterprises, including accommodation establishments, can apply for a non-repayable financial contribution for the construction of photovoltaic installations, which is announced by the Slovak Innovation and Energy Agency (SIEA, 2023)

Half of the respondents (49%) exhibit partial support towards the local community and its development. This indicates that they possess a degree of commitment, albeit not to the fullest extent, but they do not entirely neglect the neighborhood surrounding of their accommodations. Twentyfour percent of the respondents answered affirmatively, signifying that they actively endeavour to support the local infrastructure and improve quality of life for the residents beyond their accommodation facilities. These subjects actively contribute to the advancement of the city in which their lodging establishments are situated. Conversely, 27% of respondents solely prioritize their businesses and refrain from engaging in any form of support towards the local community. The fact that quarter of the respondents do not engage in any form of support towards the local community might be caused by the fact of them not knowing the options how to help the community development. Up to 65% of the respondents do not have enough knowledge about sustainability and thus not enough knowledge about the sustainable management system of the business. 20% of the respondents apply a sustainable management system in their operations, which means that the owners of the operations and their employees have an overview of how to manage the business in accordance with sustainability. The remaining 15% of the respondents were not interested in implementing a long-term sustainable management system in their businesses so far. The semi-structured interviews confirmed that the operators of mainly small and medium-sized accommodation establishments do not have an overview of what a manageable hotel management should look like. However, the interviews also revealed that many operators use the principles of sustainable management of an accommodation facility, despite being unfamiliar with the technical terminology. The interviews and observations also revealed that sustainable management of accommodation facilities is mainly practiced in larger and chain hotels that have sustainable management implemented across the board within the hotel chain. The positive news is that the majority (79%) of respondents are interested in learning how to implement sustainable principles in the management of their accommodation facility.

4. Discussion

Despite the mandatory imposition of a sustainable development orientation by hotel chains on their affiliated establishments to enhance corporate image and meet consumer demands (Bohdanowicz, 2005), it is the expectations of stakeholders that serve as the driving force motivating hotel managers to progressively pursue SD initiatives.

On the other hand, the research findings provide evidence similar to Jones, Miller & Comfort (2016) that a growing number of companies view sustainable development as a means to attain competitive advantage. This trend is influenced by several factors, such as the necessity to comply with legal regulations, concerns about escalating costs and scarcity of natural resources, heightened awareness among the general public and shareholders regarding social issues, mounting interest from media, endeavors to differentiate from competitors, and the aspiration to enhance the company's reputation.

Another noteworthy observation to consider pertains to the hotel's geographical placement, which assumes a paradoxical role, simultaneously acting as an inhibitor and a facilitator. On the one hand, the restricted spatial availability within urban settings imposes constraints. Conversely, positioning the hotel within a "natural" environment serves as a motivating factor for the adoption of conservation-oriented practices aimed at preserving this ecosystem.

A positive correlation was established between managers' tangible awareness of environmental concerns (in contrast to mere environmental value endorsement) and the degree to which sustainable development initiatives were embraced within their hotel establishments. This correlation served as a moderating factor influencing the impact of the hotel's size. Consequently, this explains the similarity in sustainable development principles adoption between both the largest and smallest hotels. These findings are in line with Vernon et al's (2003).

Conclusion

The main objective of sustainability is considered to be the creation of appropriate social and economic conditions that ensure the well-being of humanity. Achieving sustainable development requires individuals and communities working together with public actors, businesses and organisations. The main role of the State in this sphere is to support, promote and coordinate socially responsible corporate behaviour. Civil society should continuously influence the corporate sector in terms of the importance and promotion of socially responsible behaviour and sustainability. For a company to be considered a socially responsible organisation, it is necessary to set objectives in the social area (responsible employer - management operations, management strategy, performance, employee involvement and development, setting corporate objectives), the economic area (competitiveness, profitability) and the environmental area (environmental leader, conservation strategy - care for the environment).

A comprehensive implementation of sustainable development principles in tourism hinges on the collaboration among various stakeholders, including hotel owners. However, such a collaboration is more often an exception rather than the norm. The significance of collaboration extends to business owners, encompassing suppliers of products and services to hotels, as well as other organizational entities.

The hotel industry is showing a growing commitment to sustainable development concerning the natural environment and engaging in pro-social endeavors. Nevertheless, the primary emphasis continues to revolve around safeguarding natural resources. The industry's concentration on aspects like energy consumption, water utilization, and waste generation directly correlates with the financial advantages derived from the efficient operation of hotels.

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7. Environmental Management

Circular Economy in Noise Barrier Production: Exploring Sustainable and Innovative Solutions

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Abstract

Research background: Noise pollution remains a significant environmental concern, leading to a growing demand for noise barriers. However, the conventional production and disposal of noise barriers often impose negative environmental impacts. The circular economy presents a promising solution to address these challenges by advocating the use of sustainable materials, design for disassembly, and the recycling or reuse of materials.

Purpose of the article: This paper aims to explore the potential application of circular economy principles to noise barrier production and circular design strategies. By investigating sustainable and innovative solutions for noise barrier manufacturing, the study seeks to contribute to the development of more sustainable and environmentally friendly approaches to mitigating noise pollution.

Methods: The research adopts a comprehensive approach, including a review of relevant literature on circular economy practices, and their specific implementation within a case study of a noise barrier manufacturing company. Additionally, the study utilizes the Circular Canvas, a practical tool, to identify circular opportunities and prioritize actions within the production process.

Findings & Value added: The paper uncovers various circular opportunities for noise barrier production, such as utilizing sustainable materials, optimizing resource usage, and implementing eco-design principles. The Circular Canvas aids in visualizing and prioritizing these opportunities, enabling the company to adopt more circular practices. By applying circular economy principles to noise barrier production, the study contributes insights to the development of sustainable and environmentally conscious strategies for noise pollution mitigation.

Keywords: noise barriers, circular economy, circular canvas, materials use, waste reduction

JEL classification: M11, P28, P48

1. Introduction

In recent years, the escalating issue of noise pollution has propelled the demand for noise barriers as a vital means of mitigating its adverse effects on both urban and industrial landscapes (Rovňák et al., 2023). However, traditional approaches to noise barrier production often raise concerns about their environmental impact, as they generate significant amounts of waste materials, including PVC, textile waste, metal parts etc.. Embracing the principles of circular economy in this context presents an opportunity to transform the production process, paving the way for sustainable and innovative solutions.

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The concept of the circular economy, a paradigm that promotes the regenerative and restorative use of resources, has gained traction worldwide as a crucial strategy for achieving sustainability and combatting climate change. By transitioning from a linear "take, make, dispose" model to a circular approach that prioritizes reuse, recycling, and upcycling, businesses can dramatically reduce their environmental footprint and enhance resource efficiency.

The European Union (EU) has taken a pioneering role in advocating and advancing circular economy principles to tackle pressing environmental challenges. Recognizing the imperative of sustainable production and consumption patterns, the EU has laid out comprehensive initiatives to promote the circular economy across various industries.

In 2020, the EU unveiled its new Circular Economy Action Plan (EC, 2020), a blueprint that aims to "close the loop" and transform the way products are designed, manufactured, and used. Under this framework, the EU set ambitious targets for waste reduction, material recycling, and the promotion of eco-design and eco-innovation.

Furthermore, the EU's Circular Economy Package II (EC, 2022), introduced in 2022, outlines specific measures to stimulate the circular economy across all member states. This includes directives on waste management, plastic reduction, and encouraging circular business models.

By investigating the circular potential of noise barrier production and identifying innovative solutions, our research aligns with the EU's efforts to promote circularity in diverse sectors and drive forward the circular economy agenda. Moreover, it contributes to the broader EU mission of fostering resource efficiency and transitioning towards a greener and more sustainable economy and global sustainability initiatives such as Agenda 2030 (EU, 2018) and its sustainable development goals.

2. Literature review

Researchers and institutions have increasingly explored the Circular Economy (CE) paradigm as a promising approach to enhance the sustainability of our economic system (Oliveira et al., 2021; Vence et al., 2019). Comprehensive studies have been conducted to holistically define and conceptualize the CE (Kirchherr, 2017; Montag). The operationalization of the CE gained momentum with the introduction of the first CE standard, BS 8001:2017, by the British Standards Institution (BSI, 2017). According to this standard, the CE is interpreted as an "economy that is restorative and regenerative by design, aiming to retain products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles." The term "restorative" refers to the process of reusing spent resources in the creation of new products, while "regenerative" refers to enabling living systems to heal and renew the consumed resources (BSI, 2017).

Notably, the Ellen MacArthur Foundation (EMF) has played a pivotal role in providing a solid theoretical foundation for CE conceptualization and operationalization. EMF's butterfly figure has been particularly influential as a visual tool to depict a hierarchy of circularity strategies, emphasizing the priority of "reuse–repair–refurbishment–remanufacturing–repurpose–recycling" (Bocken et al., 2017; EMF, 2013).

Building upon EMF's butterfly figure, the CE is intended to be purposely restorative through two types of flow: (1) nutrients re-entering the biosphere and (2) synthetic materials intended for repeated use with limited loss in value (EMF, 2013). Synthetic or mineral materials that can safely remain in a closed-loop system of manufacture, recovery, and reuse, maintaining their highest value through multiple product life cycles, are often referred to as "technical nutrients" (Bocken et al., 2017; Mestre & Cooper, 2017). However, the transformation of undesirable outputs into technical nutrients depends on various circumstances and can change over time due to advancements in technology and economic conditions (Kyriakopoulos et al., 2019).

The Circular Economy (CE) concept represents a recent effort to integrate economic activity and environmental wellbeing sustainably (Khan et al., 2022). In a narrower context, it is one of several concepts that have proven useful in exploring the efficient use of materials and resources (Figge et al., 2018; Shevchenko et al., 2021). However, in terms of implementation, the current landscape remains characterized by diverse interpretations, lacking clear theoretical or paradigmatic clarity regarding the CE concept (Blomsma & Brennan, 2017). Blomsma and Brennan propose viewing the CE as an umbrella concept, given its application in various frameworks emphasizing circularity.

Globally, there is a growing trend pushing the international community to explore pathways for transitioning from linear to circular business models (Awan & Sroufe, 2022; Hofmann & Jaeger-Erben, 2020). Calculations indicate that implementing circular business models in the EU alone could lead to

material resource savings of up to 380 billion dollars, highlighting the business potential of value creation from waste (EMF, 2013).

The concept of Circular Economy (CE) has garnered significant attention among researchers and institutions worldwide, as it presents a promising approach to integrate economic activity with environmental wellbeing in a sustainable manner (Gupta et al., 2019). Scholars have explored diverse measures of CE across European Union (EU) member states, focusing on Small and Medium Enterprises (SMEs) (Bassi & Dias, 2019). Five key CE measures were examined, including water usage optimization, renewable energy utilization, energy consumption reduction, waste minimization through recycling or reusing, and product redesign for material efficiency.

The findings highlighted considerable heterogeneity in the adoption of CE measures among EU countries, reflecting varying levels of implementation (Bassi & Dias, 2019). At the firm level, factors such as firm size, total turnover, and investment in research and development significantly influenced the variation in CE measures within countries. The study also emphasized the relevance of considering the multilevel structure to address the between-country variability, which accounts for 6.1% to 15.1% of the total CE variability (Bassi & Dias, 2019). For EU policymakers, these insights underscore the need to design targeted framework policies to enhance CE practices, particularly within the SME segment.

In the context of the leather industry, Muktadir et al. (2020) identified challenges in implementing CE practices and proposed a decision support framework to evaluate these challenges. The study utilized the best worst method to assess factors hindering CE practices, with "lack of financial support from authorities" emerging as the most critical challenge (Muktadir et al., 2020). This financial constraint poses a significant barrier to the successful adoption of CE practices in the leather industry. The study's results offer valuable guidance to industrial managers and authorities to promote sustainable development in the leather sector.

Khan et al. (2022) addressed the dearth of literature on circular economy practices and aimed to investigate practices essential for transforming linear models into circular economy models. Through a systematic literature review, fifteen circular economy practices were identified and evaluated, with practices such as "consumer awareness," "legislation and policies," and "designing products for circularity" ranking high in importance (Khan et al., 2022). The study provides managers and professionals with actionable insights to optimize resources for effective circular economy adoption.

Barros et al. (2020) explored bioenergy boosters through circular economy practices in agriculture. Their systematic literature review highlighted trends and perspectives in the circular economy context, focusing on electricity generation and biofuel production from biogas as sustainable opportunities in the agro-industrial sector (Barros et al., 2020). European countries emerged as pioneers in this domain, publishing the majority of relevant documents in the last four years.

Shifting focus to the built environment, Joensuu et al. (2020) conducted a literature review to provide structured information for sustainable urban development through circular economy practices. The study identified three main approaches: management for sustainable cities, urban services aligned with circular economy, and cleaner production and construction (Joensuu et al., 2020). The review also suggests innovative concepts like urban-rural symbiosis and emphasizes the importance of cross-sectoral integration and capacity development in successful circular economy implementation.

Lastly, Schroeder et al. (2019) investigated the relevance of circular economy practices to the implementation of Sustainable Development Goals (SDGs). Their study revealed that CE practices have the potential to directly contribute to several SDG targets, with strong relationships identified in areas such as clean water and sanitation, affordable and clean energy, decent work and economic growth, responsible consumption and production, and life on land (Schroeder et al., 2019). The paper also explored potential synergies and trade-offs between CE practices and specific SDG targets, suggesting CE as a versatile "toolbox" for achieving multiple SDGs.

Collectively, these studies shed light on the diverse application and significance of circular economy practices across various industries and sectors. While these studies provide valuable insights into the implementation of CE practices in different areas of economic activities, it is important to note that there is currently no specific study focusing on the application of CE in the production of noise barriers.

Despite the lack of a dedicated study on noise barrier production, the existing literature provides a foundation for understanding CE practices in different contexts. The findings from these studies can be used as a reference point to explore the potential application of CE principles in the noise barrier manufacturing process. Given the importance of addressing waste management and resource efficiency in noise barrier production, conducting a study that investigates how circular economy strategies can be integrated into this specific industry would be a valuable contribution.

Therefore, this research on the possibilities of applying circular economy principles in the production of noise barriers has the potential to fill a significant gap in the literature. By focusing on the practical application of CE concepts in this specific context, it can offer insights and innovative solutions that align with the broader CE movement. By utilizing the knowledge from the reviewed studies as a starting point, this research can pave the way for the development of sustainable and circular noise barrier production processes that align with EU initiatives and contribute to achieving sustainable development objectives. The research question that guides this study is: How can circular economy principles be effectively applied to the production of noise barriers, considering the utilization of waste materials and the enhancement of sustainable practices?

3. Methodology

In our endeavor to examine the production process of noise barriers and explore opportunities for implementing circular economy principles within a real-world industrial setting, we employ the case study approach. The case study is a well-established research method that facilitates a thorough exploration and analysis of a specific real-life situation or phenomenon within its natural context. This method proves particularly valuable when investigating complex, unique, or context-dependent issues, as it allows for a comprehensive understanding of the subject of study (Yin, 2009).

3.1 Research Design

This research employs a case study approach to investigate the application of Circular Economy (CE) principles in the production of noise barriers. The case study design allows for an in-depth exploration of a specific company engaged in noise barrier manufacturing, offering a comprehensive understanding of its current practices and opportunities for circularity. By utilizing the Circular Canvas tool, the research aims to identify potential areas for implementing CE strategies within the company's production process.

3.2 Case Selection

The case selection process involves identifying a company that specializes in the production of noise barriers. The selection criteria prioritize companies that demonstrate a commitment to sustainability and resource efficiency. Furthermore, the chosen company should be representative of the broader noise barrier manufacturing industry to ensure the findings are relevant and applicable to other similar enterprises.

3.3 Data Collection

Data will be collected through a combination of primary and secondary sources:

- **Interviews and consultations:** Semi-structured interviews will be conducted with key stakeholders within the company, including management, production personnel, and sustainability experts. The interviews will explore the company's current production processes, waste management practices, and potential opportunities for incorporating CE principles.
- **Document Review:** Company documents, reports, and sustainability policies will be reviewed to gain insights into existing practices and the company's environmental performance.
- **Observations:** On-site observations will be carried out to understand the company's operations, waste generation, and resource utilization.
- **Secondary Data:** Existing literature, industry reports, and best practices in the field of circular economy and noise barrier production will be reviewed to contextualize the findings and identify relevant frameworks for analysis.

3.4 Circular Canvas Application

The Circular Canvas, a tool designed to assess the circularity potential of a company, will be applied to the selected noise barrier manufacturing company. The canvas will guide the exploration of different aspects of the company's operations, including product design, material sourcing, waste management, and product lifecycle. By mapping these elements on the canvas, the research will identify gaps and opportunities for incorporating circular economy principles into the company's production process.

3.5 Data Analysis

The data collected from interviews, document reviews, observations, and the Circular Canvas application will be analyzed using thematic analysis. Themes and patterns will be identified to determine the current practices and challenges in the noise barrier production process. The analysis will also focus on potential areas for circularity integration and highlight opportunities for waste reduction, resource optimization, and sustainable material usage.

3.6 Findings and Recommendations

The research will present the findings from the data analysis, highlighting the company's current circularity status and potential pathways for implementing CE principles in noise barrier production. Based on the analysis, specific recommendations will be formulated, providing actionable strategies to enhance circularity and sustainability within the company's operations.

3.7 Limitations

It is essential to acknowledge potential limitations, such as the generalizability of findings due to the focus on a single case study. Additionally, the research may face challenges related to accessing confidential company data and the potential bias of interviewees towards portraying a positive image of their organization.

3.8 Ethical Considerations

Ethical considerations will be prioritized throughout the research process, ensuring informed consent from participants and maintaining data confidentiality. The research will adhere to ethical guidelines and regulations governing data collection and analysis.

The case study methodology, coupled with the application of Circular Canvas, provides a robust framework to examine the implementation of Circular Economy principles in noise barrier production. By investigating a specific company and utilizing a practical tool for analysis, the research aims to contribute valuable insights to the circular economy discourse and offer tangible solutions for the sustainable development of the noise barrier manufacturing industry.

4. Results

Through an extensive analysis of the company's noise barrier production process, interview with company's representatives, observation of technological process, analysis of internal documents and databases, and a comprehensive review of relevant literature, our objective is to identify opportunities for the effective implementation of Circular Economy (CE) principles. Our research employs a case study approach, focusing on a company engaged in noise barrier manufacturing, to gain in-depth insights into its current practices and potential avenues for circularity. We begin by mapping the material flow, including the quantities of input materials utilized in noise barrier production, as well as the amount of waste generated during the process.

The noise barrier manufacturing process involves a diverse range of input materials, such as various technical fabrics, noise barrier layers, reflective elements, edging, threads, brackets, rings, and adhesive tapes. Collaborating closely with production operators, managers, and internal records, we diligently track the waste generated during material reception and processing:

1. **Technical Fabric:** Forming the foundation of each noise barrier, technical fabric made of PVC constitutes three layers: PVC film, fibreglass mesh fabric, and another PVC film. The combination of these layers enhances the technical fabric's properties, providing exceptional strength and elasticity, making it suitable for demanding conditions and ensuring durability over extended periods. Annually, an average of 61,271 m² of technical fabric, in varying colors and sizes, is processed.
2. **Mesh:** Similar to PVC technical fabric, mesh technical fabric comprises PVC material but possesses a structure with numerous holes due to the fibreglass mesh. Used mainly in large banners and some noise barriers, mesh serves an essential function in trapping sound waves and dust particles, while also acting as a windbreak and withstanding harsh weather conditions. Approximately 12,703 m² of netting is processed each year.
3. **Polyester coated fabric (PCF):** Comprising a textile surface layer (polyester) and a PVC layer, PCF is a versatile material applied in various industries. Its role in noise barriers is to prevent water penetration while allowing breathability. Approximately 63,721 m² of PCF is processed annually.

4. **Recycled Cotton:** Serving as a fundamental component within the noise barrier's construction, recycled cotton is positioned between the PVC and PCF layers, providing stability and shape to the barrier. Around 19,070 sheets of recycled cotton are processed yearly.
5. **Reflective Elements:** Essential for visibility during reduced light conditions, reflective elements are sewn or welded onto the noise barrier. Annually, about 32,646 linear meters of reflective elements are processed.
6. **Edging:** Enhancing the barrier's appearance, edging is sewn around the perimeter to conceal weld joints and maintain product integrity. An average of 121,947 linear meters of edging is processed yearly.
7. **Threads:** Indispensable for sewing tasks, threads are used for attaching edging, installing brackets and buckles, and securing recycled cotton. Approximately 890,034 linear meters of thread, with varying colors and lengths, are processed each year.
8. **Brass Rings:** Fixed around the barrier's outer perimeter, brass rings provide stability and serve as attachment points. An average of 283,658 brass rings are processed annually.
9. **Brackets & Buckles:** These elements facilitate the transportation of noise barriers and are attached from the rear to maintain aesthetics. Around 19,070 brackets and buckles are processed each year.
10. **Adhesive Tapes:** Double-sided adhesive tapes are utilized to securely hold recycled cotton against the PVC membrane. Approximately 87,559 linear meters of adhesive tape are processed annually.
11. **UV Printing Ink:** UV-resistant ink in various shades is used for industrial printing, with specific graphics tailored to individual clients. Approximately 360 liters of ink are processed yearly.

Figure 1 illustrates the quantity of recoverable waste generated in the noise barrier manufacturing process.

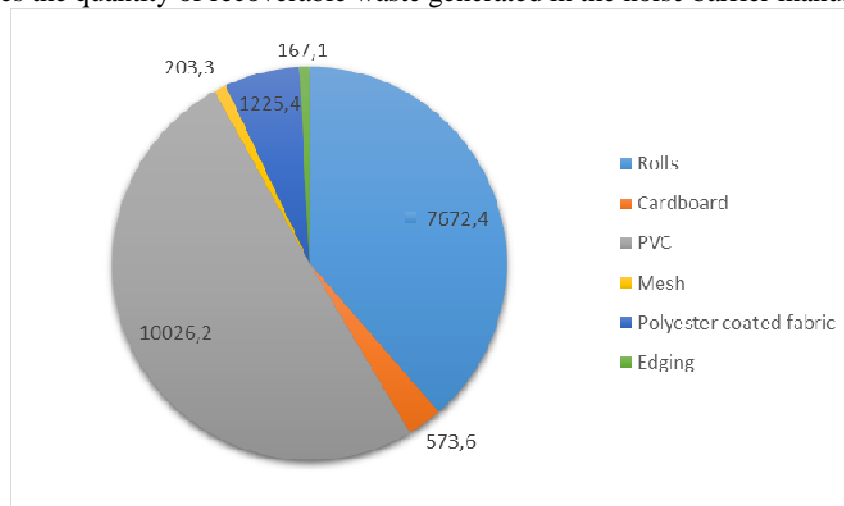


Figure 1. Quantity of recoverable waste in kg
Source: own processing

The comprehensive mapping of input materials and waste generation provides valuable insights into the company's current circularity status and lays the groundwork for identifying opportunities for enhancing circular economy practices within noise barrier production.

In the next step, we utilized the Circular Canvas, a comprehensive and practical tool, to identify circular opportunities and prioritize actions within the noise barrier production process. The Circular Canvas is a visual and analytical framework that allows us to assess the circularity potential of the company and explore various dimensions of circular economy principles.

The Circular Canvas utilized in this study was created based on the template developed by the Circulab academy (Ciculab, 2023). This structured framework provides a comprehensive outline of the business model, encompassing diverse flows, and facilitates the identification of critical implications for stakeholders, regional contexts, and ecosystem impacts. Embracing this tool empowers the development of solutions that not only cater to individual user needs but also consider the broader system within which the organization operates. Adopting a systemic approach fosters a holistic way of thinking, ensuring a mindful consideration of crucial aspects and encouraging the design of regenerative solutions. By

employing the Circular Canvas, businesses can actively cultivate sustainability, promote circularity, and contribute to the preservation and revitalization of the natural environment.

Together with representatives from the company under investigation, we collaboratively developed the Circular Canvas tailored specifically for the noise barrier production process, as visually depicted in Figure 2. This endeavor aimed to explore and identify circular economy opportunities within the company's industrial practices, fostering a positive impact on the environment while enhancing business sustainability.

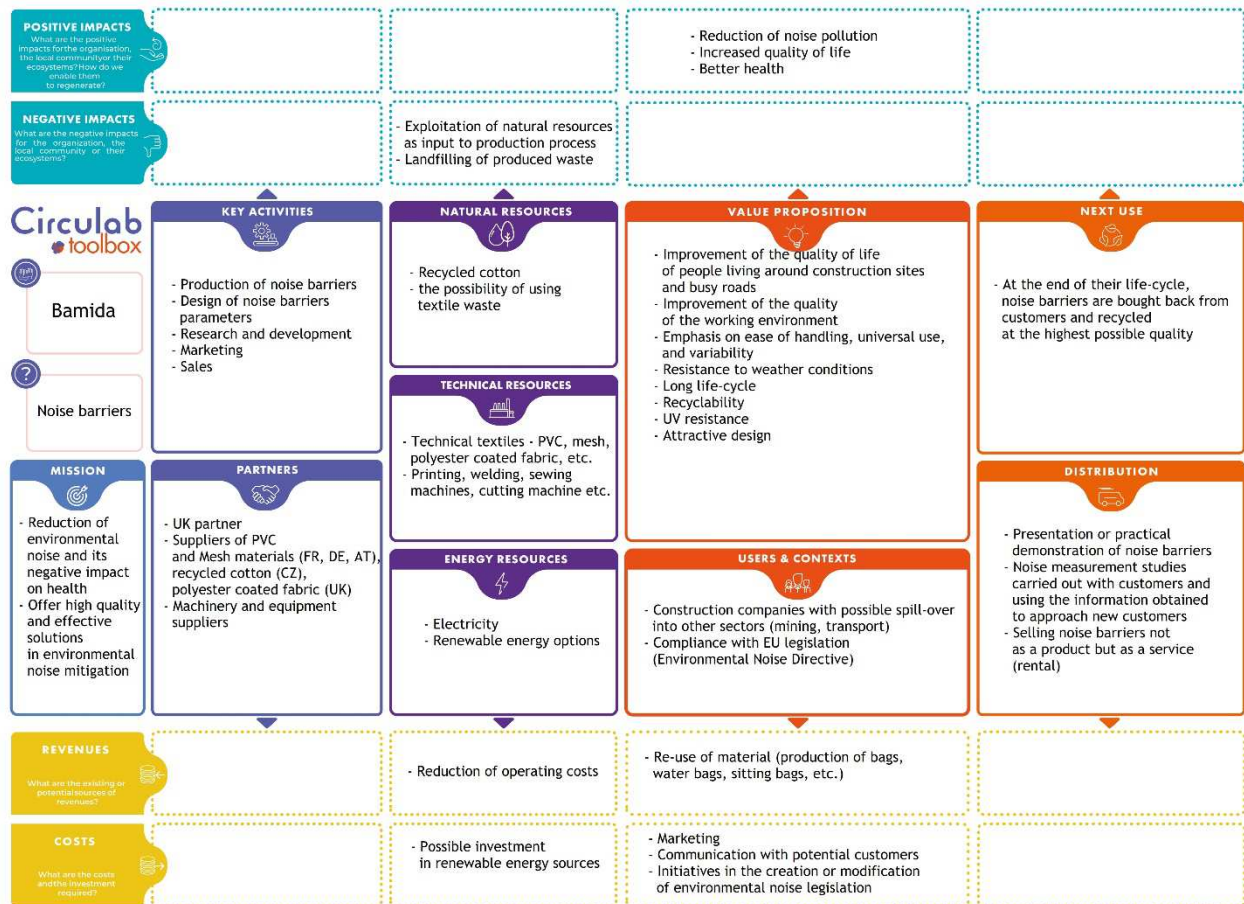


Figure 2. Circular Canvas of Noise barriers production
Source: own processing based on Circulab template (Circulab, 2023)

By applying the Circular Canvas to the noise barrier manufacturing company, we systematically assessed its circularity potential, identified areas for improvement, and prioritized actions to enhance circular economy practices. This methodological approach ensures a practical and actionable framework for advancing the company's sustainability and circularity goals in the noise barrier production process.

5. Discussion

Our investigation, focused on the possibilities of integrating circular economy principles into noise barrier production, holds significant promise in addressing a critical gap in the existing literature. This study, centered on the practical application of circular economy concepts within this specific context, offers insights and innovative solutions that align closely with the overarching circular economy movement. Leveraging insights garnered from reviewed studies, our research aims to pave the way for the formulation of sustainable and circular noise barrier production processes that resonate with EU initiatives and contribute to the realization of sustainable development goals.

Our analysis reveals a substantial volume of unutilized waste materials, such as paper rolls, cardboard, and PVC waste, which could be upcycled into new products, thus streamlining noise barrier production and minimizing waste generation (Kerdlap et al., 2019). Paper rolls and cardboard can be collected and sent for recycling. The recycling process involves breaking down the cardboard into fibers, which can then be used to create new cardboard products. By recycling the cardboard rolls, the company

can reduce the demand for virgin cardboard materials and minimize the environmental impact associated with cardboard production.

PVC foil can be recycled or upcycled into new products. Recycling PVC involves converting the material back into its original form to create new PVC products. Additionally, PVC can be upcycled into other useful items, such as PVC-based accessories (handbags, purses), furniture components (sitting bags, pillows), or non-structural construction materials. By reprocessing or upcycling the PVC foil waste, the company can extend the life cycle of the material and reduce the need for new PVC production.

As the company may face limitations in handling this issue independently, it has the opportunity to explore collaborative efforts with other industries (Janssen & Stel, 2017) that can derive benefits from the waste produced in noise barriers production. For instance, industries reliant on cardboard packaging or in need of PVC-based materials may find significant value in reusing or recycling the waste generated during the noise barrier production process. By forging partnerships with such industries, the company can establish a closed-loop system where its waste materials become valuable resources for others, contributing to a more sustainable and circular economy approach.

By embracing circular economy principles in noise barrier production, the company stands to gain numerous benefits:

- **Sustainability Leadership:** Implementing circular practices can position the company as a sustainability leader in the industry, enhancing its reputation and attracting environmentally conscious customers.
- **Resource Efficiency:** Circular approaches optimize resource utilization, reducing material consumption, and minimizing waste generation, leading to cost savings and improved profitability.
- **Environmental Conservation:** By minimizing the use of virgin materials and promoting recycling and reuse, the company can significantly reduce its environmental footprint, contributing to global efforts in combating climate change and conserving natural resources.

Conclusion

Our case study demonstrates that the integration of circular economy principles in noise barrier production offers opportunities for sustainable and innovative solutions. By emphasizing sustainable materials, and material reuse and recycling, the company can transition towards a more circular approach, benefiting its economic performance while contributing to environmental conservation and mitigating noise pollution. As noise barriers continue to play a vital role in addressing noise pollution, the successful application of circular economy principles in their production holds the potential for a greener and more sustainable future.

Despite the valuable insights gained from this study, there are certain limitations that should be acknowledged. The case study focused on a specific company in a particular industry, which might limit the generalizability of findings to other sectors or contexts. Additionally, the implementation of circular economy principles requires complex systemic changes that involve various stakeholders, regulations, and market dynamics. The study mainly concentrated on waste materials generated during the production process and their potential circular uses, neglecting other aspects of circular economy implementation, such as extending product life or redesigning business models.

Future research endeavors could extend the scope of investigation to explore the broader implications of circular economy principles in noise barrier production, including the assessment of their long-term economic viability and environmental impact. Furthermore, a comparative analysis of different circular economy strategies across various industries could provide a more comprehensive understanding of the challenges and benefits of circularity integration. Additionally, the development of practical guidelines or frameworks tailored to noise barrier production could assist companies in effectively adopting circular practices and maximizing their benefits.

In conclusion, the implementation of circular economy principles in noise barrier production not only presents a viable solution for enhancing the company's sustainability practices but also aligns with the objectives of prominent global initiatives such as the European Union's Circular Economy Action Plan and the United Nations' Sustainable Development Goals (SDGs). By adopting circular practices, the company contributes to the achievement of SDGs such as Goal 12 (Responsible Consumption and Production) and Goal 13 (Climate Action) by promoting resource efficiency, reducing waste, and mitigating environmental impacts.

Furthermore, this research highlights the value of using the Circular Canvas as an effective tool for exploring circular economy opportunities in the industrial context. The Circular Canvas facilitated a comprehensive analysis of the company's production process, helping to identify key areas for circularity integration.

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Examining the Influence of Urbanization and Low-Carbon Energy Sources on CO₂ Emissions in EU Countries: A Panel Data Analysis

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Abstract

Research background: The study focuses on examining the influence of urbanization and low-carbon energy sources on CO₂ emissions in EU countries through panel data analysis. It aims to contribute to the understanding of the relationships between carbon emissions, urbanization, economic growth, energy consumption, and the use of renewable and nuclear energy sources.

Purpose of the article: The research aims to address three key questions: (1) Are there short-term and long-term relationships among the variables of interest? (2) How do carbon emissions relate to the independent variables during different time periods? (3) Can urbanization, economic development, energy consumption, and the proportion of renewable/low-carbon energy sources influence carbon emissions and contribute to achieving carbon neutrality targets?

Methods: The study employs various econometric models, including panel models Mean Group Estimation (MG), Pooled Mean Group Estimation (PMG) and Common correlated Effects Model (CCE) to analyze data from 22 EU countries spanning the period from 1992 to 2019. These models facilitate the examination of the relationships between the variables of interest.

Findings & Value added: The findings of the study provide valuable insights into the short-term and long-term relationships among carbon emissions, urbanization, economic growth, energy consumption, and the use of renewable and nuclear energy sources. The research highlights the dynamics of carbon emissions and their interactions with independent variables over different time periods. Additionally, it sheds light on the potential influence of urbanization, economic development, energy consumption, and the proportion of renewable/low-carbon energy sources on carbon emissions and their relevance to achieving carbon neutrality targets. The research findings contribute to the existing knowledge by offering valuable insights for decision-makers and policymakers. They can inform the formulation of new or revised policies aimed at fostering a carbon-neutral and environmentally sustainable economy at both the EU and national levels.

Keywords: urbanization, CO₂ emissions, economic growth, energy consumption, panel data, EU countries

JEL classification: O13, P18, Q43

1. Introduction

Climate change, driven by rising greenhouse gas emissions, poses a significant threat to the planet and human well-being. The Intergovernmental Panel on Climate Change (IPCC) states in its latest report that urgent and decisive action is required to limit global warming to well below 2 degrees Celsius above pre-industrial levels (IPCC, 2022). Carbon dioxide (CO₂) emissions, a major contributor to climate change, necessitate a thorough understanding of their drivers and effective mitigation strategies.

Within this context, the European Union (EU) has emerged as a prominent force in pursuing the transition towards a low-carbon economy. A key aspect of this endeavor lies in comprehending the factors that influence CO₂ emissions and devising effective strategies to mitigate their impact.

The process of urbanization, characterized by the rapid growth and increased population density of cities, holds significant implications for energy consumption patterns and subsequent carbon emissions.

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The migration of individuals to urban areas has led to a surge in energy demand for powering transportation systems, buildings, and industrial activities. Consequently, these trends have contributed to escalating CO₂ emissions, unless proactive measures are implemented to foster sustainable urban development practices and promote the adoption of low-carbon energy sources (Li et al., 2022; Musah et al., 2021; Verma et al., 2021; Zhijian Wang et al., 2021; Xu et al., 2019).

According to the United Nations Human Settlements Programme (UN-Habitat), urbanization is a crucial factor in the fight against climate change. As UN-Habitat states: "Urban areas are responsible for over 70% of global energy consumption and greenhouse gas emissions. Sustainable urbanization is key to mitigating climate change and achieving sustainable development" (UN Habitat, 2020).

Concurrently, the integration of low-carbon energy sources, including renewable energy and nuclear power, has gained momentum across many countries. Multiple studies have investigated the intricate relationship between clean energy consumption, economic growth, and CO₂ emissions, consistently affirming the mitigating effect of renewable energy sources on CO₂ emissions (Adebayo et al., 2022; Chovancová et al., 2021; Petruška et al., 2021; Petruška et al., 2022; Radmehr et al., 2021; Vural, 2020). In a comprehensive analysis, Ozcan & Ari (2017) examined the nexus between nuclear energy and economic growth in 13 OECD countries. Their findings supported the feedback hypothesis, revealing a positive long-term impact of nuclear energy on GDP in six of the countries. On the other hand, Anwar et al. (2019), analyzing data from 59 countries, found that a higher proportion of nuclear energy led to reduced CO₂ emissions, with the exception of upper-middle-income countries.

These alternative energy sources offer promising opportunities to curtail carbon emissions by replacing fossil fuel-based energy generation. However, it remains crucial to explore and analyze the extent to which these low-carbon energy sources effectively contribute to emission reduction, particularly within the context of urbanization.

To address this research gap, this study aims to assess the impact of urbanization and the utilization of low-carbon energy sources on the trajectory of CO₂ emissions in EU countries. By employing a rigorous panel data analysis approach, we investigate the intricate relationships between carbon emissions, urbanization dynamics, economic growth patterns, energy consumption levels, and the proportion of renewable and nuclear energy sources. Through this research, we seek to provide valuable insights into the complex interplay of these factors and contribute to the formulation of effective policies for achieving carbon neutrality targets in the EU and beyond.

2. Data and methods

This study analyses the effect of energy consumption, renewable energy consumption, nuclear energy consumption, urban population, and gross domestic product on CO₂ emissions. The analysis utilizes data from 22 European Union (EU) countries from 1992 to 2019. Due to data availability, these 22 EU countries were selected for the analysis: Austria AUT, Belgium BEL, Bulgaria BGR, Czech Republic CZE, Denmark DNK, Finland FIN, France FRA, Germany DEU, Greece GRC, Hungary HUN, Ireland IRL, Italy ITA, Luxembourg LUX, Netherlands NLD, Poland POL, Slovenia SVN, Slovak Republic SVK, Spain ESP, Romania ROU, Portugal PRT, Sweden SWE, and United Kingdom GBR. The relationships between the six variables were examined. The list of investigated variables along with their abbreviated names used in the analyses is as follows:

- Carbon dioxide (CO₂) emissions per capita (tons) – CO₂,
- Urban population (% of total population) – Urban,
- Gross Domestic Product (GDP) per capita (thousands USD) – GDP,
- Total energy consumption per capita (MWh) – TEC,
- Energy produced from renewable sources per capita (MWh) – RES,
- Energy produced in nuclear power plants per capita (MWh) – Nuclear.

To examine the relationships between the six variables, data were sourced from publicly available databases. The World Bank provided data on GDP per capita, the Global Carbon Atlas offered data on CO₂ emissions per capita in tons, and Our World in Data supplied data on energy use per capita in kWh, urban population as a percentage of the total population, energy produced from renewable sources in MWh per capita, and energy produced in nuclear power plants in MWh per capita.

2.1 Descriptive statistics

The primary focus of this study is to examine the impact of the urban population variable on per capita carbon dioxide (CO₂) emissions, along with investigating the influence of other mentioned variables. Additionally, the study aims to explore the relationship between per capita CO₂ emissions and various other variables within a multidimensional framework. The variables, except for nuclear power, were logarithmized prior to model testing and estimation. The descriptive statistics of the variables in the entire dataset consisting of n = 616 observations are presented in Table 1.

Table 1. Descriptive statistics of investigated variables, all 616 observations

Variable	Unit	Mean	Std.Dev	Min	Max
CO2	tons per capita	8.784	3.721	3.818	31.253
Urban	% of total population	72.093	12.462	49.130	98.041
GDP	thousands USD per capita	30.406	17.058	4.504	124.591
TEC	MWh per capita	44.345	17.233	17.920	114.632
RES	MWh per capita	4.259	5.394	0.055	26.539
Nuclear	MWh per capita	4.637	5.726	0	23.385

Source: own processing (2023)

2.2 Overview of the methods used to investigate the relationship between variables

Various methods were used to investigate the relationship between the variables under study. A progression from simpler to more complex methods was chosen. Significant results from the simpler method whose diagnostics led to doubts about the validity of its application were used to select parameters in the more complex method subsequently used. The chapter concludes with the resulting model describing the nexus between the dependent variable Log_CO2 and the independent variables Log_Urban, Log_GDP, Log_RES, Log_TEC and Nuclear. The list of used methods is as follows:

- Panel models: Fixed Effects (FE), Random Effects (RE),
- Pooled Mean Group Estimation (PMG) – Error Correction Model (ECM),
- Mean Group Estimation (MG) – ECM,
- Dynamic FE estimation - ECM,
- Common correlated effect model (CCE).

The methodology flow is captured on Figure 1.

The following correlation coefficients in Table 2 were calculated from the original, untransformed data and serve to provide initial brief information about the relationship between the variables under study.

Table 2. Correlation coefficients from untransformed data

	CO2	Urban	GDP	RES	TEC	Nuclear
CO2	1					
Urban	0.3841***	1				
GDP	0.3848***	0.4553***	1			
RES	-0.2240***	0.1214***	0.2230***	1		
TEC	0.7540***	0.6464***	0.5231***	0.278***	1	
Nuclear	-0.1679***	0.3261***	-0.0550	0.4620***	0.3551***	1

Note : ***, **, * stand for significance level at 1%, 5% and 10%

Source: Own processing – in Stata

We conducted a multicollinearity test on the independent variables Log_GDP, Log_TEC, Log_Urban, Log_RES, and Nuclear using the Variance Inflation Factor (VIF). The VIF values are presented in Table 3.

Table 3. Variation Inflation Factor

Variable	VIF
Log_GDP	2.32
Log_TEC	2.27
Log_Urban	2.03
Log_RES	1.63
Nuclear	1.62

Source: Own processing – in Stata

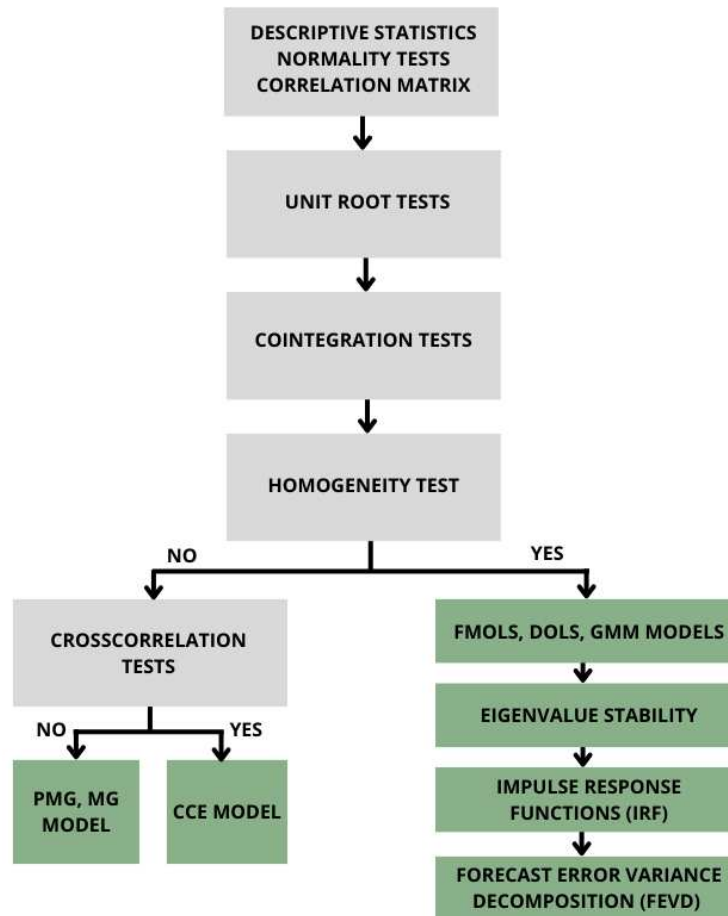


Figure 1. Methodology flow

For a reliable model, the VIF values should not exceed 5. Fortunately, all the variables exhibit VIF values significantly below this threshold. This indicates that multicollinearity among the input variables can be excluded, allowing us to consider models that include all the variables.

3. Results

3.1 Panel models

In addition to the previously considered cross-sectional variables, the panel model incorporates a time variable. The analysis covers 22 countries ($N = 22$), spanning the period from 1992 to 2019 ($T = 28$), resulting in a total of 616 measurements. The suitable model is selected from the options of Fixed Effects (FE), Random Effects (RE), and Pooled model.

The tests and parameters for the FE and RE models are presented in Table 4. The results of the FE test (F test) are promising, with a p-value of 0.00, indicating the rejection of the hypothesis that all specific constants are equal to zero. Similarly, the results of the RE test (Wald test) are favorable, with a p-value of 0.00. The regression coefficients of the FE and RE models are closely aligned and exhibit the same signs. Notably, the coefficient for Nuclear is only significant in the RE model.

Table 4. Fixed Effects and Random Effects model

Dependent: Log_CO2	Fixed Effects model		Random Effects model	
	Coef	P>|t|	Coef	P>|t|
Log_Urban	-0.3261	0.000	-0.3547	0.000
Log_GDP	-0.0774	0.000	-0.0744	0.000
Log_RES	-0.0404	0.000	-0.0430	0.000
Log_TEC	1.1752	0.000	1.1698	0.000
Nuclear	-0.0013	0.136	-0.0028	0.001
cons	-0.2534	0.044	-0.1882	0.117

Source: Own processing – in Stata

According to the panel models, an increase in Urban, GDP, RES, and in the case of RE, Nuclear, leads to a decrease in CO₂ emissions per capita. Conversely, an increase in TEC results in an increase in per capita emissions. Therefore, the panel models suggest that higher levels of urbanization contribute to reduced CO₂ emissions.

To ensure the accuracy of the model selection (FE, RE, Pooled), the Hausman test and the Breusch-Pagan Lagrange multiplication test (Table 5) were employed. The results of both tests indicate a preference for the fixed effects model.

Table 5. Model fit tests

Test	H ₀	p
Hausman	Preferred model is RE	0.001
Breusch-Pagan Lagrange multiplier	No panel effect	0.000
Pesaran CD test	Residuals are not correlated	0.000
Modified Wald test for groupwise heteroskedasticity	Homoskedasticity (or constant variance)	0.000

Source: Own processing – in Stata

3.2 Panel unit root tests

Unit root tests were conducted to determine the nature of the random variable, specifically whether it follows a non-stationary process of type I(1) (Choi, 2001; Harris & Tzavalis, 1999; Kwiatkowski et al., 1992). Initially, the logarithmic variable itself was tested, followed by its first difference. The following unit root tests were employed:

- Fisher (Augmented Dickey-Fuller Test) - Time trend, lagged difference 1;
- Fisher (Phillips-Perron unit root test) - Time trend, lagged difference 1;
- Im-Pesaran-Shin (Im et al., 2003) - Time trend, lagged specification 1;
- Levin-Lin-Chu (Levin et al., 2002) - Time trend, lagged specification 1;
- Breitung - Time trend, lagged difference 1;
- Hadri - Time trend.

Based on the majority of tests, it can be concluded that the variables exhibit first-order integrability, denoted as I(1).

3.3 Panel cointegration tests

Cointegration tests were employed to determine whether there exists a long-term stable relationship between the variables. This indicates that economic time series, driven by certain economic theories, do not diverge over time and return to equilibrium after short-term fluctuations. The following tests were used:

- KAO test - Lags(1)
- Pedroni test - AR parameter is panel-specific, includes panel-specific time trend, Lags(1)
- Westerlund tests - include panel-specific time trend

Among the ten tests, two tests do not reject the null hypothesis of no cointegration (the third Kao test and the second Westerlund test). Consequently, further estimation of the cointegration relationship between the analyzed variables can be pursued.

3.4 Estimation of heterogeneous panels

The test for column homogeneity yields a p-value of zero, indicating the need to employ heterogeneous panel methods. The estimation approaches used to determine the cointegration relationship are the Mean Group Estimator (MG) and the Pooled Mean Group Estimator (PMG). (Pesaran et al., 2001) proposed MG and PMG estimators that consider both short-run and long-run dynamics. They introduced a restriction on the coefficients of the long-run relationship, which can be uniform across all entities. The PMG model is estimated using the maximum likelihood method. Additionally, this regression can be estimated with different coefficients for the long-run relationship for each entity, and then the average is calculated, leading to the MG estimator.

3.5 Pooled Mean Group Estimation (ECM)

The dynamic PMG estimator assumes that the coefficients of the cointegration vector are the same for all entities, while the speed of adjustment (ec) and the short-run coefficients may differ across entities.

Table 6. Pooled Mean Group Estimation, Error correction form (PMG)

D.Log_CO2		Coef	Pvalue	95% Conf. Interval	
Long-run	Log_Urban	-1.9124	0.000	-2.3520	-1.4728
	Log_GDP	-0.1016	0.000	-0.1270	-0.0762
	Log_RES	-0.0928	0.000	-0.1171	-0.0685
	Log_TEC	1.1426	0.000	1.0440	1.2412
	Nuclear	-0.0097	0.000	-0.0123	-0.0071
Short-run (SR)	ec	-0.2079	0.000	-0.2912	-0.1245
	D.Log_Urban	-0.5383	0.852	-6.1752	5.0985
	D.Log_GDP	0.0295	0.356	-0.0330	0.0920
	D.Log_RES	-0.0959	0.000	-0.1447	-0.0469
	D.Log_TEC	0.8927	0.000	0.7321	1.0531
	D.Nuclear	-0.0074	0.000	-0.0112	-0.0035
	cons	0.5849	0.000	0.3510	0.8187

Source: Own processing – in Stata

Table 6 presents the model results, wherein the coefficient for the Urban variable is statistically significant. The other coefficients corresponding to the long-run relationship at the top of the table are also significant. However, in terms of the short-run relationship (SR) at the bottom of the table, the coefficients for Log_GDP and Log_Urban are not significant.

3.6 Mean Group estimation (ECM)

For Mean Group Estimation (Table 7), the coefficients for both the long-run and short-run relationships are calculated separately for each entity, and then the average is determined. In comparison to PMG, there are fewer coefficients that reach significance, but their signs remain consistent.

Table 7. Mean Group Estimation: Error Correction Form (MG)

D.Log_CO2		Coef	Pvalue	95% Conf. Interval	
Long-run	Log_Urban	-1.8208	0.199	-4.6015	0.9599
	Log_GDP	-0.1194	0.241	-0.3192	0.0803
	Log_RES	-0.1304	0.003	-0.2178	-0.0431
	Log_TEC	0.9309	0.000	0.6816	1.1803
	Nuclear	0.0001	0.987	-0.0126	0.0128
Short-run (SR)	ec	-0.6219	0.000	-0.7653	-0.4784
	D.Log_Urban	-17.6639	0.335	-53.5640	18.2361
	D.Log_GDP	0.0506	0.238	-0.0335	0.1348
	D.Log_RES	-0.0196	0.325	-0.0587	0.0194
	D.Log_TEC	0.4824	0.000	0.2828	0.6819
	D.Nuclear	-0.0034	0.141	-0.0080	0.0011
	cons	2.7268	0.138	-0.8803	6.3340

Source: Own processing – in Stata

3.7 Dynamic FE estimation (ECM)

The Dynamic FE estimator constrains the coefficients of the cointegration vector, the speed of adjustment, and the short-run coefficients to be the same across all entities. When employing this model, only the GDP and TEC variables exhibit significant coefficients in the long-term relationship, as can be seen in Table 8.

In all three models, the coefficients generally exhibit the same signs, except for the Nuclear variable in the long-run relationship. However, the significance of the coefficients varies across the models. The PMG model demonstrates the highest number of significant coefficients. Notably, the error-correction speed of adjustment parameter (ec) and the long-run coefficients are of particular interest. If the ec parameter is significantly negative, it indicates a long-run relationship between the

dependent variable, Log_CO2, and the independent variables Log_Urban, Log_GDP, Log_RES, Log_TEC, and Nuclear, suggesting a return to long-run equilibrium. The speed of adjustment values are as follows: -0.20788 for PMG, -0.6219 for MG, and -0.1535 for DFE. In all three cases, the p-value is 0.

Table 8. Dynamic Fixed Effects Regression (DFE)

D.Log_CO2		Coef	Pvalue	95% Conf. Interval	
Long-run	Log_Urban	-0.4165	0.120	-0.9417	0.1086
	Log_GDP	-0.1042	0.001	-0.1634	-0.0449
	Log_RES	-0.0311	0.079	-0.0659	0.0035
	Log_TEC	1.3522	0.000	1.1614	1.5429
	Nuclear	0.0001	0.981	-0.0067	0.0068
Short-run (SR)	ec	-0.1535	0.000	-0.2016	-0.1055
	D.Log_Urban	-0.1006	0.874	-1.3479	1.1466
	D.Log_GDP	0.0231	0.023	-0.0412	0.0875
	D.Log_RES	-0.0925	0.000	-0.1058	-0.0791
	D.Log_TEC	0.8719	0.000	0.7904	0.9534
	D.Nuclear	-0.0068	0.000	-0.0085	-0.0051
	cons	-0.0542	0.479	-0.2043	0.0959

Source: Own processing – in Stata

To determine the appropriate model, the Hausman test is employed. The null hypothesis of the test is as follows: H0: Difference in coefficients is not systematic. The results of the tests are presented in Table 9.

Table 9. Hausman tests

	Test	Models	Pvalue
1.	Hausman	MG, PMG	0.550
2.	Hausman	MG, DFE	0.000

Source: Own processing – in Stata

The first test compares the MG and PMG models, indicating a preference for the PMG estimator over MG. In the second test, the choice lies between MG and the DFE model, favoring the MG model over DFE. Consequently, the PMG model is preferred.

In the previous models, we did not test for the presence of cross-correlation between entities (countries), which can lead to biased and inconsistent estimates. Tests for weak cross-sectional dependence (CSD) reveal strong cross-correlation among all variables. Table 10 presents the results of testing for strong cross-sectional dependence (CSD).

Table 10. Testing for strong cross-sectional dependence (CSD)

	Alpha	CD	CDw	CDw+	CD*
Log_CO2	0.978	53.02***	-2.57***	813.45***	1.17
Log_GDP	1.00	78.73***	-3.09***	119.51***	-3.01***
Log_RES	1.005	55.61***	-2.82***	840.94***	4.01***
Log_TEC	0.977	32.79***	-0.45	629.33***	-1.96**
Nuclear	0.858	3.97***	3.16***	225.76***	-1.97**
Log_Urban	0.959	28.63***	-3.42***	1072.29***	3.52***

Source: Own processing – in Stata

In situations like these, the Correlated Effect Model (CCE), as proposed by (Ditzen, 2018, 2021), can be employed. The parameter estimates of the CCE model are presented in Table 11.

In situations where countries do not have nuclear power plants, such as AVT, DNK, GRC, IRL, ITA, LUX, POL, and PRT (as mentioned in the Data and Methods section), the variable Nuclear had zero values. However, the calculation using the xtdcce2 algorithm in Stata failed due to this reason, and as a result, the variable Nuclear was omitted in the CCE model.

Unlike the previous models, the CCE model exhibits the fewest significant coefficients. Among the Long Run coefficients, the Log_RES and Log_TEC variables show significance. The CD statistic yields a p-value of 0.1486, and the Estimation of Cross-sectional Exponent (alpha) is calculated as 0.5631. This indicates that the residuals of the CCE (PMG) model can be considered weakly cross-sectional dependent.

Table 11. Correlated Effect Model (CCE) (EU – 22) (PMG)

D.Log_CO2		Coef	pvalue	95% Conf. Interval	
Long-run	Log_Urban	0.2958	0.849	-2.7511	3.3428
	Log_GDP	-0.1185	0.410	-0.4003	0.1632
	Log_RES	-0.1417	0.013	0.2534	-0.0299
	Log_TEC	1.0477	0.010	0.2518	1.8436
	Nuclear	-	-	-	-
Short-run (SR)	ec	-0.6941	0.000	-1.0835	-0.3046
	D.Log_Urban	34.3202	0.378	-42.0464	110.687
	D.Log_GDP	0.0888	0.261	-0.0659	0.2435
	D.Log_RES	-0.0113	0.388	-0.0369	0.1435
	D.Log_TEC	0.2066	0.000	0.0936	0,3195
	D.Nuclear	-	-	-	-

Source: Own processing – in Stata

In the subsequent analysis, the aforementioned countries were excluded, and the computation proceeded smoothly. The results are presented in Table 12.

Table 12. Correlated Effect Model (CCE) (EU – 14) (PMG)

D.Log_CO2		Coef	pvalue	95% Conf. Interval	
Long-run (ec)	Log_Urban	2.6150	0.684	-9.9837	15.2318
	Log_GDP	-0.2323	0.610	-1.1239	0.6593
	Log_RES	-0.1290	0.098	-0.2817	0.0236
	Log_TEC	0.9630	0.012	0.2114	1.7146
	Nuclear	-0.00960	0.631	-0.0488	0.0296
Short-run (SR)	ec	-0.7422	0.166	-1.7935	0.3090
	D.Log_Urban	31.0227	0,342	-32.9910	95.0366
	D.Log_GDP	0.0728	0.518	-0.1479	0.2937
	D.Log_RES	-0.0197	0,321	-0.0587	0.0192
	D.Log_TEC	0.3941	0.000	0.2581	0.5302
	D.Nuclear	-0.0050	0.195	-0.0125	0.0025

Source: Own processing – in Stata

The CCE model exhibits even fewer significant coefficients compared to the previous case. The CD statistic yields a somewhat unsatisfactory value (p -value = 0.0789), while the Estimation of Cross-sectional Exponent (α) is at an acceptable level of 0.5702. Unfortunately, the speed of adjustment (ec) is not statistically significant. Moreover, we anticipated a significant effect of the Nuclear variable on reducing CO₂ emissions, considering these countries have non-zero nuclear power generation.

4. Discussion

The impact of urbanization on CO₂ emissions can vary across studies. Some studies find a positive relationship, indicating that higher urbanization levels lead to increased emissions (Abbasi et al., 2021; Z. Ahmed et al., 2019; Zhen Wang et al., 2019) due to energy consumption, transportation demands, and industrial activities in urban areas. However, other studies suggest that well-planned and sustainable urbanization strategies can contribute to reduced emissions (Krähmer, 2020; Raihan, 2023). These strategies involve promoting compact cities, efficient public transportation, and the integration of renewable energy sources. The varying results may be attributed to differences in urban planning approaches, policy measures, and regional contexts.

The positive association between GDP and CO₂ emissions is a commonly observed trend. As economies grow, energy consumption tends to increase, resulting in higher emissions. However, the relationship between economic development and emissions intensity (emissions per unit of GDP) is more nuanced. Some studies indicate that advanced economies with higher GDP levels exhibit lower emissions intensity, reflecting a decoupling of economic growth from carbon emissions (Chovancová & Vavrek, 2022; Menegaki, 2014). This can be attributed to the adoption of cleaner technologies, energy efficiency measures, and shifts towards service-oriented economies.

Similar to the findings in this study, numerous studies highlight the significant role of renewable energy sources in mitigating CO₂ emissions (Omokanmi et al., 2022; Özokcu & Özdemir, 2017; Siksnyte & Zavadskas, 2019). The expansion of renewable energy capacity, such as solar, wind, and hydropower, has been associated with reduced reliance on fossil fuels and subsequent emissions reductions. Policies promoting renewable energy deployment, such as feed-in tariffs, renewable portfolio standards, and financial incentives, have been effective in encouraging the transition to low-carbon energy systems.

The positive relationship between energy consumption (TEC) and CO₂ emissions observed in this study aligns with previous research that highlights the importance of energy efficiency measures. Studies consistently emphasize the need to enhance energy efficiency across sectors, including buildings, transportation, and industrial processes, to reduce energy demand and associated emissions (Ahmed et al., 2017; Mahi et al., 2021; Petruška et al., 2021). Policies targeting energy-efficient technologies, building codes, and energy management practices can significantly contribute to emissions reductions.

The impact of nuclear energy on CO₂ emissions reduction is a topic of ongoing debate and varies across studies. Some research suggests that nuclear power can serve as a low-carbon energy source, providing a stable and reliable baseload capacity (Brook et al., 2014; Kartal et al., 2023; Pao & Chen, 2019). However, concerns related to safety, waste disposal, and public acceptance have influenced the stance on nuclear energy adoption in different countries (Karakosta et al., 2013). Some studies argue that the long-term costs and risks associated with nuclear power may outweigh its potential benefits in reducing emissions, while others advocate for its inclusion in a diverse low-carbon energy mix.

The findings emphasize the need for integrated and targeted policy measures that address multiple dimensions of sustainability and prioritize a transition towards a low-carbon future. Further research and exploration of non-linear models, along with consideration of regional and country-specific factors, will continue to enhance our understanding of CO₂ emissions dynamics and inform effective mitigation strategies.

Conclusion

In conclusion, all the models utilized in this study indicate the presence of both short-term and long-term relationships between CO₂ emissions and the independent variables. The findings from the PMG model reveal that in the long run, variables such as Urbanization, GDP, renewable energy sources (RES), and ₂Nuclear have a significant effect on reducing CO₂ emissions, whereas total energy consumption (TEC) leads to an increase in emissions. In the short run, only RES and Nuclear exhibit a significant impact on CO₂ reduction, while total energy consumption maintains a similar effect as in the long run.

The question arises as to whether factors such as urbanization, economic development, energy consumption, and the utilization of renewable/low-carbon energy sources can influence carbon emissions and contribute to achieving carbon neutrality targets. Although the impact of urbanization was inconclusive in all models, further exploration utilizing non-linear models, such as Threshold models, would be beneficial to delve deeper into the relationship between urbanization and CO₂ emissions.

Additionally, the PMG model did not satisfy the criteria of weak cross-correlation, prompting the use of the CCE model. However, applying the CCE model to both the overall group of countries under study and the subgroup of countries utilizing nuclear power yielded less clear-cut impacts of the analyzed variables. When considering all countries, similar effects were observed for renewables and energy consumption in the long run, with only energy consumption having a significant impact in the short run. However, for countries utilizing nuclear energy, the CCE model demonstrated significant limitations, particularly with the speed of adjustment parameter, rendering the model impractical for application.

The findings suggest that the examined variables do have a significant influence on CO₂ emissions, and further research is warranted to explore the complexities of these relationships, particularly in the context of urbanization and the use of nuclear energy.

Future studies could benefit from investigating non-linear relationships between urbanization and CO₂ emissions using Threshold models, which may provide a more comprehensive understanding of how urbanization dynamics impact emissions. Additionally, more in-depth analysis is needed to elucidate the influence of nuclear energy on CO₂ emissions, considering its varying effects across different country contexts and income levels.

Furthermore, by exploring other variables and factors that might influence CO₂ emissions, such as policy measures, technological advancements, and international collaborations, and encompassing a

broader set of variables, future studies can better inform policymakers on effective strategies for achieving carbon neutrality targets and fostering a sustainable and environmentally conscious economy both within the EU and on a global scale.

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Significance of Deposit-Refund Systems in the Context of Effective Beverage Packaging Management in the Selected Regions of Slovakia: The Consumers' Perspective

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Abstract

Research background: Increased production and consumption of beverage packaging requires their subsequent appropriate recovery and recycling. One of the effective forms of beverage packaging recovery and also a way of reducing littering and related environmental pollution are the deposit-refund systems.

Purpose of the article: Only a few studies analyze and include the public's perception associated with the adoption of deposit-refund systems. The aim of the paper was to evaluate the significance of deposit-refund systems in Slovakia from the perspective of consumers in selected regions.

Methods: The primary data were obtained by the online questionnaire survey. We focused on the comparison of Slovakia's regions, specifically the Prešov and Bratislava regions, i.e. regions where various socio-economic differences are evident. The methods of descriptive and analytical statistics were used to analyze the collected data.

Findings & Value added: The results indicate that the awareness of deposit-refund systems is at a high level, the majority of the respondents agree with their introduction and the frequency of use achieves good results despite the beginning of their introduction in Slovak conditions, but does not yet fully reflect their knowledge and agreement with their introduction. No significant statistical differences were found in the region variable within the questions concerning the knowledge, introduction and location of deposit-refund systems, which may indicate that the deposit-refund systems were implemented correctly in the conditions of the Slovak regions.

Keywords: deposit-refund systems, beverage packaging management, consumers' perspective, Slovakia

JEL classification: H23, Q53, Q58

1. Introduction

The growing world population requires more and more food. This in turn leads to an increasing amount of packaging waste such as bottles, boxes and foils (Gomez et al., 2009). The share of packaging material in the total environmental impact of the product can be up to 45%, depending on the type of food and packaging material (Del Borghi et al., 2014). Packaging plays a fundamental role in the production of food and beverages as well as in supply chains. In addition to informing and attracting end consumers, packaging also protects and preserves the quality of food and beverages. Although there has been a steady increase in the volume of recycled and recovered waste in the European Union in recent years, the volume of packaging waste produced per year actually increased from 161.9 kg per capita in 2007 to 177.6 kg per capita in 2019 (Eurostat, 2023). The growth of social concerns regarding the deterioration of the environment has encouraged the promotion of more efficient and sustainable means of dealing with waste generation and management (Roca i Puigvert et al., 2020). Countries needed reform that would channel waste towards recycling, thus maintaining sustainability between resources and the environment (Xing et al., 2020). Recycling generally conserves natural resources and promotes biodiversity to improve the long-term sustainability of the global ecosystem (Ayodele et al., 2018; Robaina et al., 2020). Recycling

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eliminates harmful waste and environmental pollution, which has beneficial effects on human health and other living creatures (Jabbour et al., 2019). Recycling is the basis of one of the effective means of reducing environmental impacts and ensuring extended producer responsibility, which is a deposit-refund system. Deposit-refund systems effectively transfer waste streams from final disposal to reuse or recycling. Compared to other collection systems, they have a better effect on the treatment of scattered and hard-to-regulate solid waste. Therefore, the key area of application of deposit-refund systems has become the packaging of beverages, which is related to its large amount, scattered consumption and high intensity of pollution (Zhou et al., 2020).

Under beverage packaging deposit schemes, consumers have to pay a "packaging deposit" as an added price to the products purchased. This deposit is returned when consumers return used packaging to the point of sale in good condition for identification and take-back (Roca i Puigvert et al., 2020). The deposit-refund system has been implemented in many countries around the world and has led to increased recycling and reduced environmental pollution. Finland, for example, has a long history of deposit-refund systems for beverage packaging. The deposit-refund system has existed in Finland since 1950, with the first system being used for refillable glass bottles. Single-use metal beverage cans were added in 1996, single-use PET bottles in 2008, and single-use glass bottles in 2011. Thanks to a well-set system and public support, the collection rate in 2022 was more than 90% in all three cases (PALPA, 2023). In Germany, a beverage packaging buyback system has been in effect since 2003, covering PET, glass and metal bottles and cans. According to the system operator, the overall return rate of disposable packaging in Germany is 98%. These examples not only indicate that much less waste enters the environment, but also that a successful circular economy model has been created within the area, that can be followed. And many countries are currently implementing it based on these successful results, in 2022 and 2023 for example, Latvia, Slovakia, Romania, Turkey, Greece, Malta, Portugal, Ireland and Scotland (TOMRA, 2022). However, due to the large differences in national conditions between different countries, the specific ways of implementing deposit-refund systems are not the same (Zhou et al., 2020).

Siritorn (2021) describes comparisons of economic instruments of environmental policy, and deposit-refund systems are among the instruments with the best results. The application of deposit-refund systems significantly reduces environmental pollution and contributes to the efficient recycling of a large amount of recycled materials (Lavee, 2010). The deposit-refund system was gradually applied to other products, such as lead batteries, motor oils, tires, various hazardous materials, electronics and others (Walls, 2011).

The deposit system is a proven solution for more than a billion beverage containers that are introduced to the Slovak market annually. In the past, a significant part of the packaging ended up where it shouldn't - unsorted, unrecycled or thrown in nature. Thanks to the deposit-refund system, it is possible to increase the current collection rate of beverage packaging to 90%, i.e. to the level set by the European Union for the member states by 2029. Without the introduction of beverage packaging deposit-refund systems, which are constantly gaining popularity, it will be difficult to impossible to achieve this goal. The deposit-refund system started operating in Slovakia on January 1, 2022. Disposable plastic bottles and beverage cans with a volume of 0.1 l to 3 l are backed up. Each backed-up bottle or can has the symbol "Z" in the recycling arrows and the text "backed up". Only packages marked in this way are backed up and consumers can return them to the collection point for 15 eurocents. It is possible to return the packaging in any store that is involved in the deposit system. There are already approximately 3,000 such places throughout Slovakia. It is not possible to implement a complex system overnight, but the deposit-refund system results for the first year of operation exceeded all expectations. Optimistic scenarios counted on a maximum of 60% of returned beverage packaging, but the return of PET bottles and cans exceeded 70% (Ministry of Environment of the Slovak Republic, 2023).

The implementation of such a system, on the other hand, also means significant expenses, and its effectiveness is related to increasing the rate of recycling, which depends to a decisive extent on the involvement and participation of the public. Roca i Puigvert et al. (2020) conducted a study whose results indicate that attitudes and underlying motivations, as well as subjective norms and perceived ability, resources and opportunities for recycling, are decisive for the public's intention to adopt deposit systems. According to the results, the public also very sensitively perceives the information provided regarding deposit-refund systems for beverage packaging, which has the potential to change waste recycling behavior. Recycling, which is the main principle of deposit systems, is behavior guided by principles, that is, the attitudes it creates and the resulting intention to recycle are influenced by personal values and experienced social pressures, which needs to be responded to in further research by examining various

factors, as currently very few studies analyze and include public perception associated with the adoption of beverage packaging deposit-refund systems (Viscusi et al., 2011).

2. Methods

The purpose of the research of the presented study was aimed at evaluating the importance of deposit-refund systems in Slovakia from the point of view of consumers in selected regions. The study focuses on the comparison of two regions of Slovakia, namely the Prešov and Bratislava regions. The selected regions were chosen on the basis of regional disparities, which have been recorded in them for a long time in economic, social and environmental areas (Michálek & Podolák, 2014).

For the purposes of analysis, primary data were used, which were obtained using a questionnaire survey. The questionnaire contained 18 questions, while 4 questions were aimed at finding out the socio-demographic characteristics of the population and the other 14 questions were aimed at finding out attitudes in relation to deposit systems for beverage packaging, specifically knowledge, satisfaction and frequency of using deposit systems and other general opinions on the introduction and use of deposit systems in the given regions. Respondents could answer the questions based on a 5-point Likert scale. The selection of the research sample is based on the selection of respondents who meet certain criteria. In the case of the research in question, it was about criteria of representativeness from the point of view of the regions of residence - Prešov and Bratislava regions and gender affiliation. We asked the respondents to fill out the questionnaire through online platforms and social networks, focusing on various regional groups and pages that can be described as opinion-neutral.

The methods of descriptive and analytical statistics were used to analyze the collected data, while the Statistica program was used. The Shapiro-Wilk test and the Kolmogorov-Smirnov test were used to test normality, the data did not show a normal distribution, therefore we used non-parametric tests, namely the Mann-Whitney U test to test the differences between groups of respondents and the Spearman correlation coefficient to test the association between different variables.

The data collection was carried out from 14.02.2022 to 31.03.2022, while the research sample, after cleaning the data from incomplete answers and respondents from regions other than those under investigation, consisted of 201 statistical units (respondents' answers). The average age of the entire sample was 36 years. The youngest respondent was 18 years old and the oldest was 68 years old. The average age in the Bratislava region was 33 years and in the Prešov region 39 years. Table 1 shows detailed data on the distribution of variables according to gender, region of residence and maximum achieved level of education.

Table 1. Characteristics of sample selection

Characteristics	Frequency	Percent
Gender characteristics:		
Male	69	34.3
Female	132	65.7
Region of residence:		
Bratislava	84	41.8
Prešov	117	58.2
Maximum achieved level of education:		
High school	96	47.8
University	105	52.2

Source: own processing

Compared to the selection plan, the biggest differences were identified in the area of gender characteristics and relatively high representation of university-educated respondents. The above can be seen as a limitation, but no significant distortion of the results is expected.

3. Results

In the next part of the study, the results of the analytical processing are presented - they are divided into three parts. The first part is focused on the descriptive analysis of the achieved results, where the most important and interesting findings are selected. The second part analyzed the differences in the selected variables in terms of the region of residence of the respondents. The third part is focused on assessing the relationships between the selected variables.

As part of the questionnaire, after socio-demographic questions, we investigated the main source of information about deposit-refund systems for beverage packaging from the point of view of consumers. Respondents from the two investigated regions most often obtain information about this type of deposit systems by means of the internet, 33% of respondents indicated this possibility. The second most common source of obtaining information is the television with 31% of respondents, the third is social networks with 17%, followed by other information sources with 6%, which the respondents did not have a choice to select. The options family and acquaintances, print or radio reached 5% or less. The results showed that the most frequently used sources for obtaining information are the internet and television.

Furthermore, we investigated the respondents' knowledge of the concept of deposit-refund systems for beverage packaging, while in the Bratislava region up to 93% of respondents answered definitely yes, in the Prešov region it was 86%. The results show that the respondents are familiar with the topic of deposit-refund systems for beverage packaging.

In the following question, respondents were asked to agree with the statement that deposit-refund systems are a suitable method for collecting and recycling beverage packaging. According to the answers of the respondents from the Bratislava region, we record a clear agreement (I definitely agree) with the suitability of the introduction among 50% of respondents and moderate agreement (rather agree) among 32% of respondents, in the Prešov region 55% of respondents definitely agree and 33% of respondents rather agree. According to the described results, we can conclude that the deposit-refund systems of beverage packaging were received positively and the purpose of their introduction was understood correctly.

According to the results of the previous questions, the majority of respondents know the term and agree with the introduction of beverage packaging deposit-refund systems, but as for the frequency of use, the results of which are shown in Figure 1, only 13% of respondents in the Bratislava region use the possibility of deposit-refund beverage packaging "always" when it is possible, in the Prešov region it is 10% of respondents. On the other hand, among the respondents, the most frequent answer was the „very often“ use of deposit machines, which was assigned the second highest degree of frequency of use, and this answer was indicated by 31% of respondents in the Bratislava region and 38% of respondents in the Prešov region. The results of the question indicate relatively positive behavior of the respondents in relation to the use of beverage packaging deposit-refund systems.

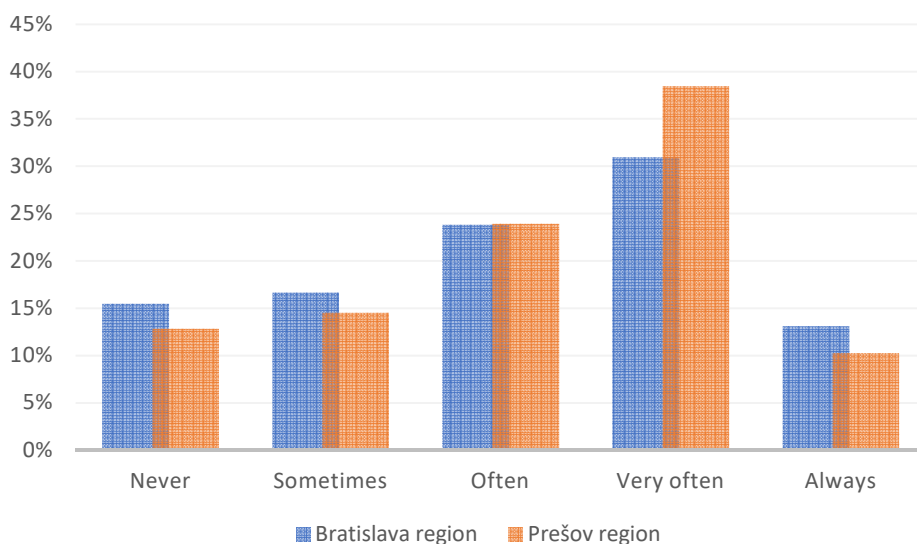


Figure 1. Frequency of use of beverage packaging deposit-refund systems
Source: own processing

In the next question of the questionnaire survey, we investigated the opinion on the sufficiency of the promotion of deposit-refund systems of beverage packaging in Slovakia. Only 37% of respondents from the Bratislava region and 39% of respondents from the Prešov region answered positively (definitely yes, rather yes). A negative answer (definitely not, rather not) was given by 45% of respondents from the Bratislava region and 43% from the Prešov region. The results indicate that the perception of the promotion of beverage packaging deposit-refund systems in Slovakia is not entirely ideal.

The following question focused on determining satisfaction with the location of deposit machines. Respondents within the Prešov region most often marked the option "rather satisfied", which was marked by 43% of respondents, and the neutral answer "neither satisfied nor dissatisfied", which was the second most common answer and was marked by 31% of respondents. Within the Bratislava region, respondents most often marked the option "neither satisfied nor dissatisfied", which was favored by 27% of respondents and 26% of respondents chose the second most frequently marked option "rather satisfied". In both regions, the third most frequently indicated option was "definitely satisfied". Negative answers (definitely dissatisfied and rather dissatisfied) were indicated by 25% of respondents in the Bratislava region and 14% of respondents in the Prešov region. The results indicate that the respondents are generally rather satisfied with the location of the deposit machines.

The last of the questions selected from the questionnaire survey focused on the impact of the introduction of deposit-refund systems for sorting other plastic waste in the household. The vast majority of respondents sort plastics as they did before the introduction of deposit systems, so the introduction of deposit systems did not significantly affect the sorting habits of other plastic waste in households. On the other hand, 30% of respondents in the Bratislava region and 26% of respondents in the Prešov region sort other plastic waste more than before the introduction of beverage packaging deposit-refund systems, which we consider a positive result.

For further statistical testing, we used the Shapiro-Wilk test and the Kolmogorov-Smirnov test for the normality of the variable distribution to test the normality of the investigated variables. Normality tests showed that the data did not have a normal distribution. Based on the nature of the data, the Mann-Whitney U test was used for statistical testing of differences between groups of respondents and the Spearman correlation coefficient was used for testing the association between different variables.

In the first analysis of differences, we wanted to test the existence of statistically significant differences in the knowledge of the concept of deposit-refund systems for beverage packaging between respondents from the Bratislava and Prešov regions. The output of the statistical difference testing using the Mann-Whitney U test, shown in Table 2, points out that the Z value is 0.93 and the statistical significance value of the test is 0.35, which is more than the selected alpha value (0.05). According to the results, there is no statistically significant difference in the knowledge of the concept of deposit-refund systems for beverage packaging between respondents from the Bratislava and Prešov regions.

Table 2. Results of the first analysis of differences

Mann – Whitney U test	Z value	p value
4480.50	0.93	0.35

Source: own processing

In the next analysis of differences, we wanted to test the existence of statistically significant differences in the evaluation of deposit-refund systems as a suitable method for the collection and recycling of beverage packaging between respondents from the Bratislava and Prešov regions. The output of the statistical difference testing using the Mann-Whitney U test shown in Table 3 points out that the Z value is -0.19 and the statistical significance value of the test is 0.84, which is more than the selected alpha value (0.05). According to the results, there is no statistically significant difference in the evaluation of deposit-refund systems as a suitable method for the collection and recycling of beverage packaging between respondents from the Bratislava and Prešov regions.

Table 3. Results of the second analysis of differences

Mann – Whitney U test	Z value	p value
4776.00	-0.19	0.84

Source: own processing

The last analysis of differences was aimed at testing the existence of statistically significant differences in the perception of satisfaction with the location of deposit machines for beverage packaging between respondents from the Bratislava and Prešov regions. The output of statistical difference testing using the Mann-Whitney U test shown in Table 4 points out that the Z value is -0.30 and the statistical significance value of the test is 0.76, which is more than the selected alpha value (0.05). According to the results, there is no statistically significant difference in the perception of satisfaction with the location of deposit machines for beverage packaging between respondents from the Bratislava and Prešov regions.

Table 4. Results of the third analysis of differences

Mann – Whitney U test	Z value	p value
4733.00	-0.30	0.76

Source: own processing

In the first association test, we wanted to test the existence of a statistically significant relationship between the frequency of use of beverage packaging deposit systems and the perception of satisfaction with the location of beverage packaging deposit machines. The output of statistical testing of the association using the Spearman correlation coefficient, shown in Table 5, shows that the value of the statistical significance of the test is 0.002, which is less than the selected alpha value (0.05), so according to our results, there is a statistically significant relationship between the frequency of using deposit-refund beverage packaging systems and the perception of satisfaction with the location of beverage packaging deposit machines. The value of Spearman's correlation coefficient is 0.36, which indicates a moderate strength of the relationship between the variables (Dancey & Reidy, 2011).

Table 5. Results of the first correlation analysis

Spearman ρ	p value
0.36	0.002

Source: own processing

The second association test was aimed at testing the existence of a statistically significant relationship between the frequency of use of beverage packaging deposit-refund systems and the sufficiency of promotion of beverage packaging deposit-refund systems. The output of statistical testing of the association using the Spearman correlation coefficient, shown in Table 6, shows that the value of the statistical significance of the test is 0.875, which is more than the selected alpha value (0.05), so according to our results, there is no statistically significant relationship between the frequency of using deposit-refund beverage packaging systems and the sufficiency of the promotion of deposit-refund beverage packaging systems.

Table 6. Results of the second correlation analysis

Spearman ρ	p value
0.012	0.875

Source: own processing

The results of the difference tests did not confirm the existence of differences in the investigated variables from the point of view of the respondents' regions of residence, which may indicate that the region of residence does not influence differences in the perception of the significance of deposit-refund systems for beverage packaging in Slovak conditions. Correlation tests revealed the existence of a significant relationship in one case, namely between the frequency of use of beverage packaging deposit-refund systems and the perception of satisfaction with the location of beverage packaging deposit-refund machines. We will describe the results in more detail in the discussion.

4. Discussion

In fulfilling the objective of the study in question, we reached several results, which we will summarize and interpret in this section.

When investigating the main source of information about deposit-refund systems, we found that respondents most often get information about deposit-refund systems from the internet and television. It should be noted that in other questions the respondents achieved a high level of knowledge of the concept and agreement with the introduction of deposit-refund systems for beverage packaging, i.e. the promotion before their launch had its effect, but on the other hand, the frequency of use is slightly behind and the respondents were rather skeptical when asked about the sufficiency of the promotion, which may indicate that the promotion and highlighting of economic, environmental and social benefits should be continued at least to some extent even after the deposit-refund system is launched and combine the internet and television, i.e. the main sources of information to be focused on, with the media that were marked by fewer respondents, that is, by social networks, which have a great influence especially on the younger generations, or by the press or radio, which have an influence more on the older generations, since the

non-marking of some media may also indicate that there was a lack of relevant information about deposit-refund systems.

According to the results of the questionnaire survey, we can say that the level of awareness about deposit-refund systems for beverage packaging is favorable in the studied regions. The results show that the subject of deposit-refund systems for beverage packaging is already widely known in Slovakia, probably mainly due to their introduction and related promotion. Furthermore, the results indicate that despite the greater burden on consumers when collecting and depositing this type of waste, deposit-refund systems for beverage packaging were mostly received positively and their introduction was understood correctly by consumers. The results of the question regarding the frequency of use of beverage packaging deposit-refund systems indicate relatively positive behavior of the respondents in relation to the use of beverage packaging deposit-refund systems, on the other hand, the results still do not reflect the general knowledge and agreement with the introduction of beverage packaging deposit-refund systems. On the other hand, at the time of filling out the questionnaire, the operation of deposit-refund systems was in its infancy, therefore the given results can be considered positive. Over time, it will be necessary to verify changes in consumer behavior with the help of further research and in case of stagnation or unfavorable development proceed to implementation of appropriate measures, e.g. renewal of campaigns and more intensive promotion.

As was partially mentioned above, we conclude from the results that the promotion of deposit-refund systems for beverage packaging in Slovakia cannot be described as completely ideal, and it was probably necessary to highlight the importance of deposit-refund in the media not only in its launch, but even after that. One of the concepts that are currently very relevant in Europe, directly related to voluntary instruments of environmental policy, which also include deposit-refund systems, and it is necessary to incorporate them in the promotion of deposit-refund systems, is the concept of the circular economy. This model will be more and more important in the future and brings economic, environmental and social benefits to the public, which need to be prioritized.

The results of the question aimed at determining satisfaction with the location of deposit machines indicate that the respondents are generally satisfied with their location, but there is probably still room for improvement in both regions. The number of machines has increased over time, so the question would need to be repeated as part of further research, i.e. when the system is fully operational.

Regarding the question of the impact of the introduction of deposit systems on the sorting of other plastic waste in the household, it is obvious that the vast majority of respondents sort plastics as they did before the introduction of deposit-refund systems, so the introduction of deposit-refund systems did not affect the habits of sorting other plastic waste in households to a greater extent. A positive finding is however the fact that quite a few respondents in both regions sort other plastic waste more than before the introduction of beverage packaging deposit-refund systems, which may indicate that this measure also had indirect effects on positive behavior in relation to other plastic waste.

The results of the differences tests did not confirm the existence of differences within the investigated variables from the point of view of the respondents' regions of residence, which may indicate that the region of residence and related regional disparities do not have an influence on the differences in the perception of the significance of deposit-refund systems for beverage packaging in Slovak conditions, and from this point of view, the deposit-refund systems were introduced correctly in the conditions of Slovak regions. Correlation tests revealed the existence of significant associations in one case, namely between the frequency of use of beverage container deposit-refund systems and the perception of satisfaction with the location of beverage container deposit machines, indicating that efforts to increase the frequency of use of deposit machines should consider their location as one of the important criteria.

Conclusion

The consumption of used beverage containers is increasing in the world, while these plastic, glass or metal containers have a significant negative impact on the environment. In many countries, this waste is becoming a critical problem and therefore the introduction of adequate waste management strategies is essential. Among the sustainable waste management systems we can also include deposit-refund systems for beverage packaging, which directly reduce the environmental impacts related to waste disposal, but also reduce the consumption of raw materials. In general, the goal of deposit-refund systems is to increase the level of recovery of beverage packaging, and this goal has been successfully met in many countries around the world, leading to the mitigation of environmental pollution.

The aim of the research of the presented study was to evaluate the importance of deposit-refund systems in Slovakia from the point of view of consumers in selected regions. In the study, we focused on the comparison of the Prešov and Bratislava regions. When comparing these regions, we did not find any significant differences within the investigated areas. In further research, however, it is necessary to examine other factors of recycling participation and involvement in Slovak conditions, e.g. the potential effect of sociodemographic variables such as age, education, gender or economic situation. It would be no less interesting to explore the motivation factor, without which consumers are unlikely to engage in recycling behavior. It is widely accepted that values, attitudes and behaviors are crucial in determining recycling behavior (Strydom, 2018; Passafaro et al., 2019).

The results of the questionnaire survey indicate that the level of awareness of deposit-refund systems for beverage packaging is favorable in the studied regions, deposit-refund systems are perceived as a suitable method for the collection and recycling of beverage packaging and the frequency of use of deposit-refund systems for beverage packaging indicates relatively positive behavior of respondents in relation to the use of deposit-refund of beverage packaging. For example, in relation to the above, the performed analysis of the correlations suggests that in efforts to further increase the frequency of use of deposit machines, it is necessary to take into account their location as one of the important criteria. Although the frequency of use of deposit-refund systems for beverage packaging does not yet reflect the results within the framework of general knowledge and agreement with the suitability of introducing deposit-refund systems for beverage packaging, on the other hand, deposit-refund systems in Slovakia are still in their infancy and the overall results within the given areas can be evaluated positively. Another positive finding is the fact that quite a few respondents in both regions sort other plastic waste more than before the introduction of deposit-refund systems for beverage packaging, which can be described as a positive phenomenon that may deepen even more over time. The described results, together with the data on the return of PET bottles and cans at the level of 70% for the first year of operation of the system, can be described as a success of this economic instrument of environmental policy in the conditions of Slovakia. However, changes in the perception of deposit-refund systems and the context resulting from their introduction should not be neglected and it is necessary to monitor them over time. When solving any problems with the deposit-refund system in Slovakia or when trying to upgrade it, e.g. with the introduction of new items suitable for deposit-refund, instructions and inspirations from other countries, where deposit-refund systems have been working for many years and achieved excellent results, are also still available.

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Does the Current EU Climate Policy Endanger the Economic Future of the EU Countries due to Unsettled Climate Science?

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Abstract

Research Background: The “European Climate Law“ aims at achieving net zero carbon dioxide emissions within the next 27 years. It is based on the findings of the IPCC and its climate outlook for the 21st century. However, there are serious doubts about IPCC computer models and concerns that measures to curb emissions are not balanced by the possible benefits.

Aim: We want to show the economic impact of climate legislation and bring new facts and aspects to the scientific debate that serve as justification. Furthermore, we find that climate science on global scale is not really settled and we designed a suitable experimental setup to clarify this important question

Methods: We reviewed relevant EU legislation, and performed lab and field measurements of infrared back radiation depending on varying CO₂ concentrations compared to atmospheric CO₂ concentration. To assess the potential economic impacts of current EU legislation, we surveyed with experts from different fields.

Findings & Value added: Our findings corroborate the repeatedly voiced doubts that increased CO₂ will lead to dramatic climate effects. We see clear evidence for saturation of IR absorption at current CO₂ concentrations in the atmosphere. A qualitative expert survey points at the potentially negative economic impact of present EU climate legislation.

Keywords: european climate law, IPCC, EU Green Deal, CO₂ saturation, experiment, measurement, economic impact assessment

JEL classification: O52, O39, K32, C90, Q20, Q54

1. Introduction

The EU considers climate change as an existential threat and wants to reduce net greenhouse gas emissions by at least 55% by 2030 and down to 0% by 2050 within the "EU Green Deal". Economic growth should be decoupled from the use of energy resources contrary to traditional thinking and practice. It therefore sees fighting climate change as one of the most important targets although Europe contributes less than 10% to the world population and CO₂ emission.

There is considerable dissent about the impact of growing CO₂ levels on temperature increase and their implications on living conditions. While the IPCC and the EU are predicting strong and negative effects John Christy (Christy, 2017) has shown that all of the climate models fail the test to match the real-world observations by a significant margin. Moreover, clouds are also scientifically not fully understood and therefore a big question mark in global climate models (Wild, 2020).

With a relative low cost experimental setup we measured the IR back radiation from varying CO₂ levels within a given N₂ atmosphere. The results confirm previous findings about infrared CO₂ saturation within the earth's atmosphere. Measurements were also performed studying the potential thermal forcing of additional CO₂ against clear night skies. These results will be discussed in more detail somewhere else and their interpretation should be seen as another contribution to the general discussion about correct climate measures to be taken.

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Human activities have a profound and often negative impact on the environment. The concept of planetary boundaries (Steffen, 2015) provides a general framework for the different aspects of environmental degradation, with biodiversity loss and the change of nitrogen cycles among the areas of greatest concern. Human activities influence the climate in a multitude of ways. Soil sealing causes the urban heat island effect, increasing temperatures significantly compared to surrounding, non-urban areas (Phelan, 2015). Changes in the chemical composition of the atmosphere by emitting CO₂ and aerosols have an impact (Portner et al., 2022) as well as aircraft-induced clouds (Kärcher, 2018).

2. Methods

The main objectives of this paper are: On the one hand, to present reasonable doubts regarding the safety and reliability of the scientific basis as justification of the EU climate legislation and on the other hand, to show what massive impact this legislation would have on EU citizens and the EU economy.

Review of relevant EU Legislation and analysis of justification. We analyzed specific EU legislation relevant to the topic of this paper. Specifically, this analysis refers to REGULATION (EU) 2021/1119; REGULATION (EU) 2018/842, and Directive 2003/87/EC.

Own measurements and experiments

Due to the lack of specific measurements and experiments on the topic we made measurements ourselves. We describe our measurement setup in 3.1. First results for laboratory and field measurements are in 3.2 and 3.3. We will investigate two additional aspects here: Is there a saturation of back radiation due to increased greenhouse gas concentrations? Has this saturation limit already been reached at the current CO₂ levels in the atmosphere?

Economic impact assessment by expert survey

Political and economic impacts for three different stakeholder groups were determined through expert interviews. Six experts have been interviewed, face to face and independent of each other. They are from several scientific fields. The arithmetic mean was calculated from these ratings.

The three different stakeholder groups are:

- EU citizens & Mittelstand
- EU member states & EU
- international corporations

Each of these six interviewed experts are out of different scientific fields: Ecology, physics, energy, entrepreneur, environmental engineer, data management,

Ratings:

Green = positive for this stakeholder

Red = negative for this stakeholder

Black = neutral for this stakeholder

1 = Minimum impact, 9 = maximum impact

3. Results

Two different experimental setups

The focus was in measuring whether greenhouse gases (GHG) have indeed the potential to increase the temperature through thermal back-radiation as a function of their concentration. Two questions arise here. Is there actually a saturation limit on back-radiation due to increased GHG concentrations? Has this saturation limit already been reached at current CO₂ levels in the atmosphere?

Figure 1 explains the setups for Lab and Outdoor Modes. In Fig. 1a (“Lab Mode”) a cooling compression device is placed below the so-called cooling plate. The measurement cylinder with a thin Polyethylene (PE) foil is hermetically sealed and thermally insulated by appropriate seals. On the opposite site the Calcium chloride (KCl) Window glass faces the laboratory ceiling. The IR detector is mounted in the center of the window and thermally stabilized. According to the Second Law of Thermodynamics, the warmer surroundings of the laboratory radiates towards the colder cooling plate and warms the variable GH gas concentrations. The back-radiation is then measured with the IR sensor from Thorlabs[®]. In Fig. 1b the test cylinder is rotated by 180°, the cooling compressor is removed and replaced by the clear night sky.

The measurement cylinder is first filled with pure N₂. After thermal equilibrium is reached, CO₂ is added in 50ml steps. The CO₂ concentration is measured with a fast and sensitive gas sensor. The IR sensor reacts instantaneously to changes in the gas composition (see 3.2. and 3.3.), as it reacts to the reflected power.

In the field test arrangement, the IR sensor takes the place of an astronomy-type terrestrial observer of space, "looking" through the troposphere into space. By gradually feeding additional CO₂ into the measuring cylinder, it can be observed whether there is a measurable change (increase) in the reflected power. This experiment can also be done using other GH gases.

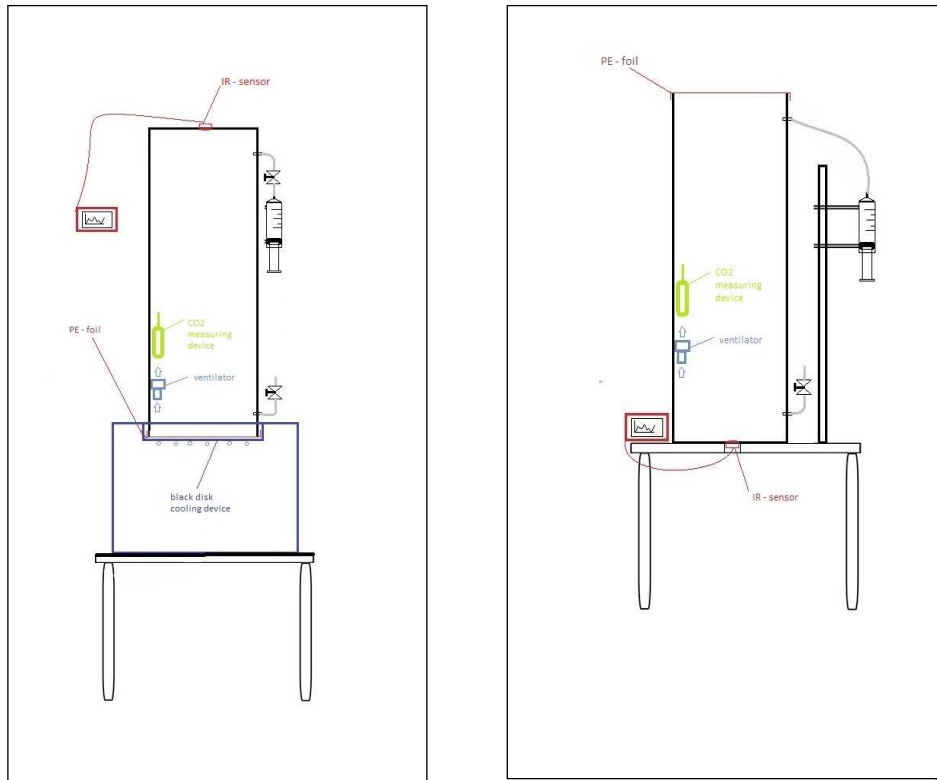


Figure 1. Experimental setup for (a) “Lab Mode” using a cooling compressor and (b) “Outdoor Mode”
Source: own drawings

First results laboratory measurements

After some small improvements to the measurement setup, we obtained reproducible results for various CO₂ concentrations when measuring in the Lab-Mode. Fig.2 shows the averaged data for each 50ml CO₂ adding for two different runs.

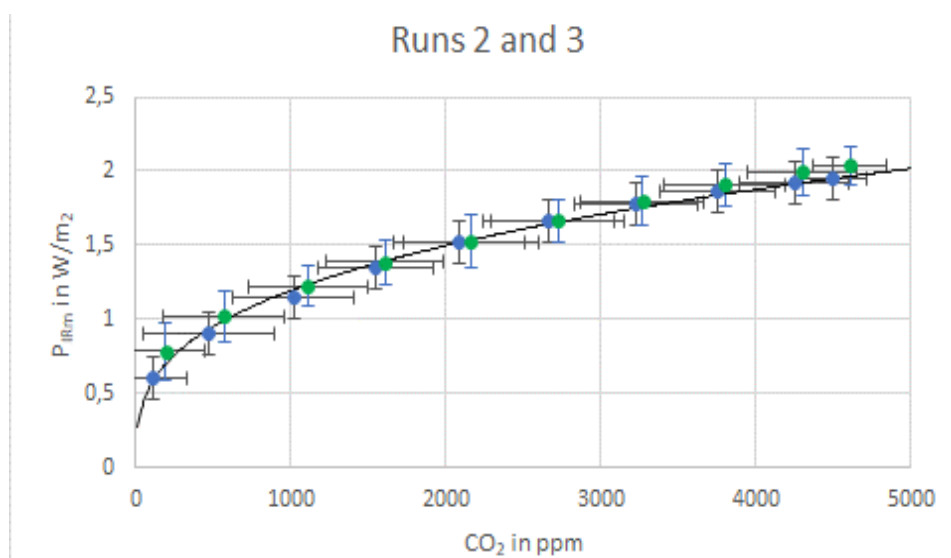


Figure 2. Lab-Mode back-radiation after adding CO₂ in 50 ml steps into pure N₂ atmosphere
Source: own processing (2023)

Further details and theoretical background to these results will be published elsewhere. It should be sufficient for the reader to see that even in a 75 liters cylinder of 1 m length, saturation behavior can be observed with respect to longwave infrared absorption due to CO₂ GHG additions. It is easy to understand that for longer air columns (>> 1m) the saturation is already achieved at low CO₂ content. Such technical details will be discussed in the forthcoming paper.

First results of field measurements

To have direct evidence that the addition of CO₂ to the current levels of 420 ppm does not cause any measurable additional back radiation, we used the outdoor mode in Fig. 3. The initial results show that the addition of CO₂ does indeed not cause any measurable additional back radiation. Since the detector is set to measure only such changes, the measurement confirms the hypothesis of complete saturation of the CO₂ bands.

This part of the experiment is set up to use only a realistic environment, i.e. measurements in the real atmosphere. The effects of an increased CO₂ concentration in the measurement apparatus simulate an increased total CO₂ concentration in the whole atmosphere. This also accounted for any factors, such as aerosols, that would prevent IR radiation from passing through. The use of pure N₂ as a test substance only in the 1 m of the measurement apparatus is justifiable, since the back radiation power sensor looks into the entire real atmosphere, except in the first meter.

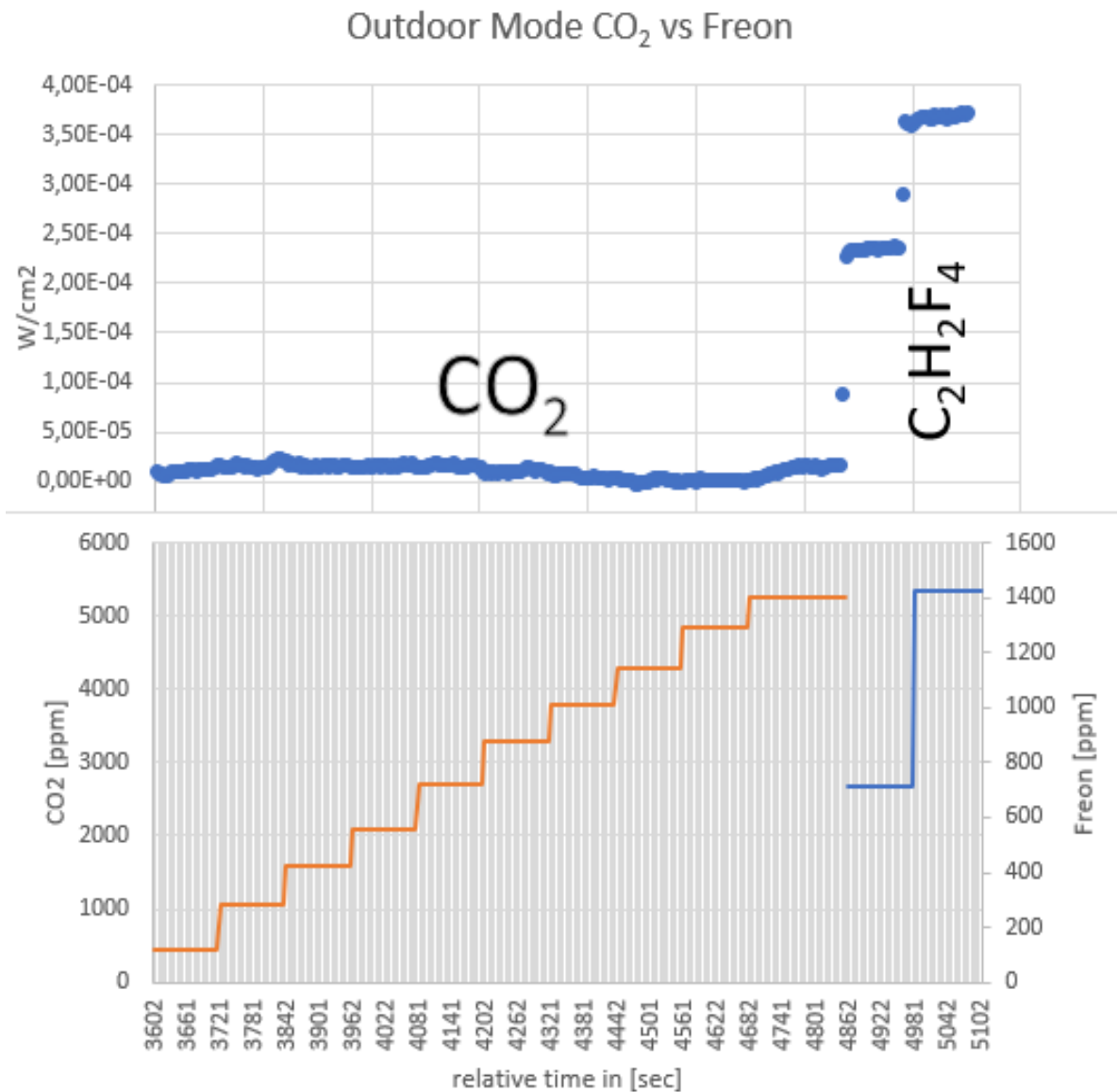


Figure 3. Outdoor-Mode back-radiation after adding first CO₂ in 50 ml steps into pure N₂ atmosphere. Source: own processing (2023)

Finally, Freon ($C_2H_2F_4$) was added, resulting in an immediate increase in backscattered IR radiation. This proves qualitatively and quantitatively that CO_2 -contents can increase by a factor of 2 without having catastrophic effects on the global climate. This cannot be said for other GH gases in atmosphere with currently low concentrations. However, since almost 90% of the IR spectrum in the relevant wavelength (13-16 μm) is already covered by the actual existing gases in the atmosphere (mainly water vapor, CO_2 , O_3 and others) there is not much room left for any absorption by additional IR-active gases.

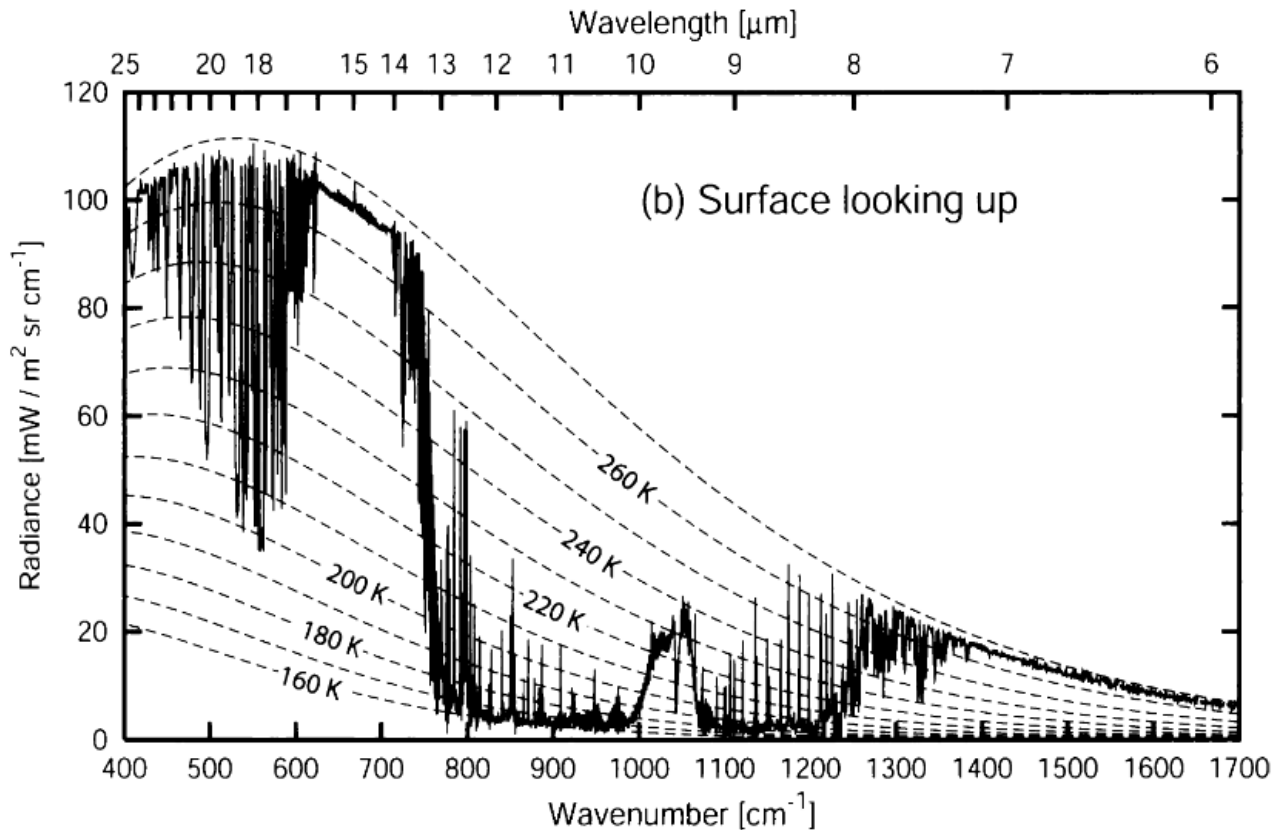


Figure 4. Measurements of the infrared emission spectrum of the cloud-free atmosphere at the surface looking upward. Data courtesy of David Tobin, Space Science and Engineering Center, University of Wisconsin-Madison
Source: Petty, 2006, p. 223

Our measurements correspond well to Fig. 4, which does not support significant Atmospheric Thermal Enhancement (ATE) increase by additional atmospheric CO_2 .

Possible economic impact assessment

Political and economic impact assessment for 3 different stakeholder groups which are:

- EU citizens & Mittelstand
- EU member states & EU
- international corporations

are presented in Table 1. The following is a summary of the assessments from 6 expert interviews. "Mittelstand" is a very important society group in German-speaking Europe (A, D, CH). The word "Mittelstand" has no equivalent in English or Slovak. Briefly, "Mittelstand" are SME owners, their family members and sympathizers.

Table 1. Political and economic impact assessment

		EU Citizen, "Mittelstand"	EU States, EU	International corporations
1	More conscious use of energy and resources	4 4	3 4	1,5 1
2	Strengthening of regional structures and regional added value	8	5,6	4
3	Jobs in the region	6 4	5 5 4	4 4
4	Green deal, Keynesian approach - artificial increase of demand (like 1930 new deal USA)	3	7	6 7
5	CO ₂ taxation = increase government revenue to stabilize budget	9	9	2,3
6	Investment uncertainty and creeping devaluation of equipment, real estate, etc.	8,75	5 4,5	5 5 2
7	Price uncertainty - supply	8,75	5 4,5	5 5 3
8	Reduction of individual mobility	7,5	4 8 5	7 2
9	Planned economy and command economy	8	6 5	8
10	Constant increase of prices of all goods, because of rising energy costs	7,6	5 5,3	4,3 9
11	"Mittelstand" will downsize at the expense of corporations	9	5	8,5
12	Gradual collapse of the (export) economy	9	8	6
13	Migration of all (energy-intensive) value-adding businesses to non-EU countries.	8	7,3	5 9 5
14	Thus complete dependence on the world market, foreign trade deficit	8	7,75	7 4,5
15	Rise of the shadow economy, bungling, crime (fuel theft, firewood theft)	8,3	6	4,6
16	Competent and capable people emigrate (brain drain etc.)	6,6	7,6	5 3

Source: own processing (2023)

Table 1 shows the summary ratings of the expert interviews. For some questions, there are strong divergent assessments by the experts - such as "jobs in the region" or "investment uncertainty". In fact, these topics are very difficult to predict.

In the overall picture, the experts are unanimous in postulating massive effects on EU citizens, EU economy and SMEs in particular.

4. Discussion

In addition, it is worth noting that EU publishes the results of EU-wide surveys at approximately annual intervals to try to show how the majority of the EU population assesses the importance of climate change, the need for action, and the benefits of action (European Commission, 2023a).

EU Press release July 2023: "A huge majority of Europeans believe climate change is a serious problem facing the world (93%), according to a new Eurobarometer survey published today" (European Commission, 2023b).

Looking at the latest survey in detail (European Commission, 2023c) only 17% - instead of 93% of all Europeans - according press release - are considering climate change to be the single most serious problem (page 10), and the trend is downward (18% April 2021). Thus, this somewhat deeper look at the latest Eurobarometer surveys shows the difference between public and published opinion.

Overview of European Climate legislation

EU climate regulations comprise a multitude of directives and regulations. Their overarching goal is reach net zero CO₂ emissions by 2050.

The so called „European climate law“ (REGULATION (EU) 2021/1119) came into force in 2021. This Regulation sets out a binding objective of climate neutrality in the Union by 2050. Union-wide

greenhouse gas emissions and removals regulated in Union law shall be balanced within the Union at the latest by 2050, thus reducing emissions to net zero by that date, see Fig5.

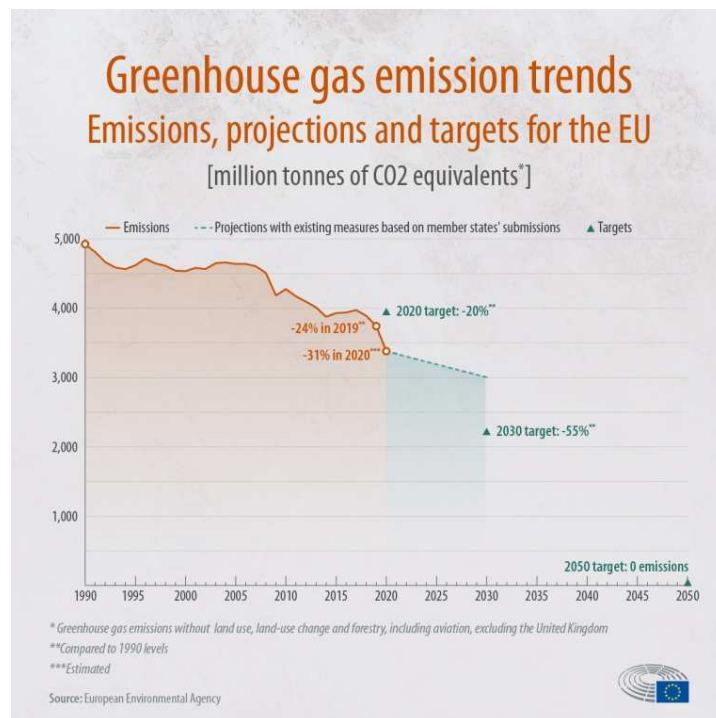


Figure 5. GH gas emission trends, projection and targets EU
Source: (European Parliament, 2018b)

Net zero means that annual carbon dioxide emissions must not exceed annual carbon dioxide sequestration (= uptake and storage of carbon) by carbon sinks. The most important carbon sinks are the growing forests in Europe. New technologies - such as carbon capture and storage (CCS) - may be able to bind CO₂ permanently. However, this technology has not yet been developed to market readiness (see Fig.6). The CCS process is also very energy intensive and thus expected to be very expensive.

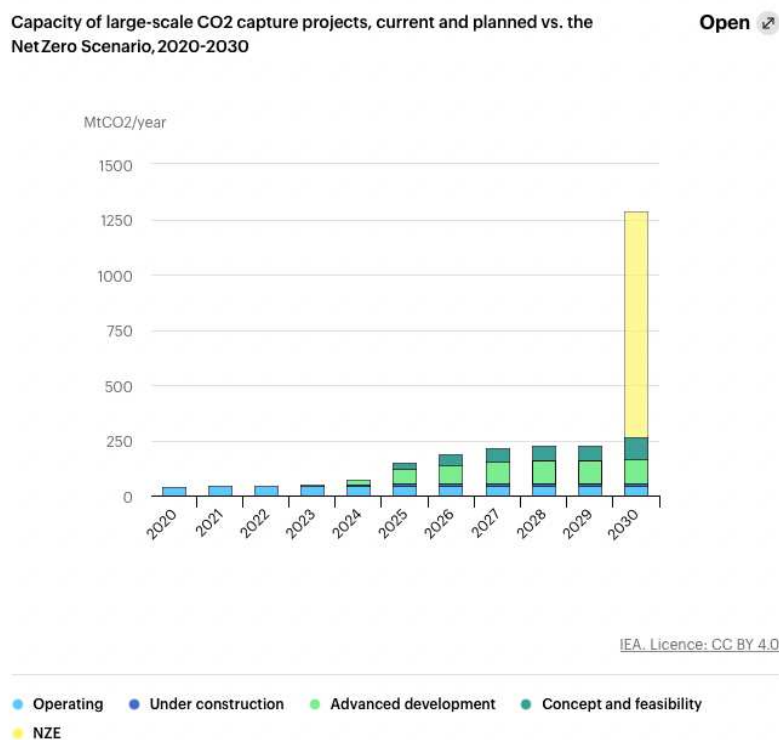


Figure 6. IEA CCU CO₂ capture projects, current and planned vs. the net zero scenario 2020-2030
Source: (International Energy Agency, 2020)

Although the „European climate law“ will allow for carbon dioxide emissions in the future, reaching net zero requires dramatic and rapid emission reductions.

Article 3 of the „European climate law“ describes the tasks of the European Scientific Advisory Board on Climate Change. The board has to consider the latest scientific findings of the IPCC reports and identify actions and opportunities needed to achieve the Union climate targets.

The „European Climate Law“ calls climate change an „existential threat“ and states that „it is necessary to address the growing climate-related risks to health, including more frequent and intense heat waves, wildfires and floods, food and water safety and security threats, and the emergence and spread of infectious diseases.“ (European Parliament, 2021)

Article 1 of the REGULATION (2023/857) “on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030” (European Parliament, 2023) „lays down obligations on Member States with respect to their minimum contributions for the period from 2021 to 2030 to fulfilling the Union’s target of reducing its greenhouse gas emissions by 30 % below 2005 levels in 2030“. Mandatory reduction targets differ between member states. Bulgaria has a reduction target of 10%, Slovakia has a target of 22,7% less emissions in 2030 compared to 2005, while Sweden and Germany have to reduce their emissions by 50%.

Directive 2003/87/EC3 (European Parliament, 2003) established a scheme for greenhouse gas emission allowance trading within the Community.

Member states are allowed to emit a certain amount of CO₂ per year. If they exceed this amount, they must purchase allowances. As member states are allowed to emit less and less CO₂ per year and the costs for allowances will increase, it is very likely that the emission of CO₂ will become extremely expensive in the near future.

Justifications of EU for Climate legislation and our criticism

The European Climate law is justified by an alleged existential threat and a growing number of deadly natural disasters including extreme weather events and infectious diseases.

Extreme weather events have been recorded for a long time. An overview of the state of studies on extreme weather events in the U.S. is provided by the Climate Science Special Report (CSSR) as part of the Fourth National Climate Assessment (NCA4) (Wehner et al., 2017). Droughts and hurricanes have not become more frequent in the United States (Heim, 2017) (Klotzbach et al., 2018). A recent analysis of the Emergency Events Database (EM-DAT) suggests a linear upward trend to around mid-century of the 20th century, followed by rapid increase to the turn of the new century and then a declining trend through 2022 (Alimonti et al., 2023). Although the increase in heat days over the last hundred years is well documented for Europe, there is no clear evidence of an increase in extreme weather events in Europe. The same is true for floods in Europe (Blöschl et al., 2019). Forest fires in the Mediterranean region have decreased slightly since 1980 (European Environmental Agency, 2021).

On the contrary, the number of deaths from extreme weather events has declined dramatically over the last 50 years (World Meteorological Organization, 2021). Globally, the death rate from infectious diseases has decreased by more than 50% since 1990 (Institute for Health Metrics and Evaluation, 2022).

Taken together, these undisputed facts point at improved living conditions around the world, including in Europe. In light of these findings, the rationale put forward by the EU seems highly questionable.

The rising economic costs of natural disasters are well documented (Centre for Research on the Epidemiology of Disasters, 2023), but can be attributed to the fact that both human population and world economy have grown substantially since 1900. More and more property is being hit by disasters. Florida, a state particularly vulnerable to hurricanes, has nearly doubled its population since 1990 (WorldPopulationReview, 2023). In its latest Assessment Report (Portner et al., 2022), the IPCC notes that “many poor communities, especially in regions with high levels of vulnerability and inequality, are less resilient to diverse climate impacts”. Resilience to natural disasters is provided by improved infrastructure such as flood protection facilities, early warning systems, or emergency vehicles. Effective protection of forests and mangroves will also increase resilience against extreme weather events. None of the above mentioned measures has anything to do with the CO₂ content of the atmosphere. On the contrary, the IPCC does not explain how a transition from reliable fossil energy to less reliable renewable energy contributes to building more resilient infrastructure in the poorest countries.

Other factors to be considered

The U.S. Environmental Protection Agency provides a list of the natural and human-caused factors that influence climate trends, with particular emphasis on the correlation between the increase in atmospheric CO₂ and the rise in global average temperature in recent decades (U.S. Environmental Protection Agency, 2023). In a report for the Congressional Research Service, Jane A. Leggett, an expert on energy and environmental policy, uses selected citations from the history of climate science research to illustrate the evolution of scientific understanding and confidence regarding the drivers of recent global climate change (Leggett, 2018). The citations she selected emphasize the central role of man-made CO₂ as the primary cause of global warming. Current climate policy focuses monocausally on anthropogenic atmospheric carbon dioxide concentrations, but climate science has yet to conclusively resolve many questions about the drivers and interrelationships of climate. Climate science usually underestimates the importance of astrophysical, geophysical and singular factors, e.g. solar and cosmic radiation variations (Svensmark et al., 2021), geomagnetic disturbances, radioactive decays and radiochemical effects and energetic geological events. Only recently has it been found that underwater volcanic eruptions (Jenkins et al., 2023) can change seawater temperatures by an order of magnitude. Another fact that has not been as well studied was the change in radioactivity of the seafloor due to underwater nuclear bombing tests in the years between 1950 – 1970. The activation of rare earth materials (Stosch, 2016) (Stettler et al., 1979) on the seafloor is a source of energy and warms the water. On the other hand, no reasonable explanation has been found for the decline in temperatures over an extended period after 2000. In a sound and strong climate model that clearly demonstrates the detrimental influence of anthropogenic carbon dioxide, it should not be possible to have periods of falling or stagnating global average temperatures while carbon dioxide levels are steadily increasing. But we must insist that such deviations from predictions be plausibly analyzed and that there be a serious and honest discussion about the limitations of predictions and the risks of wrong IPCC conclusions. Not only is the path to addressing negative environmental impacts at stake, but we also face the risk of taking wrong and irreversible actions that could in fact lead to a catastrophic outcome for citizens and the economy as opposed to the expected benefits.

Is climate science really settled?

There is reason to doubt it. Science does not understand all the mechanisms behind the actual climate. Most predictions are based on complicated, bloated computer models that are not tested for robustness. Systematic errors and assumptions to achieve favorable outcomes need to be exposed. Currently a discussion about the climate narrative in the EU is hardly possible, neither on a political nor scientific level. This circumstance is evocative of the well-known human psychological vulnerabilities in connection with "group think" (Janis, 1972) and the associated problem of fatal wrong decisions.

Science must be open and controversial to guarantee successful insight. Only scientific discourse - ideally supported by real measurements and experiments - leads to real solutions and clarifications. In the past, scientific and political misconceptions have been challenged by experimental verification and direct observations, such as the heliocentric world view (16th century) or Albert Einstein's proof of general relativity on May 29, 1919, on the occasion of a solar eclipse and the accompanying measurements. Measurements and experimental confirmations/falsifications create an important gain in knowledge. To initiate and contribute to an objective scientific discussion, we have developed a simple experimental setting that we propose for further, more rigorous studies.

Conclusion

The described regulations of the "European climate law" will have a massive impact on European citizens and our economy. The European climate law is being justified by an alleged existential threat from a growing number of catastrophic natural disasters, including extreme weather events and infectious diseases.

This paper questions many of the arguments and facts used to support such rigid legislation measures. Such controversial issues cannot be considered as scientifically settled. Political decisions made on an unsettled basis bear the risk of social disaster due to wrong predictions from hypothetical computer models.

Very alarming is also the fact that EU internal discussions and decisions are passed on to the outside (*the latest scientific findings of the IPCC reports come into play*).

Cited studies of renowned experts and first results of our own experimental laboratory and field measurements raise reasonable doubts about the EU & IPCC climate narrative. The authors are also very

concerned that there is no open political and technical discussion on the topic of global warming and its causes postulated by the IPCC and the EU. This paper is intended to help renew a factual discussion.

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The Analysis of the Relevance of the 2030 Agenda Goals for the Development of a Model for Assessing Sustainable Development

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Abstract

Research background: As part of global efforts to achieve sustainable development, the 2030 Agenda and its Sustainable Development Goals (SDGs) have been adopted as a comprehensive framework for addressing key global challenges, including poverty, inequality, climate change and environmental protection. Effective monitoring and evaluation of progress on these goals requires reliable and measurable indicators that can provide concrete information on progress in different areas

Purpose of the article: The aim of this paper is to identify and analyse key indicators for measuring progress towards the 2030 Agenda SDGs. This study focuses on the selection of indicators that are able to provide objective and measurable information on progress towards each goal, while reflecting the broader socio-economic and environmental contexts.

Methods: The study uses a combination of quantitative and qualitative methods to select and evaluate indicators. The quantitative analysis involves a statistical assessment of data availability and consistency, while the qualitative analysis focuses on assessing the relevance and accuracy of indicators in relation to the SDGs. Data were collected from a variety of publicly available sources, including international databases such as those of the United Nations and the World Bank.

Findings & Value added: The results of the study show the importance of the selected indicators as an effective tool for monitoring and evaluating progress towards the SDGs. Key challenges were identified, including inconsistent and incomplete data, and the importance of technological innovation for more accurate data collection. The study also highlights the need for a comprehensive approach to interpreting indicators that includes an understanding of the broader socio-economic and environmental contexts. The results provide valuable information for policy makers, research institutions and other stakeholders, and support global efforts to achieve a more sustainable and equitable world for all.

Keywords: sustainable development management, sustainable development indicators, multi-criteria analysis

JEL classification: Q01, Q58

1. Introduction

The importance of the 2030 Agenda goals for sustainable development is highlighted by many authors (Allosio, Zucca, Carrara, 2022; Anderson et al, 2021 Campagnolo et al 2018). Field many need to intensify integrated and coordinated efforts to achieve the SDGs, Policies should be implemented to promote sustainable socio-economic development, address environmental pollution, promote financial development and increase the use of renewable energy. These policies should take into account the interrelationships between these variables and should aim for inclusive and sustainable economic growth (Allosio, Zucca, & Carrara, 2022). Anderson et al (2021) point to the importance of understanding the interactions and impact between the Sustainable Development Goals (SDGs) and their targets in order to promote supportive interactions and overcome barriers in the long run.

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An assessment of the interlinkages between economic growth, pollution, financial development and renewable energy consumption in the context of Sustainable Development Goals (SDGs) 8, 13, 10 and 7 is discussed by Zheng et al (2022). The econometric analysis conducted in the study shows that these variables interact in the long run, indicating the interlinkages between the four SDGs. Findings from causality and variance decomposition analyses confirm the existence of robust causal relationships among the variables. Alternative causality estimators were used to test the robustness of the causality-related findings. Based on these critically important causal relationships, the authors recommend a set of interactive policies related to the SDGs.

The analysis of the interactions between the 2030 Agenda's Sustainable Development Goals (SDGs) and their relevance for SDG assessment is also addressed by Tremblay et al (2020). The authors analysed the Sustainable Development Goals (SDGs) and their targets based on the five pillars of the 2030 Agenda: people, planet, prosperity, peace and partnership. They classify the SDGs and targets according to the quantification system used to classify the SDGs and examine the interactions between the SDGs and targets. They find that similar classifications lead to more positive interactions and that there are synergies between the goals of different classifications.

The relevance of the 2030 Agenda goals for assessing sustainable development through the SDG index and dashboards is discussed by Sachs et al (2021). They examined country performance on the SDGs in 193 countries using a wide range of indicators. They identify six key transformations needed to implement the SDGs.

1.1 Models in sustainable development assessment

Due to the complexity of sustainable development, much research has focused on developing models that can comprehensively address this challenging issue.

The CapSEM model provides a set of methods and tools for companies and organisations to track, measure and improve sustainability performance. By grouping these tools by level, it is easier for companies to consider their use and determine which tools are useful to address the environmental, economic and social impacts associated with their operations and processes. Fet, Knudson, and Keitsch (2023) suggest placing the Sustainable Development Goals (SDGs) along the four levels of the CapSEM model to serve as a starting point for engaging organizations on the goals and their objectives. This approach helps to conceptualize the linkages between SDGs and sustainability dimensions. The combination of the CapSEM model and the SDGs provides a systematized approach to engaging with the goals and helps to simplify complex goals for companies burdened with sustainability requirements. It serves as an essential baseline for engagement and sustainability improvement.

The SDG systems model developed by Anderson et al (2021) focuses on the development of a dynamic SDG model that accounts for interactions between SDGs and their targets over time. The results of the model can support decisions on prioritizing actions for SDGs.

Mabhaudhi et al (2021) used the nexus planning model to monitor and evaluate progress towards the SDGs. The link between SDGs and nexus planning facilitated sustainable resource management in an integrated manner, addressing cross-sectoral synergies, value addition and trade-offs across interconnected sectors. The linkages established between nexus planning and the SDGs strengthened cross-sectoral collaboration and revealed measures for cooperative management and governance through evidence-based interventions.

Optimization techniques used in modelling and analysis of economic indicators to achieve the UN Sustainable Development Goals are discussed by Modibbo et al (2021). The authors extensively discuss optimization techniques used in the modeling and analysis of vital economic indicators, with goal programming (GP) and its variants being the most commonly used techniques. Other multi-criteria optimization techniques used include the analytic hierarchy process, Fuzzy-AHP, entropy method, ranking of preferences by similarity to ideal solution (TOPSIS) technique, Fuzzy-TOPSIS, VIKOR method, combined trade-off method, and data envelopment analysis.

Stanujkic et al (2020) propose a model for assessing progress towards the 2030 Agenda Sustainable Development Goals. The authors propose the use of the combined trade-off solution (CoCoSO) and Shannon entropy methods for this assessment. They consider the obtained results to be fully objective and rational and the applied model is considered applicable for this type of analysis. The model allows for the ordering of countries depending on the success of countries in meeting the SDGs.

Campagnolo et al (2018) developed a composite multidimensional index to assess sustainability worldwide. It was used to create a global ranking of current sustainability performance for 139 countries.

Indicators focused on the UN Sustainable Development Goals were selected for the index. The indicators were organised into three pillars: economy, society and environment. A total of 26 indicators were normalized to a common metric and aggregated into the index.

The overview presented here is by no means a comprehensive overview. It monitors some of the relevant scientific work that has recently addressed the issue of assessing sustainable development through indigenous algorithms to objectify the state and developments in sustainable development, specifically taking into account the goals defined by the 2030 Agenda.

2. Methods

Our analysis focused on the selection and validation of indicators used to measure progress towards the 2030 Agenda goals. These indicators were selected for their ability to provide objective and measurable information on progress against each SDG. This process was inspired by methodological approaches used in similar studies, including the application of modern portfolio theory and systems modelling to the SDGs.

A combination of quantitative and qualitative methods was used to select indicators. The quantitative analysis involved a statistical assessment of data availability and consistency, while the qualitative analysis focused on assessing the relevance and accuracy of the indicators in relation to the SDGs.

The quantitative analysis was based on an assessment of data availability at country level for each indicator that is defined, described and targeted by Agenda 2030. The data availability of the relevant indicators was assessed, in particular in terms of their transparency, comparability over time and completeness.

Thus, the main criteria for selecting indicators in the quantitative analysis were their relevance to the specific SDG objectives, measurability, data reliability, and the possibility of comparison across different geographic and socio-economic contexts. Emphasis was placed on selecting indicators that are able to provide a clear and objective view of progress towards the 2030 Agenda goals.

Data for the indicators were collected from various publicly available sources, including international databases such as those of the United Nations, the World Bank, and other relevant organizations. Particular attention was paid to the timeliness, reliability and comparability of these data.

The qualitative analysis was based on an assessment of indicator relevance: each indicator was assessed in terms of its relevance to the specific SDG targets. Consideration was given to how well the indicator reflects the key aspects of the goal and its relevance to sustainable development. Contextual Analysis was then conducted: for each indicator, a contextual analysis was conducted, which included an assessment of the social, economic and environmental factors that may influence the indicator values. This analysis helped to understand how different conditions and policies affect progress towards the SDGs. Finally, SDG experts and stakeholders were consulted to further understand and validate the selection of indicators. These interviews provided further insights into the meaning and interpretation of the indicators.

Although the indicators were carefully selected and analysed, several challenges and limitations were identified. These include incomplete data for some regions or groups, potential data bias, and difficulty in interpreting complex indicators. These factors were taken into account in the assessment and interpretation of the results.

3. Results

As we also state in the literature review, there has been a long-standing demand in the academic, but not only in the academic field, to move towards objectivisation of the measurement of results achieved in the pursuit of goals to ensure sustainable development at the micro-, meso- and macro-levels.

Sustainable development is such a complex issue that it needs to be approached in an interdisciplinary manner and hence the evaluation of this robust system itself is challenging.

As noted above, our research at this stage has not focused on creating a model for assessing the status and changes in the state of sustainable development at the country level, but on selecting appropriate indicators that could describe changes and levels of the phenomenon for both spatial and temporal comparisons.

The assessment model should on the one hand be comprehensive, i.e. covering all key aspects of sustainable development, and on the other hand relatively simple and open to modification. In this case, comprehensiveness should be ensured by representing all or as many as possible of the 2030 Agenda's SDGs. The simplicity of the model should be ensured by identifying one representative for each goal, i.e.

an indicator that contributes as comprehensively as possible to the substance of each individual 2030 Agenda goal.

Based on the previous theoretical background, an analysis was carried out to assess the extent to which it is possible to objectively verify the success in achieving the 2030 Agenda goals using selected indicators from publicly available sources. This section presents our own findings.

Indicator selection and validity: key indicators were identified that measure progress towards the SDGs. These indicators include, but are not limited to, indicators in areas such as poverty, health, education, gender equality, clean water, clean energy and economic growth. In evaluating these indicators, it was found that while they provide useful insights, they can be limited due to incomplete or outdated data.

The final selection of 14 indicators from the 17 goals of the 2030 Agenda was based on the desire to provide a representative overview of key areas of sustainable development, focusing on those indicators and goals that are most frequently discussed and have wide data availability. This approach was chosen given that some goals may be more integrated or overlap with other goals and therefore their separate analysis may be less telling than for other goals.

For example:

Goal 17: "Partnership for the Goals", despite its importance, is more about mechanisms and collaborative strategies than about concrete, measurable results. This goal supports the implementation of the other goals, but does not have as many specific, separately measurable indicators.

Goal 16: "Peace, justice and strong institutions" is also extremely important, but its indicators are often more complex to measure and may require complex qualitative analysis.

Our selection therefore focused on those goals that are most measurable and provide clear quantitative indicators of progress. This can ensure that the analysis is specific and based on hard data. However, it is important to note that all the goals of the 2030 Agenda are interlinked and together form a comprehensive framework for sustainable development.

Also excluded were goals where it is objectively problematic at the country level to identify the status or change. In this case, it was SDG 14: Life below water, which is dominated by coastal countries in the indicators.

For landlocked countries, the selection of relevant indicators for SDG 14 ('Life below water') is somewhat specific, as these countries do not directly face the problems of oceans and seas. However, some indicators of SDG 14 can be adapted or interpreted to be relevant for inland waters such as rivers, lakes and freshwater ecosystems.

One such indicator may be 14.2.1: Percentage of national water area covered by effective systems for the protection of marine and coastal ecosystems. While this indicator is primarily focused on marine and coastal ecosystems, the principle of conservation and sustainable management of water resources is equally applicable to freshwater ecosystems of inland countries. Measuring and protecting biodiversity, water quality and ecosystem services in these areas are also key to achieving the SDGs.

Another option is to focus on 14.7.1: Sustainable fisheries, which is also relevant to inland waters, as river and lake fisheries can have a significant impact on the economy and food security of inland countries. This indicator can help monitor how fish resources are managed and protected in inland waters.

These examples show how global goals such as SDG 14 can be adapted and interpreted to be relevant to the specific contexts of landlocked countries.

The above mentioned uses of the defined indicators are suggestions on how the existing set of indicators could be used to measure sustainability also in those conditions or countries that objectively cannot contribute directly to the achievement of the selected SDGs in general (of course, they are indirectly measurable: e.g. through consumption, etc.). In the absence of an extension or modification of indicators at the supranational level in the given goal for this area, we abstract from the identification of a single representative that could be used for the assessment of the status and evolution of the achievement of the SDGs among arbitrary countries.

For a detailed analysis of progress towards the 2030 Agenda goals, the following specific indicators have been selected to reflect different aspects of sustainable development:

Table 1. Overview of indicators as representatives of the SDGs

Goals	Indicators	Reason for selection
SDG 1: No Poverty	1.2.1 Share below the national poverty line	This indicator directly reflects the economic aspect of sustainable development and is key to assessing success in the fight against poverty.
SDG 2: Zero Hunger	2.1.1 Prevalence of undernourishment	Hunger and food security are fundamental pillars of sustainable development and this indicator helps to monitor progress in this area
SDG 3: Good health and well-being	3.2.1 Under-5 mortality rate	This indicator is key to measuring improvements in health and wellbeing, which are central components of the SDGs
SDG 4: Quality education	4.1.2 Ensuring children complete their education	Education is essential for sustainable development and this indicator provides an overview of access to and quality of education
SDG 5: Gender equality	5.5.1 Women in political positions	This indicator reflects progress on gender equality, a fundamental aspect of social justice and sustainable development
SDG 6: Clean water and sanitation	6.1.1 Safe drinking water	Water and sanitation are basic human needs, and this indicator helps monitor achievements in this area
SDG 7: Affordable and clean energy	7.2.1 Renewable energy	Transition to sustainable energy sources is key to environmental sustainability
SDG 8: Decent work and economic growth	8.5.2 Unemployment rate	This indicator reflects economic stability and is key to assessing economic development and the quality of job opportunities
SDG 9: Industry, Innovation and Infrastructure	9.5.1 Research and Development (R&D) spending	Investment in research and innovation is essential for technological progress and sustainable development.
SDG 10: Reduced inequalities	10.1.1 Income growth inequalities	This indicator measures the rate at which the incomes of the poorest 40% of the population are improving, which is key to assessing efforts to reduce income and economic inequalities..
SDG 11: Sustainable cities and communities	11.2.1 Public transport access	This indicator reflects the quality of life in cities and the availability of infrastructure
SDG 12: Responsible consumption and production	12.5.1 Recycling rates	Recycling is key to reducing the environmental impact of consumption and production
SDG 13: Climate action	13.2.2 Total greenhouse gas emissions per year	This indicator is essential for measuring progress on climate change
SDG 14: Life below water	N/A	see comment before the table
SDG 15: Life on land	15.1.1 Forest cover	The choice of this indicator allows us to measure and evaluate progress in the protection and restoration of forest ecosystems, which is essential for sustainable development and biodiversity conservation on the planet.
SDG 16: Peace, justice and strong institutions	N/A	see comment before the table
SDG 17: Partnerships for the goals	N/A	see comment before the table

Source: authors research (2023)

These indicators were selected based on their ability to provide a comprehensive and multidimensional view of progress towards the 2030 Agenda goals. The selection was made with regard to data availability and quality, ensuring objective and reliable analysis.

4. Discussion

Our analysis focused on the selection and evaluation of indicators to measure progress towards the 2030 Agenda's Sustainable Development Goals (SDGs). Indicators were selected based on their ability to provide objective and measurable information on progress and a combination of quantitative and qualitative methods were used to assess them. This discussion focuses on the key aspects, challenges and implications identified in our research.

- **Relevance and measurability of indicators:** the selected indicators effectively reflect key aspects of each SDG and provide a measurable basis for assessing progress. For example, the indicator "Share of forest area in total land area" for SDG 15 effectively indicates the status and health of terrestrial ecosystems. This measurability is essential for providing concrete and actionable information for decision-making and policy.
- **Complexity and challenges in interpretation:** while indicators provide a useful tool for assessment, they also present challenges in interpretation. For example, the indicator "Income growth of the bottom 40% of the population" for SDG 10 can be affected by a variety of economic and political factors. It is therefore important to consider the broader context when interpreting the data.
- **Comparability and consistency of data:** one of the key findings was the variability in data availability and quality between different countries and regions. This inconsistency can make it difficult to make accurate global comparisons and assess overall progress towards the SDGs. For example, data on "Under-five mortality" for SDG 3 may be incomplete or outdated in some regions.
- **The importance of technology and innovation:** research has highlighted the importance of technological innovations such as IoT and machine learning in data collection and analysis. These technologies can make a significant contribution to more accurate and timely data collection, which is key to assessing progress.
- **Socio-economic and environmental factors:** The analysis showed that socio-economic and environmental factors play a crucial role in achieving the SDGs. For example, the indicator "Share of renewable energy in total energy consumption" for SDG 7 reflects not only technological progress but also political and economic decision-making.
- **Implications for policy and decision-making:** The results of the analysis have important implications for the formulation of policies and strategies. Effective use of the indicators can help governments and organisations better target their resources and initiatives to achieve the SDGs.
- **Need for further research and data:** Our analysis also highlighted the need for further research and better data collection, particularly in areas with incomplete or inconsistent information.

Overall, the selected indicators provide a valuable basis for assessing progress on the SDGs. Their effective use and interpretation requires a comprehensive approach that includes not only quantitative analysis but also qualitative assessment and contextual understanding.

"It's all about information" - a phrase we are often confronted with has a special meaning in this case. The quest for the most objective assessment of status or change, the assessment of success in a comprehensive assessment of the level of sustainable development, is based on relevant data.

Theory and practice know many metrics, methodologies, tools, models for assessing sustainable development. We are also trying to make our small contribution to the issue. However, it will be very difficult to take an objective position on such a complex issue without sufficient relevant and comparable data. Nevertheless, this should not discourage researchers from studying this socially (but not only socially) desirable issue more and more comprehensively, as the research results can be an important decision-making tool for modifying national and transnational policies in this field.

Conclusion

Focusing on the selection and analysis of indicators to measure progress on the 2030 Agenda's Sustainable Development Goals (SDGs), our study revealed key aspects and challenges associated with assessing global sustainable development. The selected indicators provide a measurable and objective

basis for tracking progress on goals such as reducing poverty, improving health and education, protecting biodiversity, and promoting a sustainable economy and environment.

The research has highlighted the importance of a comprehensive approach to assessing sustainable development that includes both quantitative and qualitative analysis and takes into account the broader social, economic and environmental contexts. The findings highlighted the need for better data collection and consistency, as well as the importance of technological innovation for more accurate data collection and analysis.

The study also highlighted the importance of indicators to inform decision-making and policy formulation. Effective use of these indicators can help governments, organisations and other stakeholders better target their resources and initiatives to achieve the SDGs.

Ultimately, our findings contribute to a better understanding of the challenges and opportunities associated with measuring and achieving sustainable development. In doing so, they support the global effort to achieve a more sustainable and equitable world for all.

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Innovative Environmental Management Approaches to Reduce Pollution of Water Resources

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Abstract

Research background: Slovakia is currently considered a country with sufficient high-quality water resources. However, it faces extensive pollution of these vital assets, coupled with inadequate water management practices, which is becoming a severe problem in relation to their sustainability. The adverse repercussions of water resource pollution resonate directly through the diminished quality of life for the populace and the deterioration of broader environmental components. Thus, the imperative to address this issue is undeniably urgent.

Purpose of the article: The paper is oriented to evaluating the possibilities of using the floating trash barriers as a product of the circular economy in curbing water resource pollution.

Methods: The study encompasses experimental investigations into utilisation of the floating trash barriers, exploring its role as a sustainable solution for water management.

Findings & Value added: The floating trash barrier itself is a product of the circular economy, as it uses waste (waste material) in its production, and at the same time its function is environmentally beneficial for society. This research adds value by demonstrating its multifaceted contributions to society and the environment.

Keywords: circular economy, sustainability, floating trash barrier, water resources, pollution

JEL classification: Q5

1. Introduction

Preserving the quality of water resources has become an increasingly urgent concern. Historically, Slovakia has been renowned for its abundant and pristine water resources. However, due to the impact of human activities and climate change, it is imperative that we focus more on sustaining the quality and quantity of our water resources.

Water, which plays a pivotal role in the development of human civilization, is significantly affected by climate change (Kopáček et al., 2021; Stelian & Juhasz, 2022, as cited in Šulyová & Kubina, 2022). These findings emphasize the necessity of enhancing resilience, efficiency, and quality within water resources management, both in urban settings and water management institutions (Šulyová & Kubina, 2022).

According to Marciniuk-Kluska and Kluska (2023), one of the major challenges associated with waste is its contribution to water, soil, and air pollution. The combination of precipitation and septic processes results in leachates containing heavy metals and acids, which negatively alter the composition and pH of surface and groundwater, among other effects.

Water pollution stems from diverse sources and manifests in various forms. For instance, Valentin et al. (2023) discuss the widespread adverse impact of microplastics from waste in aquatic environments, which often lead to devastating consequences such as irreversible changes in aquatic biodiversity and health issues in the population. The presence of microplastics in aquatic environments is steadily on the rise.

One effective method to prevent pollution in aquatic resources is the use of various species of barriers (Slaninka, Kordík, Mikita, 2010). Reactive barriers, in particular, are a passive approach to

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impeding the spread of contaminated groundwater fronts, especially in sensitive aquatic areas where remediation is challenging or costly (Bica et al., 2008).

Our paper explores innovative approaches to environmental management, exemplified by the use of bore walls to reduce pollution, specifically from municipal solid waste, in the Ružín reservoir.

The Ružín reservoir spans the territorial boundaries of municipalities in the Košice-suburb and Gelnica districts. The quality of its water is influenced by both natural factors and human activities, primarily municipal waste, in the surrounding catchment areas. In the Gelnica district, two major tributaries, the Hornád and the Hnilec rivers, flow into the reservoir. These tributaries pass through areas that were heavily mined and processed for ores in the past, significantly affecting water quality and leading to the accumulation of heavy metals in the reservoir's sediments. In the Košice-suburb district, the Opátka and Belá watercourses feed into the reservoir, with sporadic exposure to anthropogenic activities and geological influences. However, during floods and high-flow periods, the accumulation of municipal waste on the water's surface becomes evident (Office of Public Health, 2019).

The Ružín dam has long grappled with recurrent pollution issues caused by waste flowing in from the Hornád and Hnilec rivers. Preventing their formation is only possible through systematic work in the community and education among citizens (Vrábl'ová, 2009). Rural communities should be examined through a "dual approach" as both contributors and receivers of plastic pollution leakage into the natural environment (Mihai et al., 2021). The influx of waste is particularly pronounced during "big waters" or floods when these swollen rivers carry waste from unauthorized dumps along their banks. Thus far, the approach has been reactive, focusing on waste removal from the dam's surface, with the burden falling on those who contribute very little or not at all to the pollution (such as the municipalities of Margecany and Jaklovce, and the Ružín Waterworks Authority). However, this does not address the root cause, as the waste returns with each subsequent flood. Black dumps continue to form on the stream banks, as revealed by field research (Vrábl'ová, 2009).

A significant portion of the waste on the water surface comprises plastic waste. Although the introduction of a refundable deposit system in 2022, covering PET beverage bottles and aluminum cans, has led to some improvement in waste accumulation, plastic pollution persists during heavy rainfall or persistent rains. Therefore, it is crucial to address the consequences of this pollution, as the reservoir serves as a vital source of water, energy, recreation, fishing, and flood protection. The use of floating trash barriers represents one systematic approach to capture and manage waste effectively.

The circular economy, broadly defined, is a regenerative and sustainable economic model that seeks to minimise waste and the continuous use of resources by closing the loop on product lifecycles. Unlike the traditional linear 'take, make, dispose' approach, which leads to resource depletion and environmental degradation, the circular economy promotes the reuse and redesign of materials, products and processes. It encourages practices such as recycling, reuse and re-use of materials, thereby reducing the demand for new resources and limiting the generation of waste (Shevchenko et al., 2021).

The principles of the circular economy are closely aligned with addressing the pervasive problem of water pollution. By applying circular economy practices to this problem, we can promote a more sustainable and proactive approach to protecting our water resources. This includes developing and deploying technologies that trap pollutants and waste, such as the floating garbage barriers mentioned in this study. Such innovations not only reduce water pollution, but also uphold the ethos of the circular economy by repurposing waste materials for productive use, contributing to a greener and more resource-efficient future.

2. Methods

The primary objective of this paper is to introduce an environmental management approach aimed at safeguarding water resources from pollution. Specifically, this paper focuses on assessing the feasibility of employing borehole walls as a component of the circular economy to reduce water pollution.

To achieve this goal, the paper employs a combination of analytical and synthetic methods, as well as a case study approach centered around the use of floating trash barriers in the context of the Ružín reservoir. Additionally, in order to provide a comprehensive understanding of floating trash barriers, their construction, production, and utilization will be presented through best practices.

Furthermore, the investigation into the viability of implementing floating trash barriers has also been conducted through experimental research.

3. Results

3.1 Floating trash barriers in the process of protecting water resources from pollution

The concept of floating trash barriers has emerged primarily as a response to the pressing societal need to actively and effectively combat watercourse pollution caused by the escalating consumption and production of waste, often exacerbated by inadequate waste management practices among the population. Presently, a variety of floating trash barriers exist, differing primarily in their capacity to capture pollutants and the methods they employ. These variations encompass the materials used, design specifics, and outward appearance, all tailored to the specific application and the type of waste they aim to intercept.

Within the global market, numerous manufacturers offer a diverse array of floating trash barriers in their product portfolios. Nevertheless, the majority of these barriers are designed for capturing petroleum products and chemical pollutants, which constitute liquid waste. A much smaller proportion of these products are specifically designed for capturing solid waste. In freshwater streams and reservoirs, floating trash barriers are primarily engineered to intercept solid debris floating on the water's surface.

Currently, the most prevalent types of floating trash barriers encompass foam-filled barriers, self-inflating and inflatable variants, barriers employed for firefighting, and those dedicated to trapping debris and unwanted elements afloat on the water's surface. However, while they may exhibit slight variations in appearance and technological design depending on the intended application, the overarching objective of all floating trash barriers remains consistent: mitigating the expansion of surface contamination, be it in the form of liquid or solid pollutants, within water bodies and watercourses.

3.2 Use of floating trash barriers in the Ružín reservoir

Floating trash barriers employed for passive solid waste collection harness the force of the water's natural flow within the watercourse. These barriers are relatively straightforward to install and remove from the water's surface, requiring minimal time and effort. Operating them is also hassle-free, primarily involving the management of collected waste on the water's surface in accordance with the quantity of debris captured. However, there is a drawback to such barriers, stemming from their construction, which predominantly comprises rigid and inflexible plastic components. This inflexibility makes storage, transportation, and on-site installation challenging tasks. Moreover, many of these floating trash barriers incorporate a rigid, water-impermeable layer within their submerged portions, hindering water flow in the upper layers of the current. This exacerbates tension on the barrier in stronger water currents, potentially resulting in accelerated material wear due to elastic deformation over time. In the worst-case scenario, this could lead to the complete rupture of the barrier at its weakest point.

The limitations mentioned above are effectively addressed through the unique design of the floating trash barriers we have presented and tested (manufactured by Bamida, s.r.o.). In this design, almost all primary barrier components are crafted from PVC film/fabric using an upcycling process, effectively transforming residual materials into a new product. This approach not only benefits water management and aquatic ecosystems but also contributes positively to the broader environment by reducing waste generation during the manufacturing process of these floating trash barriers.

The crux of this floating trash barrier's design lies in the use of more flexible and elastic materials, specifically a special type of PVC film. These materials exhibit properties ideally suited for this application, granting the barrier significantly greater flexibility and maneuverability during storage, transportation, and installation at the intended location.

The development of these specialized floating trash barriers, tailored to the protection of water resources, was preceded by a comprehensive field investigation. This investigation encompassed an assessment of the quantity and types of waste within the reservoir, along with an evaluation of the location and conditions pertinent to the installation, operation, and service life of the floating trash barriers. Additionally, the study examined their environmental sustainability and efficiency in capturing waste within the Ružín reservoir's specific conditions.



Figure 1. Installation of floating trash barriers in the area of the Ružín water reservoir
Source: authors (2023)



Figure 2. Waste captured with the use of a burrow wall in the area of the Ružín water reservoir
Source: authors (2023)

As part of our research endeavors, we have designed, installed and tested a specialized type of floating trash barriers (Figure 1 – 5), meticulously crafted for the purpose of capturing solid waste from both the water's surface and its immediate vicinity. These innovative trash barriers have been developed and manufactured by Bamida, s.r.o., and they boast a distinctive set of functions and characteristics. These floating trash barriers were specifically designed and tested within the Ružín water reservoir, resulting in the following features:

- **The Visible Section Above the Water Surface** (Figure 3, 4): This visible section serves dual purposes of buoyancy and tensioning. It comprises a buoyancy component, crafted from a hydrophobic material, which keeps the trash barrier afloat. Additionally, there is a clamping component designed to apply tension to the trash barrier against a steel structure situated along the watercourse's bank. The visible part of the trash barrier primarily collects the bulk of waste (Figure 2), often significantly less dense than the water itself.
- **The Submerged Section Below the Water Surface:** The submerged section plays a crucial role in bearing weight and applying tension. It is composed of a mesh skirt with inherent properties that do not impede the flow of water while effectively capturing solid waste with a density akin to that of water. This section also incorporates a load chain, oriented almost vertically, creating a wall-like structure. An essential element within the 'invisible part' is a tensioning mechanism employed to apply tension to the lower portion of the trash barrier, securing it firmly against a steel structure positioned at the watercourse's banks.



Figure 3. Installed floating trash barriers in the area of the Ružín water reservoir
Source: authors (2023)



Figure 4. Installed floating trash barriers in the area of the Ružín water reservoir
Source: authors (2023)



Figure 5. Installed floating trash barriers in the area of the Ružín water reservoir
Source: authors (2023)

The above-mentioned special design of the floating trash barriers allows the capture of floating waste from water areas and watercourses, which are mostly contaminated with common municipal and bulky waste, plastics and, last but not least, biological waste (e.g. tree branches), which tends to occur and float on the water surface. This solution contributes significantly to simplifying the maintenance of clean watercourses, but also to efficient water management. At the same time, this non-invasive intervention in the environment does not reduce the quality of life of aquatic organisms or the quality of the use of the reservoir as a recreational space. On the contrary, such environmental intervention removes negative elements from the environment.

Another advantage of floating trash barriers is their visual potential. Visually, floating trash barriers are highly variable and can be individually designed and manufactured 'tailor-made'. Floating trash barriers can be produced to blend in as much as possible with the environment where they will be placed, or conversely they can become an interesting visual element in the environment.

3.3 Floating trash barriers as a sustainable and circular product

In addition to their primary function of protecting water resources from pollution, floating trash barriers can be considered as a product that fully represents sustainability and circularity in up to three ways (Figure 6):

- 1. Noise barriers (the so-called original product = product 1) enhancing and protecting the quality of the environment and the quality of life.**

Waste material from the production of another environmentally oriented product (noise barriers) primarily intended to protect the environment and quality of life is used for the production of the floating trash barriers. Thus, at the very beginning of the production cycle, there is an environmentally oriented product - a noise barrier - whose aim is to protect the environment and quality of life.

- 2. Reutilization of noise barrier waste.**

The floating trash barrier, as the final product, exemplifies the essence of a circular economy. Its constituent materials are originally derived from the waste generated during the production of noise barriers (often referred to as echo barriers). The concept of crafting these floating trash barriers emerged from the imperative to maximize the utility of this waste, effectively putting into practice the principles of waste reuse. This involves repurposing waste materials, particularly residual PVC fabrics resulting from noise barrier production.

- 3. Floating trash barriers (a new product = product 2) improving and protecting the quality of the environment and quality of life.**

Primarily, the floating trash barrier serves to trap pollutants in watercourses and water reservoirs, thus directly contributing to the elimination of environmental pollution. The product's very intended use and mission is pro-environmental and is an important element in the environmental management process, in ensuring the sustainable use and preservation (quality) of water resources. Thus, in the production circle, the floating trash barrier represents a new product enhancing/protecting the quality of the environment and quality of life.

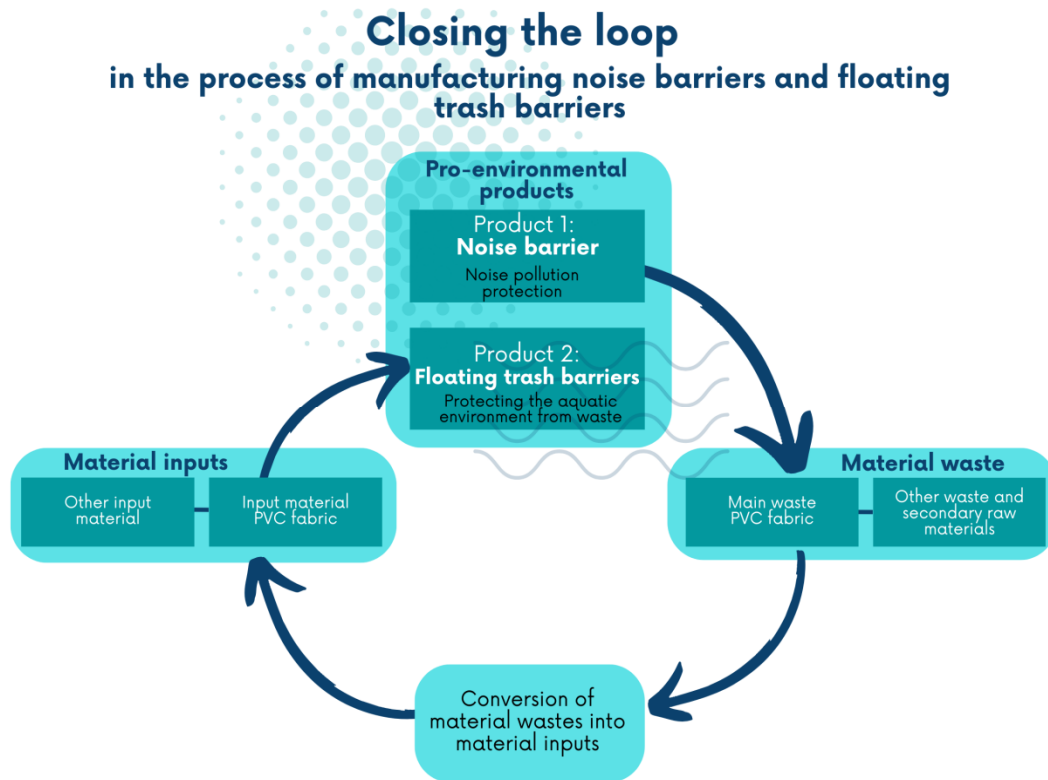


Figure 6. Closing the loop in the process of manufacturing noise barriers and floating trash barriers
Source: authors (2023)

This production process reveals a compelling triple pro-environmental impact, effectively transitioning from a linear production cycle to a circular one thereby enhancing its pro-environmental value. Simultaneously, it leads to a reduction in waste generation and conserves valuable resources (Figure 6).

Conclusion

The application of floating trash barriers to combat watercourse pollution holds practical significance in the field of environmental protection. These barriers themselves exemplify a product of the circular economy, as their production involves the utilization of waste materials, all the while fulfilling a crucial environmental role for society. The waste captured through the deployment of floating trash barriers possesses potential for further recovery, as highlighted by Marciniuk-Kluska and Kluska (2023), where municipal waste can be harnessed, for instance, in the generation of electricity. Waste, in all its abundance, stands as an untapped and vast reservoir of energy resources.

The use of floating trash barriers in the preservation of water quality, as well as overall quality of life, brings forth a multitude of positive impacts. These benefits extend not only to users and producers but also to the broader public. This research, therefore, enhances its value by showcasing the multifaceted contributions it makes to both society and the environment.

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8. Psychological, Ethical, Cultural, Legal and Other Issues in Management and Business

Psychological Flexibility in Human Leadership - Facing the Challenges and Needs of the 21st Century Working Social Spaces

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Abstract

Research background: Psychological flexibility, rooted in acceptance and commitment therapy (ACT) principles, has gained recognition as a vital trait for leaders. It involves adapting to changing circumstances, managing emotions effectively, and staying aligned with personal and organizational values. Research in this area explores how leaders who cultivate psychological flexibility among themselves, and their teams can foster innovation, resilience, and a culture of continuous learning in the workplace. Human leadership emphasizes the holistic well-being of employees, recognizing them as individuals with unique needs and aspirations. It emphasizes empathy, ethical conduct, and work-life balance as core principles. Studies in this domain explore how human-centered leadership practices contribute to employee satisfaction, retention, and the ethical integrity of organizations, ultimately driving long-term success.

Purpose of the article: This article aims to explore and elucidate the significance of psychological flexibility and human-centered leadership in the context of the 21st-century workplace. It aims to provide insights into how these concepts shape modern leadership practices and their impact on organizational culture, employee well-being, and overall effectiveness.

Method: A quantitative survey was administered to a broader cross-section of professionals across different sectors to investigate the interplay between psychological flexibility, human leadership qualities, and their impact on thriving in the 21st-century social space.

Findings & Value Added: We found that by incorporating psychological flexibility into human leadership, managers can cultivate a work environment characterized by nurturance and growth that embraces change, fosters collaboration, and empowers employees to thrive amidst the dynamic challenges of the contemporary working place social spaces.

Keywords: psychological flexibility, human-centered leadership, organizational culture, employee well-being, innovation

JEL classification: M12, M54, O15

1. Introduction

Psychological flexibility is a fundamental psychological concept that encompasses a person's ability to cope with life's challenges as well as cognitive, emotional, and behavioral events. Rooted in Third Wave Cognitive Behavioral Theory, particularly Acceptance and Commitment Therapy, psychological flexibility plays a critical role in improving the quality of life for individuals and those around them. This literature review examines the components of psychological flexibility and its application in people management, considering the evolving demands of 21st century reality. The review highlights the importance of psychological flexibility in fostering empathy, adaptability, resilience, and other essential skills for effective leadership according to the demands of 21st century reality.

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In the dynamic and unpredictable landscape of the 21st century, leadership requires a new perspective and practice that provides responses to the social needs of global society, rapid change, uncertainty, and technological development. Leaders in this era must develop skills that help them act flexibly and creatively while being a human role model who leads their environment to develop an integrated approach that combines leadership with participation, cooperation, and a quick and creative response to different situations and needs. Psychological flexibility is a key component in developing mental and affective adjustment skills, making it an important component for leaders in the 21st century. This paper explores the concepts and foundations of psychological flexibility from the perspective of acceptance and commitment therapy and its implications for effective and humane leadership in addressing the challenges and needs of our time.

The 21st Century brings new challenges. This period is characterized by accelerated technological developments, leading to the need to deal with increasing complexity, rapid changes, and growing uncertainty, in addition to frequent changes in values, goals, social and personal perceptions, needs, qualifications, and skills. Growing individualization and social diversity, expanding economic and cultural uniformity, and frequent changes in values, goals, social and personal perceptions, needs, qualifications, and skills characterize this period's technological development. This reality requires rapid and multidimensional adaptations.

Current and future citizens face new challenges, such as uncertainty, growing individualization and social diversity, expanding economic and cultural uniformity, and exposure to natural disasters caused by climate changes resulting from ecosystem degradation.

In the 21st Century, therefore, flexibility becomes an important skill. A frequently changing world brings the skills to handle effectively with a high degree of uncertainty. Flexibility drives one to navigate between changing situations, identify needs, act quickly, efficiently and responsibly, and contribute skills. The High levels of flexibility help to adapt to change and build the ability to act efficiently in different environments and situations. Studies mapping skills and competencies that are required to be specified in the 21st Century presented three key areas of skills: literacy skills, social skills, and personal skills (Fuchs, 2022).

Social space is multifaceted in various fields, encompassing the immediate environment where humans exist and interact. Social space is an interdisciplinary research topic studied in various fields like sociology, psychology, urban planning, political science, geography, and architecture, exploring its influence on human behavior and vice versa. In this research, we focus on the workplace's social space in our generation, examining how it shapes behavior and influences individuals and organizations. It recognizes that physical and social surroundings influence human behavior and interactions, shaped by political, economic, cultural, and historical factors. The key aspects of the social space include: 1. The Immediate Surroundings, including physical spaces (homes, workplaces) and social networks, affect behavior and attitudes. 2. Impact of Location (inside the Immediate Surroundings): One's place within a social space can significantly impact behavior due to imposed norms and expectations. 3. Influencing Factors: Political, economic, cultural, the shape of the social space structure, resources, and character. 4. Dynamic Evolution: Rapid transformations due to technology, politics, economics, and culture. 5. Interactive Relationship: Individuals adapt to and influence their Immediate Surroundings, involving physical and mental adaptations (Fuchs, 2003; Petkova & Chukov, 2019).

The Human leadership model, researched and validated by Fishbein (2021), we explore in this article is one of the ideal models for leading employees in our generation, and as we will see here - psychological flexibility can be considered the key to the Human leadership model and the application of the acquired tools.

The challenges and complexities of the modern world are increasingly shaping workplace dynamics. Employees and managers now confront unique circumstances that demand adaptability and a nuanced understanding of the evolving social space within and outside the workplace. In this evolving landscape, effective leadership involves understanding and embracing the complexity of individuals transitioning between different roles and experiences. It requires creating a workplace environment that values diversity, promotes adaptability, and provides the necessary support and guidance for employees to excel in their multifaceted lives.

The world's diverse challenges can bring complexity and uncertainty. The world is becoming more complex and uncertain, requiring individuals to navigate multifaceted issues. They experience individualization from one side but the development of growing gaps of social diversity. People have diverse backgrounds and values, leading to various perspectives and expectations. Furthermore, despite

globalization, there are various economic and cultural norms and growing environmental concerns because of the growing vulnerability to natural and technological hazards.

Workplace as a Unique Social Space. Workplace expectations, laws, rules, and limitations may differ from the broader social space. Employees must adapt to these workplace-specific rules and regulations, which can highly differ from their everyday life experiences. On the other hand, managers are tasked with leading employees with diverse experiences and roles outside of work. Employees can switch roles and experiences rapidly, such as transitioning from gaming to a professional role. Moreover, managers must balance the expectations and behaviors associated with different roles, ensuring employees meet workplace demands.

From the Human Leadership model point of view, effective leadership is based on communication and empathy. Leaders should maintain open communication and demonstrate empathy, acknowledging the varied experiences of their team members. They should have clear expectations for workplace behavior and performance while recognizing that individuality is vital. They should train and support them to help employees bridge the gap between their diverse experiences, which can be beneficial. The manager should embrace the multifaceted employee. Recognizing that employees bring various experiences and skills from various aspects of their lives can lead to innovative solutions. Encouraging employees to balance their diverse roles and responsibilities can enhance well-being and job satisfaction (Fishbein, 2021).

Our research assumptions are:

1. Workplaces today differ from those in the past. Workplaces are now considered social spaces with rules, laws, and limitations that may not align with individuals' experiences outside of work. This disconnect can create challenges for both employees and managers.

2. Psychological flexibility is a crucial quality for employees in adapting to the demands and constraints of the modern workplace. It implies the ability to effectively adjust one's mindset and behavior to navigate different aspects of life, including the workplace.

3. Managers face the challenge of leading employees who may have diverse backgrounds, experiences, and expectations. Traditional authoritarian leadership styles may not be effective in this context, as employees bring various experiences and skills from their outside lives, which may only sometimes align with their work roles.

4. The "Human leadership" model is based on the encounter of psychological flexibility.

5. A psychologically flexible manager who uses the human leadership model and encourages his employees to apply the tools and principles of psychological flexibility strengthens his ability to understand and relate to the diverse experiences and skills that employees bring to the workplace and the efficiency and output he will receive from his employees.

1.1. Psychological flexibility

Psychological Flexibility is the ability to experience the present consciously and non-judgmentally and to act according to one's chosen values (Marom et al., 2011). Psychological Flexibility forms the basis for processes of appropriate choices and attentive and conscious behavior. These processes give rise to a wide array of physical and cognitive strategies and help an individual change the role of his inner experience through flexible conduct in the face of thoughts and events (Rolffs et al., 2018). In general, the elements of psychological flexibility include awareness of the present, adapting to situations and events, having a flexible perspective, and balancing conflicting needs and behavior consistent with values (Kashdan & Rottenberg, 2010). According to Hayes, Strosahl and Wilson (2012), six parallel and interrelated processes serve as the foundations of psychological Flexibility: Acceptance – the state of being ready, willing, and able to experience private events without trying to change their frequency, content, or form. Cognitive Diffusion – the ability to differentiate between thoughts, feelings, physiological sensations, and impulses in evaluating real events while fully aware of the present and choosing effective and relevant behaviors. Mindfulness of the present – an active, attentive, full, non-judgmental awareness of the present moment. "Myself as an observer" is a multi-dimensional perception of oneself as more than the sum of one's experience. Values - Selected principles that shape personality, which are freely chosen by the individual, which define processes and are linked to patterns of action, directing and organizing the individual's behavior (ibid), providing him with a sense of meaning. Committed Action - Strengthening effective behavior patterns that help individuals reach value-based goals (Yuval, 2011). The scales of processes that constitute the foundations of psychological flexibility are dynamic and are responsible for shaping the patterns of interaction of the individual with his environment (ibid.).

There is a parallel between the processes that make up psychological flexibility and similar processes that are defined as self-control, emotional regulation, and self-regulation (Fuchs, 2021). Kashdan and Rottenberg (2010) refer to executive functions, default mental states, and personality configurations as three significant factors that form the basis for psychological flexibility. Executive functions generate significant neuropsychological support for self-regulation, which reflects brain activity primarily in the frontal lobe and enables behavioral choices based on integrating cognitive abilities and goals. Executive functions are a system of high-level cognitive control processes and have a significant role in the navigation and success of all day-to-day activities. They are responsible for choices, decisions, risk assessment, planning, awareness processes and breaking habits, setting priorities, behavioral sequence, coping with changing situations, etc. (Miyake & Friedman, 2012). Executive functions are related to important aspects of health and function both at the physical level and at the mental level (Snyder, 2013). Deficient performance in these areas will impair the individual's ability to develop psychological flexibility (Kashdan & Rottenberg, 2010). Executive control is an example of a skill derived from executive functions. Executive control includes awareness of a situation combined with the ability to focus on the fundamental aspects of the situation. Executive control enables correlation between a situation and behavior, emphasizing the context and an authentic response based on awareness and not the result of an automatic pattern. Executive functions also include dealing with distressing situations and openly accepting thoughts, emotions, and sensations of any kind (ibid.). Challenges and tensions are an integral part of life and are significant factors in an individual's development and maturation. The ability to experience, cope with, and organize different thoughts and feelings affects emotional well-being (Robinson et al., 2004). Executive functions also include working memory, information processing speed, and the ability to regulate behavior (Kashdan & Rottenberg, 2010).

These factors are important for psychological flexibility because when utilized properly they help the individual to see complex situations via several vantage points and representations and to select the appropriate responses and actions for each situation (ibid.). In summary, executive functions are a significant factor in the ability to regulate responses, adapt responses to reality, set goals and achieve them. The ability to be attentive, to accept and tolerate stressful situations, and to use memory skills helps the individual identify contextual clues and select appropriate responses in individual and social situations. Default mental states - Psychological flexibility depends on the individual's ability to make efficient and balanced use of the mental energy he invests in current events in his immediate environment, and the energy he will have to invest in significant future situations (ibid.). Automatic processes such as heuristics, stereotypes, and habits help us to make a balanced effort in interpreting and responding to the environment. However, processes of this kind make the individual draw conclusions about themselves, others, and the world around them based on limited knowledge and misconceptions (Dunning, Heath & Sols, 2004).

Heuristics are simple mental procedures that help to find quick but incomplete answers and solutions to difficult questions (Kahneman et al., 1982). Heuristics help us navigate social environments and deal with the myriad of verbal and nonverbal information that exists in social interactions (Kashdan & Rottenberg, 2010). Heuristics and stereotypes enable us to draw conclusions and to establish responses to conclusions daily (ibid.). Heuristics and stereotypes are very resistant to reconsideration and change. Often, the information they provide is neither accurate nor relevant, makes it difficult to identify other relevant information or to gain new insights, and prevents one from experiencing and taking part in varying personal situations (Kahneman et al., 1982). Psychological flexibility helps shape our automated processes in more efficient and better ways. To do so, one must recognize the tendency to automatically put into play social judgment and preferences based on habits, limitations of biased social judgment, habits and preferences, and the fact that automatic, habit-based activity ultimately reduces actions resulting from freedom and flexibility (Kashdan & Rottenberg, 2010). Personality configuration also has a significant impact on psychological flexibility. Neuroticism, self-control, Positive affect and openness to experience are personality dimensions that can be tested for psychological flexibility. Positive affect enables flexible thinking and flexible behavior. It expands the range of possible thoughts, feelings, behaviors, and modes of action in any given situation. Positive affect expands attention, enhances work memory, increases creativity, and enables openness to new knowledge and a variety of perspectives (Johnson & Fredrickson, 2005). These traits contribute to effective, thorough and qualitative decisions. Openness and curiosity and readiness for new knowledge and new experiences leads to a willingness to tolerate all sorts of experiences and emotions that may naturally arise because of coping with new stimuli (Kashdan & Rottenberg, 2010).

When an individual acts out of openness and willingness, he sees in unfamiliar situations an opportunity to find meaning in his actions, to expand the self. Openness allows for multiple perspectives and creative thinking and is related to tolerance and compassion. Balanced self-control or the ability to modify cognitive and behavioral tendencies is another major factor in psychological flexibility (Kashdan & Rottenberg, 2010). People with balanced self-control have more flexibility and perseverance, their psychological well-being is higher, and they experience more satisfaction in life and fewer instances of psychopathology (Fuchs, 2021).

Self-control helps to inhibit gratification, resist impulses, and control thoughts and emotions to achieve behavioral flexibility (Kashdan & Rottenberg, 2010). At the same time, the individual's natural ability to control himself may limit psychological flexibility. Psychological flexibility refers to an attentive orientation that forms the basis for the individual's awareness of his thoughts and feelings while understanding them as thoughts and feelings that do not necessarily indicate reality itself. This awareness allows a person to continue to act according to his or her values even when he experiences emotions and thoughts that may interfere with his actions (Biglan, 2009). Studies have shown a positive relationship between psychological flexibility and empathy and caring, as well as an inverse relationship between psychological flexibility and bias and prejudice (ibid.).

Social problems such as wars, terrorism, prejudices, interpersonal conflicts and conflicts between groups created based on lack of care, erroneous assessments, hostility and environmental pressures. Thus, raising the level of caring among people by raising psychological flexibility may be a solution to many social problems (ibid.). On the other hand, labeling, prejudice, and false beliefs may lead to problematic, maladaptive and avoidance behaviors (ibid.).

1.2. Social Space - The Mobile Human

The social space has been dramatically changed under the influence of globalization. The latter creates the conditions and gives a chance to the unknown mobility human so far. But alongside this, on an equally unknown scale, it produces random occupations that are the source of alienation among people. Globalization ruins many of the boundaries typical of traditional societies. But it also ruins the limits of the risks, forcing the modern human to live in a society that is labeled with global risks. From the point of view of its anthropological implications, globalization cannot be judged by the terms of comfort or apocalypse.

The world in which we live is a world of movement, a world in which everything is dynamic and often leaves in our minds the image of chaotic and disorder in our happenings. The world today is mobile, highly mobile. This peculiar definition of reality carries at least two meanings:

On the one hand, "this" world is a world of continuous, rapid change. Perhaps the hallmark of this movement is the words of A. Toffler (Toffler, 1970), who defined the life of modern man as a life in a permanent "shock of the future" (Toffler, 1970, p. 7), which brings renewal that makes it difficult human adaptation.

On the other hand, Anthony Giddens (Giddens, Duneier, & Appelbaum. 2011) illustrates the mobility of the modern world with the definition "If we imagine the whole history of mankind as one day, agriculture is invented at 23.56 hours, and civilizations - at 23.57. The development of modern societies begins only in 23 hours, 59 minutes and 30 seconds! Still, over the last thirty seconds of this "human day" perhaps more changes have occurred than all the time before them." (ibid., p. 123). The dynamics of change in our times are so great that we can find two "neighboring" generations live so differently as if they were living in different centuries.

Nevertheless, when our time is characterized as a time of mobility, this designation is not only in a metaphorical sense. The modern world is mobile in both the transportation and the direct meaning of the word - today, people are as if they are continuously on wheels, in airports, on high-speed roads, on electronic highways, and so on. Bauman (1999) argues that the life ambitions of today's man "Most often are expressed in terms of mobility, freedom in choosing the place, traveling, exploring the world." (ibid., p. 145). However, tourism and occupational mobility are only two dimensions of modern mobility. Meanwhile, millions of people migrate from native places and countries to bring their lives to other parts of the world. Each of these mobility trends produces dual effects - on the one hand, it leads to the mutual opening of the world, to the dropping of many of the traditional borders between states and people, but on the other, it produces new frontiers and conflicts.

Bauman (1999) provides a good example of the human dimension of globalization, outlining the emerging new sociality among some modern people. He cites Agnes Heller (in Bauman, 1999), who in

turn tells of a businesswoman who speaks five languages and has three apartments in three different places. "The type of culture in which it participates is not a culture of a certain place, it is the culture of time. This is the culture of the absolute present. Let's accompany her on her constant journeys from Singapore to Hong Kong, London, New Hampshire, Tokyo, Prague, etc. She stays at the same Hilton hotel, eats the same lunch sandwiches, or if she eats Chinese food in Paris and French - in Hong Kong. It uses faxes, phones, computers, looks at the same movies and discusses the same problems with the same people." (ibid., pp. 114-115).

The contemporary man, though still not at the scale of Bauman's character, is relieved of locality and of his "statehood", gradually acquiring a cosmopolitan consciousness. In other words, a state of consciousness that challenges any territorial, national, state, or geographical confinement. Cosmopolitanism denotes the feeling of belonging to the world and the commitment to universal values. It is a sign of the moral maturity of mankind, overcoming the limitations and intolerance of such antipodes as racism, irrational patriotism and nationalism. The cosmopolitan personality is or, at least, is making ever more serious attempts to engage in human causes, while also enjoying deep respect and recognition for existing cultural practices. But it is also necessary to say that cosmopolitanism is eclectic in its own way: its forms of expression are constantly changing, as if without its own center, the cosmos of the cosmopolitan consciousness is a center which is in constant motion. At the same time, the cosmopolitan consciousness of man does not release him from calling them non-cosmopolitan attachments. Even cosmopolitan in spirit, individual human subjectivity will always be a carrier of specific characteristics derived from origin, from bio-anthropological affiliation, from value and moral specifics. But they are not leading. These specifics are rather the individual nuances in the richness of the cosmopolitan personality. The criticism of the global cosmopolitan community is that it is not enough to simply be imagined and propagated by the various calves, info and mass media. And it is necessary for mankind to put the strong foundations of wider political unions, to embrace more and more diverse types of cultural communities. This criticism is reasonable.

Indeed, the process of cosmopolitanism is in its beginnings, but in general it is irreversible in its idea. This process is and will be accompanied by inevitable contradictions and difficulties coming from different directions. There are many problems that will be encountered, and which must be overcome. Some of them are the following: the post-nationalist movements and the confrontation in the social communities implanted by them; ethnic xenophobia; historical prejudices that are remnants of distant ages in the consciousness of people living in the 21st century (Petkova & Chukov, 2019).

Along with all the challenges (positive and negative) arising from globalization, which change people's way of life, with a history that is unknown in history so far, this dynamism first reflects on the human soul. It turns out that globalization, mobility, the dynamics of time, as they are subjected to sociological or philosophical analysis, are so much the subject of psychology. Today we talk about mental disorders such as anxiety, panic, depression, etc., which show how uncertain the modern man is from this dynamically changing setting around him. A person now lives in a compressed time, often having to perform several operations - for example, by talking on the mobile phone to search for information on the Internet and at the same time often reading in a foreign language by considering the information he reads. All of this is extremely heavy on our minds. Such accumulated over-fatigue and over-stress have led to the creation of a concept like burnout (Petkova, 2021).

The Mobile person becomes more and more important as a topic of modern social research. In connection with its study, specialized academic centers are created, scientific journals are published, congresses are held. At the same time, mobility is beginning to impose a new paradigm in the social sciences. One of its first authors is the well-known British sociologist John Urry (1999). Urry considers it necessary to formulate such a paradigm because, in his view, the mobile person with his continuous spatial mobility modeled and modified modern societies so that they became difficult to reason in the framework of the present paradigm. Urry believes that any attempt to analyze or study globalization and global change is the same as analyzing and exploring "mobilities" and "mobility" (ibid., p. 49), which "are the basis of social life and should be the basis of sociological analysis" (ibid.). He believes that previous sociology has neglected people's "mobility", such as compactness or mass, as well as autonomy or "self-mobility" (ibid.). This lack of interest in the prior sociology of an autonomous personality could be explained by the lack of unregistered, important social personal interactions. Still, this new mobile person lives in some societies that are less likely to "reshape", so Urry (1999) allows himself to continue to use traditional concepts and ideas for civil society. But the image of this society through his gaze is more refined. The difference, he says, is that: on the one hand, this society allows for a greater and more easily

achievable opportunity for political change as well as for more active participation of the autonomous mobile individual and his influence on real politics; and to release from the sphere of state control and to create a kind of mobile technological social control from or through "mobilities" or through all those new boundaries and dependencies that originate from them. The latter are new forms of habiting man and the space around him from: a light car that radically changes the social spatial human being, through the media (mobile or virtual) to ideas, possessions and information, as well as the resources needed for their production, and then for their exploitation. These nobilities form the need for the already mentioned new paradigm for social research.

This, so to speak, a new "sociology beyond the enduring societies" (ibid., p. 10) through the "mobilities" (ibid., p. 49) broadens the latest debates on globalization and theorizing for and on the modern way of life. By providing analysis, it is revealed how mobilities rebuild social life in terms of inequalities in it - inequalities that arose from the difference in time, space, space, objects, etc., in terms of travel, changes in their ideas, images, messages, waste products and money across international borders, as well as the consequences of these mobilities, which we will have to break through our experience gained over time, space, our way of living, or ignorance us. The changes that globalization has brought about in our societies have led to "Dismissing the roles of the traditional definitions of the notion society - it is increasingly difficult to give some static definition of it" (Urry, 1999, p. 15).

Society increasingly needs to be characterized by flexible expressions such as: organic, functional, integrating and reproducing entities. And what imposes these flexible terms is the dramatic increase in the flow of trans-and over-national forms of associations, so the traditional notion of society becomes even less plausible. What then happens about the function of sociology, since it is science that can best answer the question of what is happening to human sociality? For Urry (1999) this is the challenge to the new sociology. It offers a peculiar manifesto to create a scientific social paradigm for the study of what is emerging as "post-society" (ibid., p. 7). The mechanism, and perhaps the language in which we can read the coordinates of this "post-society," are the so-called "metaphors" (ibid., p. 10). Urry argues that some metaphors are "scientific" (ibid., p. 29) more useful than others. He intends to overcome the static and centered concept of "society" (ibid.) more useful than others. He intends to overcome the static and centered concept of "society" (ibid.) with the help of metaphors indicating different forms of mobility. The metaphors developed in the theory of Urry reflect the movement not only of humans but also of "non-human hybrids" (ibid., p. 29): for example: "information, commodities, even the crises" (ibid., p. 30). The most important of these mobile metaphors in Urry's project are "networks, streams and periphery" (ibid., p. 32). It can be said that Urry is the first since Castells (2004) a social thinker who shows that thinking through concepts like "network". Urry provides several advantages over large structure ideas that are more centralized and less flexible than networks themselves. These networks "produce" and are derived from complicated and long-lasting connections that pass-through space and time between peoples and things " (Urry, 1999, p. 34).

The flow of people, money, information, commodities, crises, etc. are "moving", "entering" and "coming in" (Kingsley, & Urry, 2009, p. 64) in the social landscape, "travel" (Kingsley, & Urry, 2009, p. 64) inside and outside the societies.

In "Sociology Beyond Societies: Mobilities for the Twenty" Urry (1999) uses these (and other) mobile metaphors to address various issues related to travel, senses, time, housing, citizenship, etc. The common thing here is that there is a constantly changing worldview. Urry gives considerable room to explore the means for human mobility, highlighting the extremely important "role of the vehicle" (ibid., p. 98). Unlike all other times, in the modern age man can rely on fast-moving vehicles - trains, planes, cars, etc. As if they allow a person to live a little longer, saving him from time to carry your own body from point A to point B at a faster speed. It would not have happened to the same degree of security, speed, possibility of carrying additional luggage if the man relied solely on his own strength. Vehicles are at the root of modern human mobility by reducing the lost in ineffective times that man can carry himself "here" and "there" into space. At the same time, they expand and divide social spaces, making them more accessible and unlimited. Moving through social space, labor, or any other kind of human activity is about 'staying' or living in a place. The idea of Urry and Kingsley (2009) for "housing" (ibid., p. 67) is somewhat close to that of Martin Heidegger (Heidegger, 2010). As far as the dwelling is a place in which "the man remains, he finds himself and manifests himself freely, without any worries, his own intimacy" (ibid., p. 20) or expresses and feels comfortable - "the dwelling is a kind of human continuation" (ibid.).

Urry and Kingsley (2009) point to the following problematic processes that will disturb the future of our mobile societies: global warming and the global consequences of it; oil supply problems, as well as the

distribution of spheres of influence over it in the future; enhancing digitization in many different aspects of economic and social life as well as problems surrounding the recycling of unnecessary electrical products; massive population growth in the world, etc.

The theory by Urry (1999) has been a serious criticism lately. A debate in his theory provokes the theses related to the idea of "forming a new paradigm" (Urry, 1999, p. 5) with which to explore the social space in the conditions of accelerated and mass mobility. According to McKinnon and Trzebiatowska (2014, p. 67), Urry has not sufficiently clarified what these post-societies will be beyond the static. They are analyzing Urry (1999), "Sociology Beyond Societies: Mobilities for the Twenty", wrote: "In discussing travelers, John Urry (Kingsley, & Urry, 2009) makes a significant analysis of tourists, travelers and tourists, but without valid reason refuses to theorize the various types of "forced migration that causes at least 150 million migrants worldwide." (McKinnon, & Trzebiatowska, 2014, p. 69).

On the other hand, part of the comparisons that Urry (1999) makes purely social, using examples of mobiles such as "marching soldiers", "fighter jets" (Urry, 1999) should not be used as the key moves themselves, "They would sooner rather than be" launching a missile "(Urry, 1999, p. 79) are social activities or activities "(McKinnon, & Trzebiatowska, 2014, p. 75).

In other words, it could be said that Urry (1999) presents a peculiar manifesto of sociology adapted to the 21st century, using as an example the mobilities that the 20th century people used. McKinnon and Trzebiatowska (2014) also criticize the lack of a clear statement, which is only implied by Urry (1999) regarding the movement of cash flows in the global financial system. And the latter is certainly one of the most dramatic and important spheres in the post-social space of global societies. Irrespective of the critique of Urry's theoretical platform (Urry, 1999), it is a good incentive for activating search in modern social theory. The mobility of man in the age of globalization becomes a factor that will increasingly change the characteristics of social space and, with it, the structure of society. The scientific toolkit, which has worked well in a relatively sustainable society, will become increasingly inefficient in view of the ongoing and deepening changes due to the increasing mobility of modern human. (Petkova & Chukov, 2019)

1.3. Leadership in a changing world

The 21st century demands that we move from the perspective of solving puzzles to solving mysteries. Constant change brings new ideas and behaviors. Leadership in a changing world requires a transition from an approach that focuses on planning to one that focuses on creating and becoming. This situation requires an understanding that change is situational, flexible, and adaptive, and the ability to respond and act in changing situations. The dynamic reality of the 21st century requires a willingness to learn and evolve from situations of internal and external uncertainty, to let go of control, to experience coping, and to learn together. It is a necessity that entails a transition from a hierarchical model of leadership to an open and collaborative model of leadership that operates within the framework of interpersonal leadership and human development (Dumas & Beinecke, 2018).

Leadership in a global society requires critical thinking and the development of problem-solving skills, technology orientation, adaptability, and pragmatic and practical skills. Good communication skills, the ability to build interpersonal relationships, form teams, and collaborate with internal and external parties (Goleman et al., 2007).

Leadership in the 21st century requires a high degree of adaptability as well as a variety of behaviors that meet needs. It is based on values, motivations, and needs and manifests itself in the leader being a personal, flexible, and visionary model who acts transparently and has confidence in leading group processes, practices, and social processes (Dumas & Beinecke, 2018). It leads and develops skills and abilities from the trust of its people and through training and education. and is focused on creative, transformative, ethical, and spiritual integrative processes (Trilling & Fadel, 2009).

In the 21st century, managers face a rapidly evolving and competitive global economy. To achieve their goals, they must adopt new approaches to leadership, recognizing that many traditional skills from the 19th and 20th centuries are no longer effective in today's work environment. The 21st-century leadership landscape demands a departure from traditional approaches and a shift towards adaptability, continuous learning, and a deep understanding of both technological and human aspects. Leaders who embrace these principles are better equipped to guide their organizations through the challenges and opportunities of the modern era.

Key points to consider: Today managers must motivate and empower their followers by equipping them with the skills and knowledge necessary to excel in their roles. This not only fosters individual

growth but also propels the organization forward. Effective leadership in the 21st century demands adaptability and flexible thinking. Managers should be prepared to embrace change and implement strategies that are responsive to evolving circumstances. The "growth mindset," as proposed by Dweck (2007), is crucial for managers. This mindset encourages continuous learning, resilience in the face of challenges, and a belief that abilities can be developed over time. Managers need to possess information skills, digital literacy, and a commitment to environmentally and socially responsible behavior. These competencies are essential for navigating the modern global economy. Emotional intelligence (Goleman, 1998) and social intelligence (Goleman et al., 2007) are invaluable attributes for managers. They enable managers to connect with their teams on a deeper level, understand and manage emotions effectively, and navigate complex social dynamics.

1.4. The Afik Model of Human Leadership and How It Serves in the 21st century

The differences between the various leadership approaches and models lie primarily in how leaders move others to action. The Afik model of human leadership (Fishbein, 2019) was originally developed and empirically validated to understand human leadership's effects on motivation in the workplace. The theory of humane leadership states that the components of humane leadership are the most important characteristics that are essential for successful leadership. The change in organizational and social models according to the changing reality, challenges, and needs of the 21st century also leads to changes in key leadership characteristics, perceptions, and goals. In this literature review, we will examine the characteristics of Afik's human leadership model to determine the effectiveness and relevance of human characteristics to the 21st-century leadership model and the importance of psychological flexibility in developing these skills and qualities.

Habel (2002) found that leaders with strong relationship management skills treat others with kindness, sensitivity, and compassion. Relationship management centers on connecting with other people and building strong relationships. However, it also focuses on developing people through inspirational leadership, building teamwork through collaboration, and resolving interpersonal conflicts. Leaders who excel in relationship management have good communication skills and are adept at using their influence to ensure positive results. Relationship management skills are particularly important for public health leaders, given the field's highly collaborative nature. Over the years, adaptations and changes in leadership perceptions and models can be seen following social, cultural, and environmental changes. We see a shift from one-dimensional, goal-oriented models to multidimensional models that speak of a combination of professional and personal characteristics and factors in the leader's image (Fishbein, 2019).

Humane Leadership goes beyond building positive relationships with one's followers. Humane leaders are driven by kindness and deep concern for their followers. They see themselves as servants responsible for their subordinates' well-being and as nurturers who help others discover their voices and inner potential and guide their personal and professional development accordingly so that they, too, can become leaders. Humane leaders are attentive listeners who express sincere appreciation and offer constructive feedback through ongoing dialogue (Cornett, 2017).

Within the Afik model of human leadership, some qualities, characteristics, and models were defined, analyzed, and tested to create a new model that defines and expands the understanding of human leadership and the need for any form of a practical tool to improve human leadership. Leadership is about influencing others to act to lead people, raise their motivation, and achieve the goals of the organization. Hence, as the researcher found, operational skills – the ability to turn a vision into reality – are at its core. The difference between different leadership approaches and models lies not so much in the what or even the why of leadership but rather in how leaders influence others to act. To show the scientific value of the Humane Leadership model, this model was validated through garnering empirical support. The Humane leadership theory holds that an executive manager who does everything to meet the task without considering the personal treatment of each employee sends a message to his subordinates that they are less important to him than the work itself. Such a manager needs to improve in human relations and can benefit from improving his leadership skills. The literature describes several traits essential for successful leadership, and many of the ideas presented were integrated into the Afik model of Humane leadership (Fishbein, 2019).

Visionary - "Vision has long been a quality and characteristic defining leadership" (Coers, 2018, p. 1). He has a vision; he perceives what will happen in the future, can think a few steps ahead, and bases his actions on that knowledge. He understands processes and what their potential outcomes might be. He is

skillful at analyzing situations and constantly considers and assesses processes and outcomes to plan and prepare follow-up plans (ibid.).

Action Taker - takes calculated risks. He is flexible and adapts to changing situations, prepares for crises, and is very decisive. This kind of a leader is a change-maker who takes initiative and seeks creative solutions (Wanasika, 2009, p. 7); call the action Taking leader a Strategic Leader: "strategic leadership as a person's ability to anticipate, envision, maintain flexibility, think strategically, and work with others to initiate changes that will create a viable future for the organization. This second definition captures several characteristics: future orientation, cognitive ability, ability to focus on the big picture, interpersonal relations, propensity to act, and risk-taking" (Wanasika, 2009, p. 7).

Sets Clear Goals - focuses on what is relevant. The leader can differentiate between what is significant to the process and what is extraneous and sets clear operational goals, and he "is cognitively complex enough to hold both short-term and long-term goals simultaneously" (Wanasika, 2009, 7).

Realistic – "A realistic leader is characterized by untenable and selfish morality, which is neither lasting nor certain" (Brzezińska, 2020, p. 180). He does not live in a fairy-tale world. His "goals arise about what is desirable, possible, and necessary out of necessities, not desires and dreams" (Wanasika, 2009, p. 7). He operates rationally, makes logical choices, and explains his decisions and actions. He never uses the excuse, "Because I want to...". He justifies everything he does.

Provides Clear Instructions - The leader has good communication skills. He is assertive, very available, and gives clear and precise instructions. Hoch (2014) calls the leader who provides clear instructions the Pragmatic Leader. The "pragmatic leader provides clear instructions about the team procedures and ways of working; may lead to uncertainty about the correct direction the team may take" (Crespo-Gonzalez & Quintero, 2020, p. 33).

Perseverance - very focused and disciplined, is "better at overcoming obstacles and can work with distant objects in view". He adheres to the mission and is passionate about seeing projects through to the end (Kirkpatrick & Locke, 1991, p. 51).

Persuasive Negotiator - has powerful coaxing skills. He seeks out-of-the-box solutions and knows how to bring people around to his viewpoint. He believes in fair play. "This leader understands the other side's story, is open to persuasion, uses reciprocity to build trust, matches appeals to the other side's circumstances, seeks agreements that feel fair to both sides, recognizes how people process information through stories as well as analysis" (Foster, Mansbridge & Martin, 2015, p. 74).

Role Model - A Positive Motivator. He is inspiring and very professional and treats his subordinates with respect. A leader who "uses role modeling to influence others", "with a socialized power motive, uses power to achieve desired goals or a vision. Its use is expressed as the ability to develop networks and coalitions, gain cooperation from others, and resolve conflicts in a constructive manner" (Kirkpatrick & Locke, 1991, p. 53).

Kindness – "The relationship between kindness and leadership is a topic of fundamental importance for the organization's well-being" (Haskins, Thomas & Johri, 2018). Baker & O'Malley (2008) "Have advocated that leading with kindness is effective in both optimizing organization performance and building high commitment workplace cultures and is a moral duty" (Caldwell, 2017, 2). This leader loves and cares for his staff. He develops relationships with his employees' families, loves his subordinates, and helps them solve their problems. He believes caring for others inspires them to follow him as a leader, and he stands up for the people he leads.

Honesty and Integrity – "are virtues in all individuals but have special significance for leaders. Without these qualities, leadership is undermined. Integrity is the correspondence between word and deed; honesty refers to being truthful or non-deceitful. The two form the foundation of a trusting relationship between leader and followers" (Kirkpatrick & Locke, 1991), "Empowerment of workers in social sphere - challenges and opportunities". He is loyal to superiors and subordinates alike. He is loyal to the organization, adhering to the organization's policies, nurturing the organization's culture, and does not abuse his position of authority or power. He does not use force or fear tactics or practice cheap populism to achieve his goals. He is honest, reliable, accountable, and stable, maintains a calm demeanor, and never plays the blame game (Smith & Harrison, 1986).

The Wandering Around Listener - listens patiently. He listens to both sides when there is a disagreement or conflict and puts his ego aside when contemplating a solution. Listeners "are effective information gatherers because they are good listeners and encourage subordinates to express their opinions. In Peters' terms, they stay in contact with the rest of the organization by "wandering around". Leaders actively seek information from outside the organization. Good leaders also disseminate

information widely so that followers will understand why decisions are made and how their work fits into the organization's goals." (Kirkpatrick & Locke, 1991, p. 57).

Interpersonal Skills and Emotional Stability - belief in teamwork. He collaborates to improve achievements, consults with others before making important decisions, is not afraid of strong colleagues, and is open to others' opinions. He says what he means and means what he says. He "remains even-tempered ... generally do not become angry or enraged ... emotional stability is especially important when resolving interpersonal conflicts and when representing the organization ... he retains emotional control and fosters trust and teamwork" (Kirkpatrick & Locke, 1991, p. 55).

Delegates - delegates responsibilities. He trusts subordinates to help reach goals and shares the credit and responsibility for results. "Delegating leadership style gives confidence as the manager recognizes and celebrates employee achievement and inspires challenge and innovative ways to reach the goal" (Lynch, 2015 in Alčauskienė, Vitkienė & Grigaliūnienė, 2019). "It is stated that this style supports and allows a high degree of staff autonomy as employees are allowed to engage in planning and administration. In this case, the manager delegates responsibilities to employees to see how the job progresses. This style is most appropriate when employees are competent in performing tasks and willing and confident in their abilities and knowledge" (Alčauskienė, Vitkienė & Grigaliūnienė, 2019).

Lifelong Learner Professionalism – "puts the knowledge base into practice" (Garman et al., 2006, p. 219). seeks to grow and learn. He deliberately surrounds himself with more knowledgeable people than he is and constantly strives for improved professionalism. "Professionalism involves cultivating and managing working relationships with others. Effectiveness in delivering and receiving constructive feedback is a hallmark of professionalism. Maintaining networks with colleagues and participating in a professional association are also highly important activities" (Garman et al., 2006, p. 220).

Nurturer - challenges and nurtures staff. He is supportive, offers positive feedback, shows others how to improve, and gives people a second chance, all to improve achievements. "Rewarding professional development, and valuing members of the organization" (Leonard & Jones, 2009, p. 26).

Accepts his Humaneness - acknowledges mistakes and balances work and leisure time. "Participants addressed the important role that acceptance played in relation to their capacity to counsel with self-compassion—accepting their humanness in all of its strengths and limitations, as well as accepting others" (Patsiopoulos & Buchanan, 2011, p. 303).

Positive Attitude - does not "lose it". He is not moody, often smiles, and has a positive attitude, even when facing difficulties. He is optimistic and trustful, instilling hope in his co-workers (Hurduzeu, 2015). The list in the AFIK Model traits contains both tasks and relationship oriented. According to the AFIK Model, a

2. Methodology

A quantitative survey was administered to a broader cross-section of professionals across different sectors to investigate the interplay between psychological flexibility, human leadership qualities, and their impact on thriving in the 21st-century social space, aiming to achieve a comprehensive understanding of the intricate dynamics between psychological flexibility, human leadership, and success in the contemporary social space. The research commenced with a comprehensive literature review encompassing studies, scholarly articles, and theoretical frameworks related to psychological flexibility, human leadership, and the 21st-century socio-professional space. This initial phase allowed for the establishment of a theoretical foundation.

3. Results

Psychological flexibility:

The fundamental components of psychological flexibility encompass acceptance, active listening, presence, contextual awareness, cognitive separation, alignment with values, effective action, diverse thinking, focused attention, broad perspective, multi-dimensional awareness, and reflective abilities. These components play a pivotal role in delineating the skills identified by the research, which encompass critical thinking involving cognitive analysis and examination of underlying assumptions from various perspectives and with an open mindset.

Psychological flexibility mechanisms include acceptance, focused attention, cognitive separation, broad perspective, context comprehension, and analytical prowess.

Creativity and innovation are characterized by generating creative, original, and contextually relevant solutions that cater to specific needs and situations. Psychological flexibility mechanisms contributing to

creativity encompass acceptance, focused attention, cognitive separation, broad perspective, contextual awareness, adaptability across situations, idea expression, execution capability, and efficiency.

Entrepreneurship involves manifesting creativity by adapting responses to meet evolving needs, experimenting in uncertain conditions, learning from failures, and demonstrating the courage to take calculated risks. Psychological flexibility mechanisms relevant to entrepreneurship encompass acceptance, focused attention, cognitive separation, broad perspective, context comprehension, heightened awareness, need identification, diverse thinking, and adaptive capability.

Cooperation and communication skills hinge on effective verbal communication, self-assured expression, broad perspective, cooperation, leadership acumen, acute social situational awareness, and holistic group-oriented action. These abilities are fortified by psychological flexibility mechanisms such as maintaining a broad perspective, adeptly transitioning between situations, acceptance, presence, openness, need identification, and effective, situation-responsive action.

Self-direction, lifelong learning, and adaptability signify the capacity to thrive amidst uncertainty, adapt to evolving environments, acquire diverse skills and knowledge, exhibit mental flexibility, and proactively respond to changing circumstances and needs. These attributes are closely intertwined with psychological flexibility elements like adaptability, presence, active listening, cognitive separation, broad perspective, situation-specific adaptation, and need-aligned action.

Ethical, social, and legal awareness encompasses understanding the power and risks associated with technology and databases. Addressing the multifaceted challenges posed by reality necessitates autonomous identification of ethical dilemmas, discerning and regulating ethically, socially, and legally contentious behaviors, and upholding ethical and legal standards. These facets of awareness align with psychological flexibility mechanisms like heightened awareness, values, value-based action, and contextual comprehension.

Cultural awareness entails recognizing and comprehending diverse cultures' distinct characteristics and needs, coupled with effective cross-cultural communication informed by cultural, historical, geographical, and general knowledge. Balancing global trends while preserving uniqueness demands flexibility mechanisms that facilitate adaptability and diversity appreciation.

Skills associated with human leadership include:

Effective leadership in the 21st century emphasizes qualities such as empathy, compassion, authenticity, and a growth mindset. Human leadership emphasizes the importance of treating employees as valuable individuals with unique needs and motivations. This style of leadership fosters trust, collaboration, and a positive work culture.

Empathy and Compassion: Leaders need to understand and relate to their team members' diverse emotions and experiences. They should also show compassion and support when needed; **Authenticity:** Being genuine to oneself fosters trust and connection with team members; **Growth Mindset:** Leaders should embrace challenges and view failures as opportunities for growth and learning; **Empathy:** Understanding and acknowledging the feelings and perspectives of others; **Active listening:** Giving full attention to others when they speak, without interrupting or judging; **Coaching and mentoring:** Helping employees grow and develop their skills and potential; **Emotional intelligence:** Recognizing and managing emotions in oneself and others; **Inclusivity:** Creating an environment where all employees feel respected and valued.

Demands of Social Space:

Social space refers to the interconnected and ever-changing social, cultural, and technological context in which individuals and organizations operate in the 21st century. It demands adaptability and the ability to navigate diverse cultural contexts, work with remote teams, and leverage technology for communication and collaboration.

21st-Century Leadership Skills:

In the 21st century, the skills required have shifted from traditional, task-specific skills to more holistic and adaptable ones. These skills include critical thinking, creativity, adaptability, communication, collaboration, and emotional intelligence.

In addition to psychological flexibility and human leadership skills, the rapidly changing world also requires leaders to possess a diverse set of skills to effectively lead their teams and organizations: **Adaptability and flexibility:** Being able to adjust to new circumstances and technologies. **Digital literacy:**

Understanding and utilizing digital tools and technology. **Data-driven decision-making:** Using data and analytics to make informed choices. **Creativity and innovation:** Encouraging new ideas and thinking outside the box. **Cultural intelligence:** Working effectively across diverse cultural contexts. **Collaboration and teamwork:** Building and leading teams with diverse skills and backgrounds. **Visionary thinking:** Setting clear and inspiring long-term goals. **Conflict resolution:** Addressing and resolving conflicts constructively. **Ethical leadership:** Demonstrating integrity and making ethical decisions. **Strategic thinking:** Planning for the future and aligning actions with long-term objectives.

4. Discussion

Psychological flexibility, particularly elements like acceptance and present-moment awareness, is crucial for coping with the demands of the social space. It helps individuals and leaders navigate the complexities of a rapidly changing social and work environment. The skills required in the 21st century, such as emotional intelligence and adaptability, align closely with the qualities of human leadership. Effective leaders need these skills to lead diverse and adaptable teams successfully.

Psychological flexibility can enhance leadership qualities. Leaders are better equipped to manage their own emotions and understand the emotions of their team members, fostering a more empathetic and compassionate leadership style.

In order to thrive in the 21st century, individuals need to possess skills like adaptability, critical thinking, and creativity. These skills require a certain level of psychological flexibility, which includes elements like acceptance, mindfulness, and values-driven action. Regarding leadership, qualities like empathy, communication, and collaboration are crucial in creating a welcoming and inclusive social space. By fostering these qualities in leaders and individuals, social spaces can meet the demands of a diverse and rapidly changing society.

Psychological Flexibility and the 21st century

The basic components of psychological flexibility include qualities of acceptance, listening, presence, seeing out of context, cognitive separation, values, binding action, diverse thinking, focused attention, a broad perspective, and the ability for a variety of points of view, awareness, and reflective abilities, analyzing situations, identifying and defining needs and goals, regulating and planning thoughts and behavior, thinking outside the box and the ability to act effectively and adaptively.

In an in-depth examination of the skills presented, the components of flexibility, in different compositions and dosages, are fundamental in the research:

Thus, **critical thinking** is the cognitive and analytical ability to examine claims, approaches, and basic assumptions underlying various processes. This, while deepening analysis, research, and precision, a variety of perspectives and openness.

The mechanisms of flexibility include qualities of acceptance, attention, cognitive separation, a broad perspective, an understanding of the context, and analytical abilities.

Creativity and innovation are characterized by creativity, originality, and relevance to developing answers that match the need and the situation.

The mechanisms of flexibility include acceptance, attention, cognitive separation, a broad perspective, understanding the context, the ability to move between different situations, the ability to bring ideas into expression and execution, and efficiency.

Entrepreneurship is defined as expressing creativity through development, adapting a response to a need, experimenting under conditions of uncertainty, learning from failures, and having the courage to try.

And the mechanism of flexibility includes components of acceptance, attention, cognitive separation, a broad perspective, understanding the context, awareness, identifying needs, focusing attention, diverse thinking, and the ability to cope.

Cooperation and communication are defined as social and communicative abilities which are based on verbal abilities, self-confidence, self-expression, a broad perspective, cooperation, leadership ability, a high understanding of social situations, seeing others and the broad group picture which are reflected in effective actions in the fields of knowledge, initiative, Task management and utilization of group resources. Flexibility mechanisms such as a broad perspective, the ability to move between situations, acceptance, presence, openness, identification of needs, and effective and need-compatible action.

Self-direction, life-long learning, and flexibility indicate the ability to cope and adapt in conditions of uncertainty, adapt to changing environments, acquire various skills and knowledge, self-direction, mental flexibility, and take the initiative while being aware of changes in the environment and needs. And

bring to light elements of flexibility such as adaptability, presence, listening, cognitive separation, a broad perspective, adaptation to the situation, and adaptation of action to the need.

Ethical, social, and legal awareness includes awareness of the power and dangers of accessing technology and databases. Meeting the many challenges posed by reality requires awareness and the ability to independently identify ethical issues and distinguish and regulate ethically, socially, and legally problematic behaviors. Admit social and legal ethics. Refers to flexibility mechanisms such as awareness, values, value-based action, and context understanding.

Cultural awareness refers to the distinction and understanding between different characteristics and needs of different and diverse cultures alongside optimal communication based on cultural, historical, geographical, and general knowledge. Combined with the ability to adapt to the global trend while creating a balance between maintaining uniqueness and adopting global characteristics, flexibility mechanisms that belong to the possibility of diversity and adaptation.

Psychological flexibility are essential components of many fundamental skills necessary for success in the 21st century in a rapidly changing world. Research has shown that individuals with higher psychological flexibility levels are likelier to possess important 21st-century skills, such as critical thinking, problem-solving, creativity, and social and emotional intelligence.

Psychological flexibility is adapting to changing emotional, cognitive, and behavioral situations. It is regarded as a key component of social and emotional intelligence. Effectively navigating complex environmental and inner situations requires self-regulation skills, acceptance, empathy, and openness to different perspectives and ideas.

Hence, psychological flexibility is an essential component of many fundamental skills necessary for success in the 21st century in a rapidly changing world. It is considered a key component of critical thinking and problem-solving skills. It is expressed in the ability to adapt to changing situations and think about problems in new and creative ways. Effective complex problem-solving and adapting to changing circumstances need wide, multiple perspectives and flexible thinking to conclude potential solutions (Fuchs, 2021).

These skills are not exhaustive, but they highlight the increasing complexity and interconnectedness required of leaders in the 21st century. Successful leaders in this era need to blend psychological flexibility, human leadership, and a diverse skill set to navigate the challenges and opportunities presented by the rapidly changing landscape.

Adaptability to Change: The 21st century is marked by constant change and uncertainty. Leaders need to be adaptable and open to new ideas and approaches. Psychological flexibility enables leaders to embrace change, be willing to experiment, and adjust their leadership style to suit the evolving needs of their team and organization.

Empathy and Understanding: Human leadership require a deep understanding of employees' emotions, motivations, and perspectives. Psychological flexibility fosters empathy, allowing leaders to connect with their team members at a personal level, understand their concerns, and provide the necessary support.

Resilience in the Face of Challenges: Psychological flexibility helps leaders, and their teams bounce back from setbacks and challenges. In the rapidly changing business landscape, resilience is vital for maintaining a positive and productive work environment, even during difficult times.

Emotional Intelligence: Effective human leadership involves recognizing and managing emotions, both in oneself and others. Leaders with high emotional intelligence can navigate interpersonal dynamics, provide constructive feedback, and inspire their team to perform at their best.

Mindful Decision-Making: Psychological flexibility incorporates mindfulness, which allows leaders to make thoughtful and well-informed decisions. Mindful leaders can take a step back, assess the situation objectively, and consider the potential consequences of their actions before making critical choices.

Employee Growth and Development: Human leadership emphasizes supporting employees' growth and development. Psychological flexibility enables leaders to identify everyone's strengths and areas for improvement, tailor coaching and mentoring approaches, and create personalized development plans.

Conflict Resolution and Collaboration: In diverse and fast-paced workplaces, conflicts may arise. Psychological flexibility helps leaders approach conflicts with an open mind, seeking to understand different perspectives and collaboratively find solutions that benefit the team.

Inclusivity and Diversity: Leaders need to create an inclusive and diverse work environment. Psychological flexibility encourages leaders to appreciate and value individual differences, fostering a sense of belonging and equality within the organization.

Visionary Thinking: Leaders must envision the future and set clear goals. Psychological flexibility allows leaders to balance a visionary approach with practical adaptability, enabling them to steer the organization in the right direction while remaining responsive to changing circumstances.

Ethical Decision-Making: Human leadership requires ethical behavior and decision-making. Psychological flexibility helps leaders examine their values and principles, ensuring that their choices align with the organization's mission and the well-being of their team.

Conclusions

In the 21st century, the synergy between essential skills, psychological flexibility, human leadership qualities, and social landscape demands has become increasingly evident. Developing psychological flexibility enhances leadership attributes and proves indispensable for navigating the intricate social space while aligning with the skills requisite for modern success. By seamlessly incorporating psychological flexibility into human leadership, leaders can cultivate a work environment characterized by nurturance and growth that embraces change, fosters collaboration, and empowers employees to thrive amidst the dynamic challenges of the contemporary era. This amalgamation of psychological flexibility and human leadership, in turn, can yield higher employee engagement, stimulate creativity and innovation, and fortify organizations for sustainable success.

In the milieu of the 21st-century social space, marked by diversity, rapid change, and interconnectedness, leaders adept at practicing psychological flexibility and embracing human leadership qualities are better equipped to address challenges effectively. They possess the ability to nurture inclusive and collaborative environments, adeptly navigate cultural nuances, and lead with empathy, all of which are pivotal for thriving in the dynamic social landscape of the modern age. Prioritizing psychological flexibility and human leadership proves indispensable as it enables adaptability in the face of change and fosters a work environment where employees feel supported and valued. Leaders who prioritize empathy, transparency, and inclusivity cultivate a profound sense of belonging among their teams, which, in turn, fuels effective collaboration and encourages individuals to contribute their best efforts. Integrating these vital components into our leadership style enables the creation of a positive social space that nurtures growth and development for all team members, ultimately culminating in a thriving and empowered workplace. As leaders in the 21st century, understanding the concept of psychological flexibility and its profound influence on forging a positive social space for our teams is paramount. Psychological flexibility equips leaders to adapt to evolving situations and effectively manage stress, fostering an environment where employees feel valued boosting productivity and job satisfaction.

Human leadership emerges as another pivotal dimension in shaping a positive social space. Leaders who prioritize empathy, transparency, and inclusivity succeed in cultivating a profound sense of belonging among their employees. When team members feel genuinely heard and valued, they are more inclined to collaborate effectively and contribute their utmost. Integrating these fundamental principles into our leadership style enables the creation of a social space that encourages growth and development for all team members. Through the concerted prioritization of psychological flexibility and human leadership, we can craft a workplace where employees thrive and feel empowered to excel.

Psychological flexibility and human leadership can significantly benefit leaders in navigating the challenges of the social space in the 21st century.

Here are how these concepts can assist leaders:

Adaptability to Change:

Psychological Flexibility: Leaders with high psychological flexibility are better equipped to adapt to the rapid changes and uncertainties in the social space. They can accept and work with the inevitable disruptions and challenges that arise.

Human Leadership: A key aspect of human leadership is adaptability. Leaders who embody qualities like a growth mindset and willingness to learn and change can effectively lead their teams through evolving social and cultural landscapes.

Emotional Resilience:

Psychological Flexibility: Leaders who practice psychological flexibility can manage their emotions more effectively, reducing stress and burnout. This resilience allows them to stay composed and make sound decisions, even in high-pressure social situations.

Human Leadership: Human leaders prioritize the well-being of their team members, fostering an environment where emotional support is readily available. This, in turn, promotes emotional resilience among team members and enhances overall team performance.

Empathy and Relationship Building:

Psychological Flexibility: Acceptance and present moment awareness, components of psychological flexibility, contribute to empathetic understanding. Leaders who are attuned to their own thoughts and emotions are often more empathetic toward the experiences of others.

Human Leadership: Empathy is a core quality of human leadership. Leaders who exhibit empathy can build strong, trust-based relationships in the social space, essential for collaboration and effective communication.

Effective Communication:

Psychological Flexibility: Cognitive diffusion, a part of psychological flexibility, helps leaders detach from unhelpful thought patterns. This enables clearer and more effective communication, as leaders can express themselves without being entangled in their own biases or emotional reactions.

Human Leadership: Human leaders prioritize open and honest communication. They create an environment where team members feel comfortable sharing their thoughts and concerns, which is vital for effective teamwork in the social space.

Values-Driven Leadership:

Psychological Flexibility: Values clarification is a component of psychological flexibility. Leaders who understand their core values can align their actions with their principles, making decisions consistent with their ethical compass.

Human Leadership: Human leaders often emphasize values-based leadership, making decisions that prioritize organizational success and ethical and moral considerations. This approach is crucial in the social space, where ethical issues and social responsibility are prominent.

Research Assumptions

The research assumptions presented align with the literature research we conducted. Here is an evaluation of each assumption:

1. Workplace as Social Spaces: This assumption reflects the growing recognition of workplaces as complex social environments with their own rules and dynamics. It is a widely accepted concept, and existing research often supports this idea.

2. Psychological Flexibility: Psychological flexibility is crucial in the modern workplace. Research in psychology and organizational behavior often emphasizes the importance of adaptability and emotional resilience.

3. Challenges for Managers: Managing diverse teams and adapting leadership styles is well-documented in contemporary workplace literature. Traditional authoritarian leadership is often seen as less effective in today's diverse and dynamic work environments.

4. Human Leadership Model: The concept of "human leadership," or leadership based on empathy, compassion, and adaptability, is gaining traction. This is a relatively recent trend, and the effectiveness of such leadership models may still require empirical research to establish.

5. Psychologically Flexible Managers: The idea that psychologically flexible managers who embrace human leadership principles can enhance employee understanding and productivity aligns with the concept of transformational leadership. Leaders who exhibit such qualities can indeed have a positive impact on employee engagement and performance.

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Role of Ethics and Its Standards in Organizational Effectiveness

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Abstract

Research background: Organizational cultures are complex combinations of formal and informal systems, processes, and interactions. Formal organizational culture components are comprised of leadership, structure, policies, reward systems, socialization mechanisms and decision processes among other things.

Purpose of the article: The objective of this study is to identify components of ethical business culture, empirical research, reported in business ethics, organizational psychology and management literature, and suggests that ethical or unethical behavior in organizations is a function of both individual characteristics and contextual factors.

Methodology: In this paper, we first briefly summarize the results of our review of literature on ethical corporate cultures and formulate the research question. Second, the study design, methodology, and sample are explained. Next, we present and discuss the study findings, including the list of attributes of ethical corporate cultures. Finally, implications for further research and HRD practice are discussed. Broadly defined, ethics is the study of human behavior viewed through a set of distinctive values and rules as it pertains to moral right and wrong.

Findings and Value added: The five clusters that have emerged are: Mission- and Value-Driven, Stakeholder Balance, Leadership Effectiveness, Process Integrity, and Long-Term Perspective. Five to seven descriptive statements represent each cluster. Many of these statements are taken verbatim from interviews with study participants

Keywords: ethics, organizational culture, business culture, leadership

JEL classification: E00, E02

1. Introduction

The discussion of complex issues, associated with ethical or unethical behavior in business organizations, has become prominent in human research development (HRD) literature in recent years. Greer&Shuck, (2020) have provided a compelling rationale for occurrence of standards on ethics and integrity for HRD research and exercisewithin the organization. This initial discussion was followed by a special issue of *Advances in Developing Human Resources*, devoted to an in-depth analysis of theoretical and practical challenges of developing such standards, and the reporting of empirical studies and/or practical work related to the execution of ethical HRD practices (Duttaetal. 2022). More recently, several articles in *AHRD* journals have reported results of empirical research or provided theoretical frameworks, related to the study of ethical behaviors in various segments of HRD work. Jang&Ardichvili, (2020) have discussed ethical problems in mentoring and the role of HRD; and conducted empirical case study-based research to identify ethics challenges, associated with attempts to create shifts in values and behaviors in organizations. Mahmood& Bashir, (2020) stated that the lack of empirical studies on factors leading to ethical or unethical behavior in the business organizations.

Furthermore, according to Russ-Eft, HRD scholars need to concentrate on researching the role of learning and development in creating ethical business cultures, and the role and effectiveness of HRD interventions aimed at developing ethical cultures.

Though the objective of this study is to identify components of ethical business culture, empirical research, reported in business ethics, organizational psychology and management literature, suggests that

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ethical or unethical behavior within organizations is an action of both individual attributes and contextual factors (Valentine & Godkin, 2019). Among these contextual factors, organizational culture is considered to be one of the most important influences. In recent years, a number of research studies have strived to connect different attributes of organizational cultures to ethical behavior (Metwally et al., 2019). However, to our knowledge, none of the published studies propose comprehensive models of characteristics of ethical corporate cultures. Therefore, the goal of the reported study was to identify characteristics attributed to ethical business cultures by business practitioners. In this paper, we first briefly summarize the results of our review of literature on ethical corporate cultures and formulate the research question. Second, the study design, methodology, and sample are explained. Next, we present and discuss the study findings, including the list of attributes of ethical corporate cultures. Finally, implications for further research and HRD practice are discussed. Broadly defined, ethics is the study of human behavior viewed through a set of distinctive values and rules as it pertains to moral right and wrong.

In anthropological literature, culture is defined as accepted behavioral standards within the confines of a specific group as led by a pattern of shared learned optimisms, traditions, values, ethics and principles (Eaton et al., 2021). Schein defines organizational culture as learned responses where “basic assumptions and beliefs that are shared by members of an organization... define in a basic “taken-for-granted” fashion an organization’s view of itself and its environment” (Laguecir&Leca, 2021). For the purposes of this paper, ethical business culture encompasses for-profit organizations comprised of individuals working reciprocally with internal and external stakeholders. Though the objective of this study is to identify components of ethical business culture, from a holistic perspective an ethical business culture promotes an organizational environment led by shared utilities and beliefs (Szydło&Grześ-Bukłaho, 2020). Furthermore, it is an environment where employees are not only expected to discern right from wrong, a basic minimum, but more importantly are expected to go beyond the minimum to explore and implement ethical decisions when all choices seem right.

An ethical culture is associated with a structure that provides for equally distributed authority and shared accountability. It also has policies such as an ethical code of conduct that is clear, well communicated, is specific about expected procedures and practices, thoroughly understood, and enforced. In addition, incentive systems are deliberately and clearly tied to behaving in concert with the code of ethics and achievement of non-economic goals in addition to economic effects (Grigoropoulos, 2019). The socialization process of an organization with an ethical culture reinforces the practice of the values in a mission statement on a daily basis, so behavior is focused on issues of health and safety of employees, customer and community responsiveness, and fairness. In fact, employee perceptions of fairness or justice in an organization have been found to have central importance in creating an ethical culture. In addition, the decision-making processes in an ethical culture are designed to consider the ethical ramifications of business decisions instead of cost-benefit analyses alone.

The informal elements of a cultural system are less tangible aspects of organizational behavior. Such aspects include norms for behavior that are consistent with the ethical standards or the code of conduct, mission, and decision-making processes within the organization (Klopotan et al., 2020). Consistent role modeling of such behavior forms the basis for a strong culture where everyone understands what is appropriate for the company. Other elements of the informal culture include the communication and belief in heroes and role models, along with myths and stories about how ethical standards of the organization have been upheld and revered by members. Such heroes and stories transcend the formal organizational culture and inspire others to behave in an ethical fashion. Organizational rituals also help to bolster this informal culture by sustaining the ethical values of the members over time. Finally, the language used by organizational members plays a crucial role in shaping behavior in the informal ethical culture. Use of moral or ethics “talk” to address problem-solving and decision-making situations creates an awareness of the ethical dimension of such processes. Ethical cultures have leaders and members who engage in ethics talk regularly in pursuit of organizational activities.

2. Methodology

Informal culture components include implicit behavioral norms, role models, rituals, historical anecdotes and language. Organizations possessing ethical cultures create and maintain a shared pattern of values, customs, practices and expectations, which dominate normative behavior in the organization. Leadership is often mentioned as one of the most important elements of an organization’s ethical culture (Engida et al., 2022). Leaders who are perceived as being able to create and support an ethical culture in their organizations are those who represent, communicate, and role model high ethical standards

emphasize attention to goals other than economic, engage in “ethics talk” and maintain a long-term view of relationships within and outside the organization. These top managers create and maintain an ethical culture by consistently behaving in an ethical fashion and encouraging others to behave in such a manner as well.

Ethics in the organization also is identified as the standards and principles that analyze acceptable function within the value of the organization. Ethics is termed to be much more essential within the organizational structure since it helps in developing confidence and trust within the business relationships (Sarwar et al., 2020). This is also significant for the success of any organization to introduce ethical code in the workplace. Each organization has a code of ethical that leads its activities and decision-making process to have efficient productivity, which helps to managing the reputation of the organization. Ethical behavior makes sure that employees complete their work with integrity and honesty also meets the organizational aim by coherence to policies and rules. It also makes sure that every staffs within the organization irrespective of position should be treated equally. Powerful organizational ethics frequently cheer up managers to give appreciation for the employee who is doing hard work (Budur, 2020). This resulted in engagement of more loyal and productive employee within the organization. An ethics code in organization is a principle set which is utilized to lead the organization within its policies, decisions, and programs. “*An ethical organizational culture*” comprises of employees and leaders by adhering the policies of this code. The five standards of ethical are fidelity, nonmaleficence, beneficence, justice, and autonomy.

At the time any organization build codes of explicit ethical, they might design their procedures and process to support different initiatives. In maximum cases, organizations introduce workplace ethics to enhance the productivity and lives of stakeholders. Organizations also develop these codes that frequently benefit the individual perceptions within their operations (Wang et al., 2019). Some of the examples of ethics that any organization might establish within the workplace are equality, trust, transparency, accountability, loyalty, responsibility, and fulfilling promises. Others are legality, discipline, cooperation, sustainability, professionalism, and dedication. The ethics in the workplace is quite more significant related to the building of successful organization along with loyal and satisfied employees. High standards of ethical could assist stakeholders such as investors, employees, and customers included within the operations of workplace and realize that the organization is protecting their interests. Intentionally developing ethical guidelines within the business structure, any organization could keep their staffs’ interests in mind at the same time managing a positive influence on the staffs. In return, other stakeholders and employees will purposely follow rules and managing the best interest of organization by acting more ethically in tier daily duties. As per example, whenever any employee is serving equally as well as fairly, that employee will work with more enthusiasm towards the benefits of organization. Workplace ethics assist to build a relationship which is reciprocal and that will eventually benefits the organization at large. This kind of initiatives might assist both employees and organization enjoying the particular advancement such as enhances employee satisfaction and heightened productivity. At the time employee perceive and understand their commitment of organization towards high standards of ethical, they might be more devoted within their work roles. They also express their pride to be a part of this kind of organization and helps to build a clear image of the organization in front of the public and fostering the effectiveness of organization (Teresi et al., 2019). This kind of conduct mode frequently termed as citizenship of organizational. It is the behavior phenomenon of employee where the members of the team willingly pledge themselves to behaving positively as well as constructively with development in mind.

In the context of organization, ethics is “*non-negotiable*”, as it is regarded as most crucial part of the development of any business. It is linked to all of the disciplines of organizations such as finance, marketing, sales, and management of human resource. This is a procedure to encounter good or bad matters along with the observance of work responsibilities and duties. The most significant thing related to ethics is the “*human understanding*” in the context of conceptual, admirable, and logical behavior. It has been seen that many organization think that morality and ethics interchangeably though these two do not indicate same thing. Ethics is a management of principles and procedures of introducing them in the workplace (Trivella et al., 2019). On the other hand, morality is the indication of decisions, intentions, as well as actions regarding wrong and right conducts. In broader respect, ethics of organization is merely concerned with principles and standards of human behavior in the structure of organization to ignore harmful behavior. The most common point, which the business ethics, and practical ethics along with the organizational ethics shares is the dogging of what, is right and wrong.

Research methodology refers to the proper techniques and procedures utilized to select, recognize, analyze, and process data. In a research paper, the methodology permits the reader to evaluate the reliability and validity of the study. In this research paper both secondary qualitative and primary qualitative research methods have been used. In order to do the secondary qualitative research, the literature review has been used, where different information about the study has been stated. On the other hand, while doing the primary qualitative research method interviews have been conducted at a national business ethics conference. In this research methodology snowball technique has been used as sampling strategy. Participants were nominated 86 companies from nine industries sectors and generated 389 descriptive statements in this research. This study has used deductive research approach as it is based on the facts and logical reasoning that makes research more reliable.

3. Results

The study was designed based on the grounded theory approach. Grounded theory studies are focused on discovering a theory or a framework, describing or explaining a phenomenon under investigation, by analyzing data collected via field investigations. In grounded theory approach, researchers are not making an attempt to develop a set of testable hypotheses or propositions. The five clusters that have emerged are: Mission- and Value-Driven, Stakeholder Balance, Leadership Effectiveness, Process Integrity, and Long-Term Perspective

Instead, only a general question about the phenomenon is formulated with a goal of leaving sufficient space for emergence of patterns, which could be used in formulating a new explanation of the phenomenon. While grounded theory provides a general framework for designing studies, specific data collection and analysis methods can vary depending on preferences and expertise of individual researchers. In this particular study, data collection was based on qualitative key informant interview method, proposed by O’Kane et al., (2021), and the data analysis was based on qualitative data clustering method, developed by YousefiNooraie et al., (2020). Key informant interviews are used when the researchers intend to obtain the data not from a random sample, but from a purposefully selected sample of individuals, who are likely to possess the most relevant information due to their key positions, experience, or expertise in industries or organizations of interest to the researcher. For the purposes of this study, the key informants were defined as top-level business executives, who were likely to have in-depth knowledge of practices (including ethics-related practices) of a variety of business organizations. A number of prominent academics, specializing in business ethics research, were included in the key informant group. Members of the Board of Directors of the Center nominated the initial group of key informants for the study for Ethical Business Cultures.

Subsequent nominations were obtained through snowballing technique, when study participants were asked to provide additional names of qualified individuals. In addition, one of the researchers and several associates of the CEBC conducted some interviews at a national business ethics conference.

Table 1. Industry Affiliation of Study Participants

Consulting & information services	5
Energy sector	7
Finance and Insurance	18
Health sector	2
Law firms	3
Manufacturing	8
Non-profits, foundations, churches	6
Retail	5
Academia	13

Source: Self-developed

Participants were asked to think about business organizations they would classify as having exemplary ethical business practices. Then participants were asked to generate a list of statements descriptive of these organizations’ ethical practices and behaviors. Overall, participants nominated 86 companies from nine industries sectors (see Table 2), and generated 389 descriptive statements.

Table 2. Nominated Companies by Industry Sectors

Basic Materials and Commodity	5
Conglomerates	2
Consumer Goods	18
Financial Services	12
Health Care	6
Manufacturing and Technology	18
Service and Retail	27
Transportation	4
Utilities	1

Source: Self-developed

Data analysis included clustering of the 389 statements with a goal of generating a short list of major clusters and representative statements under each cluster. Clustering is a tactic that can be applied at many levels to qualitative data: at the level of events or acts.

4. Discussion

Effective organizations have effective leaders. In an ethical business organization effective leaders “talk the talk” and “walk the walk.” In describing Leadership Effectiveness, the overarching theme was that “ethical culture starts at the top and is conveyed by example,” the “CEO and senior management live their lives with great personal integrity” and they “do what they say they’re going to do.” Leadership, most notably senior management, must embody the organization’s values in their own behavior and must articulate those values in a way that is compelling for employees and all other stakeholders. Ethical organizational culture is a nonstarter if senior management refuses to engage and to function as role models for the rest of the organization. Another critical aspect of leadership in an ethical culture is the issue of retaliation. Respondents expressed a belief that an ethical culture is “when ethical issues arise, [the] CEO does not ‘shoot the messenger’, but gathers facts and takes action.” However, building and sustaining an ethical culture is also a two-way street. It depends on “senior management [demanding] ethical conduct at every level of the [organization].” It must permeate throughout all aspects of the business from top management to the frontline employee and throughout all functional systems of the firm. Wang et al., (2019) stated that the theory of spiritual leadership was developed with the model of intrinsic motivation. “*Intrinsic motivation*” indicates that inherent tendency to look at challenges to the extent of individual’s learning capabilities. Different studies has stated that intrinsic motivation is related with better creativity, performance, and learning. A holistic approach to the effectiveness of leadership looks at the effects of leaders on achievement and followers of the goal. Farid et al., (2019) stated that “*CSR or Corporate Social Responsibility*” has been identified as a main element within business, management, psychology, and environment. CSR is quite significant to the internal stakeholders mainly for positioning the business as a contributing entity to the society. CSR defines that organizations are responsible to create business practices and strategies, which helps to develop organizational, based on macro level outcomes.

4.1 Ethical principles

- **Serve the Good of the Whole and the Good of Individuals**

This encompasses the affirmative dimension of our ethics. Note the relationship among moral rules (variations of “do no harm”), the moral ideals (variations of “prevent or lessen harm”), and this central principle (“serve the good of the whole”). The moral rules require us to cause no harm, and that applies to everyone. The moral ideals encourage us to prevent or lessen harm regardless of who causes it, but in contrast to the moral rules, we realistically cannot be expected to do that with regard to everyone. However, to serve the good of the whole encourages us to act in ways that manifest our values. Because of our systems perspective, we see the whole as being more than the sum of its parts and thus we look to a composite value that is more inclusive than the greatest good for the greatest number.

- **Always Treat People as Ends, Never only as Means**

This principle requires that we respect people for who they are and not merely for what they do. Never treat people as means to organizational ends. Rather, acknowledge and celebrate the importance of their personal life. Do not focus on people’s positions, such as “CEO”, “manager”,

“engineer”, “accountant”, “clerk”, or “employee”. Rather remain sensitive to the individuals who occupy these positions.

Accept responsibility for the consequences of our actions. Make every effort to ensure that our services are properly used and for the good of the people who are the target of our organizational intervention. Be ready to terminate our services if they are not properly used or used to the detriment of those we are supposed to help. Make all efforts to see that abuses of power or abuses of persons are named and corrected.

Respect the customs, beliefs, morals, and values of the various communities and countries in which we consult. Constructively confront the counterproductive aspects of those cultures whenever feasible, being alert to the effects our own cultural orientation may have on our judgments.

4.2 Ethical and professional standards

The process by which systems and organizations function and make decisions is as important as the content of discussion in producing results. Another way of saying this is: a group applies process to content in order to make decisions that lead to actions, which result in the completion of a task. When a group works on decision-making, process includes the following behavior: how people listen, argue, fight, withdraw, and generally support, confront, or undercut one another. Process refers to the emotional ambiance, what is implied, and the organizational culture. Whereas, content refers to the communication content specific to the problem solving or planning behavior. In this field, both process and content are valued, rather than either process or content.

Our contribution is primarily in the direction of improving process, whereas our clients tend to primarily value content and tend to focus on the task, and consequently, ignore process. Our challenge is to help clients awaken to the value of process and the way it can help us successfully complete a task. We see ourselves as part of a global community and recognize that our accomplishments as individuals and colleagues in the field are interdependent; that our responsibilities to each other are mutual; and that the fullest use of our potential shall be realized when we coordinate our efforts in the service of a common vision for humanity. To that end, we understand that our values and ethics are both personal and professional. We are in a service profession in which we make our expertise and ourselves available. With clarity we are willing and able to discuss with colleagues and clients the way we practice our profession.

The specific fundamental rights we value include:

- 1) Life, liberty, and security of person
- 2) Freedom of thought, conscience, and religion
- 3) Freedom of opinion and expression
- 4) Freedom of choice. We accept the United Nations’

Conclusion

From the above study it can be concluded that organizational cultures are quiet complicated combinations of formal as well as informal systems, processes, and interactions. The five clusters that have emerged are: Mission- and Value-Driven, Stakeholder Balance, Leadership Effectiveness, Process Integrity, and Long-Term Perspective. Five to seven descriptive statements represent each cluster. Many of these statements are taken verbatim from interviews with study participants. Others are a result of rewording or combining statements made by different participants, but which had essentially similar meaning. Ethical behavior is depending on the values, which are respect, responsibility, good citizenship, justice, and fairness. It is also based on capturing or holding moral values. The values of organization define the significant work and factor that assist in making decision in regard of market profit. Organizational ethics concludes both the business and corporate ethics in the workplace. The ethics of organizational is quite different other than the personal ethics as in the organization there is numerous people involved. The failure or success of the organization might impact the stakeholders, society as well the shareholders. At the time individuals argue that the ethics do not concentrate on the organizational management, those individuals are entirely wrong.

Trust and ethics helps to guide other business to choose its business partner and in return it also helps to attract more customers. It also can be stated that individuals are more deliberately trust the organizations, which is famous for their ethical culture. Organizations, which follow the ethical values, have more benefits compare to their business competitors. Any organizations that violate the standards of ethics might face the criticism from the public. Violation regarding the ethics of organization could be

exists in different forms such as patent, copyright, lying about the product and bribery. The management of organization is responsible for ethical practices by performing the resourceful foundation within the organization. It is the most significant and powerful aspects of activities of human in the workplace. The “*ethical leaders*” are the main people to maintain organizational beliefs and values. Leadership creates main difference between failure and success.

Resources

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Small Amount Fallacy - Its Psychological Causes, Their Cumulative Destructive Effect, and the Mathematical Solution

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Abstract

Research background: Behavioral economics and psychology have long explored human decision-making in financial contexts, particularly how individuals manage their expenses.

Purpose of the article: This article aims to introduce and explore the "Small Amount Fallacy," shedding light on how people often assess spending based on income proportion rather than actual value. It delves into cognitive biases like Diminishing Sensitivity and Loss Aversion, establishes a theoretical framework linking the fallacy to mathematical analogies, emphasizes its implications for personal finance and policy, and suggests avenues for future research to enhance financial decision-making.

Methods: Our approach is theoretical and concept-focused, involving an extensive literature review to build a robust theoretical framework rooted in Prospect Theory and mathematical analogies like the Geometric Point. While not collecting empirical data, we aim to provide a foundation for future research and practical applications, including behavioral interventions to reshape spending habits.

Findings & value added: The study uncovers a strong correlation between the mathematical concept of a point and the economic concept of small amounts of money, showcasing how these seemingly insignificant transactions cumulate into significant financial consequences. Understanding this transformation can positively influence financial outcomes and contribute to economic growth by recognizing the cumulative impact of small amounts.

Keywords: behavioral economics, small expenses, small amount fallacy, diminishing sensitivity, loss aversion, prospect theory

JEL classification: A12, C01, C02, C60, D14, D31

1. Introduction

Consider a scenario where a person earning a substantial income deliberates over purchasing a five-dollar cup of coffee. From a purely rational perspective, this expense might appear negligible when juxtaposed with their annual earnings of thousands of dollars. However, as this paper will elucidate, the small amount fallacy leads individuals to perceive such minor expenditures through a distorted lens. Understanding human decision-making in financial contexts has been a central focus of behavioral economics and psychology. Researchers have long been intrigued by how individuals perceive and manage their finances. This area of inquiry has led us to the emergence of the "small amount fallacy" concept suggested in this paper. Here, we will suggest calling the situation where people buy stuff under the assumption, based on the proportion to their income, that what they buy does not cost anything - the "small amount fallacy". We assume this fallacy can lead to detrimental financial consequences and a distorted perception of one's purchasing power. It can result in individuals needing to spend more time and underestimating the true financial impact of their purchases. The "small amount fallacy" concept introduces a cognitive phenomenon wherein individuals evaluate expenses based on their proportion to income rather than their absolute value.

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This leads to a tendency to perceive small expenditures as inconsequential despite their cumulative impact.

Behavioral economics has revealed that individuals often deviate from the rational economic model, making decisions influenced by cognitive biases and emotional factors. Cognitive biases have increasingly explained these deviations (Geiger, 2017). These theories and concepts collectively offer a framework for understanding the cognitive biases and decision-making processes that underlie the "small amount fallacy." They illuminate why individuals may judge their spending based on the proportion to their income rather than the absolute value and how these perceptions can impact financial behavior. Researchers have investigated cognitive biases that affect financial decision-making, such as confirmation bias, anchoring, and the availability heuristic. These biases can lead individuals to make suboptimal financial choices.

Behavioral economists aimed to challenge neo-classicists by examining alternative psychological processes that validated their counter-findings of irrational economic choices (Glimcher et al., 2009). Neuroeconomics works toward an integrated account of economic decision-making. Neuroeconomic research studies what occurs within the brain when an individual makes financial decisions. It is an interdisciplinary field, and it combines research from neuroscience, experimental and behavioral economics, and cognitive and social psychology that seeks to explain human decision-making, the ability to process multiple alternatives and to follow through on a plan of action. It studies how neuroscientific discoveries can guide models of economics (Glimcher & Fehr, 2013). Heuristics are cognitive strategies derived from previous experiences with similar problems. These strategies depend on using readily accessible, though loosely applicable, information to control problem-solving (Pearl, 1984). When an individual applies a heuristic in practice, it performs as expected but can create systematic errors (Sunstein, 2005). Heuristics cognitive strategies can be used when individuals can accept choices that are "good enough" for their purposes, although they could be optimized (Kahneman & Frederick, 2002). The evolution of heuristics cognitive processes is routed in risk situations without information; under uncertainty, heuristics can achieve higher accuracy with lower effort (Gigerenzer et al., 2011). We assume that spending a low amount of money daily is proceeding in a heuristic cognitive process that changes the small amount to "no amount".

1.1. Prospect Theory's Diminishing Sensitivity

The term "small amount fallacy" may not have been formally coined in prior research, but the underlying cognitive processes have been observed and studied. Previous literature has touched upon the idea that people sometimes overlook the cumulative impact of small expenses relative to their income. The connection between the "small amount fallacy" and Prospect Theory's loss aversion and Diminishing Sensitivity has not been explicitly explored in existing research. This paper has the potential to contribute to this gap by formalizing and examining this concept. Prospect Theory is a foundational concept in behavioral economics. It provides insights into how individuals make decisions involving risk and uncertainty.

The notion we suggest in this paper is based on the "Prospect Theory" developed by Tversky and Kahneman (1992). The Prospect Theory explains how people make decisions involving risk and uncertainty. The first part of the Prospect Theory is the Diminishing Sensitivity, which posits that the emotional impact of gains and losses diminishes as they increase in magnitude. On the other hand, the Sensitivity to the nominal amount of money decreases because it assumes that the emotional impact of nominal gains and losses decreases as the amounts increase. This means that a small expenditure may be perceived as less important or influential at a certain moment than a larger one because it disappears within the overall financial movements.

Diminishing Sensitivity posits that the emotional impact of gains and losses diminishes as they increase in magnitude (Kahneman & Tversky, 1991). As wealth accumulates, people tend to become less sensitive to incremental changes in their financial situation. This can lead to decisions prioritizing short-term gains or losses over long-term consequences. On the other hand, the Sensitivity to the nominal amount of money decreases because it assumes that the emotional impact of nominal gains and losses decreases as the amounts increase. This means that a small expenditure may be perceived as less important or influential at a certain moment than a larger one because it disappears within the overall financial movements. Diminishing Sensitivity states that the emotional impact of gains and losses diminishes as they increase in size. Thus, the Sensitivity to the nominal amount of money as the amount increases. This means that a small expense may, at a given moment, be perceived as less important or influential than a

larger expense because it disappears within the overall financial movements. This is compared to the emotional impact of the positive experience, which has presence and power. Studies show that the emotional impact is getting smaller with repetition, but it is still much more present than the reduction in the nominal value of the expenditure. Those Small expenses, being nominal in value, may be overlooked as they appear less emotionally significant.

1.2. Prospect Theory's Loss Aversion

Loss Aversion, a key concept from Prospect Theory, posits that individuals are more averse to losses than they are motivated by equivalent gains. This cognitive bias leads people to strongly avoid losses, even when they seem small in absolute terms. Loss Aversion (Schmidt & Zank, 2005; Abdellaoui et al., 2007) refers to how outcomes are interpreted as gains and losses where losses are more sensitive in people's responses than equivalent gains acquired. Kahneman and Tversky (1992) have suggested that losses can be twice as powerful, psychologically, as gains. When defined in terms of the utility function shape as in the Cumulative Prospect Theory (CPT), losses have a steeper utility than gains, thus being more "painful" than the satisfaction from a comparable gain. When spending decisions on small amounts, the perceived loss is so small, for example - the cost of a coffee, that although people double lose Sensitivity to gain sensitivity, the price of the coffee is so small that when you mentally double it, it still does not overshadow by the perceived gain - the enjoyment of the coffee. This leads people to pay more attention to the cumulative gain impact of these perceived small expenditures.

In the context of the "small amount fallacy" notion, we suggest that Prospect Theory's "Loss Aversion" concept can change how people look at small amounts using the mathematical analogy suggested here to "small amount fallacy" notion. We assume that when people acknowledge this analog, "loss aversion" will move the economic decision from spending a small amount of money. Because the attention will move from the small cost of each small expense to the destructive accumulation of that little money to very big money, debts, loans, and then consolidation of loans. By recognizing the similarity between the fallacy of small amounts and the numerical value of a geometrical point, individuals can grasp that these seemingly insignificant expenses can accumulate over time, resulting in substantial financial implications. Once people understand and embrace this analogy, their loss aversion tendencies will motivate them to make wiser financial decisions.

1.3 Mental Accounting

Mental accounting, developed by Richard Thaler, helps explain how people categorize and evaluate economic outcomes using concepts like prospect theory and transactional utility theory. This process involves creating mental accounts for managing spending and resources and influencing buyer decisions and reactions to financial outcomes. Mental accounting is a self-control strategy, with people allocating money to accounts for savings or expenses. This approach can lead to loss aversion and cognitive biases affecting consumer rationality. Understanding mental accounting sheds light on resource-based decision-making and reactions to similar outcomes (Zhang & Sussman, 2018; Chen et al., 2013).

In mental accounting theory, framing effects shape how individuals subjectively perceive transactions, affecting the utility they expect (Cartwright, 2018). This concept is intertwined with prospect theory, frequently utilized by mental accounting researchers to analyze the value function (Thaler, 1985). In prospect theory, the value function is concave for gains, promoting risk aversion due to diminishing marginal utility as gains accumulate. Conversely, it is convex for losses, encouraging risk-seeking behavior to avoid the more detrimental impact of losses compared to equivalent gains. This highlights the concept of loss aversion, where people prioritize avoiding losses over seeking gains (Thaler, 1985; Cartwright, 2018).

1.4 The Suggested Mathematical Analogy

The parallels between mathematics and economics stem from both fields' logical consistency and abstraction. Mathematics provides a framework of well-defined principles and concepts that can be universally applied. We can leverage this logical consistency to apply mathematical reasoning to economic situations by drawing parallels between scenarios (Karlin, 2003). Mathematical abstraction distills specific details into general concepts, as in economics. Applying mathematical reasoning to economics has yielded successful economic models. These models use mathematical techniques and principles to represent and analyze complex economic systems. Incorporating mathematical concepts

enhances analytical power and captures intricate economic dynamics. The accuracy of these models validates the parallels between mathematics and economics, enabling systematic analysis and policy recommendations (Sun, 2022).

Economic theories and models based on mathematical concepts have been tested against real-world data, providing accurate explanations and predictions. It underscores the practical importance of logical reasoning derived from mathematics in understanding and analyzing economic phenomena (Karlin, 2003). The suggested analogy between the suggested Small Amount Fallacy and the numerical value of the geometric point emphasizes the importance of recognizing the collective influence of seemingly small expenses in shaping an individual's overall financial landscape. To illustrate it, the geometric point in mathematics, where a point has no dimensions, is integral to the structure of geometric shapes. Similarly, while seemingly insignificant in isolation, small expenses are crucial in an individual's financial landscape. In personal finance and economic decision-making, individuals often encounter a peculiar cognitive phenomenon, which we propose to term Small Amount Fallacy, that affects how they perceive and handle seemingly inconsequential expenditures in the grand scheme of their financial landscape. This phenomenon revolves around the propensity of individuals to make cognitive judgments about their spending based on the proportion of a cost to their income rather than its absolute value. As the geometric point has no dimension in personal finance and spending behavior, we can draw a parallel to the absence of the perceived economic dimension of the Small Amount Fallacy. Moreover, just as a point contributes to the geometry it defines, small expenditures play a vital role in shaping an individual's overall financial landscape, although seemingly devoid of significance in isolation. These small expenses, like points, may be individually imperceptible but collectively define Geometrical shapes, as these small expenses can define one's financial situation.

In mathematics, points collectively form lines, lines collectively form shapes, and shapes collectively form structures. Similarly, small expenses, when collectively accumulated over time, contribute to an individual's overall debts, and accumulated debts collectively define the individual negative economic landscape. While a single coffee purchase may seem trivial to an individual who earns much more in a month than that coffee's price, a series of such expenses in a day can accumulate to a much higher amount in a single day.

While a coffee purchase, for example, may seem trivial to a person earning much more in a month, a series of such expenses can add up to a much higher amount in a single day. Whenever a purchase is made for an amount smaller than the amount the individual defines as a real expense, the individual will not have a sense of money each time. So, the amount defined as lower than that minimum threshold can be the basis for purchases several times a day without the individual having a sense of money or the same warning that a large, unplanned expense is being made. However, the problem worsens because this expense can be made several times a day, several times a month. If the person spends three times a day during each day an expense lower than the minimum threshold, then it is possible to reach 90 such expenses in one month. Let us say that spending 5 dollars for a person who earns 5000 dollars is considered to lack a dangerous economic dimension; he can reach 90 times this amount "under the radar of danger". In the case of the example, it adds up to almost 10% of the monthly salary, which could be a serious blow to the monthly budget. So, just as points are crucial for defining geometric structures, small expenses play a structural role in an individual's financial life. They contribute to the overall budget, financial goals, and long-term well-being.

Furthermore, recognizing the significance of these small expenses may be essential for financial decision-making. In this way, the Geometrical Point Analogy underscores the importance of acknowledging the role of small expenses in shaping an individual's financial landscape. While they may appear minuscule, their cumulative impact can have profound implications for financial well-being, akin to how points collectively define the geometry of shapes and structures.

1.5 From Concept of Zero to Geometric Progression

In mathematics, zero is a fundamental concept representing absence or zero value. "Zero's null-like nature... on the one hand, it is a bona fide cardinal number, yet on the other, it is linked to ideas of nothingness and non-being" (Barton, 2020, p. 3823). It is often represented as a point on a number line. As a mathematical point, zero is unique as it marks the origin or starting point from which numerical values are measured in both positive and negative directions. "Mathematically, a concept of zero plays a significant role in our natural, integer, and real numbers theories. For instance, when considering an algebraic structure (e.g., a group) under addition, zero often serves as the identity element (since for any

number n , $n+0=n$)" (ibid.). When we consider the concept of zero as a point, in terms of accumulation, it is transformed from a point to a line. This transformation occurs through the process of repeated accumulation. Let us examine this transformation in more detail. "Philosophically, our understanding of zero is tied up with classical questions concerning the status of non-being" (ibid.). Zero can be a mathematical point on a number line separating positive and negative values. As a point, it has neither magnitude nor direction.

As Barton, 2020 (p. 3823) states, "We will examine the epistemology and metaphysics of zero concerning the cardinal number zero, whereby cardinal numbers we mean those numbers that correspond to responses to questions of the form "How many Φ ?" where Φ is some descriptor of a collection of discrete individuals. We will use the term "collection" in this paper to talk about any collection-like reference to objects, for example, we could be referring singularly to a (semi) set of some objects, plurally to those objects considered together". The concept of zero begins to change through repeated accumulation to a collection of Φ . Accumulation refers to the gradual addition or aggregation of quantities over time. In mathematics, accumulation can be thought of as repeatedly adding small steps to a starting point. As these steps accumulate, the point representing zero gradually becomes a line. This line represents the accumulation of values over time. Each incremental addition helps to lengthen the line, creating a continuous representation of accumulation. The line that emerges from the accumulation process represents the evolving quantity that results from repeated additions. It shows the evolution from zero, the non-existence of a quantity, to a continuous and measurable range of values. This transformation illustrates the importance of repeated accumulation in mathematics. This concept of transforming zero into a line through repeated accumulation can be applied to various mathematical contexts, such as infinitesimal calculus, where integration involves the accumulation of infinitesimally small increments to determine the total value. Like the Adding Up Pieces model (Ely, 2017).

Mathematical induction is a logical reasoning technique used to prove statements about mathematical objects that hold for infinite cases (Telloni & Malara, 2021). In the context of converting zero to a line, mathematical induction can be used to prove the validity of the conversion for each successive increment. Using mathematical induction, we can prove that adding a small increment, starting at zero, results in a new value that extends the line. Continuing this process, each additional addition lengthens the line formed by the accumulation. The logical conclusion from mathematical induction ensures that the transformation from a mathematical point to a line holds for any number of increments (ibid.).

Geometric progression is a sequence of numbers where each term is created by multiplying the previous term by a fixed ratio. The accumulation process can be considered a geometric progression when converting from zero to a line, where each increment is added based on a fixed ratio or proportion. Let us think of the accumulation process as a geometric progression. We can analyze the behavior of the line and determine its length or size based on the number of increments added and the ratio of each increment (Grabner, 1983).

1.6 From a Two to Three-Dimensional Forms on Coordinates

The transformation from a two-dimensional to a three-dimensional form, mathematically and economically, carries significant implications. Mathematically, this transformation involves introducing an additional coordinate, typically denoted as Z . In three-dimensional space, objects can be represented with depth, height, and volume, enabling the study of spatial relationships and other properties inherent to three-dimensional geometry. In the economic context, the transition emphasizes the critical importance of accumulated money reaching a positive or negative pivotal point.

The transition from a two-dimensional to a three-dimensional financial form represents expanded possibilities, increased complexity, and the potential for financial independence. It emphasizes strategic decision-making, effective risk management, and achieving long-term financial goals. Reaching this critical point signifies personal goal attainment, freedom from financial constraints, and a solid foundation for the future. The three-dimensional representation reflects expanded financial capacity, flexibility, and autonomy. On the negative side, regarding significant expenses as "zero" can lead to reckless spending habits and a lack of financial awareness. Ignoring the cumulative impact of expenditures can result in a positive balance and financial stability. Recognizing the value of even small expenses is crucial for responsible financial management and long-term goal achievement.

1.7 The Positive Side - Accumulated Wealth

Psychological flexibility (Fuchs, 2022) for shifting the attention from the zero cost of something we will gain to the accumulated effect and debt we will find ourselves because of it. Nevertheless, we assume that once people can see it, using the mathematical analogy that examines this so well will give people the power to shift the focus needed for the gain for free to the accumulated deep debt. Moreover, once we manage to do it, we can move their attention from the deep debt to the positive side of the mathematical analogy coordinates - where accumulated wealth is situated. Managing accumulated wealth becomes challenging as the financial form transitions from a line to a more complex shape. Diversifying, risk management, and asset allocation are necessary to maintain and grow financial form. The complexity of accumulation requires informed decisions, considering income fluctuations, spending patterns, interest rates, and investments. Techniques like financial modeling and data analysis help individuals gain insight into their financial form's structure and dynamics. The multidimensional nature of the financial form incorporates time, investments, income sources, and liabilities, enabling long-term planning for financial stability. Transitioning from a simple line to a complex form signifies increased financial decision-making complexity. Evaluating risks and rewards becomes essential, necessitating diversification and understanding the impact of changes. Long-term financial planning becomes crucial for aligning decisions with goals. Preserving and growing wealth requires prudent investment decisions and adapting to market conditions. Recognizing the implications of this transition helps individuals build financial security, seize opportunities, and create a positive impact for future generations through legacy planning and philanthropy.

2. Methodology

Our paper is focused on theoretical analysis and does not involve collecting data but aims to develop a concept with potential implications for future research and behavioral change. Our methodological approach is rooted in theoretical analysis and concept development. We aim to provide a robust theoretical basis for understanding the "Small Amount Fallacy" while highlighting its potential for practical applications and future empirical research. This approach paves the way for a comprehensive exploration of the concept's impact on financial decision-making and its potential to drive positive behavioral changes in personal finance.

This section outlines the methodological approach employed in exploring the "Small Amount Fallacy" concept. Our approach is primarily theoretical and conceptually oriented, aiming to lay the foundation for future empirical research and practical applications related to behavioral economics and personal finance.

Literature Review: Our methodological approach begins with a comprehensive review of the existing literature in behavioral economics, cognitive psychology, and financial decision-making. We analyze relevant theories and concepts, such as Prospect Theory, Diminishing Sensitivity, and Loss Aversion, to identify gaps and potential connections that can explain the "Small Amount Fallacy."

We synthesize the findings from the literature review to develop a theoretical framework for understanding the "Small Amount Fallacy." This involves integrating concepts from various sources to explain the cognitive biases and psychological mechanisms that underlie this phenomenon.

Mathematical Modeling: To illustrate the cumulative impact of small expenses, we construct a mathematical analogy related to the numerical value of the geometric point. This analogy is a theoretical tool to visualize and explain how seemingly trivial expenses can accumulate into significant financial consequences.

Implications for Behavioral Change: While our primary focus is on theoretical development, we discuss the practical implications of our conceptual framework. We explore how understanding the "Small Amount Fallacy" can inform financial education programs, policy interventions, and behavioral change initiatives.

Future Research Directions: In this methodological approach, we emphasize the importance of our work as a foundation for future empirical research. We suggest that future studies can validate our theoretical framework through data collection and behavioral experiments, ultimately assessing its effectiveness in changing spending habits.

3. Results: Small Amount Fallacy Theoretical Framework

The "small amount fallacy" is a cognitive phenomenon in financial decision-making characterized by individuals making judgments about their spending based on the proportion of a cost to their income rather

than its absolute value. This leads to the tendency to perceive small expenditures as insignificant or negligible, even when cumulatively, they can substantially impact one's financial well-being. This framework seeks to elucidate the concept and its underlying psychological mechanisms.

Theoretical Framework Key Principles:

Individuals tend to evaluate expenses not in absolute terms but concerning their income or financial context. The proportion of an expense to one's income is often more salient than the absolute cost of the expense.

Loss aversion, a concept from Prospect Theory, explains that people are more averse to losses than they are motivated by equivalent gains. This bias can lead individuals to prioritize avoiding small losses, like the cost of a coffee, even when it might seem inconsequential relative to their income. Diminishing Sensitivity posits that the emotional impact of gains and losses diminishes as their magnitude increases. Small expenses may be perceived as less emotionally significant because they disappear within the broader context of financial movements.

The "small amount fallacy" hinges on the cumulative impact of repeated small expenses. While a single small expense may seem trivial, the aggregate effect can be substantial over time. Failure to recognize the cumulative impact of these expenses can result in financial mismanagement, especially when they recur frequently.

Cognitive biases like anchoring and framing can exacerbate the "small amount fallacy." For example, suppose individuals anchor their perceptions of a reasonable coffee price to a high-end coffee shop. In that case, they may be more willing to spend on expensive coffee without realizing the cumulative cost.

The degree of financial literacy and awareness plays a role in how individuals perceive and respond to small expenses. Those with higher financial literacy may be more attuned to the cumulative impact and make more informed decisions.

Cultural and societal factors and personal financial goals can influence the degree to which the "small amount fallacy" affects individuals.

To illustrate the cumulative impact of small expenses, we employ a mathematical analogy linked to the numerical value of the Geometrical Point. This analogy serves as a theoretical tool, providing a visual explanation of how seemingly inconsequential expenses can amass into substantial financial consequences. This mathematical analogy not only helps change the perspective on financial risk but also demonstrates how a lack of dimension can become a tangible reality through persistence and repetition. Moreover, it showcases the potential for economic transformation, illustrating how one can shift from a negative financial reality to a positive one.

4. Discussion: Small Amount Fallacy – Insights and Implications

The results of our research offer valuable insights into the psychological and behavioral underpinnings of financial decision-making. It underscores the complexity of financial decision-making and the significant role that seemingly insignificant amounts play in shaping individuals' economic outcomes. Addressing the "small amount fallacy" requires a multifaceted approach that combines financial education, awareness-building, and effective visual tools like mathematical modeling. By understanding the psychological mechanisms, we can empower individuals to make more informed and responsible financial decisions, ultimately contributing to improved financial well-being and economic stability. We can draw several significant conclusions and implications by examining the theoretical framework and key principles.

Our findings confirm that individuals often assess expenses concerning their income or financial context, not in isolation. This proportionality bias can lead to perceiving small expenses as insignificant, even when they collectively impact financial well-being. This highlights the need for financial education emphasizing absolute value and encouraging a holistic view of expenses.

The observed impact of loss aversion and diminishing sensitivity on the "small amount fallacy" reinforces the idea that people are more inclined to avoid small losses than to pursue equivalent gains. To address this bias, financial literacy programs should focus on building resilience against loss aversion and promoting a more balanced assessment of expenses.

Our research underscores the importance of recognizing the cumulative effect of small expenses over time. The failure to do so can lead to financial mismanagement, especially when these expenses recur frequently. Encouraging individuals to track and consider the long-term implications of their spending habits is crucial.

Cognitive biases like anchoring and framing can exacerbate the "small amount fallacy" by distorting individuals' perceptions of reasonable expenses. Mitigating these biases may involve raising awareness of how they influence spending decisions and encouraging individuals to reconsider their reference points.

The role of financial literacy and awareness in shaping responses to small expenses cannot be overstated. Our findings suggest that those with higher financial literacy may be more attuned to the cumulative impact of small expenses and make more informed decisions. Therefore, investing in financial education programs is pivotal to addressing the "small amount fallacy."

Cultural, societal, and personal factors significantly influence the degree to which individuals succumb to the "small amount fallacy." Tailoring financial education and intervention strategies to consider these influences is essential for their effectiveness.

The mathematical analogy, employing the geometric point concept, is a powerful tool for illustrating the cumulative impact of small expenses. It not only shifts perspectives on financial risk but also demonstrates the potential for economic transformation through persistence and repetition. This visual representation can be incorporated into financial education curricula to enhance understanding and promote responsible financial behavior.

Conclusions

In Behavioral Economics, individuals often exhibit irrational behaviors and neglect the long-term consequences of their actions (Sunstein, 2013). From a budgetary and economic management perspective, recognizing the significance of seemingly inconsequential amounts and incorporating them into financial planning can enhance financial well-being. The formalization and exploration of the "small amount fallacy" concept represent a novel contribution to the field. This scientific understanding may be one of the most intriguing factors of economic suffering in the developed world. It explains why people all over the developed world have very good salaries but live in debt and suffer every month trying to understand where their money disappears. It can also have practical implications for personal finance, budgeting, financial literacy programs, economic policies, and financial product design, ultimately promoting more informed financial decision-making. Policymakers can benefit from understanding how small amounts impact the economy, especially in initiatives aimed at poverty reduction or income equality. Policies such as microfinance and support for small businesses can leverage these amounts to stimulate economic growth. Financial institutions can offer tailored products like micro-loans and micro-savings accounts to cater to individuals with limited resources, promoting financial inclusion. As proposed in this paper, the formalization and exploration of the "small amount fallacy" concept represent a novel contribution to the field. Prior studies have touched on related cognitive biases and spending behavior but may have yet to address this specific fallacy explicitly. Understanding the "small amount fallacy" can have practical implications for personal finance, budgeting, financial literacy programs, economic policy considerations, and the design of financial products and services. This research aims to promote more informed financial decision-making by shedding light on this cognitive bias. By recognizing the long-term consequences of seemingly insignificant expenses, individuals will be more inclined to prioritize their financial well-being, moving from short-sighted spending habits to informed choices and financial stability.

The study underscores the importance of recognizing the impact of seemingly insignificant amounts in economic contexts, shedding light on debt accumulation dynamics and its implications for economic growth. It emphasizes the importance of continuous additions and their cumulative effects on individual and societal financial outcomes. This study bridges mathematics and economics, offering insights into financial accumulation and its role in shaping economic outcomes. Exploring parallels between mathematical concepts and economic scenarios provides a unique perspective on financial strategies, risk assessment, and long-term planning. The theoretical framework developed through conceptual construction empowers individuals and policymakers to make informed decisions, optimize financial outcomes, and promote economic stability.

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The effects of Classroom Management Base C.B.T. on the Development of Self-management Skills in Young Children

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Abstract

Research background: Effective classroom management is characterized by the consistent application of classroom procedures and routines that provide clarity about behavioral expectations. Consistency creates order and helps build confidence. Active student participation in educational processes as part of a management strategy contributes to positive classroom behavior.

Purpose of the article: This study examined the effects of an intervention program based on cognitive-behavioral principles on the assimilation of the common semantics of discipline management in the classroom. The intervention program was conducted in the context of discipline and behavior management and general classroom management over one year with thirty 4th grade students in an elementary school.

Methods: The research is action research within a qualitative method. The data was mainly analyzed thematically. This, along with a quantitative measurement of behavior change based on participant reports.

Findings & Value added: The results show that the application of the cognitive behavioral principles for behavior management in the classroom leads to a better social and emotional climate, reduces violence, and increases students' well-being, sense of protection and belonging, and classroom skills. The intervention program and its outcomes form the basis for a general model of classroom management, discipline management, and behavior management. Because there are clear principles guided by defined goals, phases, and tools, this model can be applied to other environments and needs in terms of environmental management, goals, and objectives for review, accuracy, and optimization.

Keywords: classroom management, discipline management, self regulation, cognitive behavioral intervention, behavior

JEL classification: O03, I01, I03, Z01

1. Introduction

Managing discipline in the classroom refers to the ability to positively control student behavior and allows for the creation of a learning community (Valente et al., 2019).

According to Franklin & Harrington (2019), the classroom is a shared learning space where knowledge and functions are formed to help students shape their futures. The responsibility for a positive and formative experience with positive outcomes is shared between the teacher and the students. A positive learning experience in the classroom requires a balance between a variety of student needs and environmental factors. It requires the co-creation of a learning environment characterized by respect, empathy, trust, and interest. Effective behavior management strategies contribute to a positive classroom climate. They strike a balance between applying laws and rules and maintaining curiosity and inquisitiveness.

Effective classroom management is characterized by the consistent application of classroom procedures and routines that provide clarity about behavioral expectations. Consistency creates order and helps build trust. Active student participation in pedagogical processes as part of a management strategy contributes to positive classroom behavior (Freiberg et al., 2019). Effective management reduces stress, regulates behavior, and enhances students' sense of belonging, competence, and legitimacy (Valente et al., 2019).

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Management skills that focus on classroom behavior have been divided into proactive and reactive skills. Proactive skills include designing a program that provides a meaningful and tailored learning experience that allows the student to participate. Integrating direction and focus into learning processes helps increase student persistence in terms of concentration, focus, and participation (Nagro, Fraser & Hooks, 2019). Adjusting teaching and learning processes to the pace of the class. Implementing monitoring and reflective processes while understanding the causes and circumstances of student behavior and consistently using reinforcers to influence behavior, achievement, engagement, and success (Malik, 2020).

Reactive strategies are less effective in managing behavior (Malik, 2020) and yet it is a necessary skill to manage discipline in the classroom to correct disruptive behaviors and prevent escalation (Mielke & Farrington, 2021). Reactive action involves the use of consistency (Wang et al., 2020), immediacy and purposefulness in response, and establishment as an expected response to create awareness, order, and a link between behavior and response (Freiberg, Oviatt & Naveira, 2020)

Behavior problems and disorders are terms that group together problematic or disruptive behavior, defiant, oppositional behavior, antisocial disorders, and conduct disorders. Conduct disorders refer to the violation of social rules and negative actions toward others such as aggressiveness, lying, and stealing (Goldstein et al., 2023). From studies conducted over the years, a high percentage of elementary school children are at high risk of developing a conduct problem during their school years (Olivier et al., 2020). Behavior problems among students in the classroom can arise for a variety of reasons. Some are related to environmental factors, others to factors related to the individual. They can be influenced by developmental background, various types of learning disabilities, emotional state, difficulty driving, sense of competence, sense of belonging, educational challenges, mismatch of learning with the student's talents, and other external and internal factors (WHO, 2019). Studies have shown that how the classroom is managed and how discipline is handled in the classroom has a significant impact on classroom climate, behavior, and educational outcomes (Valente et al., 2019).

Cognitive-behavioral intervention is based on an approach that includes cognitive and behavioral components and aims to change individual behavior. It utilizes basic cognitive processes that are responsible for successful problem-solving processes. Studies have shown that this type of intervention is able to improve self-monitoring mechanisms and thus social problem-solving skills in a variety of situations and structures. Therefore, this type of intervention helps reduce the risk of developing behavior problems (McDaniel et al, 2023).

The complexity of treating behavior problems, their negative effects, and the importance of effective and adaptive developmental outcomes underscore the importance of studying and developing tools and responses to this complex issue.

1.1 Behavior problems in the classroom

Emotional and behavioral problems (EBP) or disorders (EBD) include any behavioral patterns that are abnormal compared to the norm and developmental level. They can be classified as either "internalizing" or "externalizing". Externalizing behavior problems and disorders are manifested in the violation of social rules and negative actions toward others (Fossum et al., 2021).

Violence is an extroverted behavior characterized by the exertion of an unpleasant stimulus, physical or verbal, toward the other. Studies distinguish three types of violent behavior: reactive violence, which can result from activating events that cause the individual to behave violently. Instrumental violence, which helps the individual to satisfy his needs when he is unable to achieve his goal in an acceptable way; and violence for its own sake, which arises from severe emotional problems that are sometimes a consequence of the environment (Eliram, 1982). Another distinction is between violence that results in physical harm and violence that results in psychological harm. This type of division focuses on the secret motives that cause the violent act (Marom et al., 2011). This categorization led to examining violence at the level of its underlying factors as well. In the literature based on frustration-anxiety theory, violence is divided into reactive and proactive violence. Reactive violence occurs in response to violence that causes anger and frustration, and aims to reduce the level of anger and frustration by hitting the perpetrator. This type of violence has a more positive prognosis than initiated violence (Ibid.).

Initiated violence is based on past experiences. The individual has learned that a violent response will help him or her achieve various goals and is therefore activated whenever the individual wants to achieve his or her goals. Other subdivisions refer to the differences between the behaviors that characterize

violence, distinguishing between direct violence and indirect violence, and between verbal violence and physical violence (Ronen et al., 2007).

1.2 Patterns of victimization during the elementary school years

Victimization is a common stressor in school-aged children and can affect the child's future development. Children who suffer from persistent bullying and an unprotected social-emotional climate (Mandira et al., 2020) are at increased risk of developing psychological and behavioral adjustment problems such as loneliness, low self-esteem, anxiety, depression, externalizing problems, and school dropout (D'Urso & Symonds, 2021). Violent behavior is not only harmful to the environment of the violent child, but also to the development and functioning of the violent child, who is at risk of social rejection, dropping out of school, and developing criminal behaviors (Ferrara et al., 2019).

An association has been found between an early victimization experience during the elementary school years and the continuation of the pattern of bullying victimization in later years (Wu et al., 2023). The early years of elementary school are a significant and important time to observe the child's developmental process and understand why certain children are victimized and others are not, and how the change in victimization patterns is related to their behavior and its context over time.

As the child progresses through the developmental stages of acquiring complex cognitive skills, patterns of violence decrease. It is likely that there is a relationship between these two processes (Gaffney et al., 2021).

Cognitive skills are related to mechanisms of self-control, information processing, and emotion control. These mechanisms enable individuals to control and regulate their behavior and moderate the relationship between sensitivity and aggression (Mitsea, et al., 2021). Violence control and behavior regulation become possible for a child as he or she acquires tools and skills that enable him or her to behave socially.

The development of self-control skills enables the child to activate mechanisms of observation, monitoring, and self-reinforcement, to use accepted social models, and to control his or her behavior (Marom et al., 2011).

1.3 Cognitive-behavioral theory - development, perception and intervention

The classical "cognitive-behavioral" model was developed in recognition of the interrelationships between cognition and behavior, as well as the emotional state and general functioning of the organism, and assumes a connection between the way individuals perceive events in their lives and their feelings, physiological reactions, and behavior. According to this concept, a person's feelings and behavior are influenced by the interpretation he or she gives to the events in his or her life, rather than by the events themselves (Beck, 2014). Cognitive-behavioral intervention methods use strategies aimed at bringing about change in thinking, feelings, and behavior (Kendall, 2012). Their foundation is the individual's belief system, behavioral strategies, and understanding of the beliefs and behaviors that characterize them. A cognitive-behavioral intervention program addresses the acquisition and establishment of a cognitive change in the thinking and belief system to achieve stable emotional and behavioral change (Beck, 2014). It relies on an approach that includes cognitive and behavioral components to change individual behavior through its influence on the basic cognitive processes responsible for successful problem-solving processes and to improve self-monitoring mechanisms. It affects social problem-solving skills in a variety of situations and structures. Therefore, this type of intervention helps reduce the risk of developing behavior problems, contributes to positive social functioning, and promotes a visible and hidden impact on individual development (McDaniel et al, 2023).

One of the most important issues in child care is the issue of cognitive processing and the distinction between "cognitive impairment" and "cognitive bias" Processing impairment is caused by a lack of attention to information and a lack of foresight that affects behavior and its outcomes. Cognitive distortion refers to a disorder of thought processes (Kendall, 2012).

Impulsive behavior results from cognitive impairment, which manifests itself in the inability to let thinking precede action, as opposed to cognitive distortion, which indicates active but distorted processing (Kendall, 2012).

The self-regulatory system is at the heart of any daily process. Its components mediate the influence of the external environment on individuals and provide them with the basis for purposeful action. Consistent, reliable, and frequent self-observation leads the individual to success in self-regulation.

A child's self-regulation skills can influence his or her adjustment to the school environment in which he must function independently and without dependence on the presence of his or her primary caregivers (Wellington, 2022).

2. Methods

The purpose of this study was to examine the effects of classroom discipline management using a cognitive behavioral intervention program on students' acquisition of self-management and self-regulation skills, the extent of behavior problems in the classroom, and the social and academic emotional climate in the classroom.

The sample consisted of thirty 4th grade students in an elementary school in Israel. The vast majority of the children in the class have been learning together for about five years, i.e., since pre-compulsory kindergarten. Of them, 8 are girls and 22 are boys, aged 9-10, living in Jerusalem or surrounding areas. 16 of the children in the class were diagnosed with learning disabilities or ADHD, and 14 of the children were not diagnosed (Table 1).

Table 1. Study Population – children

	N	%	Mean
Gender			
• Girl	8	26.66	
• Boy	22	73.33	
Age			9.4
Origin			
• Abroad	2	6.66	
• Israel	28	93.33	
Place			
• Jerusalem	24	80	
• Outside Jerusalem	6	20	
Diagnosis			
• Adhd	9	30	
• learning Disability	7	23.3	
• undiagnosed	14	46.7	

Source: own processing (2023)

Research tools: In-depth interviews: semi-structured in-depth interviews to capture staff feelings about the class before and after the intervention program.

open-ended face-to-face interviews were conducted on predetermined general topics to understand students' feelings and needs.

Participant observation: participant observation was conducted in the classroom to directly and personally intervene in the lives and processes of the students and to experience the reality of the classroom together with them. The Observations focused on events that occurred during common class time related to self-management and self-regulation, as well as the general atmosphere in the classroom during class time and extracurricular activities. In addition, classroom discussions were recorded to monitor the program and its outcomes.

Open-ended questionnaires: Twice a year, open-ended questionnaires were distributed before the end of each semester regarding students' experiences in the classroom

The intervention included the use of cognitive and behavioral tools. The goal was to teach strategies and tools to strengthen and develop self-reflection, self-management, and self-regulation in the first phase.

In the second phase, goals were established to support classroom discipline in creating a positive social and emotional classroom climate and to manage student behavior.

At the same time, the process of introducing and acquiring tools and semantics continued.

The program was created and implemented using a variety of tools:

Tools to assimilate behavioral routines: as the school year began, the schedules, lesson system, and accompanying lessons were created in the spirit of the intervention plan to create a unified and consistent language and a sense of framework and safety.

Permanent Lessons: Three permanent weekly lessons were incorporated into the system to learn and use program language, role play, learn tools and strategies, learn through stories, practice social discourse, practice reflection skills, reflect, and create daily report pages.

Monitoring Boards: behavior boards were created and posted in the classroom to provide consistent, orderly, and engaging monitoring of the behavior process.

Self-management board: a self-management board was created based on the cognitive behavioral model derived from the emotional-rational method. The board is divided into quarters to distinguish between an event, a thought, an emotion/feeling, and a reaction.

In applying the model, a specific work routine was established (Figure 1).

Reaction stages: An axis for reaction stages was placed under the circle to practice observing behaviors and reactions (Figure 2).

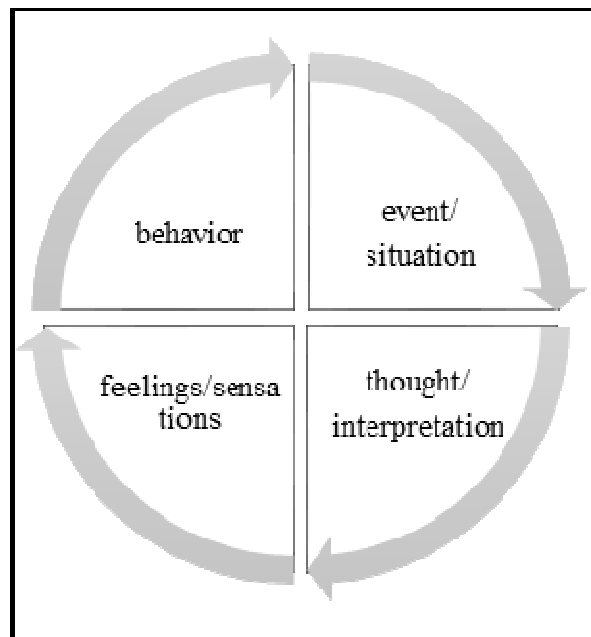


Figure 1. Self management wheel
Based on Albert Ellis (1957), in (Beck, 2014)

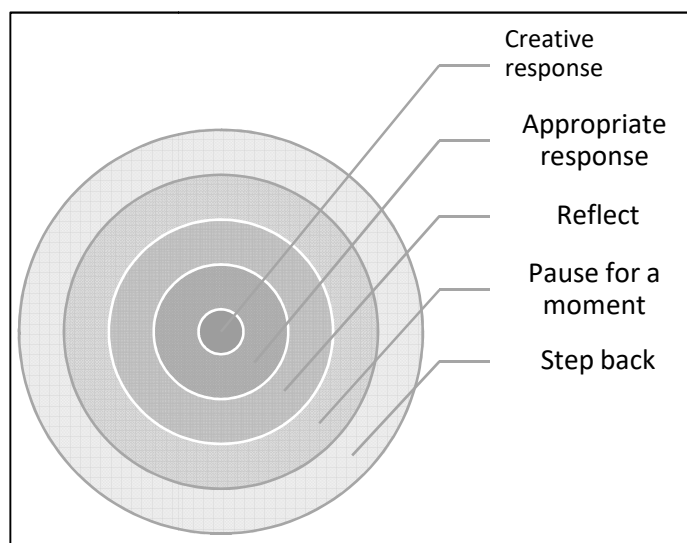


Figure 2. reaction stages
Source: Fuchs (2023)

3. Results

The results obtained combine data that indicate qualitative processes that indicate a change in perceptions and experiences as a result of the discipline and behavior management program. Measurable data indicate a reduction in maladaptive behaviors and an improvement in adaptive behaviors in the classroom.

Analysis of the results of the social climate:

The results describe a comparison between the responses on the reflection questionnaires completed by the children at the end of third grade before the intervention program and at the end of fourth grade after the program.

The questionnaires completed by the children contained closed and open-ended questions. The closed questions were rated on a scale of 1-5: 1 - never, 3 - sometimes, 5 - always, 2,4 - intermediate situations between always and sometimes or between sometimes and never.

The results describe a comparison between responses on reflection questionnaires completed by children at the end of third grade before the intervention program and at the end of fourth grade after the program (Table 2).

Table 2. reflection sheets comparison

statement	Mean - Before	Mean – After
"I choose my friends by myself"	1.76	4.33
"My friends respect me and my opinions"	2.63	4.43
"I manage to avoid conflicts and arguments with friends and reach a solution in pleasant ways"	1.53	4.36

Source: own processing (2023)

In relation to the proverb "I choose my friends by myself"

Numerical results: 70% of the students were found to have a numerical increase in the legitimacy and ability to choose their friends, 30% were ranked in the highest scoring group at the beginning of the program and the score was maintained. 60% of children rated the statement with the highest score at the end of the year compared to 30% at the beginning of the year.

Verbatim Results: At the beginning of the year, 70% of subjects reported some difficulty finding a friend they would like to play with. At the end of the year, all children said their social status in the classroom had improved. 40% of the children reported a personal process they went through regarding their personal responsibility in choosing friendships.

In relation to the statement, "My friends respect me and my opinions."

Numerical Results: A numerical increase in the feeling of being respected was observed in 80% of the subjects, no change was observed in the remaining 20%, while in 10% of them the statement was rated with the highest score from the beginning and in another 10% there was no improvement in the feeling of being respected in the class. 60% of subjects rated the statement with the highest score at the end of the year, compared to 10% at the beginning of the year.

Verbatim results: At the beginning of the year, 80% of subjects were dissatisfied with the level of respect they received from their classmates, and 10% said they did not know how to refer to a verb. At the end of the year, 80% of subjects reported feeling a change in the overall class climate. 10% indicated that their feeling in class was not good.

In reference to the saying "I manage to avoid quarrels and arguments with friends and find a solution in a pleasant way".

Numerical results 50% of the subjects observed a numerical increase in the feeling that they manage to behave better in conflict situations. No change in outcome was observed in the remaining 50%. 60% of the subjects rated the statement at the maximum score at the end of the year, compared to 10% at the beginning of the year. No decrease in score was observed in any of the subjects.

Verbatim results: At the beginning of the year, 50% of subjects said they did not need conflict management tools. 30% saw no personal responsibility for their involvement in fights. 30% referred to their personal responsibility. 20% said they had tools to help them solve problems. 10% referred to their general feeling about classroom interactions and communication. At the end of the year, all subjects reported improvement in dealing with conflict. 70% of subjects said they purchased tools to help them

manage conflict and solve problems. 30% of subjects were positive about the process and the general atmosphere in the class and said they had expanded their social circles.

The next question asked students to say what they would keep in the class and what they would improve in it. The question included only a verbal description without a numerical representation. At the beginning of the year, 90% of the subjects felt that there was something to improve in the class socially. 60% of them experienced the class as an unsafe place and reported bullying towards them or their classmates. 10% reported feeling disrespected. 20% reported that they would like to expand their social circles and opportunities to play with friends.

20% reported that noise and anger affect the atmosphere. 10% said they did not know what they would like to improve. 10% said they would like to improve everything in the classroom. At the end of the year, 30% felt there was nothing left to improve. 10% felt everything should be improved and 60% mentioned specific changes that should be made. Compared to the beginning of the year, only 10% said that the children's attitude towards each other should be improved.

As for what students wanted to keep in the classroom: At the beginning of the year, 70% of subjects wrote that they would keep their best friends. 30% did not find anything on the social level in the classroom that they would like to keep. At the end of the year, 70% of the children referred to the flow in the class and the general social climate, 40% of the subjects described the improvement of the children's behavior towards each other. 20% of the subjects the presence and effectiveness of the acquired tools for self-management and problem solving. 30% mentioned the good atmosphere and pleasant feeling in the class. 75% of the 30% who did not find what they wanted to preserve at the beginning of the year found things they would preserve.

At the level of the defined goal of social climate and social communication, there was a significant improvement in the children's feeling about their social status and an increase in their overall good feeling in the classroom. 20% reported that noise and riots affected the atmosphere. 10% said they did not know what they would like to improve. 10% said they would like to improve everything in the classroom. At the end of the year, 30% felt there was nothing left to improve. 10% felt everything should be improved and 60% mentioned specific changes that should be made. Compared to the beginning of the year, only 10% said that the children's attitude towards each other should be improved.

Results of a circle for self-management, guided discovery, and mantras:

Results describe a comparison between content brought up during observations, conversations with children, and class discussions at the end of third grade before the intervention program and at the end of fourth grade after the program.

At the level of the defined goal of habituation and internalization and application of the principles of the program and the reference tables At the end of the year, most children had acquired the circle of self-management and the tools for observation, internalized the stages at the cognitive level and the emotional level, and used them to achieve defined behavioral goals, such as: social climate, rules of discourse, social play.

At the level of defined goal of rules of discourse: significant improvement was observed in the ability to engage in attentive, appropriate, and respectful classroom discourse.

At the level of the defined goal of a social game, the intervention helped in acquiring tools to manage a social game.

Results of the reaction phases: according to the students' reports, using the reaction stages as an available, practical, and clear tool helped them avoid impulsive and violent behavior. At the beginning of the year, 51.7% of the children reported that they were victims of verbal violence expressed in humiliation, insults, threats, social ostracism and boycott, compared to 17.24% at the end of the year. At the beginning of the year, 24.13% of students reported having suffered physical violence, compared to 10% at the end of the year. At the beginning of the year, the percentage of children who required repeated treatment and activation of personal programs due to violent behavior was 30%, compared to 6% at the end of the year (Table 3).

Table 3. violent and victims compression

	Percent – before	Percent – after
Violent behavior (physical or verbal)	31%	6%
victims of physical violence	24.13%	10%
victims of verbal violence	51.7%	17.24%

Source: own processing (2023)

4. Discussion

The intervention program primarily required clear classroom management, which included classroom organization, i.e., creating the weekly and daily schedule and establishing regularities and routines in the classroom. The organized and orderly environment structure that created by the intervention program was important and central element in building a framework that facilitates productive learning academically and socially (Allen, 2010).

Studies have shown that there is a clear correlation between classroom management, the establishment of clear and consistent rules and expectations, and an infrastructure that allows for student participation in decision making, and a decrease in violence and bullying (WHO, 2019). It can be concluded that maintaining an organized and orderly work environment has helped to improve classroom climate, which is reflected in the improvement of how students feel in the classroom by making more connections to learning and having a sense of security. The uniqueness of the study is reflected in the fact that the behavioral problem was included as a major theme in the classroom management objective and that a cognitive-behavioral intervention program was activated in a school setting with a large group of thirty students. The reflective and metacognitive work affected automatic responses and the system of beliefs and perceptions. It also helped students discover for themselves for the first time skills and potentials in several areas, including mastering appropriate social discourse and finding a place in the social group. The goal of the intervention program was to develop self-management skills in students through cognitive and behavioral tools to improve class management and classroom climate. The intervention program led to an improvement in the students' self-regulation and self-monitoring skills. It expanded their awareness and personal responsibility. The results of the intervention illustrate the importance of classroom and discipline management for effective problem solving skills. Changing thinking, learning and monitoring skills lead to development and implementation of an independent self-management system and learning new behaviors.

The results of the study show the importance of classroom management and how through a slow and structured process, through small successes and reinforcements, self-management skills were acquired by the students. The requirement to reflect daily helped internalize and process reflective observation as a tool to examine thoughts, feelings, and behaviors. The process of internalization and establishment involved regular instructional sessions in which automatic thoughts, belief systems, perceptions, and resulting cognitive patterns, feelings, and emotions and their effects on behavior were made conscious. Research findings suggest that students were able to moderate their feelings of anger and consequently their behavior by focusing on classroom reflection and changing their automatic thoughts.

Conclusion

The purpose of the study was to examine the relationship between a program combining cognitive and behavioral classroom management principles and tools and students' self-management skills and behavior. The study also examined the relationship between working on self-management skills and improving classroom climate, reducing behavioral difficulties, and increasing students' sense of safety and involvement. Findings suggest that purposeful classroom management based on structure, clarity, stability, and consistency supports the development and acquisition of self-control, self-regulation, and self-management skills. Skills that influence individual behavior and facilitate positive, effective, and productive group behavior. The study was conducted over one year with a group of students. It did not include a control group to examine the effectiveness of another program or the natural developmental processes of adolescence without the implementation of a program. The study proposed an intervention model to manage group behavior by improving individual self-management skills.

In order to use this model as a management model in different settings and institutions, it needs to be tested on different types of groups, needs, ages, and goals.

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School Management through an Emotional Lens: Fostering Student-Teacher Engagement and Academic Excellence

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Abstract

Research background: In addition to the acquisition of knowledge, a school should consider the emotional needs of students and teachers as well as the needs of some students for therapeutic interventions. For effective management of such a complex system, a methodology for providing guidance and response for both student and teacher was needed.

Purpose of the article: Using an intervention program, teachers used action research to proactively and in a transparent manner work to resolve academic, emotional, and therapeutic issues. The effects of this program, based on management models that defined precise tasks and the functioning of the school, is explained.

Methods: In the Action Research study (Kaniel, 2014), quantitative and qualitative techniques of collecting data were used along with in-depth interviews. Evaluation of the program was accomplished through two different methods of evaluation which looked for congruence between what was intended to happen and what actually happened.

Findings & Value added: When focus was placed on individuals in a systemically and holistically adjusted way, children's functioning as independent learners increased, as did teacher satisfaction. The trust of the community within the school and in the education system grew and there was a significant improvement in the mutual relations between all of those involved as the teachers, parents, and students worked together in an organized fashion.

Keywords: school management model, systemic approach, humanistic education, elementary school

JEL classification: A2, A3, A10, I2

1. Introduction

Today and for decades, school organizational management culture is based on providing detailed guidelines and policies based on every source except the individual classroom and teacher. Field personnel—the teaching staff—do their best to fulfill these to the best of their abilities and understanding, but often these conflict with a teacher's strengths or what her experience and intuition tell her the students need. Sometimes they even conflict with each other, leaving teachers in a “no-win” situation. This study proposes a more effective method in which the educational team is a fully responsible and active partner in the process. It uses

a systematic approach and operates in a holistic and coordinated manner from the bottom—from the field—up to the administration.

The model, Humanistic Systemic School Management Model (HSSMM), is modular and also draws inspiration from educational models that focus on involvement and emotional communication, critical pedagogy in which the emphasis is on empowering teachers and students in cooperation with parents and superiors.

The HSSMM seeks to redefine the responsibilities and the need to develop clear and accurate determinations of classroom needs by combining holism with a systematic view of the educational field. This way there can be a successful and effective combination of diverse management ideas and methods that complement each other, empower teachers to work to the maximum of their individual strengths, and provide targeted education to meet the particular needs and temperaments of individual classes and even

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students. Simply put, it exchanges the present “one size fits all” model that fails many students and burns out the best teachers with a model that empowers and differentiates both student and teacher needs while avoiding a free-for-all because it is based in a coherent management system.

We used evaluation methods that provided data for consideration of students’ progress and achievement, as well as for teaching and classroom management decisions. Within the action research study we used mixed methods of research. Quantitative questionnaires validated the model to all stakeholders. Quantitative research data was supported by qualitative research using semi-structured interviews for students, parents, and teachers as well as an in-depth interview of each participant of an advisory committee. We attempted to identify the factors that contributed to overall school satisfaction, checking parental involvement and satisfaction, school administration involvement, teacher effectiveness, and children’s achievements. The results of the research was a new school management model, contributing new knowledge in the field of school management and educational leadership that focuses on creating educational opportunities for all students while ensuring sustainable solutions. See Figure 1.

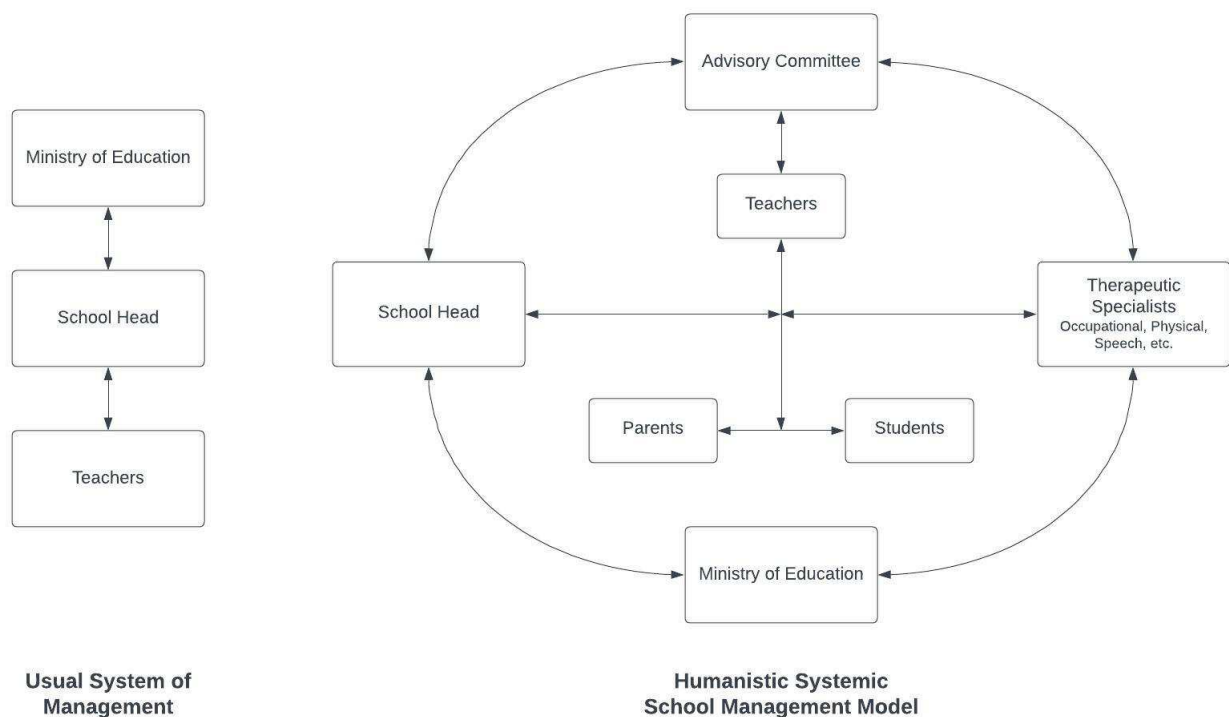


Figure 1. Comparison of Traditional and HSSMM Management
Source: Tsarfati (2023)

1.1 Educational Systems and Change

In the traditional departmental education model that has been the dominant school organization model since the late 19th century, every academic subject is separate from the others. Especially within larger schools, educators may report to different heads who report to a higher-level administration (Rose, 2012). In spite of a great deal of research and many new models, in practice education systems are generally very traditional structures that do not tend to change (OECD, 2016).

The contradiction between the extensive preoccupation with change and the lack of change in practice is due in part to the fact that most of the research deals with aspects that require not only change but also reflections on the nature of the desired change, rather than with practical and systematic aspects involved in implementation of the change such as monitoring the effects of reforms and using different policy tools to implement them. An axiom of ours was that true change in education should focus on improved learning and should benefit all the stakeholders.

Pedagogical reform concerns the study content and methods of both teaching and assessment, while organizational reform concerns aspects such as organizational structure, the salary system, etc. Just as there are pedagogy reforms that adapt and develop over time, so modern management approaches must

adapt to the dynamism and the needs that arise from the field. This implementation refers to the systemic approach of the way the school is managed and the operations in it (Eisenberg & Selivansky-Eden, 2019).

In constructing the Humanistic Systemic School Management Model (HSSMM) we have used elements of various management models that researchers like Schechter (2011) have explored, including: (1) constructing an understanding of how to support teachers, empowering them to promote student learning; (2) developing shared aims, identity, and purpose, encouraging effective communication and responsibility for school processes; (3) encouraging collaborative processes promoting better teaching and learning; (4) promoting individual and collective efficacy; (5) situating teacher training in the unique educational context at hand; (6) promoting collective learning by establishing organizational structures, methods, and practices wherein management takes on the role of facilitator of mutual learning; and (7) modeling learning as a shift in perspective, thereby promoting learning in which teachers can assemble, refine and negotiate meanings. Moreover, our model is also inspired by both (8) the Cultural Feminism model, which focuses upon emotional attachment and engagement (Beck, 1994), and (9) Critical Pedagogy, that includes empowering students to become active and engaged citizens who are able to actively improve their own lives, making connections between school and the broader community (Kincheloe, 2008).

There is no contradiction between the systemic and humanistic views. The systemic approach outwardly desires perfection, but in practice there can be no perfection. Holistic education in its entirety is the application of the systemic approach with an over-all view that incorporates humanistic elements overlooked by the systems approach, including the sometimes dramatic lack of perfection. Thus there can be a successful and efficient combination of diverse managerial ideas and methods that complement each other.

1.2 A deeper look at the holistic-systemic blend

The connection between holistic education and the systemic approach promotes team spirit and cooperation in the education system (Adiges, 2010). The HSSMM approach brings together all the different parties--students, teachers, therapists (occupational, physical, speech, psycho/social, and any others), administrators, and community—and connects them to promote learning and the achievement of educational goals. These local information sources are an important part of the system. They provide detailed and complete understanding of aspects of the educational environment that are often overlooked in the traditional management model.

The collaboration ensures an improvement in educational processes, permits freedom and creativity in educational frameworks, expresses effective management of the system, and promotes renewed interpretations and systemic thinking about the goals of education. With all parties working together, the decision-making process is naturally transparent and builds trust.

The flexibility that develops is critically important because modern education faces many and complex challenges, such as technological changes, social changes, and fluctuations in the field of information. Refinement of the connection between holistic education and its systematic delivery allows for a broader understanding of what is happening in the school because participants must participate actively, not merely be mirrors reflecting back what they think is a desired response.

1.3 Implementation of the systemic-humanistic approach to management

The essential problem within school management is that bureaucratic procedures and interfaces make it difficult to move freely within the system. Schools run on strict schedules of hours, standards, supports, diagnoses, and teacher requirements. Participants understand education-related issues through these frameworks (Chapman, 2002). They have indifferent explanations for understanding educational phenomena (Burton & Bartlett, 2020) and do not have tailor-made solutions to presented problems. Oplatka (2015) shows that a person's position in the system affects the problems he identifies, and he frames the solutions or creates multiple perspective awareness for each problem. All in all, the system fails the many who fall between the cracks.

Academic innovation requires experience and change in pedagogical practices, learning approaches, student evaluations, and professional collaborations. According to Eisner (1992), any important and educationally significant reform requires reference to five study dimensions: the intention, the structural, the educational, the pedagogical, and the assessment. The connections between all the factors are crucial because they constitute a systemic point of view and not just adapted solutions to the presented problems (Ben-Peretz, et al., 2011). Author Stefko et al. (2014) also stresses the aspect of communication and its importance.

According to systemic thinking, systemic change can occur at all levels of the system (Sharan, Y. & Sharan, S., 2021), and the entire process must be based on autonomy, responsibility, dialogue, trust, involvement, and continuity (Chapman, 2002). The “big picture,” which emphasizes the interrelationship between the components and not the components themselves, makes it possible to find solutions to problems because the connections become clearer and the solutions more accessible (Shaked & Sharan, S., 2021).

These educational processes and their implementation led us to develop what we call Targeting in Particular or TIP—in other words, special focus (Figure 2). Chapman (2002) discussed the importance of implementing multidisciplinary humanistic education according to personalized goals and seeing these as a whole. We accomplish this through TIP.

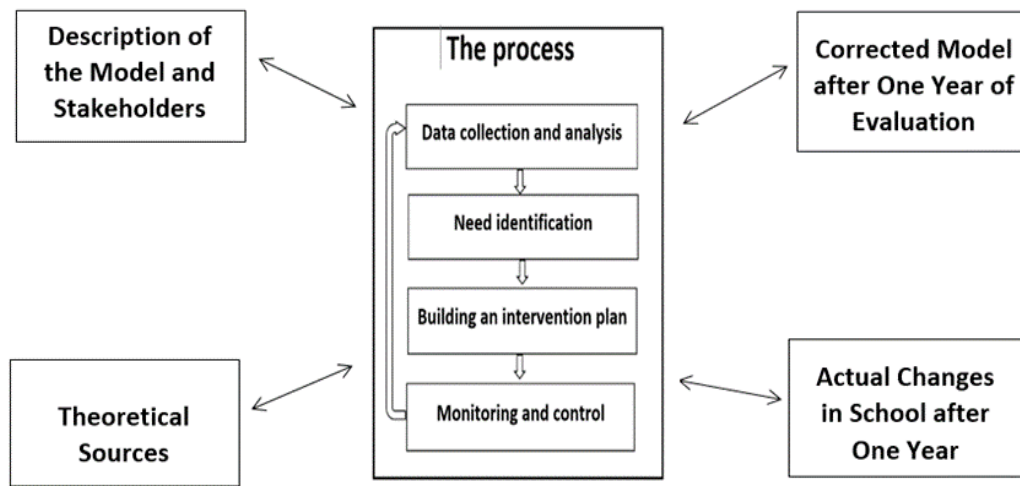


Figure 2. The TIP model - "targeting in particular"
Source: Tsarfati (2020)

1.3.1 Combining the holistic and systemic approaches

The relationship of the holistic approach to each student is reflected in a complete, detailed portrayal of each child, constructed with the help of measurable tools obtained from all the partner teachers who surround the student as well as from an in-depth analysis and discussion by the advisory committee. Parents are recruited to the process because their involvement is also important.

The systemic approach enables precision in details because information moves directly between the officials, according to their professionalism and specialization, and not through several bureaucratic levels. It includes an understanding of the mechanisms of achievement and the development of learning in a targeted manner. It also emphasizes the connections between different aspects of knowledge in the education system. The combination provides each teacher encouragement and support for the needs that arise from the field, and is a suitable answer to the indifference and bureaucracy that exist today.

Critical to the success of the management process is the implementation of the overall humanistic-systemic approach involving input from the many sources. Operation involves recruitment of parents; empowerment and development of teaching teams with an individual-focused team structure; development of multi-system professional units including mapping, diagnosis, guidance, counseling, and treatment; in-depth mapping of the students; social, family, academic, emotional, therapies if needed, and their synchronization. Personal, class, and school data are presented to the advisory committee working with each group which then develops action plans for each level—personal, classroom, and school. It is this breadth of input that creates the in-depth, complete picture needed.

This integration of modalities creates a system in which each child’s personality, strengths, and weaknesses are known and understood. Students are exposed to a variety of educational approaches, topics, and areas of knowledge in different subjects in order for them to identify connections that they want to deepen. Students are able to make informed choices about the areas in which they choose to develop while the educational staff provides precise guidance using all the educational approaches that have developed over time. In this environment the students learn to be responsible and significant partners

in their own success. They begin to consider and then develop a personal dream that they would like to fulfill. Development of such goals provides both a basis for success as well as a sign expressing success of the process.

1.3.2 The breadth of input

Parents (or parent substitutes who are responsible for children) have a primary role in children's development, both educational and psycho/social. In our study, the school recruited parents as active partners in the educational process with an emphasis on connecting and strengthening the relationship between the child and the parents. Using the Shoham process, a long-standing practice that allows parents and mentors to be around the student during learning/experience, parents took part in an ongoing and consistent procedure together with their children. Each meeting was recorded and documented. It was then evaluated by the student. This action strengthened and restored the desired and expected status of the parent, developing a common and fruitful dialogue between the teacher and parent following challenges that arose during the meetings.

An advisory committee consisting of three educator teachers, one counselor, one psychologist, and one individual coordinator was an important part of the process. Personal, class, and school data were presented to the committee for consideration. Based on the comments of these specialists, action plans were devised at the personal, classroom, and school levels.

The committee met for a week to discuss classes according to a schedule prepared in advance. In preparation for the meetings, each educator was responsible for collecting data from the professional teachers and other professional parties using a special form to ensure necessary information was provided. Because of the structure and preparation, the meetings provided a professional environment for discourse, for discussion, to receive answers, and to make decisions about the student/study group/class.

Each class met twice with the advisory committee. This committee was the replacement for the standard pedagogical meeting with multi-professional committees, providing individual-focused scrutiny not possible in the old system.

Each teacher formulated a way to deal with students' differences and to create conditions for the realization of each student's abilities. This is necessary because each student is unique and special, and learning is a personal, conscious, and informed process that takes place in a social context through interactions with significant adults and peer group members, in and out of the classroom. Thus the curriculum needs to be individual-focused in order to allow each child to realize learning and to reach academic, social, and emotional goals.

All the critical data was collected by the class teacher, who also conducted a discussion about each child in front of the committee. Because of this, each student could be helped to progress from where he or she was.

Teachers developed a deeper knowledge of their students, including the characteristics of different cultures. They also acquired professional knowledge and tools for teaching and working with gifted, average, and struggling students. Evaluation of teacher-student relationships allowed for better prediction of cognitive and school achievements than did evaluation of functioning of the students themselves, as predicted by Hamre and Pianta (2001).

The application of new knowledge gained was integrated into the actual teaching and work processes. This created an enabling and nurturing environment in which students were empowered and their curiosity was developed while their special needs of each were taken into account.

1.3.4 Curriculum

When there is a rich, challenging, and supportive learning environment, a connection is made possible for teachers to process information and deepen their students' growth. A curriculum was adapted to teaching-learning including various aspects including mental, emotional, social-value, sensor-motor, and spatial. At the same time, the students' progress was monitored and quality feedback was provided for their promotion while each student was given the opportunity to express him- or herself and to feel a sense of belonging, acceptance, and appreciation.

1.3.5 Responsibility for student advancement

In this model, the responsibility for the advancement of all students rests with the complete staff of the educational institution. The teaching staff must recognize the differences that exist between students; a climate and educational concept that supports and promotes a response to diversity is critical. A consistent

diagnostic system in the field of learning, support-inclusion, treatment, and updating must be maintained. The ability to include and promote learners is important, as is providing diverse opportunities for teachers including further training, mentoring and accompaniment, and counseling. Teachers need an increase of periodic training hours to increase their toolboxes.

A separate team is necessary to provide support for the educational team and to lead the overall support system. Also needed are increased resources for the institution to promote student learning and growth. Pooling and maximizing resources for optimal utilization while prioritizing other educational initiatives is sometimes necessary. Peer learning and collaboration between the various professional bodies is necessary in relation to the needs of both staff and students.

All of these requirements were met by the HSSMM model.

2. Methods

Before the start of the year, as well as during it, an ecological diagnosis was built in an orderly and systematic way describing the current situation and the desired situation (see Table 1). The collected data, consisting of questionnaires, interviews, trainings and so forth, were carefully measured and selected in a continuous and unceasing process. An analysis and correlation examination was performed on the data to make sure that the direction did indeed point to the desired goal.

Table 1. Schedule of action research activities of stakeholders

Month Who	May-June	July- August (School Holiday)	September through November	December	an- Feb	March through June
Counseling Committee	-Resource discussion -Year summary	-Data collection and analysis -2 days of evaluation	First round: -assignment check -Data processing-optimization -Examination of resource pooling			Second round
	-Professional training -Internal professional meetings					
Teachers	-Testing children	-Input data -Complete forms -2 days of evaluation	First round after data collection	Implementatio n of decisions		Second round of meetings after data collection
Involved Parents			First conference	Second conference	-Third conference -Parent questionnaire	
Students	Undergoing tests and examinations	School holiday	-Placement in focus groups -Transition between study groups			
						Climate questionnaire

Source: Tsarfati (2020)

The distribution of resources and the harnessing of all teachers as partners in planning and implementation was critical. Great care was used to strive for and maintain the required balances to encourage cooperation.

2.1 Setting

The research was carried in an elementary school that included students from the age of 6 (first grade) to the age of 11 (6th grade). Each level had two classes for a total of 12 classes in the whole school. This amounted to about 240 students total. Each class had an educator who was the head of the class, the elementary teacher. There were 28 additional professional teachers. The social composition of classes was heterogeneous. One class was defined as a special education class for students with special needs.

Every year tests and mapping were conducted for all students towards the end of the year. These were used to create proactive action plans to be carried out through the advisory committee. The only exceptions were the two groups of children who moved up from kindergarten to first grade. These

students were mapped towards the end of the first quarter. These assessments were used as information for consideration in making decisions related to achievements (Kusmaryono et al., 2019).

2.1.1 Research population

The research year began in May of the school year before the majority of the research. It was carried out in grades 1-6 with children between the ages of 7 and 12, for a cohort of 240 children who were all students at the school. There were also 200 parents, or at least one parent for each student (some students were siblings). Twelve educators were involved as well as an advisory committee consisting of three teacher-educators, one counselor, one psychologist, and one coordinator.

2.1.2 Quantitative research

The quantitative research aimed to determine how the implementation of the model affected the students' learning and understanding (See Figure 3).

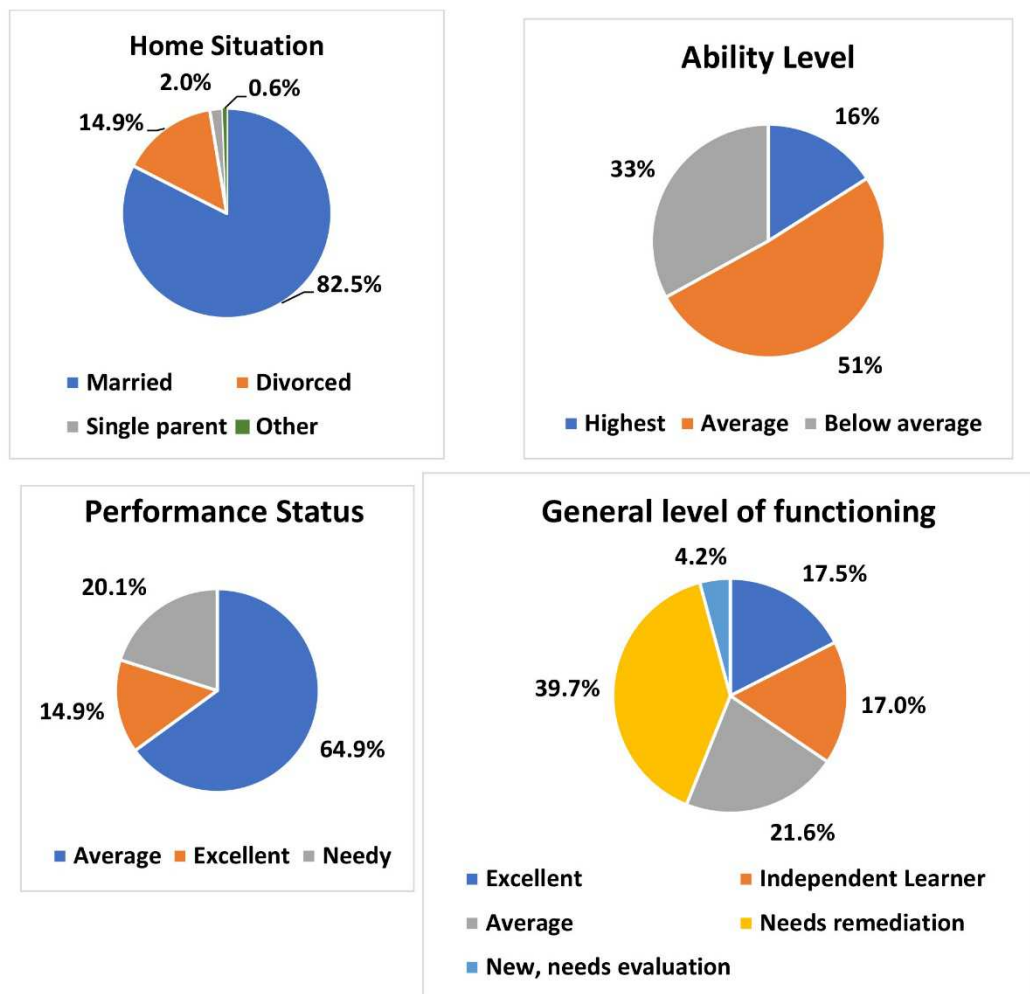


Figure 3. Systemic overview of students' educational and emotional data
Source: Tsarfati (2023)

For the students, this involved checking their achievements in May and June. Additionally, each student had a learning and motivation questionnaire that looked at his or her sense of connection with the teacher and with the school.

In March and April there was an evaluation of the questionnaires, which included questions with open-ended answers.

Teachers had a motivation questionnaire completed by August 15. Parents had two satisfaction questionnaires, one in September and one in June. Both parental and teacher questionnaires included open questions.

2.1.3 Qualitative research

The advisory committee was given in-depth interviews about the process that influenced their career path in the education system, about implementing this new approach, about their motivation, and if and how it changed the way they saw and experienced their careers. Also investigated was their willingness to implement innovative pedagogy.

3. Results

In order to study this management model, the educational team was recruited. Each member had a significant role along with the right to choose to focus on their area of strength in order to implement the educational model and contribute as an important contributor to the process.

This intervention model of school management was implemented in the school when the partners understood that education leads to progress through a combination of psychology and pedagogy. As long as a teacher has significant data and an overview of both each student and each class, the teacher will be able to be more precise in his or her work. By implementing this school management model, the teachers were able to develop their individual intellects and at the same time their social/emotional abilities.

The process was regulated in stages in a modular manner using means of action based on databases for the implementation during the study year as well as for future implementation in more educational environments (Whitehead, 2009). Miller (1998) shows that teacher leadership and administrative leadership work collaboratively to create more democratic and participatory school organizations. For this reason, the diagnoses were made through a consulting group, the school's advisory committee, and can be adapted following the values-based educational agenda in each school.

The teacher questionnaires provided a snapshot of the comfort teachers had in their roles and in their school. Some questions required responding to a scale of one (worst) to five (best). To the question, "To what extent do I have the necessary tools at school to succeed and to express my abilities?", 35 percent selected 5, 65 percent chose 4, and none rated their abilities below that. When asked, "To what extent do I feel comfortable in the teachers' room?" answers were spread more widely, with 55 percent answering 5, 36 percent answering 4, 1 percent answering 3, and 1 percent answering 2.

Answering an open question about the teacher's room, one teacher wrote, "The teacher's room has a good and pleasant climate for talking with co-workers. There is caring, understanding, help, and listening to the needs of others, acceptance, and help." A second teacher responded, "In the teachers' room there is a lot of happy giving and encouragement, and of course a lot of investment of each and every one of us in our roles. We could improve, for example by celebrating birthdays for teachers born in the same month and adding more atmosphere of belonging to the teachers' room."

At the close of the research study, 56.7 of the parents reported significant improvement in their child's performance; 23.3% reported slight improvement; 11.7% reported no significant improvement, and 8.3% either did not respond or only responded to the open-response part of the question.

The question, "What does your child's educator/classroom teacher know about your child, considering both his academic situation and outside interests?" had six possibilities ranging from "little" to "very much." Slightly more than 48% of parents selected the highest response, 24.2% the second-highest, 21% the third-highest, 3.2% slightly below the midpoint, and 3% the very lowest, with none selecting the second-lowest choice. Parent comments on the open response questions averaged a high satisfaction level with teachers.

Regarding student responses as far as emotional connection was concerned, 54.2% of students rated their teachers highest on a scale of 1 (lowest) to 4 (highest) in response to the statement, "Most of the teachers give me the feeling that I can do well in school." 40.6% of students agreed with the next statement, "sometimes yes and sometimes no," 4.2% said "generally no," and 3.1% responded "I never got this feeling from a teacher."

In response to the pedagogic element, students replied to the statement, "Most of the teachers clearly explain to me the material they teach." The 38.5% agreed with the highest level, while 50% said "sometimes yes and sometimes no." 14.6% responded "in general no," and 2.1% responded "I never had this feeling from a teacher."

4. Discussion

This paper presents a new humanistic management model for schools focusing on the function of the model and its contribution to the school. The development process of the teaching staff was presented through continuous action research (Whitehead, 2009).

This was a reflective self-study, and its purpose was to help improve the work in a rational and controlled process. The study introduced a shared reflective autobiographical narrative (Zeichner, 2001) to help understand personal and social situations through action research. The work was carried out with the possibility of analysis and presentation in a circular way, without a break. Sharing this research enables reflection and helps build a systemic-pedagogical theory that can be used to help solve educational problems (Whitehead, 2009) and implement the educational milestones.

In general, the relationship between holistic education and the systemic approach focuses on a central understanding of the educational system as a central system with coordination, work sharing, and common understanding among the various components within the system. This is a reality that guarantees the improvement of educational and learning processes and results in an improved educational environment.

The entire system can be made more effective for the planning and implementation of educational processes when there is a central understanding of the educational system. Increasing proper cooperation between the various components in the system and systemic thinking on both the effects of the actions and on the broad educational goals is possible with the humanistic/systemic management approach described here.

This model involves the promotion of the development of teams as well as influencing the individual components of the education system, most notably teachers and students. The students improve and develop when the teachers and administrators develop and renew themselves. Therefore, central importance is given to the training and professional development of the staff in the education system.

Conclusion

In this article we present an effective new school management model, the Humanistic Systemic School Management Model. We have seen that this model leads to happier and more successful teachers and students. The very fact that the teachers, who work in the field and are the human capital of the school, are involved in all the details, in the processes, and are partners in the action research allows the system approach to be fully assimilated.

Broad recent knowledge in education management documents the benefits of using a holistic systemic approach. The goal of this study was to develop, apply and evaluate a method to teach administrators how to implement a holistic systemic management approach in the education system, in order to provide an integrated and fruitful learning experience for students. This was done in a practical, step-by-step modular fashion while integrating managerial practices. As a first step, it was critical for administrators to understand the basic principles of the holistic systemic approach in education.

In order to accomplish this managerial goal, it was necessary to also focus on professional development of the educational staff. Thus important ideas and activities were introduced that examined different ways of measuring student progress in an effective and creative way. Main aspects of the holistic systemic approach in education enabled the understanding of the central principle of seeing the student as a whole, thinking outside the box, recognizing and addressing diverse learning ability, and the ability to influence proactive learning processes. This had to be taught and encouraged. Additionally, administrators were encouraged to be creative and to integrate the holistic systemic approach into all processes and decisions in the education system.

The results of the research show how the suggested model, based on the Systemic Approach and with the addition of the humanistic holistic approach, when applied to education, establishes a new modular school management model. The interactions among teachers, parents, and students is a critical part of this model as they provide a guide for the direction of the school, including identifying both strengths and weaknesses.

This new knowledge in the field of school management and educational entrepreneurship can be used to create entrepreneurial opportunities as well as opportunities within school systems for individuals and populations while ensuring sustainable solutions. It permits high precision and professionalism in managing the various components of the school to improve student achievement and satisfaction, teacher effectiveness and satisfaction, and the development of a warm, supportive, and positive school climate.

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Sustainability in Healthcare: A Conceptual Study

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Abstract

Research background: There are a lot of issues that policy makers and healthcare professionals should consider with regards to sustainability, including how to assure quality and incorporate financial, environmental, cultural and societal aspects to maximise the likelihood of a sustainable system. Although researchers in healthcare have emphasised the issue of sustainability, this concept is not sufficiently explored and poorly researched in our conditions. A need exists for theoretical and empirical studies of sustainability in healthcare.

Purpose of the article: The aim of this study is to describe, explore and explain the concept of sustainability in healthcare.

Methods: Conceptual analysis is based on a series of focused articles covering many of the domains that are encompassed in this broad spectrum and still overlooked area of sustainability in healthcare. The basis is secondary data from literature searches and articles published in indexed databases over the last 6 years.

Findings & Value added: The purpose of the article is to summarize literature about the issue of sustainability in healthcare context (with a specific focus on the sustainability pillars and sustainable employability) and thus provide a contribution to the scholarly conversation about the issue.

Keywords: sustainability, healthcare, sustainability dimensions, sustainable employability

JEL classification: M0, I1, Q01

1. Introduction

Today, the issue of sustainability is not only socially important, but also crucial for all organizations that want to build and maintain their competitive position. Sustainability seeks to balance and optimize environmental, social, cultural and financial interests. Sustainability in healthcare is a particularly challenging task as it involves healthcare organizations covering a wide range of facilities, operations, processes and activities. Hospitals and other healthcare facilities use a lot of energy, food and materials, which means they also cause environmental pollution. Last years there are strengthening tendencies to make a healthcare sector more sustainable and to reduce the sector's negative effects on climate and the environment (for instance by implementing environmentally friendly technologies, green building, reducing its carbon emissions and mass waste, recycling and reuse contaminant disposal, water efficiency, using green cleaning agents).

Sustainability is a continuous process of improvement, collectively completed through communication, action, follow-up, and benchmarking. „Sustainability is seen as a holistic worldview that provides the ability to adapt and integrate paradigms, where the key element is the system of humans and the rest of life, and each member of the system has its role and place in the individual-to-global system according to the living system principles of wholeness, change, and relationships“ (Mostepaniuk et al., 2023). Calabrese et al. (2023) (based on the work of other authors) argue that, health sustainability refers precisely to the ability of systems to promote the long-term health and well-being of people within society. Sustainable are considered those health systems that manage to balance the interests of stakeholders, while having the ability to improve, innovate and develop continuously. The sustainability of a system in this perspective involves a balance between cultural, social, economic, and environmental factors. The aim of the paper is based on the study of the scientific literature theoretically clarify the issue of sustainability in healthcare.

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2. Methods

The paper has a character of conceptual study which purpose is to provide a deeper understanding of the issue studied that serves as a basis for future research. Conceptual research relies on literature review which involves a systematic search and analysis of existing literature in order to identify basic concepts and theoretical starting points of the issue of sustainability in the healthcare sector, supplemented by an overview of research results in the given area. Articles in academic journals were used for conducting it.

3. Results

This conceptual study is built around existing literature and appropriate research studies that can explain the examined phenomenon. The main aim of the article is to summarize literature about the issue of sustainability in healthcare pointing out the individual pillars of sustainability and with a special emphasis on socio-cultural aspects and sustainable employability.

3.1 Sustainability in healthcare context

As mentioned, sustainability covers the economic, environmental and social impacts of an organization's operations. Environmental impacts typically refer to an organization's relation to the natural earth systems, including consumption of non-renewable resources. The social sustainability addresses a business organization's relationship to the communities and societies where it operates; it includes human rights activities, labor practices, fair operating practices, consumer support, health and safety, and community involvement and development (Boone, 2012). From a clinical perspective, considering sustainability means allocating resources - both human and material - appropriately and considering the health and wellbeing of staff which is arguably the single most important entity in the sustainable delivery of healthcare. Sustainability incorporates many core topics including quality improvement, process and systems design, and workforce planning issues across an integrated healthcare system. (Nicol, 2018). In connection with sustainability, we cannot forget the environmental impacts of the operation of medical facilities. For example a study of Andersen and colleagues in 2010 was aimed at estimation the impacts of inhalation anaesthetics on climate change and found out that global emissions of such anaesthetics have a climate change impact comparable to that of the CO₂ emitted by 1 million passenger cars. Moreover, most anaesthesia gases when released are not absorbed by patients, but they are captured by ventilation systems and ultimately expelled from the buildings and end up in the atmosphere. And there are also other non-negligible impacts, for example, CO₂ emissions from the healthcare organisations, waste produced by hospitals, drug manufacturing among others (Sustainable health systems, 2022).

Mehra and Sharma (2021) in their study focused the attention to various practices for sustainable healthcare, imperative measures of sustainable healthcare and the way of attaining sustainable healthcare. Authors based on the acknowledged sustainability practices in healthcare (grounded in appropriate theories) have developed a compendious theoretical model for sustainability in healthcare which encompasses twenty-seven sustainability practices under its triple bottom line, which have been subsequently reorganized and arranged for analysis into twelve sustainability measures. Authors' proposed conceptual model of sustainability in healthcare which is comprised of various practices, activities, and strategies was assessed by healthcare experts who advised the grouping of twenty-seven sustainability practices into twelve following measures for analysis divided into three dimensions:

1. Environmental:

- circular practices (the concept of keeping resources in use for as long as possible through their recovery and re-use following cradle to cradle approach),
- facilities design (architectural design of a hospital facility including its technology and equipment and its effect on patient safety),
- waste reduction and management (reduction to the greatest extent possible, the waste that is destined for ultimate disposal by means of re-use, recycling and other programs),
- sustainable procurement (combining social and environmental factors with financial considerations when making purchasing decisions).

2. Social:

- patient satisfaction,
- employee satisfaction,
- affordability (healthcare facility should be available (24 × 7), accessible and affordable to all),

- sustainable health (prevention of diseases and promotion of healthy lifestyles through vaccines, exercise, yoga, meditation, healthy food etc.).

3. Economic:

- green growth (the incorporation of environment friendly practices into healthcare delivery such as a green hospital),
- research & innovations (improvement programmes such as in clinical practice, nursing practice, reducing the cost of healthcare etc.),
- savings in operational costs and enhanced profits (strategies that promote cost savings, profits and research & development),
- indigenous production.

This hierarchical model (comprised of various practices, activities, and strategies) may help organisations in recognizing significant practices necessary for sustainability achievement.

3.2 Sustainable healthcare: social and cultural aspects

Social sustainability is a work field characterised by an emphasis on social aspects, e.g. equity, ethics, health, gender balance, or empowerment, within a broader sustainability context (Leal Filho et al., 2022). However, some authors (Shirazi and Keivani 2019; Chatterji 2021) believe that social sustainability is an area of knowledge that has proportionally received less attention compared with economic and environmental dimensions being discussed in academic research (in Leal Filho et al., 2022). Similarly, Djukic and Marić (2017) assume that social sustainability has had significantly less attention in public dialogue, and academic research than economic or environmental aspects although healthcare institutions are making a focal point on patients' and staffs' contentment.

In a healthcare setting, social sustainability can be represented by the ability of hospitals and healthcare systems to enhance quality of life and improve well-being in a population as well as by the ability of healthcare architecture to facilitate connections, enable access, improve health and enhance equity. Calabrese et al. (2023) believe that as for the social approach, the sustainability of health systems should be based on the ability of organisations to redesign relationships with patients, considering legitimacy, trust, and social value. The established relationship tends to emerge as a means of creating and maintaining value within organisations that aims to provide superior quality care to citizens and patients. According Djukic and Marić (2017) social sustainability of healthcare facilities in future will depend on their ability to improve quality and design towards user-oriented performance. The primordial responsibility for policy makers and designers of healthcare development is to build a facility where the feeling of human dignity could be conserved to its maximum. The design of hospitals should consider the needs and preferences of the patients and staff, to provide therapeutic and protective atmosphere for patients and to promote efficient staff performance. It is important to diminish the psychological discontent of patients, the impression of anxiety and uneasiness caused by diseases. Such type of design finally boosts the organization's clinical, economic, productivity and cultural contentment (Djukic and Marić, 2017).

Culture is an embedded mindset. The concept of culture is multi-interpretabile and thus the role of culture in sustainable development varies with different interpretations of culture - from tangible and intangible human achievements to symbolic patterns, norms, and rules of human communities. Linkages between culture and sustainable development can be generally classified into two sets according to the accepted definition of culture in terms of its constituent interpretation and its functional interpretation. In the constituent interpretation (in which culture refers to a set of shared values, beliefs, and norms through which people perceive, interpret, or respond to actions and environments) the culture acts as a facilitator or barrier to development by affecting human perceptions, actions, and achievements concerning sustainability. According the second interpretation with a more functional orientation (which denotes the practice of culture through cultural production, consumption, and participation) culture plays a role as a driver and enabler of development since the cultural and creative industries that produce cultural goods and services can generate growth, income, and employment (Zheng et al. 2021).

To change a culture, it must be developed and understood by all stakeholders to include input from all of those impacted. So it is with a cultural aspects of the sustainability in the healthcare. In the healthcare systems, there is a movement of culture change called person-centered care and it does not only speak about patients or residents being served, but also those providing care or other services, families and visitors, product and service providers as well as others spending time within a health care system. We can also understand the sustainability as a culture that weaves together the fabric of an organization.

Additionally, inter-facility dialogue is necessary to creating a wider culture of sustainability in a larger geographic area. Such is the case in Maryland, United States, where health care facilities have recently formed the nation's first statewide health care sustainability leadership council (Medical Tourism Magazine).

Who knows a hospital or health care facility better than the individuals whose job it is to clean and operate it? According to the Medical Tourism Magazine the environmental services and facilities staff are the eyes and ears of an institution and know more about the efficiencies and inefficiencies than anyone else. For example, they can identify locations that are lit when unoccupied; faucets and pipes that leak or drip; excess use of toxic cleaners; entryways for pests; opportunities for recycling as well as others. Nurses, who are the end user of many products, understand the connection between environment and health and can identify opportunities for improving facility sustainability. Hospital managers including purchasing, facility, dietary, marketing, etc. are in a position to spearhead projects and best practices since often learning from peers, the literature, or at conferences so they are the right ones to support integrated sustainability practices. In addition to staff, residents and patients can contribute to the sustainability journey of healthcare as well, simple by not staying quiet about the critical topics.

According to a report in Vatornews conducted among clinicians who showed signs of burnout, up to 69% of them said they did not feel appreciated. The fact that nearly 7 out of 10 doctors feel their work is underappreciated points to the fact that health care systems should work tirelessly to be strong advocates for their own employees, to appreciate and recognize them for their selfless work, to build a favorable culture, part of which is the provision of sufficient time off for employees in the healthcare sector (Awan, 2023). The ultimate goal of developing and implementing a sustainable culture in healthcare is not only about the physical setting or operations of a facility but is also related to the positive outcomes of the populations served by the facility, and the ability to instill in all the populations to create healthy and sustainable cultures healthcare community wide (Medical Tourism Magazine).

3.3 Sustainable employability in healthcare

Sustainable employability is a growing concern for many societies since with the aging of the workforce many individuals leaving the labor market for health reasons. Achieving sustainability in healthcare, i.e., when employees are able to continue working in a satisfactory, productive and healthy manner, is a timely challenge for healthcare (Roczniewska et al., 2020). International organisations including WHO, Organisation for Economic Cooperation and Development (OECD) and World Economic Forum (WEF) have recently identified significant challenges to the long-term sustainability of healthcare systems and since: aging population, increasing rates of chronic and complex diseases, growing costs of new medical technologies and medicines, wasteful spending on low-value care, inefficiencies due to system fragmentation and limited use of data and evidence to support reform are real threats to health system performance and sustainability (Braithwaite et al., 2019). Sustainable employability can be defined as „making a valuable contribution through the work of workers, now as well as in the future, while safeguarding their welfare and health. From an organizational perspective, a sustainable workforce is absolutely necessary because it reduces the costs of turnover and absenteeism. This is especially important in healthcare services, as it supports the retention of trained specialists who are difficult to be replaced because of their specific education, skills, and expertise (Roczniewska et al., 2020). Yet, the problem is that turnover is relatively high in healthcare settings.

For example, a prospective questionnaire study of healthcare managers in Sweden demonstrated that 40% left their jobs within a 4-year period (Skagert et al., 2012). The Pakistan study of Knowledge Management in the Healthcare says that Pakistan government admits having troubles within its healthcare sector despite the fact it is rapidly growing and the second largest economy in South Asia. Pakistan government has continuously increased the budget of healthcare over the years and presented multiple policies and strategies (National Health Policy (2001), Poverty Reduction Strategy Papers (2001–2009), Medium Term Development Framework (2005–2010), National Health Vision setting targets for 2025) in field of sustainable healthcare but still is unable to cope with the rapid growth and increase in patients on a national level, and the performance is below average (Karamat et al, 2018). Many articles present that Pakistan is considering the adoption of knowledge management to improve performance, which it is currently at infancy stage in developing countries (Karamat et al., 2019). A results obtained by survey of study from 2019 about Knowledge of Sustainable Development Goals (SDGs) and 2030 Agenda from nine Italian universities showed most of the interviewed subjects having never read nor heard about SDGs, while 26.0%, although having heard about them, reported not knowing what they were; only 36.0% of

respondents claimed having heard about them, but only one out of ten actually knew what they were. This is absolutely shocking since The Sustainable Development Goals (SDGs) were adopted already in September 2015 by nearly 200 countries participating in a historic UN Summit, calling for action each country with equal commitment and the 2030 Agenda, where the SDGs are enounced, represents a globally shared development program, involving the whole population in a common mission aimed to face climate change, to fight against inequalities and to put an end to any form of poverty. The achievement of these goals runs parallel to the guarantee of satisfaction of social needs as quality education, decent work opportunities for all, social protection as well as effective healthcare services and sustainable healthcare (Smaniotto et al., 2019). According Deloitte considerations „healthcare organizations need new thinking about the workforce and how its structured. Licensed professionals need more support from both automation and other clinicians -from nurses to pharmacists. Rising investments to address worker shortages and attrition indicate a growing recognition of challenges that providers and other industry participants face“. In order to meet the needs of the population in the immediate term and for the foreseeable future it is necessary to ensure sustainable healthcare workforce. Governments are spending considerable effort and funding to address health workforce retention issues, for example: United States plan to invest \$1.5 billion to increase the number of health workers in underserved communities by offering scholarships and loan repayments for students in healthcare who pledge to serve those communities, the Indian government is expanding medical college seats and starting special courses for rural health services,

One of the most important challenges healthcare sector is facing that threatened the sustainability of its workforce is burnout. It is major issue affecting turnover of the healthcare workforce. By its nature, burnout is prevalent among healthcare workers. The term burnout is a term for a psychological syndrome encompassing three dimensions: emotional exhaustion, depersonalization and decreased sense of personal accomplishment, according to the Revision of the International Classification of Diseases (WHO). The number of burnout healthcare workers is alarming. According to a study in Mayo Clinic Proceedings, more than 3 in 5 physicians reported at least one manifestation of burnout in 2021 (Awan, 2023). A Japanese Cross-Sectional Survey about burnout of Healthcare Workers from 2021 says that hat approximately 20–30% of resident physicians in Japan, who are considered to be more vulnerable to stress, were experiencing burnout already before the COVID-19 pandemic. Japanese healthcare delivery system, which was famous for universal health coverage was because of COVID-19 in danger of collapse, given the overwhelming number of hospitalizations and due to exponential growth in the number of cases and deaths related to the disease, the first cross-sectional study found that 50% of the front line healthcare workers who engaged in direct care for COVID-19 patients experienced burnout (Nishimura et al., 2021). According Murthy (2022) burnout manifests in individuals, but it’s fundamentally rooted in systems. However, health care worker burnout was there before Covid-19 crises. Main causes include inadequate support, escalating workloads and administrative burdens, chronic underinvestment in public health infrastructure, and moral injury from being unable to provide the care patients need. The author notes that burnout is not only about long hours, but it’s about the fundamental disconnect between health workers and the mission to serve that motivates them. It is alarming that these systemic shortfalls have pushed millions of health workers to the brink. According to surveys (American Nurses Foundation and Mayo Clinic Proceedings) around 52% of nurses and 20% of doctors are planning to leave their clinical practice. It is expected that by the end of the year (U.S. Bureau of Labor Statistics) there will be shortages of more than 1 million nurses and a gap of 3 million low-wage health workers is anticipated over the next 3 years (Mercer).

3.4 Sustainable healthcare: environmental and financial point of view

When it comes to environmental aspect of sustainability in healthcare, healthcare actually might not be the first industry that springs to mind when you consider the causes of the climate crisis. But globally, an estimated 5% of global emissions come from the healthcare industry. According to the World Health Organisation (WHO), high-income countries generate around 0.5kg of hazardous waste per hospital bed, per day. Robert Metzke, SVP and Global Head of Sustainability at Philips said, that “The healthcare sector in itself is emitting more CO2 than airlines and shipping lines and we often don’t talk about it, “If the world is to meet the targets set out in the Paris Agreement on climate change, the healthcare sector needs to transition to a more sustainable model and implemented the principles of the circular economy. This means finding new and sustainable ways to use resources and bring about the decarbonisation of the

industry. The European Union is leading the way with several initiatives following the European Green Deal and its Circular Economy Action Plan (CEAP) (Daunton, 2023).

There are a number of studies that have evaluated the performance of global-, regional and country-level healthcare systems. A comprehensive study conducted by using data from 173 countries concluded that the average efficiency of national health systems was 78.9% (Sun et al., 2017). Nobody is surprised that African countries had the lowest efficiency of 67% and countries in the west Pacific had the highest efficiency of 86% because the efficiency of national health systems depends the most on national economic status as well as on the incidence of HIV/AIDS, governance and health insurance mechanisms. The study concluded that a 1% increase in social security expense as a percentage of total health expenditure results in a 1.9% increase in national health system efficiency (Asandului et al., 2014).

There are some country-specific studies as well. A study on the Australian healthcare system concluded that healthcare services in Australia are among the best in the world. The study highlighted resource allocation and performance in patient outcome improvements as two main challenges faced by the healthcare system. Lebanon is one of the countries that has opened its borders for Syrian refugees. The influx of the refugees has put pressure on the Lebanese healthcare system. A study conducted on the Lebanese healthcare system inferred that the healthcare system performed reasonably well despite being stressed by the influx of refugees. China has made great progress in providing equal access to healthcare and health insurance but the challenges of better quality, control of non-communicable disease and efficiency in healthcare services remains a challenge. But what these states has in common within the efficiency of healthcare system is a non-negligible financial flow into sustainable healthcare (Umar et al., 2021).

Conclusion

Sustainability in healthcare seems to be the new and inevitable trend all across the world. It is obvious that the need for sustainable transformation of healthcare system becomes very urgent. The topic of sustainability itself is very wide-ranging and complex, it concerns various aspects of the functioning of organizations. Environmental issues are inseparable from other aspects of sustainability, such as social and economic. Significant changes in one dimension will inevitably affect the other dimensions. However, when dealing with the topic of sustainability of the health system, the issue of environmental sustainability is often coming to the fore and therefore one of the intentions of this paper was to point out other aspects of sustainability in the healthcare industry.

There are many ways to maintain sustainability. As the Mehra and Sharma (2021) state “it is time for the healthcare ecosystem to be re-engineered with systemic and structural changes, keeping ground realities in mind, through innovative and sustainable models of care delivery as well as business processes. It means that progress towards sustainability practices in healthcare needs to be further strengthened”. It is a big challenge to incorporate sustainability in such a big and diverse system like healthcare system. Our task at the moment is to raise awareness about this issue, which would eventually lead to the fact that the competent authorities, institutions and persons would take the necessary measures.

Since it is a conceptual study a research was conducted by observing and analyzing already published information on a given topic with the aim to interpret existing theories with the possibility of their further use in upcoming research. This conceptual study explains the investigated phenomenon and indicates the actions needed in the course of the research study based on the knowledge obtained from other ongoing researches and other researchers' point of view on the subject matter.

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Management of Tax Administration and Tax Evasion as a Result of Overall Economic Behavior

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Abstract

Research background: Currently, tax evasion is increasingly widespread, which is also indicated by the excessively high fines for individual tax crimes. Tax crimes do not have a positive effect on our economy, on the contrary, they have a negative effect, so the state lacks funds to develop other areas of economy. The extent of these tax crimes is quite high.

Purpose of the article: The paper focuses on the issues of tax administration management and tax evasion in the conditions of the Slovak Republic.

Methods: Our approach involves delving into the VAT tax gap's arrangement and its temporal development within the 2008-2021 period. This examination relies on secondary data accessible via the official portal of the Financial Administration of the Slovak Republic.

Findings & Value added: The results of the analysis showed that Slovak Republic recorded a historic success in the value added tax (VAT) collection for 2021, when the tax gap decreased by 4.7 percentage points year-on-year to 12.1%. The improvement of VAT collection in quantitative form brought an additional 360 million euros to the state budget. This also meant a qualitative prediction of a favorable development of tax administration management..

Keywords: tax crimes, value added tax, tax gap

JEL classification: F38, G32, H26

1. Introduction

Taxes affect our daily lives. Each tax is part of the tax system. This system evolves in tandem with a nation's economic and historical progression, resulting in a distinctive tax structure for every country. The tax recipient, known as the tax subject, holds the responsibility of fulfilling tax obligations. This role is assumed by either a natural person (whether an entrepreneur or a non-entrepreneurial citizen) or a legal entity. There are instances where the tax subject might encompass a legal representative, a tax guarantor, or even the lawful successor of a natural or legal entity. Within the framework of tax-related legal interactions, these tax subjects are most commonly denoted as taxpayers and tax payers. (Schultzová et al., 2011)

According to Lénártová (2009), who defines the taxpayer „as an anonymous consumer who pays the tax in the price of the purchased goods or services, because the tax is part of the consumer price.“ A tax payer is a tax subject who is obliged by law to remit to the public budget the tax collected from other subjects or withheld by another payer under his property responsibility. (Vančurová, Láchová, 2010) As part of the value added tax concept, we encounter the term taxable person. It is any person who does business independently, regardless of the purpose or results of this activity.

Foreign persons who are not residents of the Slovak Republic are also subject to value added tax. The objective of preventing discriminatory taxation is met through agreements aimed at sidestepping double taxation. These agreements cover various aspects, including the classification of the tax subject - whether they are a tax resident or a non-resident - and the characteristics associated with each. In essence, a tax resident can be characterized as an individual tied to the geographic jurisdiction of a state, leading to the establishment of their tax responsibilities. Tax residents assume comprehensive tax liability, obligating them to pay taxes on their earnings worldwide. (Schultzová et al., 2011)

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1.1 Defining the issue of tax evasion

When viewed through the lens of criminal law, tax evasion emerges as an unconventional type of criminal transgression. It strays from the traditional model of criminal acts due to the extensive and widespread harm it generates, making it intricate to accurately pinpoint. Additionally, concerning its frequency, tax evasion distinguishes itself from other criminal offenses, exhibiting notably higher occurrence rates compared to various potentially grave breaches of administrative procedures. The enforcement of laws specifically designed to tackle tax evasion occurs in an uneven and sporadic manner. Despite these peculiarities, or possibly because of them, tax evasion occupies a space within the gap of normative analysis. In the realm of criminal law, scholars have largely skirted the exploration of tax evasion, whereas in the domain of tax law, theorists do address the subject, albeit with only partial application of the fundamental tools found in various criminal law theories. (Green, 2015)

Boháč (2011) portrays tax evasion as an instance in which taxation isn't determined and fulfilled in alignment with legal guidelines, causing a shortfall in tax revenue within the specified scope of the public budget. As a consequence, the tax amount established and remitted by the taxpayer diverges from the conceptually 'ideal' tax that would be imposed based on legal regulations, leading to a decrease (or even total absence) of the tax figured and paid.

In general, there are two basic forms of tax evasion, namely:

1. legal tax evasion or tax avoidance, which points to tax evasion in line with current legislation. Tax evasion means avoiding tax obligations by using the options offered by the law, such as the consumer who can change his behavior to pay less taxes,
2. illegal tax evasion or tax avoidance, which is actually a violation of the law as it is carried out beyond the scope of applicable legislation, and its mechanism basically has two basic forms, namely tax evasion based on complete concealment or tax evasion based on partial declaration of income for taxation. (Burák, 2016)

López (2017) states that tax evasion often occurs in developing countries. Therefore, it is necessary to comply with tax regulations in order to avoid tax evasion. Most firms avoid paying taxes by staying smaller, but larger firms can engage in costly tax evasion. Economies where revenues are too high are in a trade-off between overall efficiency and tax collection. Where tax evasion runs high, tax collection is low. Therefore, it is necessary to focus on more effective tax evasion-countering measures. Townsend (2012) explains that tax evasion is the ultimate manifestation of conventional tax-related offenses. This signifies the gravest misconduct that taxpayers can engage in, yet if it is recognized as a violation of the tax system, it results in a penalty. According to Evertsson (2016) from a globalization perspective, tax evasion is viewed as a crime with global implications. The issue isn't limited to tax evasion originating solely from business corporations. Corporate tax avoidance presents a phenomenon that impacts various regions and diverse companies simultaneously, resulting in global consequences due to companies evading their just tax liabilities within the countries of their operations. The free market structure opens avenues for tax avoidance as regions and countries aim to attract international investments by modifying their tax regulations to cater to corporations. Buehn and Schneider (2012) draw attention to the emergence of a sequence of tax evasion occurrences across 38 OECD countries between 1999 and 2010. These occurrences are rooted in the shadow economy and its estimated models. When combining indirect taxes and self-employment as propellers for tax evasion, a consistent decline in these incidents is observable across all nations during the 1999-2010 period. Over this timeframe, the average magnitude of tax evasion stands at 3.2% of the official GDP for all countries. Leading the averages is Mexico with 6.8%, closely followed by Turkey at 6.7%. In contrast, the USA and some others rank at the lowest positions with values like 0.5% or 1.3%.

Slemrod (2007) contends that no government can establish a tax system and then simply expect taxpayers to willingly follow suit. In reality, only a minority honors their tax obligations to the state, while the majority seeks ways to sidestep payment. Over time, the pool of diligent taxpayers diminishes, while the ranks of non-compliant individuals swell, emboldened by the perception that as more people evade taxes, it becomes increasingly acceptable. Consequently, it becomes imperative for each citizen to bear a legal responsibility to fulfill their tax duties, with penalties imposed on those who fail to adhere and pay. Despite the imposition of penalties, tax evasion remains widespread. Currently, tax evasion is significantly more prevalent than in the past, and this pattern is likely to persist into the future.

Stankeviciute (2018) conducted empirical research specifically centered on the challenge the European Commission faces in addressing tax evasion and fraud within the European Union. The research aimed to evaluate and quantify the collective financial harm inflicted by tax evasion on tax revenues throughout the EU. The study included a sample of 28 EU member states in 2016 (now comprising 27 member states) and covered a 12-year span from 2003 to 2014. The research employed a methodology grounded in the concept of the shadow economy to examine historical tax evasion trends. Through hypothesis testing, the research identified specific EU countries characterized by taxpayers sensitive or insensitive to EU membership, as well as their correlation with the economic conditions of those nations and the magnitude of their national tax rates. Empirical findings from this investigation substantiated the European Commission's concerns about the adverse influence of tax evasion on the EU economy. These findings subsequently established a multifaceted quantitative basis for shaping future tax policies, facilitating informed decisions aimed at mitigating tax evasion losses both within and beyond the EU.

1.2 VAT differences in the EU

The VAT tax gap can be defined as the discrepancy between the potential tax revenue that would be realized if all economic entities operated within legal bounds, and the actual tax receipts collected. Gaps in VAT predominantly arise from disparities between projected VAT obligations and the cumulative income. The surge in VAT-related tax evasion and fraud has underscored significant obligations within the EU in recent times. This encompasses tasks such as analyzing VAT gaps and subsequently computing the resulting damages. Nonetheless, VAT variations serve as more than a mere indicator of VAT fraud; they can also encompass unpaid VAT stemming from legitimate tax planning or result from financial constraints. Larger VAT differences can also manifest if tax authorities are less than efficient. On occasion, the VAT gap can be utilized as a gauge of tax collection efficiency that remains unswayed by shifts in VAT rates or economic conditions. An expanding gap can signal suboptimal tax collection or tax evasion, necessitating the vigilant focus of tax administration. As depicted in the illustration below, VAT revenues hold substantial significance as an income source for all EU member states. (Zídková, 2014)

As per estimates put forth in 2018, the VAT gap reached an approximate sum of nearly 150 billion (in eur), with organized crime groups emerging as a key contributing factor. To safeguard their economic interests, states adopt suitable measures aimed at proactively uncovering shortcomings related to the prevention of tax crime. Poland, in particular, has displayed a pronounced dedication to this endeavor, implementing several innovative measures in this sphere over recent years. Commencing from 2015, Poland has introduced measures aimed at countering various forms of fraud, thereby enhancing overall efficiency. Data provided by the government underscores the tangible impact of these initiatives, yielding measurable outcomes. A compelling illustration of progress is the reduction in VAT disparities and the subsequent enhancement of tax collection rates. The variance in VAT between 2012 and 2016 contracted by 6%, accounting for 21%. In contrast to the EU average, this rate is notably higher, surpassing the EU mean by roughly 10%. Remarkably, Poland ranked sixth among EU member states in terms of experiencing the most significant reduction during this timeframe. (Rojszczak, 2021) In comparison to 2019, the current tax-to-GDP ratio within the EU stands at 41.1%. The overall tax-to-GDP ratio, encompassing net social contributions and taxes as a percentage of GDP, reached 41.1% in the EU in 2019. This indicates a slight decrease compared to 2018's figure of 41.2%. For the eurozone, tax revenues accounted for 41.6% of GDP in 2019, showing no change from the data recorded in 2018. (Eurostat, 2020) Tax evasion predominantly takes place within environments conducive to committing such acts. (Varma, Doob, 2019) According to Torgler and Valev (2010), the subjects of tax evasion and corruption are gaining increasing recognition and significant attention in the present era. In this context, an inquiry emerges regarding whether attitudes vary based on gender—specifically, the inclination to engage in tax-related wrongdoing. It has been noted that women exhibit notably stronger aversion to tax evasion and corruption compared to men. This observation holds true across all countries in the region.

2. Methods

The study focuses on matters related to the management of tax administration and tax evasion within the context of the Slovak Republic. We offer an analytical perspective on the configuration and progression of the tax gap (VAT), specifically during the period spanning from 2008 to 2020. This analysis is based on secondary data accessible via the official portal of the Financial Administration of the Slovak Republic.

3. Structure and development of the VAT tax gap

As we mentioned above, the VAT tax gap can be defined as the discrepancy between the potential tax revenue that would be realized if all economic entities operated within legal bounds, and the actual tax receipts collected. Gaps in VAT predominantly arise from disparities between projected VAT obligations and the cumulative income. Figure 1 represents the Development of the VAT gap in the years 2000 – 2021 in Slovak Republic. As can be seen, the gap reached its peak in 2012 and gradually decreases in the following years.

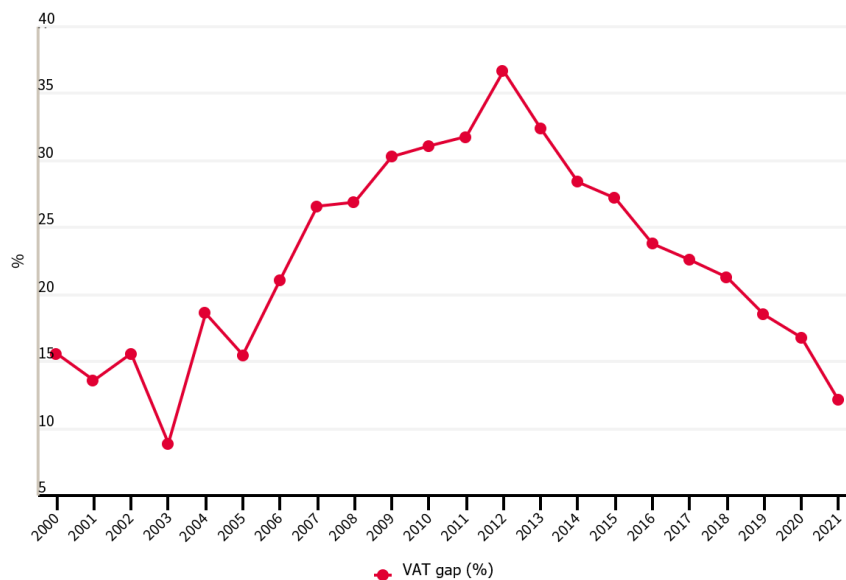


Figure 1. Development of the VAT gap in the years 2000 – 2021 in Slovak Republic
Source: opendata.financnasprava.sk (2023)

The structure of the tax gap on value added tax. The tax gap in VAT is compartmentalized into two segments—unidentified VAT and the withdrawal gap. Unidentified VAT constitutes a portion of the gap wherein taxpayers either deliberately or inadvertently fail to acknowledge, and simultaneously, it goes unnoticed by the Financial Administration (FSSR) during control assessments. It's calculated as the variance between potential and stipulated tax. The tax collection gap, on the other hand, represents the discrepancy between the stipulated tax and the tangible tax payments. This encompasses any additional tax liabilities determined post a tax audit but left unpaid. Figure 2 represents the structure of the VAT gap in the years 2008 – 2020 in Slovak Republic.

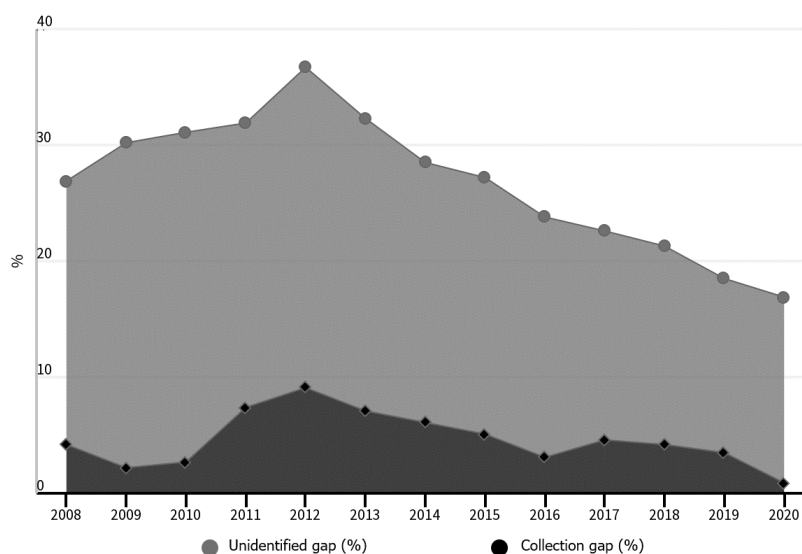


Figure 2. Structure of the VAT gap in the years 2008 – 2020 in Slovak Republic
Source: opendata.financnasprava.sk (2023)

Table 1 represents values of the tax gap for VAT in the years 2008-2021 in Slovak Republic (in %) consisting of two components – the unidentified gap and the collection gap.

Table 1. Values of the tax gap for VAT in the years 2008-2021 in Slovak Republic (in %)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Unidentified gap (in %)	22.7	28	28.4	24.5	27.6	25.2	22.4	22.1	20.7	18	17.1	15	16	11.4
Collection gap (in %)	4.2	2.2	2.7	7.4	9.1	7.1	6.1	5.1	3.1	4.6	4.2	3.5	0.9	0.7
VAT gap (in %)	26.9	30.3	31.1	31.8	36.7	32.4	28.4	27.2	23.8	22.6	21.3	18.5	16.8	12.1

Source: opendata.financnasprava.sk (2023)

Between 2009 and 2015, the tax gap was very high, which testifies to the ineffectiveness of the management of the tax administration. In the following years, we observe a decline. During 2018, the VAT tax gap in the Slovak Republic stood at 21.3% of the potential VAT. In contrast to its peak in 2012, the VAT gap experienced a reduction of over one third. In nominal figures, the disparity between potential and realized VAT revenue for the past year accounted for 2.3 billion euros (equivalent to 2.6% of GDP). Delving deeper, a sector-specific assessment reveals an estimate of the tax gap across various industries. This analysis highlights that sectors like agriculture, industry, wholesale and retail trade, accommodation and catering services, professional services, and other services pose higher risk levels (MF SR 2019).

In the year 2021, Slovak Republic made substantial strides in enhancing the collection of value-added tax (VAT), as indicated by a year-on-year reduction of 4.7 percentage points in the tax gap, resulting in a value of 12.1%. This positive shift in VAT collection contributed an additional 360 million euros to the state budget. In comparison to 2011, the efficiency of VAT collection increased by approximately 23 percentage points from the previous 65%, and in contrast to 2020, it rose by 4.7 percentage points.

The Financial Administration of the Slovak Republic has set an ambitious goal of narrowing down the tax gap to the level of other EU member states by 2024, which hovers around ten percent. The drive to enhance value-added tax (VAT) collection is motivated by several factors. This improvement was achieved without altering existing legislation.

In recent years, the Financial Administration has introduced a project to connect all cash registers online to the Financial Administration portal - the so-called eKasa. Online connection of the cash register for financial management is mandatory. The adoption of eKasa and the heightened adoption of online payments and internet-based purchases also contributed significantly to bolstered oversight and, consequently, tax collection. The shift from cash to electronic transactions has been incredibly advantageous. In an era of cashless transactions, each transaction leaves a trace, and it would be unreasonable to disregard sales made through card payments.

4. Discussion

Value added tax (VAT) stands as the primary revenue source for the state budget and the second most crucial source for the public administration budget. The operational framework of VAT is notably vulnerable to instances of tax evasion. This susceptibility, coupled with the substantial influx of both domestic and international transactions, positions VAT among the tax categories carrying the highest risk. The methodology presented is built upon the initial computation of the tax gap for VAT in the Slovak Republic, conducted in 2012. Subsequent to this, minor revisions were introduced to the methodology, and in collaboration with the International Monetary Fund in 2014, a more intricate calculation of the sector-specific gap was incorporated into the portfolio of tax gap estimations. The primary objective of this material is to outline the currently employed methodology for assessing the comprehensive as well as sector-specific VAT gap in the Slovak Republic.

The estimation of the VAT tax gap employs two distinct methodologies. In both instances, the top-down approach is employed, grounded in macroeconomic aggregates. The initial approach, rooted in final consumption, is utilized to gauge the entire tax gap. Its notable advantage resides in its relatively straightforward estimation process, along with the capacity for regular updates and the simplicity of input data. However, conversely, the model lacks the capability to provide in-depth insights into the intricate composition of the tax gap. In contrast, the second approach simulates the interplay between supplier and customer relationships across sectors, encompassing the fundamental application of VAT principles. This approach's strength lies in its ability to furnish a breakdown of the tax gap's composition (sectoral

decomposition), yet it is accompanied by the need for comprehensive input data and substantial delays in procuring the essential supply and use input tables.

Throughout its evolution, the tax structure of the Slovak Republic underwent diverse modifications that contributed to aligning it with global economies. Despite this alignment with global economies, individual tax systems remain distinct in each country. These disparities stem from political factors, legislative norms, administrative protocols, and the like. However, conversely, there exists a common thread that runs through all tax systems. This shared element revolves around the pursuit of enhancing tax collection. The challenge of tax evasion is intricately intertwined with the tax framework itself. The matter of tax evasion predominantly centers around the realm of taxation. Beyond financial and tax law, the realm of tax evasion also intersects with criminal and constitutional law. It's this interconnectedness that has rendered tax evasion an enduring subject of discussion, with ongoing deliberations concerning its origins and potential remedies.

They represent a phenomenon that is of interest not only to the public, but also to various scientists and state authorities, as tax evasion undermines the fiscal stability of the state. The various available studies address not only issues related to the structure of the tax gap, but also the quantification of tax evasion.

When it comes to tax evasion, Slovak Republic, as a member of the European Union, falls within the category of countries where, based on estimates, tax evasion surpasses the 2-billion-euro threshold annually. In preceding periods, this figure has sometimes exceeded 3 billion euros per annum. Looking at the time span from 1990 to 2020, the aggregate value of tax evasion in Slovak Republic tallies up to an approximate 60 billion euros each year. The emergence of these occurrences of tax evasion is predominantly intertwined with the nation's high tax and levy burden, in conjunction with the prevailing distrust among taxpayers towards the government. Considering these statistics, one can infer that taxpayers have been complicit in a substantial volume of tax fraud, leading to instances of tax evasion that have culminated in Slovak Republic suffering substantial financial losses, ultimately impacting its public finances.

In terms of the tax gap's magnitude, it holds statistical significance due to a notable reduction in this phenomenon over recent years. The tax gap embodies the variance in VAT collection between the amount the state could reasonably accrue as value-added tax in line with the law and the actual sum directed to the state treasury, which results in the exploitation of excessive deductions. The fiscal administration lacks the capacity to capture revenue losses resulting from undocumented and unpaid tax obligations. Within the European Union, member states should strive to mitigate the tax gap. The tax ratio serves as a gauge of a state's prowess in tax collection. A higher tax ratio corresponds to greater success in tax collection. When the effective tax ratio rises, the tax gap contracts, and vice versa. Slovak Republic 's tax gap remains among the highest in the European Union, with the country forfeiting billions of euros annually in VAT collection.

The tax gap might also encounter adverse effects due to the pandemic, which could potentially lead to its escalation. The pandemic has the potential to exacerbate this situation both locally and globally, given that the state budget is influenced, primarily relying on value-added tax as its key revenue source, followed by income from the public administration budget. Furthermore, the pandemic has disrupted public finances, thereby necessitating Slovak Republic to explore diverse avenues for enhancing tax collection efficiency and mitigating tax evasion.

Improving the collection of Value Added Tax (VAT) receivables is a critical task for the state treasury of the Slovak Republic as well, as it directly impacts the government's ability to fund essential public services such as healthcare, education, and infrastructure. One of the first steps in enhancing VAT collection is a digital transformation. Improvement of the existing software that enables real-time monitoring of VAT collections would provide a valuable tool for flagging any irregularities for immediate investigation.

Legislative reforms also play a pivotal role. Strengthening the penalties for VAT evasion or avoidance could serve as a significant deterrent against malpractice. Additionally, streamlining VAT rates for different goods and services could simplify the tax system, making it easier for businesses to comply and reducing the administrative burden on tax authorities. Enforcement strategies could further bolster VAT collection efforts. Frequent audits, particularly targeting sectors or businesses with a history of VAT evasion, would add another layer of oversight. Specialized task forces within the tax authority could be developed to handle complex cases that require focused expertise. Education and awareness are just as essential. Comprehensive education campaigns could enlighten businesses and the general populace on the

importance of VAT to national development. Tax officials could benefit from specialized training programs in new technologies and methodologies for identifying tax evasion schemes, enhancing their ability to enforce the law effectively. International partnerships with tax authorities in other EU countries could serve as a forum for sharing best practices and information on transnational companies that operate in multiple jurisdictions. Furthermore, adopting a customer-centric approach could make compliance easier and more attractive for businesses. Simplified reporting mechanisms, including easy-to-use online forms, can reduce the hassle associated with filing VAT returns. For businesses facing genuine hardships, offering flexible payment options could facilitate compliance without the threat of shutting down operations.

By adopting these multifaceted approaches in a coherent and systematic manner, the Slovak Republic stands to significantly improve the efficiency and effectiveness of its VAT collection processes, thereby positively contributing to the state treasury.

Conclusion

Slovak Republic, as a member of the European Union, falls into the category of states where tax evasion, according to estimations, surpasses the threshold of 2 billion euros annually. In preceding periods, this figure occasionally exceeded 3 billion euros per year. If we narrow our focus to the timeframe spanning from 1990 to 2020, tax evasion in Slovak Republic aggregates to approximately 60 billion euros annually. These instances of tax evasion are primarily attributed to the nation's elevated tax and levy burden, alongside the prevailing skepticism among taxpayers towards the government. Considering these statistics, it becomes evident that taxpayers have been involved in a significant volume of tax misconduct, culminating in instances of tax evasion. This trend has led to substantial financial losses for Slovak Republic, thereby exacerbating the deficits within the nation's public finances. In relation to the perspective of the investigated issue, it is necessary to realize that in recent years, efforts to suppress tax evasion and illegal economic activity led to the promotion of the idea of eliminating cash (Cohen et al., 2020), as cash (perceived as "anonymous money"), can play the role of a facilitator of such activities. The socio-economic system is currently very dynamic; the trend of dominance of cashless payment systems and convergence to cryptocurrencies, bitcoins, etc. is evident (Gandal et al., 2018; Korauš et al., 2021). All this, in addition to the positives, also has its negatives, which causes heated debate among experts (Rogoff, 2017; Araujo, Camargo 2015). Cohen et al. (2020) even point to the un-wanted consequences of eliminating cash. In their study they construct a simple general equilibrium model in order to demonstrate how elimination of cash-paying can lead to a misallocation of resources in a naturally segmented economy.

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Conceptualization of Intercultural Competence as Part of Managerial Education

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Abstract

Research background: Academic discourse offers various definitions and models of intercultural competence. The heterogeneousness of intercultural competence conceptualization can be seen as its drawback as empirical research has to be theoretically based. In the Czech and Slovak contexts, the element of intercultural education is an integral part of management and economics study programmes. Knowledge of the specifics of one's own and foreign cultures together with cultural tolerance and knowledge of foreign languages is considered an important prerequisite for the successful employment of future managers in practice. Therefore, it is important to know what the elements constituting intercultural competence are.

Purpose of the article: The aim of the paper is to review, analyse, and summarize the most recent concepts of intercultural competence in order to excerpt its most prominent characteristics and elements.

Methods: Analytical-synthetic and comparative methods are applied to achieve the set aim.

Findings & Value added: The paper presents the overview of the main elements of intercultural competence in cognitive, affective, and behavioural dimensions to find possible discrepancies in current interpretation in academic literature. The paper represents an opportunity to identify and synthesize current research in the field including the Czech and Slovak academic discourse.

Keywords: intercultural competence, conceptualization, intercultural competence models, cognitive, affective, behavioural

JEL classification: Z1, Z13

1. Introduction

Demographic, economic, political, and technological changes create a world dominated by cultural differences in a global environment (Osler, 2020; Thesing et al., 2021; Negedu & Ojomah, 2021). There is a growing need to understand the importance that culture plays in communication and to learn how to function effectively in this environment (Lustig & Koester, 2010). Although the emergence of intercultural communication as a process dates back to the origins of human civilization (Průcha, 2010), its more systematic scientific exploration began in the mid-20th century and is associated with interdisciplinary collaboration between linguists (such as G. Trager and R. Birdwithstell) and anthropologists (such as E. T. Hall). Around the same time, in 1959, Robert White identified the human trait, which was named "competence" and from the 1970s, the so-called competency approach to selecting candidates for jobs began to be applied (Kubeš et al., 2004). The first competency assessment programme was developed in the 1970s to distinguish successful managers from unsuccessful ones (Kubeš et al., 2004, p. 20).

From the 1970s to the 1990s, several descriptions of competences (ranging from generic to specific) and more than 200 competence models have been developed (Kubeš et al. 2004, p. 21). The concept of intercultural competence was also developed in this period. At present many authors (Wang, 2020; Yurtsever & Özel, 2021; Kalaja & Pitkänen-Huhta, 2020; Pondelíková, 2022) focus in their research on the development of models of intercultural competence. The paper presents an overview of the main elements of intercultural competence in cognitive, affective, and behavioural dimensions to find possible discrepancies in current interpretation in academic literature. The aim of the paper is to review and

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summarize the most recent concepts of intercultural competence in order to excerpt its most prominent characteristics.

1.1 Terminological Peculiarities of Intercultural Competence

There are several aspects to be addressed before proceeding to the models' analysis. There is no homogeneous approach to the concept of intercultural competence. It is also caused by various terminological differences, such as: *inter-*, *multi-* (Hladík, 2010; Kostková, 2013), *trans-* or *cross-cultural* (Stone, 2006), *competence* vs. *competency* (Hladík, 2010; Kostková, 2012), or *competence* vs. *effectiveness* (Stone, 2006).

There is a problematic use of the prefix with *cultural* in the context of the study of effective communication in intercultural setting. Hladík (2010, p. 27) points out that in academic literature, both *inter-* and *multi-cultural* terms are used, while he understands them as interchangeable. Though, he admits that terminological heterogeneousness complicates the discussion. Kostková (2013) describes this distinction as being geographically based when the term *intercultural* is preferred in the countries of the European Union and the term *multicultural* is more used in the US, Canada, or Great Britain. Kostková (2013, p. 31) differentiates the terms and claims that the prefix *inter-* implies process and *multi-* implies state. Moreover, Stone (2006, p. 338-339) adds that the terms *transcultural* and *cross-cultural* are also used, but claims that in practice, these terms are "often used loosely and sometimes interchangeably. Choosing one or the other appears to be either a matter of local preference or a result of conventions specific to particular academic or vocational contexts." Similarly, Deardorff (2006, p. 247) observed "more than six different terms ... including cross-cultural competence, global competence, intercultural competence, and global citizenship" in her research of intercultural competence among administrators of higher education institutions.

Furthermore, Hladík (2010, p. 28) and Kostková (2012, p. 22-25) claim that the use of the words *competence* and *competency* in English can be also problematic. Hladík (2010, p. 28) identifies as a source of ambiguity the English distinction which is not reflected in the Czech language. Similarly, Kostková (2012, p. 22-25) claims that the concept of *competence* is used with relative variety in professional academic discourse identifying two sources of ambiguity, one is based on the differences in terminology in both, the professional literature and various fields of its application, and the second one in the English use of the concepts *competence* in the holistic meaning, and the analytical meaning of *competency*. Kostková (2012, p. 42-43) cites as examples DeSaussure's distinction of *langue* as a system of language and *parole* as a specific discourse or Chomsky's competence as a grammatical *competence* vs *performance* as a language use. In both cases, the distinction is based on the abstract vs. specific use of language, i.e. an abstract system of language vs. its specific performance in an individual's speech or discourse. In the Czech and Slovak environments, the term competence/competency also can have two different meanings.

Kubeš et al. (2004, p. 14-15) identify two meanings in foreign languages:

1. an authorization or right to do some activity – given to a person externally; this meaning is dominant in German and French;
2. an ability to carry out an activity, being qualified – the internal quality of an individual; this meaning is preferred in English, and it is this meaning that is used with managers and their abilities.

Kubeš et al. (2004, p. 19) also identify three categories of approaches to defining *competence*:

1. competences as perceivable behaviour;
2. personal characteristics as basis of behaviour;
3. individual abilities possible to turn into a performance.

In the context of terminological heterogeneousness connected with the word *competence*, Stone (2006, p. 340) chooses to talk about intercultural effectiveness where the related literature uses the term intercultural competence. Stone (2006, p. 340-341) argues that the term *competence* has been used in many different contexts and is usually connected with lower skills and abilities.

In the study, the term *intercultural competence* is used following the tradition of Deardorff (2006) who has done significant research in this area. *Intercultural competence* is also understood here as interchangeable with *intercultural effectiveness* as both aim at effective performance in intercultural setting.

1.2 Selected Intercultural Competence Definitions and Models

As Deardorff (2006, p. 258) claims, „the definition of intercultural competence continues to evolve...“ Nevertheless, there are several definitions which are up-to-date and suitable in the context of this study. Deardorff (2004 as cited in Deardorff, 2006, p. 247) postulates such a definition when she understands intercultural competence as "the ability to communicate effectively and appropriately in intercultural situations based on one's intercultural knowledge, skills, and attitudes." Deardorff's definition is currently cited by many authors (Cajander et al., 2012; Kohli Bagwe & Haskollar, 2020; Hackett et al., 2023; Hladík, 2010) as being the most comprehensive and widely accepted in the field.

In the Slovak context, Zelenková (2014, p. 14-16) defines intercultural competence as¹: "the ability to communicate and act in intercultural situations in such a way that the participants in the interaction are understood without compromising their integrity, which is manifested in the cognitive domain (manifested by a certain amount of knowledge), the affective domain (manifested by understanding, comprehension of other cultural patterns and a certain amount of empathy) and the action domain (manifested by acting and behaving in a way that takes into account cultural differences and the specificities of the different cultures)." In the Czech academic discourse, Průcha (2010, pp. 46-47) in his definition of intercultural competence focuses on its perception in the psychological and pedagogical sense: "Intercultural competence is the ability of an individual to realise effective communication and cooperation with members of other cultures using the acquired knowledge about the specificities of national/ethnic cultures and the relevant skills."

When it comes to modelling of intercultural competence, Hladík (2010, p. 29-30) talks about two approaches: prescriptive and descriptive. In prescriptive models, elements are conceptualized as typical or ideal and are general and easily applicable. The disadvantage of a prescriptive model is its normative character and the fact that it is not based on empirical data. Descriptive models, on the other hand, are based on descriptions of existing elements of intercultural competence (Hladík, 2010, p. 29-30). Kubeš et al. (2004, p. 63) identify three approaches to competence model design, i.e. prescriptive, combined, and tailored, the selection of which depends on key aims and strategies, or external factors of the selecting company.

Hladík (2010, p. 34) states that there are many models of competence which differ in elements and their mutual interaction. The most recent models of intercultural competence summarizing the development of research in the field which were selected for the purpose of this study:

- Stone's (2006) Model of Intercultural Effectiveness;
- Deardorff's (Deardorff, 2004 as cited in Deardorff, 2006, p. 254) Pyramid Model of Intercultural Competence;
- Deardorff's (Deardorff, 2004 as cited in Deardorff, 2006, p. 256) Process Model of Intercultural Competence;
- Hladík's (2010) Hierarchical Model of multicultural competences inspired by Průcha (2006).

These models can be considered prescriptive, though Deardorff's models are based on empirical data but need empirical validation (Hladík, 2010, p. 30).

Stone's (2006, p. 342-345) model of intercultural effectiveness (ICE) is based on an existing literature review. As such, it can be considered prescriptive and not based on the results of empirical research. He identified the following elements of ICE:

- emotional intelligence,
- knowledge,
- motivation,
- openness,
- resilience,
- reflectiveness,
- sensitivity, and
- skills.

These elements can be divided into three interrelated areas:

1. knowledge as prior learning;
2. skills as observable behaviour;
3. attributes specifically related to ICE, such as emotional intelligence, motivation, etc.

¹ Translated by the corresponding author.

Deardorff (2006) in her extensive research of intercultural competence asked the institutional administrators in higher education and prominent scholars in the field to define and assess the intercultural competence of students in higher education institutions. She found out that both, administrators and scholars preferred broader definitions of intercultural competence and not in connection with its specific components (Deardorff, 2006, p. 253-257). Both groups agreed upon twenty-two essential elements of intercultural competence including, for instance:

- understanding others' worldviews;
- cultural self-awareness and capacity for self-assessment;
- skills to listen and observe;
- flexibility;
- skills to analyse, interpret, and relate;
- mindfulness;
- respect of other cultures;
- cross-cultural empathy, etc. (Deardorff, 2006, p. 249-250).

Based on her previous research, Deardorff (2006) offers two models which are dynamic and incorporate the idea of intercultural competence degrees. Both models begin with attitudes and move towards interpersonal and interactional levels as internal and external outcomes constitute the degree of intercultural competence. In her Pyramid Model of Intercultural Competence (Deardorff, 2004 as cited in Deardorff, 2006, p. 254), "degree of intercultural competence depends on acquired degree of underlying elements." In her Process Model of Intercultural Competence (Deardorff, 2004 as cited in Deardorff, 2006, p. 256), "degree of intercultural competence depends on degree of attitudes, knowledge/comprehension, and skills achieved." The main advantages of these models are their recognition of the continuous development of intercultural competence with attitude as the most critical element.

In the context of Czech and Slovak intercultural education, there is a significant influence of Průcha's (2006) ideas of multicultural education. Hladík's (2010, p. 35) Hierarchical Model of multicultural competences was inspired by Průcha's (2006, p. 17) views on multicultural competence as being based on a formula: "multicultural education = learn to know → understand → respect (other cultures, ethnicities, nations) → coexist and cooperate"². Hladík (2010, p. 34-35) understands it as implying hierarchy caused by the linking. He adds the three most frequent elements of multicultural competence and offers a hierarchical model the basis of which is knowledge creating the foundation for attitudes. Knowledge is at the same level as cognition and leads to attitudes. Understanding and tolerance are parallel to attitudes. The model aims at cooperation. Hladík (2010, p. 34-35) admits that the relationships among the elements of multicultural competences are not scientifically explained which is also the usual drawback of other models.

2. Methods

The paper presents a comparative analysis of selected models. Analytical-synthetic and comparative methods are applied to achieve the set aim of identification and summarization of the main concepts of intercultural competence and its most prominent characteristics. The results will be graphically processed into a table of identified elements (Table 1).

3. Results

All the definitions and models focus on knowledge, attitudes and external/visible outcomes which can lead to internal changes necessary for effective communication and mutual understanding in intercultural setting. All the models include elements of knowledge, skills as observable/behavioural outcomes, and also attitude as internal motivation. These elements of intercultural competence can be classified as cognitive, affective, and behavioural aspects. The difference among the selected models is in the mutual relations among these elements. Pyramid Model of Intercultural Competence (Deardorff, 2004 as cited in Deardorff, 2006, p. 254) and the Hierarchical Model (Hladík, 2010) are layered, starting with attitudes as their bases. The Model of Intercultural Effectiveness (Stone, 2006) and Process Model of Intercultural Competence (Deardorff, 2004 as cited in Deardorff, 2006, p. 256) focus more on interrelations or interactional relations as a process.

² Translated by the corresponding author.

what the elements constituting intercultural competence are. Therefore, a comparison of the most recent models was offered. Knowledge, attitudes, and behaviour were recurring elements. These can be categorized into cognitive, affective, and behavioural aspects. The differences could be spotted in the hierarchization or its absence. The results of the study are applicable in the managerial education context.

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Navigating the Evolution of Managerial Communication: Comparative Analysis of Anglicism Domestication in Economic Texts across Selected Slavic Languages

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Abstract

Research background: In our article, we discuss the professional terminology of selected Slavic languages - Slovak, Polish, Czech and Serbian. The paper focuses on borrowed language elements from English in economic texts. We examined and compared the degree of their domestication in the target Slavic languages.

Purpose of the article: The article compares economic terminology in related Slavic languages, focusing on intercultural communication. Effective cross-cultural management requires awareness of partner cultures and adept use of professional vocabulary, including Anglicisms. The study emphasizes integrating native equivalents with Anglicisms for effective communication.

Methods: Our study employs three domestication criteria for Anglicisms: 1. Original form in Slavic languages, 2. Adapted spelling, and 3. Native language equivalents. We utilize scientific methods: data compilation, lexicographic databases, comparative analysis, data coding, quantitative measurement, interpretative analysis, and cross-cultural insights.

Findings & Value added: Analyzing 100 selected anglicisms in economic texts, we found Czech has the most Anglicisms in original form (80), Serbian has the most anglicisms with adapted spelling (Latin: 48, Cyrillic: 61), and Serbian also shows the highest domestication rate (48 in both scripts). Our study sheds light on Anglicism adaptation in Slavic languages, benefiting cross-cultural business interactions. Managers understanding Anglicism dynamics can communicate more effectively with diverse stakeholders.

Keywords: manager, communication skills, intercultural communication, anglicisms

JEL classification: E00, E02

1. Introduction

Lopez Zurita (2022, p. 72) means that “the expansion and globalization of marketing and technology make lexical creation and the use of anglicisms inherent characteristics, more evident when both fields are combined in digital marketing.” The position of English in contemporary (not only) Slavic languages is undoubtedly dominant. The influence of English is related to globalisation, the contact of several cultures (and thus languages), business travel, the desire to establish oneself not only on the domestic but also on the foreign market. In the past, each of the languages under study was influenced by other languages primarily through liturgical texts. Also according to Bobáková (2009), the influence of English on other languages is striking. The author cites as a reason e.g. opening of borders.

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Currently, according to Jesenská (2014), English is mainly spread vicariously through the economic environment; it is the language of international and transnational trade. According to the author, there is no language within Europe that does not come into contact with other languages; languages are not isolated and it is virtually impossible to avoid any cultural, social or commercial contact, be it cultural, social, commercial, etc.

Another important factor in the penetration of English expressions into other languages is the number of foreign companies operating in 'our' territory. Linked to this is also the vocabulary of the English language, which was and is rich in new terms for which the target language (in our case, the Slavic languages under study) has no adequate equivalent.

In our paper we focus on the comparison of dynamic processes within the selected Slavic languages - Slovak, Czech, Polish and Serbian from the aspect of intercultural communication.

1.1 Intercultural communication

Intercultural communication is the process of exchanging information and ideas between individuals from different cultures. It is a complex process that requires an understanding of cultural differences, language proficiency, and communication styles (Gudykunst & Kim, 2003). Effective intercultural communication is essential for building relationships, resolving conflicts, and achieving goals in diverse settings.

One critical aspect of intercultural communication is nonverbal communication. Nonverbal cues, such as facial expressions, gestures, and body language, can vary greatly across cultures and can significantly impact the meaning of a message (Gudykunst & Kim, 2003).

Another important thing to consider is the proximity of languages. The closer the languages, the higher the mutual intelligibility. Some Slavic cultures, such as Bosnia and Herzegovina, share similar communication styles and have mutually intelligible languages such as Serbian, Bosnian, and Croatian (Kordić, 2017). The proximity of these languages makes intercultural communication very simple.

Language proficiency is another important factor in intercultural communication. Individuals who are not proficient in a language may struggle to understand and express themselves effectively, leading to miscommunications and misunderstandings (Gudykunst & Kim, 2003). It is essential to recognize the limitations of language proficiency and to use appropriate strategies such as simplifying language, using visual aids, and using translation services if necessary.

Cultural values and beliefs also play a significant role in intercultural communication. For example, the value placed on collectivism versus individualism can impact communication styles and expectations (Hoffmanová & Kuchařová, 2020). Similarly, cultural differences in power distance, uncertainty avoidance, and masculinity/femininity can also affect communication styles (Hofstede, 2001). In the context of Bosnia and Herzegovina, collectivism is a prevalent cultural value, and communication is often more indirect, with an emphasis on maintaining harmony and avoiding conflict (Hoffmanová & Kuchařová, 2020).

1.2 Manager communication skills

English as a lingua franca (EFL) can be understood as “any use of English among speakers of different first languages for whom English is the communicative medium of choice and often the only option” (Seidlhofer, 2011, p. 7). Due to the processes of globalization and major technological advances, English has become the lingua franca for a wide range of purposes, including international trade, communication and business. Both in private and in professional lives, people are increasingly engaged in international and multicultural environment (Charvatova, 2018, p. 631). According to Eginli (2016, p. 33), intercultural communicative competence implies the development of language fluency, understanding of culture, knowledge, attitudes and skills. Nowadays, the majority of international communication among business professionals (e.g. managers, CEOs, CFOs) is expected to be held in English, therefore in order to improve communication skills, managers not only need to perform various tasks in English (e.g. negotiations, giving presentations, telephoning) but they also need to acquire the knowledge of new vocabulary. However, as it was mentioned in the introduction, when English comes into contact with another language, the target language may borrow or adapt some words. According to Cierplich (2019, p. 109) English has become lingua franca of the business communication; she also uses the term *professiolect*, i.e. a type of language used in a particular group of professionals. In Polish such a phenomenon is referred to as *korpomowa*, i.e. the type of Polish language used in big international companies with many anglicisms and pseudoanglicisms adapted according to the Polish grammar and

spelling rules. Therefore, the process of intercultural communication is very dynamic – new anglicisms enter various languages and their usage becomes natural and common, which will be described in the next part of the article.

Knowledge of English is a must for any professional in the world. Therefore, it is systematically taught at primary, secondary and tertiary levels of schools. While at primary and secondary schools, pupils learn mainly general English, at the tertiary level, students usually continue with English for specific purposes (ESP). A more general term, referring to any language (not only English) of specific purposes is LSP (language for specific purposes).

When we teach a course of LSP, the scope of the specific content has to correspond to the aims of the course and to the language level and age of the students. Integrating specific content into the curriculum can have a very motivating effect.

In courses of business English, university students usually work with authentic texts. They develop mainly their knowledge of the specific vocabulary, but also the formal style of English which is typical of ESP.

Managerial communication skills are one of the key elements of managers' success and that is why it is a frequent topic of research. Researchers approach the issue from many different perspectives. Focus on the usage of languages is only one of them. In other works, authors investigate the relationship between communication within an organization and its impact on employees' well-being (Proctor, 2014), communication and performance, communication and organizational commitment (Bambacas, 2008, Ng, 2006), communication and work satisfaction, verbal and nonverbal communication of managers (Feyz, 2020) etc.

According to Feyz, Kiakojouri, Farrokhseresht and Aghaahmady (2020, p. 61) "are communication skills one of the key elements of managers' success and a process in which individuals share information, thoughts and feelings through the exchange of verbal and nonverbal messages."

Effective communication is critical to the success of managers in organizations. In order to effectively communicate, managers must be able to convey information clearly, listen actively, and adapt their communication style to the needs of their audience (Guffey & Loewy, 2016). The ability to communicate effectively has been shown to be positively related to job performance, job satisfaction, and overall organizational effectiveness (Al-Hussami, Darawad & Saleh, 2018).

One important aspect of effective communication is the ability to listen actively. Active listening involves paying close attention to what the speaker is saying, asking clarifying questions, and providing feedback to ensure that the message has been accurately received (Guffey & Loewy, 2016). This is particularly important in situations where the message being conveyed is complex or sensitive.

Another important aspect of effective communication is the ability to adapt one's communication style to the needs of the audience. This involves being able to understand the preferences and communication styles of others and adjusting one's own communication style accordingly (Guffey & Loewy, 2016). For example, some people may prefer direct and straightforward communication, while others may prefer a more indirect and diplomatic approach.

Research has shown that effective communication skills are positively related to job performance (Al-Hussami, Darawad, & Saleh, 2018). Managers who are able to communicate effectively are better able to convey their expectations to employees, provide feedback, and resolve conflicts. Effective communication also leads to increased job satisfaction among employees, as they feel more informed and better able to contribute to the organization (Al-Hussami, Darawad, & Saleh, 2018).

Effective communication is, therefore, a critical skill for managers in organizations. Active listening and the ability to adapt one's communication style to the needs of the audience are important components of effective communication. Managers who possess these skills are better able to convey their expectations, provide feedback, and resolve conflicts, leading to improved job performance and organizational effectiveness.

1.3 Anglicisms

All the target languages studied - Slovak, Czech, Polish and Serbian - belong to the group of Slavic languages, which are divided into East Slavic languages (Russian, Ukrainian, Belarusian), the West Slavic languages include Slovak, Czech and Polish (which also includes Lusatian Serbian and the extinct languages: Polabian and Northern Slovene) and the southern group of Slavic languages includes Serbian (along with Bulgarian, Macedonian, Croatian and Slovene). The work from which we drew information about the analysis languages, *Úvod do štúdia jazykov* (Introduction to the Study of Languages, 1984), was

published before the division of Yugoslavia and thus before the division of the Serbo-Croatian language into Serbian and Croatian. For our work, the designation of the Slavic language under study as „Serbian” is relevant, so we refer to the current designation. On the other hand, contemporary linguist J. Dudášová (2014) lists Serbian and Croatian as two separate languages. The author states that the written Serbo-Croatian language never represented a unified system throughout history. On the contrary - there have always been two variants - Serbian and Croatian. In contrast, English belongs to the Germanic languages, namely the West Germanic group (together with German, Dutch, Flemish and Frisian) (Ondruš, 1984).

As society evolves, so does language, which evolves in response to changing social events and conditions. Vocabulary is a dynamic system - some words „leave” its periphery (archaisms, historicisms), others enter it. Words that are used in the language for the first time are called neologisms. Words that occur in at least three languages are called internationalisms (Jesenská, 2014).

The adoption of words of foreign origin is a consequence of mutual linguistic contacts, their economic, political and cultural situation. The adoption of words occurs when there is a need to name new realities, when the language has no linguistic means of its own to name this new reality. In language contacts, direct or mediated acquisition of language units occurs. Language contacts are characterized by *Encyklopédia jazykovedy* (the *Encyclopedia of Linguistics*) (1993) as a situation in which two or more languages that are close to each other territorially or socially interact. In a broader sense, language contacts arise mainly in the acquisition of foreign words from other languages.

In this context, we can speak of the internationalisation of natural language. The process of internationalization is promoted by globalization tendencies, especially in the fields of economy, tourism, politics, etc. *Encyklopédia jazykovedy* (the *Encyclopedia of Linguistics*) (1993) characterizes internationalization as the most typical interlingual category, which has an impact on all linguistic levels of all languages. It most significantly affects the lexical plane - both through the adoption of names and through the emergence of new word-formation patterns, etc.

If we focus our attention on the words (i.e. meaningful units, lexemes) of a certain language, we deal with lexicology. The total list of all the lexemes of a language is called lexicon. Also, the authors of the *Oxford Concise Dictionary of Linguistics* (2005) define lexicon as a complete set of meaningful units in a language. There are several ways how the lexicon of a language is enriched. If a language takes lexemes from another language, the new items are usually called loan words or borrowings. Words which came to other languages from English are called anglicisms.

Borrowing words from other languages is a natural part of a language development. There are areas where language loans are particularly frequent. These are areas of human activity, which develop extremely fast, such as technologies, medicine, business and management etc. There is often no time for making and introducing equivalents in the given language and therefore, borrowing English words is often the only possibility.

Sometimes, several synonyms (anglicisms together with words in the home language) exist simultaneously. The preference of usage of one or another may be stylistic or purely personal. Sometimes, usage of an anglicism instead of a word in the home language may be perceived as an expression of social prestige.

1.4 Serbian digraphia

Digraphia refers to the practice of using two distinct writing systems in a language. The Serbian language is one of the few European languages that employ both the Cyrillic and Latin scripts, with their use depending on the context, personal preference, and historical background. Modern Serbian language is, thus, an exemplary case of active digraphia. (Ivković, 2013). The use of the Cyrillic script in Serbian can be traced back to the 9th century when it was introduced to the Slavic-speaking population of the Balkans by the brothers Cyril and Methodius (Pavlović, 2013). Over time, Cyrillic became the dominant script in Serbia. However, in the 19th century, with the rise of nationalism and the influence of the West, Latin script began to gain popularity. In 1868, Serbian linguist Vuk Karadžić proposed a reform of the Serbian language that included the adoption of the Latin script (Greenberg, 1998).

Today, both scripts are officially recognized and are used in different contexts. The Cyrillic script is employed in official documents, books, and newspapers, while the Latin script is more common in informal settings, such as texting, social media, and advertising (Vasiljević, 2015). Code-switching is another interesting aspect of digraphia in Serbian, which refers to the use of both scripts within the same text or conversation. For example, a person may use the Cyrillic script to write a formal email but switch to the Latin script to write a text message to a friend (Pavlović, 2013).

The phenomenon of digraphia in Serbian has also attracted the attention of scholars in various disciplines, including sociolinguistics, language planning, and cultural studies. Greenberg (1998) explored the relationship between digraphia and national identity in Serbia, while Pavlović (2013) conducted a corpus-based analysis of code-switching between the Cyrillic and Latin scripts.

2. Methods

If the target language does not have an adequate alternative to the foreign word, it will accept it into its vocabulary. Foreign words enter the vocabulary of another language first with their original spelling. After prolonged use, the foreign words become established, which is reflected in a change of spelling, e.g. management.

Jesenská (2014, p. 25) considers Anglicisms to be „direct borrowings from English, foreign words mediated by English, and hybrid words containing an English element.” When selecting Anglicisms for the database, we also considered words that were adopted from other languages and entered the investigated Slavic languages through English, e.g. the lexemes *benefit*, *franchising*, *leasing*, *tender* which entered English through French; or *marketing* - entered English from Latin; the word *management* entered the English vocabulary through Italian.

There are several ways of classifying Anglicisms - according to the form of contact and the way of pronunciation in the adopted language. In our work we have chosen the criterion of the degree of domestication of an English lexeme. From this point of view we distinguish the following (according to Jesenská, 2014):

(a) domesticated Anglicisms - they have existed in the linguistic consciousness of users for a long time and are not perceived as a foreign element; they have adapted to the orthographic and orthoepic form of our language,

b) post-gentrified Anglicisms - words that have been present in the language for 20 - 30 years. These Anglicisms already have a native orthographic form, but some users ignore this fact, e.g. *leasing/leasing*,

c) foreign words that have only recently entered our language - professional terms that retain their English orthography (in this case we can speak of internationalisms, e.g. *roaming*).

These three stages of domestication are referred to by Ološtiak (In Jesenská, 2014) as „1. integration, 2. adaptation, and 3. interference.”

In our analysis, we took note of the degree of domestication in the (written) language and chose the following categories:

1. anglicisms in their original spelling, e.g. *blog – blog*,

2. anglicisms with adapted spellings, e.g. *catalog – katalóg*,

3. words that have replaced the original Anglicism with an equivalent from the home language, e.g. *key buyer – klíčový zákazník*.

When selecting lexemes for the database, we chose a random selection of representative terms from the field of economics, taking into account the linguistic equipment of the authors. We performed the comparative analysis on a sample of 100 expressions excerpted from professional texts.

When looking for a Slovak equivalent, we proceeded as follows: first of all, we verified the occurrence of the Anglicism in the online dictionaries of Slovenská akadémia vied (the Slovak Academy of Sciences - slovník.juls.savba.sk). There we verified the spelling equivalent. In case we did not find the Anglicism, we searched for the occurrence of the lexeme in Slovenský národný korpus (the Slovak National Corpus) and the online dictionary *glosbe*, which contains a number of phrases, sentences, continuous texts and also in freely accessible professional economic texts.

When searching for Polish equivalents, we verified the existence of the lexeme in the Polish National Corpus (Narodowy Korpus Języka Polskiego - www.nkjp.pl).

When searching for Serbian counterparts, our first step was to examine the incidence of the Anglicisms within the digital dictionaries provided by the Serbian Academy of Sciences and Arts (sanu.ac.rs). If an Anglicism was not listed, we turned to the Serbian National Corpus, as well as the same online *glosbe* dictionary we used for the Slovak language.

3. Results

Among all the Anglicisms we have analysed, we have selected representative phrases to illustrate all three degrees of domestication. Here is the list of analyzed words: *back office*, *banner*, *benefit*, *benchmarking*, *blog*, *bossing*, *brainstorming*, *brand*, *briefing*, *budget*, *business*, *business intelligence*, *business plan*, *buzz marketing*, *call centre*, *cash*, *cash and carry*, *cash before delivery*, *cash flow*,

cashback, catalog, click and collect, client, cold call, consumer, CRM, crowdfunding, CSR, database marketing, deadline, dealer, design, digital marketing, dumping, e-government, e-request, e-shop, e-signature, email marketing, event, franchise, front office, fundraising, goodwill, green deal, green marketing, green washing, headhunter, high end, home office, HR, image, impact, interview, key buyer, leader, leadership, leasing, live, logo, low end, management, manager, marketing, marketing concept, marketing controlling, marketing mix, meeting, micromanagement, on line, outsourcing, podcast, portfolio, poster, PR, profit, promotion, public affairs, public relations, ranking, relationship marketing, social network, soft skills, spam, sponsoring, spot, stake holder, story, SWOT, team, teambuilding, telescript, tender, up-selling, viral marketing, webinar, webdesign, workshop.

Results for Slovak:

We also included in the analysis the double occurrence - the original spelling or the modified or new Slovak equivalent. Of the 100 English lexemes analysed, we recorded the largest group of words at the first stage of domestication - 54 words (including 12 double occurrences), a smaller group at the second stage of domestication - 32 words (including 5 double occurrences), and the smallest group of words at the third stage of domestication: 27 words (including 12 double forms).

Results for Serbian:

The number of Serbian words in their corresponding levels of domestication is as follows:

Latin first stage: 16 lexemes including double occurrences,

Cyrillic first stage: 0 lexemes,

Latin second stage: 48 lexemes including double occurrences,

Cyrillic second stage: 61 lexemes, including double occurrences,

Latin third stage: 48 lexemes including double occurrences,

Cyrillic third stage: 48 lexemes including double occurrences.

Results for Polish:

The number of Polish lexemes on the following stages of domestication:

First stage (Anglicisms in the original spelling) - 70 lexemes, including 17 double occurrences (i.e. lexemes with original spelling which are also used in Polish with adapted spelling or which have Polish equivalents);

Second stage (Anglicisms with adapted spelling) – 22 lexemes, including 5 double occurrences (i.e. lexemes with original spelling)

Third stage (Polish equivalents) – 27 lexemes, including 12 double occurrences (i.e. lexemes which are also used in Polish with original or modified spelling).

Results for Czech:

Here is an overview of the number of Czech lexemes on the following stages of domestication:

First stage (Anglicisms in the original spelling) - 80 lexemes, including 17 double occurrences (i.e. lexemes with original spelling which are also used in Czech with adapted spelling or which have Czech equivalents);

Second stage (Anglicisms with adapted spelling) – 21 lexemes, including 4 double occurrences (i.e. lexemes with original spelling)

Third stage (Czech equivalents) – 17 lexemes, including 13 double occurrences (i.e. lexemes which are also used in Czech with original or modified spelling).

4. Discussion

In some cases, we happened to find parallel Anglicisms in the texts in the original wording next to the **Slovak** equivalent, e.g. interview - interview, rozhovor. We counted each expression (both the original occurrence in the Slovak language and the Slovak equivalent) separately.

To the first group we also included e.g. the lexeme green washing, which in Slovak has the form greenwashing (i.e. only the graphic modification in the target language, not the pronunciation).

For the lexeme fundraising we did not find a stable word equivalent alongside the original word, so we included it in the first group. The following meanings were found in the texts: zhromažďovanie ekonomických zdrojov, zhromažďovanie a získavanie príspevkov a finančných zdrojov, získavanie zdrojov... (gathering economic resources, gathering and soliciting contributions and financial resources, raising resources...). Here we revealed the still unfinished process of domestication of the foreign word.

In three cases we did not find any Anglicisms or **Polish** equivalents of the following lexemes: cold call, green deal, telescript, which indicates that process of domestication has not been finished yet. These lexemes have been added to the first category (Anglicism with original spelling).

On several occasions, we discovered co-existing Anglicisms alongside their **Serbian** counterparts in their original form in the text. For instance, poster - poster, plakat. However, Serbian is unique in this group because of the dygraphia we mentioned previously. The same Anglicism - poster - can also be written as “постер”. This time, the pronunciation is the same, but because of a completely different script, we cannot count it as a fully domesticated word. This means that Serbian has a rare property where a single Anglicism can have different levels of domestication as per our definition, depending on the script one uses to write the word.

In other cases, the level of domestication is the same in both scripts. Take for example the Anglicism live - lajv/лајв, živo/живо. In both scripts, Latin and Cyrillic, both the adapted English and the native Serbian words have their variants.

People who are interested in loans in the **Czech language** have several dictionaries and other publications at their disposal (Kraus 2005, Martinová 1998, 2004). However, as this area of language develops quickly, no printed dictionary can cover all the currently used anglicisms in the Czech language. Therefore, to verify the correct form of each anglicism, we consulted the online Czech National Corpus (www.korpus.cz). This is an electronic collection of authentic texts (written or spoken) easily searchable for various language phenomena and to display them in their natural context.

Conclusion

In our article we compiled a database of 100 representative Anglicisms from economic texts in each of the four target languages: Slovak, Polish, Czech, and Serbian. These Anglicisms were chosen based on their relevance to the field and the linguistic expertise of the authors. We utilized online lexicographic databases, linguistic corpora, and language resources specific to each target language. These sources included national language academies, language corpora, and online dictionaries. This allowed us to verify the existence of Anglicisms, their spellings, and potential native equivalents.

The study provides a comprehensive insight into the incorporation and domestication of Anglicisms taken from various economic texts of selected Slavic languages, namely Slovak, Polish, Czech, and Serbian. Our research identified distinct levels of borrowing and adaptation from English, with a clear delineation found between Anglicisms maintained in their original form, those with adapted spelling, and words that have been replaced by native language equivalents.

After collecting and categorizing the data, we conducted an interpretative analysis to draw meaningful conclusions from the observed patterns. We interpreted the findings in light of cultural, historical, and linguistic factors that influence the domestication of Anglicisms in each language.

We found that the highest prevalence of Anglicisms in their original form was found in the Czech language, whilst Serbian language showcased the most Anglicisms with adapted spelling. Conversely, the lowest rate of domestication was observed in the Serbian language, as well, where native equivalents were used more frequently instead of original Anglicisms. This is of no particular surprise given cultural differences, historical background as well as geographical proximity.

These findings underscore the importance of understanding the dynamic evolution of professional terminology in different languages, particularly in the context of economic discourse and managerial communication. Intercultural communication, and the ability to navigate language nuances and cultural specificities, emerges as a critical skill in modern managerial communication.

Understanding the degree of Anglicism domestication in different languages, therefore, has practical implications. It helps managers to leverage an appropriate professional vocabulary in a foreign language, enabling them to communicate effectively across cultural boundaries.

This study also promotes the effective use of Anglicisms and their native equivalents, reaffirming that where a suitable native equivalent exists, it should ideally be employed to facilitate cross-cultural understanding.

Our findings contribute to a better understanding of the dynamic interplay between languages in professional lexis, with significant implications for intercultural communication in the field of economics. Future research could expand upon this work by exploring Anglicism domestication in other professional fields and languages.

The paper underscores the importance of effective communication skills for managers. By studying the incorporation of Anglicisms, managers gain valuable knowledge about the usage of professional vocabulary in both native and foreign languages. This knowledge empowers them to communicate proficiently with international counterparts, thereby enhancing their credibility, rapport-building, and negotiation prowess.

In the realm of marketing, understanding the degree of Anglicism domestication can influence branding and advertising strategies. Businesses operating in Slavic markets can use this knowledge to make informed decisions about whether to use Anglicisms or their native equivalents in marketing campaigns. A nuanced approach to language adaptation can help companies resonate more effectively with their target audiences and build stronger brand connections.

The paper's findings contribute to the realm of cross-cultural management. In an increasingly globalized business landscape, managers are tasked with overseeing teams and projects spanning multiple countries and languages. By comprehending the varying levels of Anglicism integration in different Slavic languages, managers can foster more inclusive and cohesive team dynamics, ensuring effective communication and collaboration.

The paper contributes to academic literature by offering a comprehensive analysis of Anglicism domestication in specific Slavic languages. Researchers, linguists, and academics in the fields of linguistics, communication studies, and cultural studies can use this work as a foundation for further research into the dynamics of language adaptation, cross-cultural communication, and linguistic trends in professional fields.

The combination of these research methods allowed the authors to comprehensively analyze the phenomenon of Anglicism incorporation and domestication within the context of business, management, and marketing in the selected Slavic languages. The study's robust methodology contributes to a nuanced understanding of linguistic borrowing, cultural influences, and intercultural communication dynamics in the professional domain.

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