THE POPRAD ECONOMIC AND MANAGEMENT FORUM 2021

Peter Madzík and Mária Janošková (editors)

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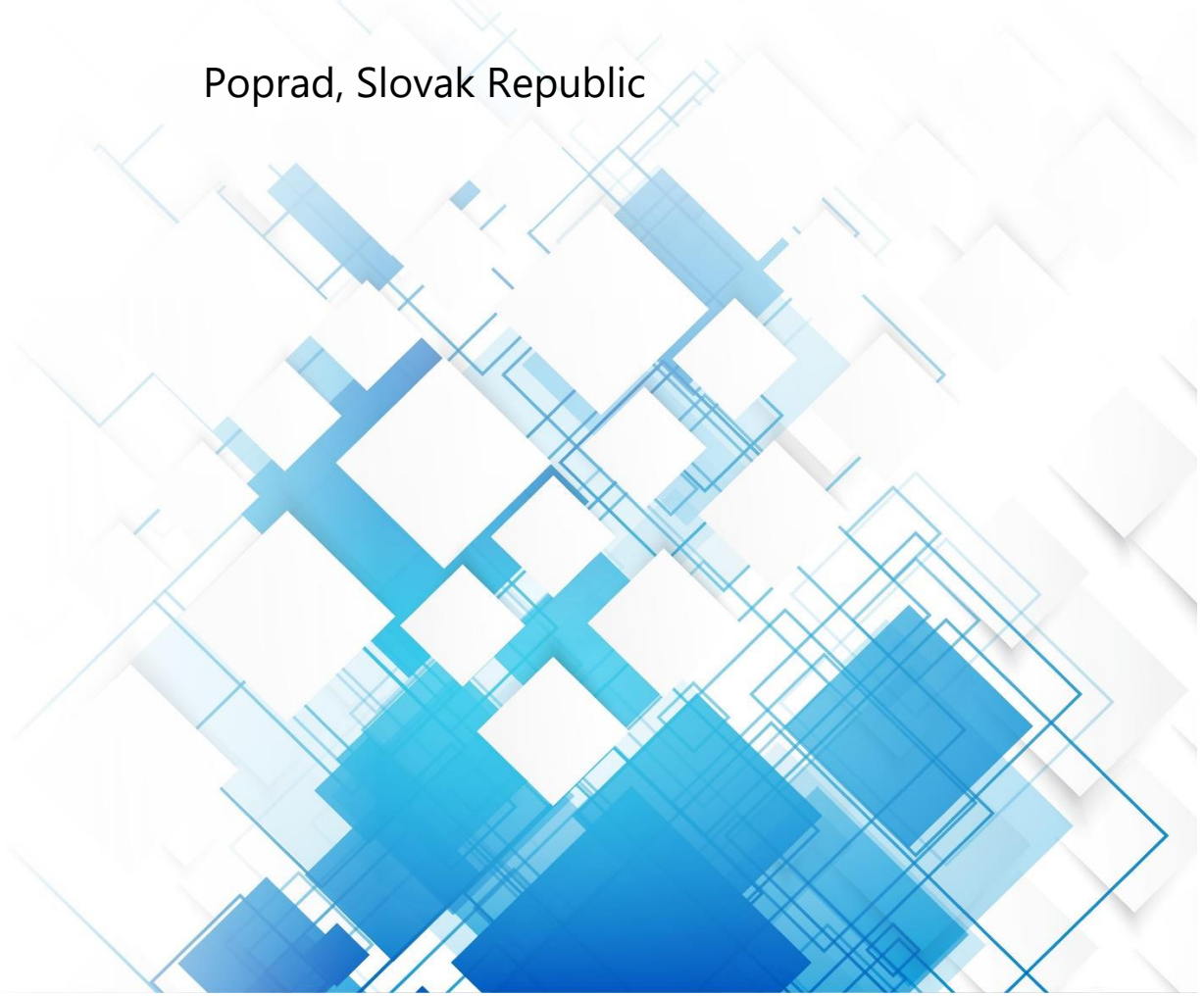

Faculty of Education
Catholic University in Ružomberok

and

Faculty of Management
Comenius University Bratislava

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3rd PEMF2021 conference is devoted to the presentation of current problems, trends and challenges in the field of theory and practice of management of the business and non-business entities in the domestic and international environment. Exchange of actual theoretical and practical knowledge resulting from the area of holistic management is required. A wider public platform will contribute to fulfilment of the idea of meaningful cooperation of theory and practice, higher quality of university programmes of studies, networking and mutual positive enrichment of practitioners, scientists and educators and last but not least students as well.

The conference is divided into three topical areas:

- Trends of Management and Marketing in the Theory of Business and Practice
  - current issues and trends in the development of management and marketing,
  - Industry 4.0 and its impact on changes in lifestyle, work and relationships,
  - optimization and business process management systems,
  - human resource management,
  - socially responsible business,
  - international management and business.
- Economics and the entrepreneurship in the era of digitalization (part of this topic area is the result of solving the project APVV-19-0581 Cross-generational entrepreneurship in Slovakia in the era of digitalization: pragmatic approach)
  - current issues and trends in the development of business economics,
  - the impact of digital transformation on business,
  - support and development of information and communication technologies for business.
- Changes in business management in the context of Industry 4.0 (part of this topic area is the result of solving the project APVV-17-0656 Transformation of Paradigm in Management of Organizations in the Context of Industry 4.0)
  - digitization and digital transformation of companies,
  - business readiness for Industry 4.0,
  - new approaches to management and organizational culture (agility, flexibility, teal-organization,
  - Industry 4.0 and its impact on changes in lifestyle, work and relationships,
  - the impact of digitization on business,
  - disruptive innovation and disruptive change management,
  - work virtualization and new challenges in human resource management.

Conference website:

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Department website:

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SESSION C: CHANGES IN BUSINESS MANAGEMENT IN THE CONTEXT OF INDUSTRY 4.0

Foreword

The International Scientific Conference has been organized since 2008 by the Department of Management, which is the part of the Faculty of Education of the Catholic University in Ružomberok. This is the third time, when it is organized under the integrated name **The Poprad Economic and Management Forum 2021**. During the history of the Management Department three conferences were organized:

- International Scientific Conference - **The Messages of John Paul II. in economics, management and human life** (1st - 9th year in 2008 - 2016)
- International Scientific Conference - **A knowledge-based organization in the period of globalization and internationalization** (1st - 6th year in 2009-2014)
- International Scientific Conference - **Marketing Trends in the Knowledge Society** (1st - 4th year in 2011-2014)

During this period, the external environment that formed the university education changed significantly and this influenced the strategic decision of the Department of Management to organize one integrated conference from 2017. The PEMF (Poprad Economic and Management Forum) conference is being held for the third time in a row under this unified name. Previous years of PEMF have focused on "Trends in Quality of Work, Production, Service and Life" (PEMF 2017) and on "Current trends and challenges in businesses management" (PEMF 2019).

The third year of Poprad Economic and Management Forum 2021 (PEMF 2021) followed the successful two years and was aimed at the presentation of current problems, trends and challenges in the field of theory and practice of business and non-business entities management in the upcoming "post-covid" era. The conference was held on 14th October at the Department of Management in Poprad.

The conference is divided into three topical areas:

- Trends of Management and Marketing in the Theory of Business and Practice
- Economics and the entrepreneurship in the era of digitalization (part of this topic area is the result of solving the project APVV-19-0581 Cross-generational entrepreneurship in Slovakia in the era of digitalization: pragmatic approach)
- Changes in business management in the context of Industry 4.0 (part of this topic area is the result of solving the project APVV-17-0656 Transformation of Paradigm in Management of Organizations in the Context of Industry 4.0)

The first two years of PEMF were successful in terms of international participation and scientific discussions. For this reason, a closer cooperation was later established with the Faculty of Management, Comenius University Bratislava. This cooperation resulted in the joint organization of PEMF 2021. Comenius University Bratislava is the largest Slovak university with a very good international reputation focusing on social, technical, medical, philosophical and other scientific fields. Catholic University in Ružomberok, in cooperation with Comenius University in Bratislava, organized this third year of PEMF. Historically, most participants from several countries took part in this year.

The topics discussed in the presentation of papers reflect current trends and challenges in management and economics, concerning social changes related to the pandemic and the automation of production, the development of information technology, etc. We believe that this event will build on successful past years and become a suitable platform for scientific discussion, development of partnerships, and personal contacts, thus contributing to the transfer of knowledge in managerial and economic disciplines.

Poprad, 2021 October

Anna Diačiková

Chair of Organizational Committee of PEMF 2021
Department of Management
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Session A

Trends of Management and Marketing in the Theory of Business and Practice

Machiavellian manifestations and social intelligence in business behavior

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Abstract

Elements of manipulation accompany a person throughout life and affect almost all areas. The research is based on the characteristics of Machiavellianism, resp. Machiavellian personality, which is characterized by the prioritization of personal goals over generally applicable norms. The aim of the paper is to examine the differences and connections between the attributes of Machiavellian expressions, social intelligence and selected socio-demographic characteristics of respondents (gender, residence, education and age) in business behavior. The research sample consisted of 149 respondents with an average age of 31.34 years. Data were collected through a questionnaire survey using two methodologies. For the purposes of detecting Machiavellian manifestations in business behavior, it was the CASADI methodology (Calculativness, Self-Assertion, Diplomacy) and for the determination of social intelligence the MESI methodology (Manipulation, Empathy, Social Irritability). The results of the survey were evaluated by mathematical-statistical analysis in the IBM SPSS program. In all four hypotheses examined, the research showed differences in the attributes of Machiavellian manifestations and social intelligence.

Keywords: Machiavellianism; Social intelligence; Business behavior; Personality.

JEL Classification: M12, M54

Article Classification: Research article

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1 Introduction

Christie and Geis (1970) described people with strong Machiavellian traits as being focused on success in solving a problem. They solve it exclusively cognitively-strategically. They do not allow their egos to be drawn into the situation and are willing to admit their socially undesirable traits. They do not feel remorse associated with manipulation not only during manipulation, but also after it. They lack a moralizing view. They are motivated by profit. They know how to quickly evaluate an experimental situation and are sensitive to hints that could provide them with benefits. They are better at negotiating. Their focus on achieving the goal is not disturbed by emotional influences, such as the effort to act fairly. This depersonalized approach without emotional involvement allows them to strategically address situations and objectively perceive others (in order to influence them in a more targeted way). They successfully resist social influences and orient themselves rationally, not emotionally or moralizing. They initiate the creation of a social structure, which they then control. A characteristic feature of Machiavellianism is cold calculation and a manipulative approach to others. Individuals with strong Machiavellian traits use others to promote their own interests.

Dahling et al. (2009) describe Machiavellianism as a construct based on inner beliefs, values and motivations. Although it involves amoral manipulation, those who are highly Machiavellian are not constantly and actively involved in amoral manipulation. They tend to be very adaptive, and if they realize that this will accelerate their goals and interests, they can engage in pro-organizational behavior in a friendly and cooperative manner. Such manifestations of Machiavellian behavior are also pointed out by Judge et al. (2009). Machiavellianism as such speaks of the means that man chooses to achieve something.

When communicating with customers, salespeople use different procedures. Merchants find out to what extent they managed to bring the customer into a relaxed atmosphere and how deeply they trust them. The trader's self-assertion in the form of acting on the customer is reflected in the customer's acceptance or change of previous statements in response to negative feedback. If customers respond in accordance with the merchant, it is a so-called dependence of the customer on his person. The customer trusts the trader and gradually the trader begins to increase his position (Beck, 2007).

We look at the mentioned issue mainly from the point of view of goal-oriented behavior (Aarts & Elliot, 2012). Specifically, we are interested in what a person is willing to do to achieve a goal. In this context, the idea of Machiavellianism, resp. Machiavellian personality, which is characterized by the prioritization of personal goals over generally applicable norms. It is a willingness not to take moral standards into account and to see value in behavior that represents achieving a goal at the expense of others (John & Paulhus, 2009). It is not immoral in terms of manipulation and betrayal, it is a selective willingness to abandon moral standards when the opportunity for profit arises (Dahling, Whitaker & Levy, 2009). The idea of utilitarianism, resp. prosperity, which says that what is most beneficial is the most beneficial (Mill, 2010). According to this approach, the appropriateness of behavior is determined by the positive or negative value of the consequences of the behavior and not by the nature of the actions that led to them (Broeders et al., 2011).

The following four factors are often associated with Machiavellianism and success: gender, age, ethnicity, and birth order (Ricks & Fraedrich, 1999). Gable and Topol (1991) showed a partial connection between gender and Machiavellianism. Age is considered an important variable of success, and research has shown that younger managers are more Machiavellian than older managers (Lumpkin & Rawwas, 1991).

Research by Ricks and Fraedrich (1999) suggests that gender is a modifier of sales volume, with older, more experienced women selling at higher volume levels.

A number of definitions of manipulation enable its broad examination and understanding within the work process. Elements of manipulation accompany a person throughout life and affect almost all areas.

2 Material and methods

The aim of the research was to identify and analyze the differences and connections between the attributes of Machiavellian expressions, the attributes of social intelligence and selected socio-demographic characteristics of respondents in business behavior. Four hypotheses were established:

- Hypothesis 1: *We assume that there are statistically significant gender differences in selected attributes of Machiavellian expressions and selected attributes of social intelligence.*
- Hypothesis 2: *We assume that there are statistically significant differences in selected attributes of Machiavellian expressions and social intelligence between urban and rural areas.*
- Hypothesis 3: *We assume that there are statistically significant differences in selected attributes of Machiavellian expressions and social intelligence within the highest achieved education of respondents.*
- Hypothesis 4: *We assume that there are statistically significant relationships in selected attributes of Machiavellian expressions and social intelligence in terms of age.*

The first methodology used was designed for the purpose of detecting Machiavellian manifestations in business behavior. Three factors were extracted by factor analysis: calculativness (CA), self-assertion (SA) and diplomacy (DI). The new CASADI methodology contains statements that relate to the respondent's personal opinion on manipulation between people. The individual items of the questionnaire were inspired by the publication The Prince by Niccol Machiavelli (2007). The questionnaire contains 17 items, to which the respondents answer using the scale "0 - definitely no, 1 - no; 2 – rather no than yes; 3 – rather yes than no; 4 - yes, 5 - definitely yes ".

Factor analysis using the Principal Component method with Varimax rotation extracted three factors that confirmed the existence of the presumed factor structure of Machiavellian manifestations in business behavior. These factors were characterized by Frankovský et al. (2017) as:

1. *Calculativness* **–** respondents who score higher in this factor are more convinced that people's control must be maintained at all costs. These respondents hold the view that it is necessary to tell others what they want to hear and that it is necessary to gain knowledge so that they can be used to control others. Calculating people are of the opinion that when two competitors compete, it is necessary to recognize who the victory is more beneficial for them, and in any case it is beneficial to base their power on the control of other people. Cronbach's alpha: 0.760.
2. *Self-assertion* – respondents who score higher in this factor are characterized by the fact that they believe that only such a person is reliable, who relies on himself and on his own strength. A successful person must always keep in mind that he must avoid allies stronger than himself. This factor also adheres to the view that whoever helps another to seize power cuts the branch on which it sits., and then the one who wants to stay in power must consider all the necessary tough

measures in advance and take them all at once so that he does not have to return to them later. Cronbach's alpha: 0.521.

3. *Diplomacy* – respondents who score higher in this factor are characterized by the fact that they are characterized by a constant collection of information that can later be used for their own benefit. Skillful diplomacy is used to control others, and false and indirect communication is preferred. Respondents surround themselves with capable people and society in general and show them generosity and recognition at the right time. Cronbach's alpha: 0.696.

The second methodology used, MESI, designed to determine social intelligence based on a psychometric approach, is a developmental continuation of the EMESI methodology (Frankovský & Birknerová, 2012). It was inspired by the PESI methodology developed by Kaukiainen, Björkqvist, Osterman, Lagerspetz and Forsblom (1995). This methodology was developed for students or their teachers and examined the degree of perception of social intelligence as a performance characteristic. It contained 10 items and its internal consistency (Cronbach alpha) was 0.90. The MESI methodology contains 21 items, which are assessed on a 5 - point scale (0 - never, 4 - very often). Factor analysis (Principal Component Analysis with Varimax rotation) extracted 3 factors of social intelligence, which Frankovský and Birknerová (2014) named:

- *Manipulation* - people who score higher in this factor are able to persuade others to do what they need from them. They know how to use them to their advantage and persuade them to stand by them. They also use lies for their own benefit. Cronbach´s alpha: .854.
- *Empathy* - higher scoring individuals in this factor know how to recognize other people's intentions, feelings and weaknesses. They can adapt to new people, estimate their wishes and at the same time they are able to fulfill these wishes. Cronbach´s alpha: .783.
- *Social irritability* - people who are characterized by a higher score in this factor are nervous about contact with other people. The feelings of others drive them crazy, adapting to other people makes them difficult. Weaknesses and desires of others distract them. They make them nervous who are willing to do anything for them. Cronbach´s alpha: .716.

We verified the established hypotheses through descriptive statistics and statistical analysis in the IBM SPSS statistical program.

The research sample consisted of 149 respondents. The average age of the respondents was 31.34 years (standard deviation was 9.848 years, range 18-65 years) and in terms of gender were 87 (58%) women and 62 (42%) men. According to residence, 103 (69%) respondents were from the city and 46 (31%) from the countryside. In terms of education, 59 (40%) respondents had a secondary education and 90 (60%) respondents had a university degree.

3 Results

The first hypothesis assumed the existence of statistically significant gender differences in selected attributes of Machiavellian expressions and selected attributes of social intelligence. To verify it, we used the mathematical-statistical method t-test (Table 1).

Table 1 Gender differences in selected attributes of Machiavellian expressions and attributes of social intelligence; Source: own elaboration

	Gender	**Mean**	**St. Deviation**	**t**	**Sig (2-tailed)**
Calculativness	Man	2.4903	1.08804	-1.065	.289
	Woman	2.6805	1.06420		
Self-assertion	Man	2.9718	0.64672	-.675	.501
	Woman	3.0632	1.00523		
Diplomacy	Man	3.2036	0.74871	-3.944	**.000**
	Woman	**3.6537**	0.63900		
Empathy	Man	2.4816	0.55433	-.539	.590
	Woman	2.5271	0.47195		
Manipulation	Man	2.0783	0.59757	1.911	.058
	Woman	1.8489	0.79878		
Social irritability	**Man**	**2.0507**	0.60393	4.343	**.000**
	Woman	1.6453	0.52955		

The results of the mathematical-statistical analysis confirmed the existence of two statistically significant differences, namely in the attribute of Machiavellian manifestations of Diplomacy and the attribute of social intelligence - Social irritability. In assessing the Diplomacy attribute, women scored higher and were inclined to answer yes rather than no. Rather, women use skillful diplomacy to control others and prefer false and indirect communication. When assessing the Social Irritability attribute, men scored higher. Men are more often nervous about contact with other people and sometimes have difficulty adapting to others. Based on the above analyzes, we can state that the hypothesis H1sa was confirmed.

The second hypothesis assumed the existence of statistically significant differences in selected attributes of Machiavellian manifestations and social intelligence between urban and rural living. Table 2 describes the results of the t test.

Table 2 Differences between selected attributes of Machiavellian expressions and attributes of social intelligence from the point of view of residence; Source: own elaboration

	Residence	**Mean**	**St. Deviation**	**t**	**Sig (2-tailed)**
Calculativness	city	2.6835	1.06072	1.401	.163
	countryside	2.4174	1.09449		
Self-assertion	**city**	**3.1578**	0.81273	2.841	**.005**
	countryside	2.7283	0.93664		
Diplomacy	city	3.4842	0.78604	.515	.608
	countryside	3.4266	0.54809		
Empathy	city	2.4868	0.46847	-.705	.483
	countryside	2.5559	0.58572		
Manipulation	city	1.9695	0.67561	.628	.531
	countryside	1.8882	0.84053		
Social irritability	**city**	**1.9251**	0.53857	3.544	**.001**
	countryside	1.5652	0.64309		

Within the differences in terms of residence, we record statistical significance for the attribute of Machiavellian manifestations of self-assertion and for the attribute of social intelligence, Social Irritability. Higher average values were measured for

respondents from the city. The results suggest that these respondents tend to rely on themselves and their own strengths. Respondents from the city are more nervous about contact with other people than with respondents from the countryside. Hypothesis H2 was confirmed in the above attributes.

The assumption of the third hypothesis was the existence of statistically significant differences in selected attributes of Machiavellian expressions and social intelligence within the highest achieved education of respondents. Table 3 describes selected attributes of Machiavellian expressions and attributes of social intelligence between secondary and university education of respondents.

Table 3 Differences between selected attributes of Machiavellian expressions and attributes of social intelligence in terms of education; Source: own elaboration

	Education	**Mean**	**St. Deviation**	**t**	**Sig (2-tailed)**
Calculativness	secondary	2.3898	1.11258	-1.964	.051
	university	2.7400	1.03183		
Self-assertion	secondary	2.8305	0.78433	-2.234	**.027**
	university	**3.1528**	0.90775		
Diplomacy	secondary	3.4555	0.75991	-.150	.881
	university	3.4736	0.69622		
Empathy	secondary	2.4746	0.55356	-.654	.514
	university	2.5302	0.47513		
Manipulation	secondary	1.8232	0.60104	-1.750	.082
	university	2.0238	0.79446		
Social irritability	secondary	1.8814	0.45652	1.210	.228
	university	1.7698	0.66858		

Within the examined differences in terms of the highest achieved education of respondents, we record statistical significance for the attribute of Machiavellian manifestations of self-assertion. Higher average values were measured for respondents with a university degree. The results suggest that respondents with higher education tend to keep in mind that they must avoid allies stronger than themselves. For the other attributes, we did not observe statistical significance in the context of the distribution in terms of education. Hypothesis 3 was confirmed in one attribute.

The last, fourth, hypothesis assumed that there were statistically significant connections in selected attributes of Machiavellian expressions and social intelligence in terms of age. Using Pearson's correlation coefficient (Table 4), a statistically significant relationship was recorded between age and selected attributes of Machiavellian manifestations, as well as between age and selected attributes of social intelligence.

Table 4 Relationships between age and selected attributes of Machiavellian expressions and attributes of social intelligence; Source: own elaboration

		Calculativness	Self-assertion	**Diplomacy**	**Empathy**	Manipulation	Social irritability
AGE	r	.095	**- .059**	**- .203***	**- .317****	.029	.155
	p	.248	.476	.013	.000	.725	.060

* Correlation significant at the 0.05 significance level

** Correlation significant at the 0.01 significance level

As part of the study of age, statistical significance was recorded for the attribute of Machiavellian manifestations of Diplomacy and the attribute of social intelligence, Empathy. This correlation suggests that the older the respondents, the less they use false and indirect communication. At the same time, the older the respondents, the less they are able to adapt to new people. The results proved the truth of hypothesis H4.

The trader manipulator can perfectly convince others that they want what he offers them. Based on such behavior, customers orient themselves in making decisions by the wrong logic. Merchants control the power of communication and use knowledge from others, which is very beneficial for them. They remember the need to surround themselves with capable people and to show them constant praise and recognition.

4 Discussion

In the context of the topic of Machiavellianism and social intelligence, we examined the existence of statistically significant differences in selected attributes of Machiavellian expressions and attributes of social intelligence between men and women. Higher values were measured for women under the Diplomacy attribute and higher values under the Social Irritability attribute were scored higher for men. We have found that women are more likely to use skillful diplomacy to control others and tend to prefer false and indirect communication. Men are more often nervous about contact with other people and have trouble adapting to others. According to Křížková (2007), the structure of the organization and the way of working correspond to male characteristics and abilities. In her research, women described their male colleagues and their approach to work as aggressive, competitive, confident, real, calm. Subsequently, they described men as less responsible, lazier, impractical. Women characterized themselves and their way of working as emotional, systematic, communicative, practical, caring, with a sense of detail.

According to Czibor et al. (2017), by examining Machiavellian in the context of personality traits, showed differences within the genus, especially in the area of emotional regulation. In women, Machiavellianism correlated with hypersensitivity, anxiety, harm avoidance, and vulnerability. Machiavellianism in men has been associated with self-confidence, risk-taking, and an opportunistic worldview. Following on from already published findings, as well as research findings, it is possible to point out the need to analyze gender differences not only on the basis of highly generalized comparisons. Within the situational context, it is important to draw attention to social, historical and cultural contexts (Kiczková & Szapuová, 2010), but also to contexts more specifically related, for example, to the level of business, respectively job position.

By examining statistically significant differences in selected attributes of Machiavellian expressions and attributes of social intelligence in terms of residence, we found a statistically significant difference in the attribute Self-assertion and the attribute Social Irritability, where respondents from the city scored higher. These differences point to the possibility that respondents from the city find it more difficult to adapt to other people, which often causes them problems. These respondents rely on themselves and their own strengths.

Based on the results of the research, we can say that we agree with the findings of the authors, who claims that the differences between urban and rural areas are deepening. In the cities, more educated, younger and better paid people are concentrated, in the countryside, on the contrary, those who can be described as defeated in a new class division. The differences between urban and rural areas have been known since time

immemorial. Young people used to travel to college places. After starting a family, they often returned to the countryside, where life was safer and better. As a result, the most qualified did not only gather in cities. Those who live in the city today usually stay there forever.

In the context of the topic of the paper, we examined the existence of statistically significant differences in selected attributes of Machiavellian manifestations and attributes of social intelligence in terms of the highest level of education. Higher values were measured for respondents with the highest university education within the Self-Assertion attribute. We found that respondents with a university degree tend to rely on their own strengths and avoid allies stronger than themselves.

The authors Frankovský et al. (2017) are of the opinion that employees who have a university degree are less honest and do not consider lies to be unjustifiable. According to the authors, these employees tend to believe that a person should act in all circumstances, even if he is not sure that what he is doing is morally correct. Employees with a secondary education promote honesty in several cases.

An educated person differs from a manipulator in that he will never show that the other is uneducated or less intelligent. The manipulator relies on the ignorance of others and applies elements that increase his authority, whether it is education, socially recognized profession, age or experience. He is able to control people and force them to accept what he wants (Wróbel, 2008).

By examining statistically significant relationships in selected attributes of Machiavellian expressions and attributes of social intelligence in terms of age, we found a statistically significant relationship between age and the attribute Diplomacy and between age and the attribute Empathy. This result shows that the older the respondents, the less often they want to obtain information that they would later be able to use for their own benefit. With age, respondents are less likely to recognize other people's intentions, feelings, and weaknesses. According to Frankovský and Birknerová (2017), with the increasing age of employees, their preference for lying in manipulation decreases. Older employees in the work process are therefore those who act only when they are sure that what they are doing is morally correct. According to these employees, honesty is the best course of action in all cases.

Many studies point to the manipulative behavior of traders. Nazare-Aga (1999) is of the opinion that an intense attack to support negative emotions is the trader's statement that if a person does not own a product, he does not live a full life and endangers his health. It is the client's belief that by purchasing the product, they will improve and avoid possible problems. According to Taylor (2006), a businessman appeals to seniors who have health problems at their age and their health is the most valuable thing they have.

According to Vybíral (2003), the trader presents himself as the one who solved our problems and eliminates our anxiety, he is the one who helps us. In the real case, however, it is just a manipulator. Instead of finding out the facts, the data and trying to verify the information, the older person shows the attributes of emotional dependence and at the same time the tendency to make irrational decisions. We can also agree with the ideas of the psychologist Murray (2014), who presents studies according to which one primarily evaluates the success of business on the basis of personal feelings and experiences, rather than on the basis of facts and characteristics. Emotions have a strong impact on older people in particular and in some cases even determine their decisions.

In conclusion, we present the opinion of Birknerová and Frankovský (2015), who claim that people with a higher score on the scale of Machiavellism show less ethical behavior, less agree with ethical norms and codes, are more hesitant in punishing unethical behavior. They are interested in being positively perceived in the team and are

not good collaborators in situations of collective decision-making. People with higher manipulation scores are more assertive and socially intelligent.

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Growing importance of synergistic effects in the strategic management of cooperation

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Abstract

In today's dynamic and interconnected global market synergy represents a contribution to the strategic management, cooperation and competition concept. The reason of drawing attention to synergies is to achieve synergistic effects for individual interest groups. Synergistic effects create a competitive advantage for engaging entities in creating common values, whether these include conditional (objectives) or unconditional expectations (added effects) which depend on a particular cooperative case. The purpose of this paper is to highlight the most significant synergistic effects which can be achieved in a cooperation environment. Identified indicators also have a major impact on the expansion of partnership relationships within cooperative organizational forms. The research in this paper is conducted through content analysis which results in several identified qualitatively oriented categories of synergistic effects.

Keywords: Strategic management; Cooperation; Competition; Synergy; Synergy effects.

JEL Classification: J5, L1, P13

Article Classification: Case study

1 Introduction

The main starting point of the study is to create a relevant basis for the designing of strategic management elements which should establish the focus and efforts for improvement by existing businesses and their managers. It is important to draw attention to strategic management, how to organize business groups so that management can achieve synergistic effects, improve the performance, profitability and competitive ability of business groups. The success of such efforts means creating and maintaining

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synergistic effects in cooperative and competitive environments. The framework of this paper consists of a complex content analysis and an orientation analysis of the situation in the issue under consideration. It is classified into the intersection of three areas: synergy, cooperation and strategic management. The paper is enriched by the addition of a case study of the selected company and examines the situation of strategic management issues in alliances and clusters.

The scope of synergies can be observed in several well-known disciplines, if not all. Synergy is the central discipline of changing the perception of added value created by a larger number of objects (businesses, individuals, clusters, etc.). It helps methodologically with the analysis and exploration of individual synergistic phenomena, with the examination of the conditions of establishment and potential establishment of values and impacts.

"Synergistic aspects point us towards finding co-operative principles of self-regulation, ways of transitioning from lower to higher organizational levels, interconnection of various qualitatively different areas of material and spiritual world." (Ivanička, 1997) Synergy has become the focus of science only recently. According to Haken (1978), it was established in the field of physics which identifies synergy as the theory of the emergence of new cooperative structures in systems with non-linear dynamics, which cannot be obtained by simply adding together the properties of subsystems. It is further argued that synergetics itself does not exist but is associated with other sciences that bring their ideas into synergetics and are subject to different fields of study. According to Vodáček and Vodáčková (2009) synergetics refers to a discipline, which systematically deals with synergy.

This concept needs to be complemented by an assessment of an individual or a business within a co-operative relationship, when information about past behaviour, interactions and reputation is gathered for the knowledge base. Ulrich (2011) defines reputation establishment based on secondary sources. Primary resources include direct testing of an individual or past experience with the individual, with co-operation being more likely if in the past interactions it resulted in an engagement brought positive benefits to the relationship. Soviar (2013) states: "Cooperation is a complex social process. It is a behaviour that maximizes the results or benefits of the group." The objective of each cooperation is a certain contribution to one co-operating party, for both parties or for the whole community. Certain benefits are expected from the provided resources, but there is also the possibility of loss or return of the costs.

The cooperative strategy is the effort of business to realize their objectives through cooperation. It focuses on the benefits resulting from the cooperation in question. The cooperative strategy brings significant advantages such as easy access to new markets, mutual synergy and learning opportunities (Child et al., 2005; Zrakova et al., 2017; Dorcak et al., 2017). If several businesses concentrate in one area on a common objective, it is advisable to use the cooperative strategy as a means to more effectively achieve these objectives, thereby creating a synergistic effect with appropriate strategic management.

Strategy and strategic management represent the resource, which has a prerequisite for building synergies and synergistic effect in the business environment from the point of view of previously studied issues. The main identification of strategic management is its orientation and the future of the business when assessing the current state. For example, as stated by Kang and Sakai (2000): "synergy is shown in long-term interactions within international strategic alliances." It is also important not to exclude the occurrence of short-term effects, which may include partial effects, which after summarizing will represent the overall effect over a longer period of time.

The idea of M. Porter, which is confirmed by several authors such as Souček (2005), Jankal et al. (2016) and Magretta (2012), is that permanent competitive advantages can only be achieved through strategy. The success of each business is based on its strategy. This lead to the fact that a company which does not have a well-formulated strategy and a well-functioning strategic management system cannot survive in the current competitive world. Every corporate strategy is a unique creative work.

2 Material and methods

Synergy in today's interconnected market should represent a new contribution within the strategic management concept itself, as part of cooperation and competition. The essence of drawing attention to synergy is to achieve synergistic effects. Synergistic effects create a competitive advantage in creating common values, whether they are conditional (objectives) or unconditional (added effects) expectations depending on the particular case. From a complex analysis of individual cases of cooperation, it is necessary to identify the unified synergistic effect indicators.

Indicator	Indicator specification
Joint negotiation power	The common effects of business against the impacts of the environment.
Economic aspects	Economic prerequisites in relatively stable market conditions. Common interactions represented by various economic indicators such as: Economies of scale; Costs; Recombination of resources; Growth potential; Pricing; Financial and monetary indicators.
Diversification of business	Value generated by the company's internal business.
Cultural engagements	The emergence of a new culture or organizational structure.
Interactive and cooperative action between business units	The value created by links between business units.
Common behaviour and organization	The future development of the jointly generated value affects the behaviour within the group. Allocation and relocation of activities and resources of the subsystems take place within the group in favour of the overall functioning of the group's cooperation.
Competitiveness	Value generated through common interactions as part of strategies or a common strategy.
Performance management of cooperation	Monitoring through performance criteria that are current, objective, understandable and quantifiable.
Consistency between strategy and operational activities	The value of the interconnection where the strategy creates the criteria which are applied in the operating activities.
Driving force	Current incentives encouraging the emergence and progress of cooperation: alliances, strategic alliances, and other cooperative organizational forms.
Evolution	The emergence of new values or the recombination of evolutionary material (success of survival, innovation, creation of something new).

Figure 1 Indicators of synergistic effect; Source: own elaboration

Most often during cooperation the studied objects always evaluated in a certain way the results of their joint activities. Within the context of the examined environment the existence of the synergy result may be evaluated or measured by the derived indicators in the following table. The following table presents an in-depth analysis and synthesis of various authors (Vodáček & Vodáčková, 2009; Damodaran, 2005; Wind & Mahajan, 2002; Goold & Campbell, 1998; Cornig, 2006; Martin & Eisenhardt, 2002; Kaplan & Northon, 2006; Varmus et al., 2018; Hittmar et al., 2015; Dorcak et al., 2015) into uniform starting points for the subject. Figure 1 shows the identification of synergistic effects indicators (synergy quantification), which is especially needed to concretise the areas of further research. These indicators not only show how synergies can be measured or evaluated, but also the level of success of individual businesses in terms of cooperation and interaction. The evaluation of the joint result or mutual interaction has an impact on the success of the final state of synergy within the cooperative organizational forms.

Defining a narrower scope of synergy moves us further into the subject under consideration. Examined views from different scientific areas help us create a unique view for strategy review, strategic management and selected management methods, thereby increasing the chances of choosing the right elements for strategic management of a group of companies to create synergistic effects.

Identified indicators also have a major impact on the expansion of partnership relationships within cooperative organizational forms. Strategic management of cooperative organizational forms needs to achieve the full potential of cooperation. The full potential of cooperation means not only the fulfilment of expectations and goals, but also the opening of new possibilities - synergies within cooperative relationships and the emergence of a synergistic effect. Strategic business management is a tool that can deliver long-term objectives and goals. Today's business groups, such as various cooperative clusters (networks, clusters, alliances, mergers, and others), point out the need to prove long-term cooperative relationships.

3 Case study of synergistic effects in cooperations

According to Kang and Sakai (2000) strategic alliances are considered to be one of the strongest mechanisms for combining competition and cooperation and for industrial restructuring on a global basis. The formation of international alliances is accompanied by increased competitiveness in integrated global markets (partnerships of General Motors and Isuzu, Suzuki, Fuji, Toyota and Fiat, Ford and Mazda). Entering into strategic alliances includes several incentives: saving manufacturing and research costs, enhancing market presence, access to intangible assets of other businesses (managerial skills and knowledge of markets and customers). An alliance provides strategic flexibility, allowing business to respond to changes in market conditions and to the emergence of new competitors. In the technology sector, driving forces may include innovation and the development of cutting-edge technologies. In other sectors, the alliance may be more focused on conventional co-operation, such as sharing of partner sales and distribution networks. In all sectors, deregulation and liberalization of markets continue, competition is growing at international level and all this supports new and diverse business alliances. These driving forces (economic, technological and governmental factors (factors of power, governance)) form the background of international alliances. A new trend in international cooperation is to search for maximizing efficiency and profit. On the one hand, businesses create cooperative links, on the other hand the same businesses compete for customers – thus creating rival

alliances. In all this, businesses can establish conditional and unconditional synergistic effects.

Hamel et al. (1989) reviewed fifteen strategic alliances, focusing on how companies use competitive cooperation to increase (enhance, improve) their internal skills and technologies, while hampering the transfer of competitive advantages to ambitious partners. In areas requiring high investment to develop products and enter new markets, where only a few companies can stand alone in every situation. Cooperation is competition in a different form. Occasional conflicts are proof of mutually beneficial cooperation, with only a few cooperations able to maintain a steady win-win strategy. The authors further argue that cooperation has its limits, and businesses have to defend themselves against competitive compromises. For example, strategic alliances include continually evolving negotiations, the real terms of which go beyond top management agreements or goals. Learning from a partner is paramount, but each alliance is actually a window to broad partnership skills, building new knowledge through business cooperation.

Cases of cooperation are stronger than ever before, not only in the past, but mainly into the future. Strategic alliances are an example of such cooperation - an example of synergy in cooperation. Similarly, to strategic alliances, the corporate clusters are managed in terms of cooperation. The following factors influence the development and formation of business clusters: self-development, market saturation, competitive strength and changing economic environment, back-check effect, dynamic elements in the environment. Significant similarities between business clusters in terms of cooperation include the following autors Youngkun and Tianwei: duration (they only help each other at the time of threat or for a limited time); dominant individual parts (the individual leads the whole group), the internal structure (hierarchy and feedback); openness (view of members and individuals).

Danish Food Cluster

Danish Food Cluster is a member non-profit cluster for businesses, research institutions and public authorities active in the food and agriculture sector in Denmark. It features strong research, innovation and production capabilities that cover the entire food value chain. It was established in 2013. Agro Food Park is known for innovation and knowledge sharing in the fields of agriculture, food and related technologies. The cluster has more than 134 members (from businesses, consultants, through education and research institutions), employs more than 200,000 people and produces more than 20% of Denmark's total exports. It supports the visibility and growth of its members at the global level - the growth of competitiveness. Cluster focuses on organizing events, creating contacts and expanding cooperation in this sector. The objectives of the cluster also include attracting new businesses, investment, improving the living conditions of people around the world, tackling global food challenges and other cluster strategic goals. The cluster has its own organizational structure, which includes the Director (strategic objectives, reporting on functioning), and the Board of Directors (cluster representative). The entry and membership in the cluster are subject to certain fees (Danish Food Cluster, 2018).

Research, development and innovation activities are crucial for all members of the cluster and are closely linked to the cluster promotion process. The strategy consists of maximizing innovation, planning and building cluster infrastructure which supports science and research in the food and agricultural sectors. Generally, the following cluster processes form the basic strategic steps (Scott-thomas, 2013; Danish Food Cluster, 2015; Banks, 2015):

- Ensuring a cooperative environment for cluster members (networking, cooperation, organization of conferences and meetings).
- Ensuring knowledge-sharing environment (application and dissemination of knowledge, building an image of a strong partner for cooperation or investment).
- Networking among cluster members, supporting mutual co-operation. Cluster increases the competitiveness of members and ensures the conditions for information sharing and mutual co-operation.
- Promotes the visibility and growth of its members at the global level (solutions to global food challenges).
- Supporting research and development in the food industry. Maximize and share innovations. Sharing technologies through its own Agro Food Park development centre, which applies the results of research from university laboratories. Thanks to the transfer of technology, research is made more accessible not only to commercial enterprises but also to government authorities and other stakeholders.
- Cluster promotion at international level (communication, awareness). Building attractiveness as part of targeting to attract new customers, members, experts and investors. Denmark is one of the very attractive countries.

The resulting synergistic effects achieved by the common activities of cluster members include mainly: a) the increasing cluster's global competitiveness (strengthening of brand, cluster awareness and cluster visibility); b) creating new innovations; (c) improving the living conditions of people (not only in Denmark but also globally); d) increasing the pace of growth of its members (new contacts, new experiences, new knowledge); e) attracting new members of the cluster and investors.

4 Results

Strategic management in complex content analysis and the case studies of strategic alliances and the cluster has pointed to specific strategic processes focused on managers' activities. An important element of strategic management is the ability to adapt to changes in the external or internal environment of any business, and also to use opportunities to reduce the risk of threats. This implies, among other things, a need of a clearly defined strategy, objectives, and, in particular, the appropriate strategic management of such cooperative organizational forms. Based on the observed situation within the overall global environment, one of the main tasks and the sense of the corporate strategy, is the ability to compete and cooperate at the same time.

Strategic management means knowing how to make the right decisions and shift the direction of the path that will lead to success. Therefore, if we become more familiar with the conditions and links between the strategic management of the elements in creating synergistic effects - we will achieve one of the successful strategies – how to be competitive and know how to use the key competencies (key success factors). Strategic management in these cases needs to be seen as a broad range of options for addressing certain issues and objectives, ensuring competitiveness and market presence. The bases of strategic management in a cooperative environment in order to maintain and gain synergistic effects are as follows:

- Clearly defining the objective for the area of cooperation, e.g.: cost savings, new solutions, sharing resources and knowledge, and others. In order to achieve these results, it was necessary to set certain rules and conditions of cooperation, e.g.:

size of the contribution to the relationship, information sharing, education, but also profit distribution and pricing.

- Effective communication is a central element in managing cooperation between associations. Initially, it was necessary to build confidence which could lead to bilateral communication. This fostered mutual cooperation and provided an environment for exchange of information.
- Building a higher visibility (market awareness) and growth of individual cases is determined at the beginning of each relationship. It is not determined directly, but it connected with synergy.
- Creating a cooperative organizational structure of various business environments which promotes the integration of individuals (teamwork) as well as individual business units (business departments). Such integration within the organizational structure contributes to increasing the efficiency of processes, such as: production, sales, distribution, customer base expansion, support for R&D, sharing knowledge and experience of people.
- Acceptance of a culture of cooperative environment (support of mutual cooperation). Examined environments were characterized by a culture which achieved: unification of behaviour, mutual learning, strengthening of key competencies of employees and managers, teamwork focus and emphasis on staff management.
- Employee management – managers are important for sharing strategic information between employees and actively creating joint management. Their role is also to promote the tuning of culture towards shared strategic goals. Also, the determination of business-wide decision-making principles contributes to open communication and reduced misunderstandings in managing and implementing changes.

Creating and maintaining synergy is ensured by selecting the appropriate management components. These components may vary depending on the external and internal environment of the cooperation. It is necessary to rely on the condition of the uniqueness of each subject, its relationships, the current environment and the changes involved in the creation and implementation of the selected strategy. This research had the character of an introductory entry into the issue in global environment. It points to the actual state of the real situation in the field of synergistic effects in the business environment. It also confirms the importance of a deeper assessment of the strategic management of cooperative organizational forms. Further research will focus on a more detailed and more focused definition of the conditions and links of the strategic management of the elements for the creation of a synergistic effect.

5 Discussion

Pearce and Robinson (1991) point out how the conventionality of the strategic management system depends on the level of participants, responsibility, authority and decision-making. This specificity is positively correlated with costs, complexity, accuracy and planning success. Also, their research in Fortune 500 and INC 500 has produced the following result: These businesses perceive strategic management as a tool for high performance, cost efficiency, business orientation, and growing sophistication. They view this tool as critically important for their individual and corporate success.

According to the authors, strategic management should not only be based on the business's internal environment, but should also rely on external factors, analyses and

changes. Strategic management is also influenced by external actors: cooperating subjects, members of the distribution network, legal and legislative environment, environment protection, sociological and cultural aspects, and others. Thompson and Strickland (1992), characterized the main benefits of strategic business management as follows: providing a better business leadership within a critical point - what we are trying to do and what we achieve; managers' vigilance in the face of changes, opportunities, threats and business development; providing managers with the reasons to assess budget requirements for capital investment and new employees; helping to unify a large number of strategic decisions with all business managers; creating a proactive management approach and concentration as part of the decision-making in order to be reactive or defensive. The following critical elements of effective strategic management are based on the authors (Mintzberg et al., 1991; Pearce & Robinson, 1991; Thompson & Strickland, 1992) whose main research focus was strategic management:

- Formulating the vision of the business (guiding the business to its long-term objectives and goals, mission - purpose);
- Assessing the situation: creating a business profile and evaluating the external environment, as well as analysing the business's options relative to external environment (concentrating on the relationship with the competitors);
- Distribution of vision to specific goals (short and long-term objectives);
- Building and selecting strategies / partial strategies to achieve objectives (tactical coherence maintained during strategy implementation, compatibility with objectives);
- Effective and efficient implementation of the chosen strategy, the chosen path (strong and flexible in strategic manoeuvres in the allocation of resources, independence and continuity of strategic activities);
- Coordinated strategic management (a commitment to the objectives, not just their acceptance);
- Evaluation of performance and correct adjustment for the future within strategic management.

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Social Pillar of CSR in Relation to Customers in Food Enterprises in Slovakia

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Abstract

CSR stands on three pillars known as Tripple bottom line. The social pillar is one of them. Nowadays it is highly important to pay attention especially to CSR activities related to customers, as this is the way how to build brand awareness and reputation within this part of the external public. The research was conducted in 66 food enterprises in Slovakia, divided by size, that actively use and apply principles of CSR into their daily activities. The attention was paid to social pillar activities related to the customers. For statistical evaluation of questionnaire, research was used Two-sample Kolmogorov-Smirnov Z test, Exact tests, Pearson Chi-square test, Contingency coefficient C and Monte Carlo method. The results of our survey proved that the most common activity used in food enterprises in Slovakia within social pillar related to customers are: achieving high-quality standards, measuring customers´ satisfaction, loyalty program related to CSR and education of customers in the CSR area and panel discussions related to CSR. As many as 92.4% of large food enterprises reported a significant increase in the value of the company's brand and image due to the application of CSR activities and their communication as part of the company's PR. This share is declining with the medium-sized (85.2%) and the small food enterprises (68%).

Keywords: CSR; Social pillar; Customers; Food enterprises; Brand awareness.

JEL Classification: Q13, M31

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1 Introduction

Modern businesses today are made up of a large number of people with many interests and requirements. In times of recession, members of the surrounding community expect quality and a sustainable lifestyle. It is therefore essential that companies respond to individuals and groups that can create pressure and demands on companies (Carroll & Buchholtz, 2014).

Corporate social responsibility (CSR) is widely recognized as an honorary commitment to ensure lasting benefits for both business and society. CSR is becoming an important business foundation for building trust with stakeholders (Urip, 2010). Incorporating stakeholders, including customers, into business strategies is an important step toward a company's success (Weiss, 2009).

European Union considers CSR as the obligations a person or organization has towards its socio-economic context, in which people, as well as physical environment, are included when conducting any activity whose consequences will not only affect the subject who carries it out. In the case of companies, responsibility is towards all its stakeholders and the environmental footprint would be obstructed if such a company fails to its major stakeholders However, there has been scarce attention in academia and practice to CSR's influence on brand awareness (Mattera et al., 2012).

In the CSR field, Hoeffler and Keller (2002) state that brand credibility is a necessary antecedent to building brand value through social marketing, in which the essential part is customers. High company-CSR coherence improves customer attitudes towards companies because it leads them to believe that the corporate behaviour is adequate (Till & Nowak, 2000). Therefore, a good fit between the company and its CSR initiatives will be more easily integrated into customer associative networks, strengthening the perception of a positive relationship between the company and its CSR initiatives (Fiske & Taylor, 2008). In turn, company-CSR coherence strengthens the market position of the company, which is important in helping customers understand the adequacy of the company within its competitive environment, providing brand differentiation, reducing uncertainty and increasing purchase intentions (Becker-Olsen et al., 2006).

Bronn and Vrioni (2011) stated firms can increase their positive image by adopting CSR as a core corporative element and communicate this to the stakeholders.

Nowadays, based on the results of research by Polakevičová (2015), Rybanská (2015), Smutka et al. (2016) and Pérez Barea et al. (2020) can be stated, that CSR activities in relation to the success of enterprises on the market are an essential and key factor. According to Džupina (2016) and Kádeková (2019), communicating CSR activities is important to build brand value as well as the image of the company.

2 Material and methods

The attention of the submitted research paper was paid to the social pillar activities related to the customers. We realized the questionnaire research online, that had been sent to 358 food enterprises listed in the Business Register of the Slovak Republic. Managers of food enterprises were asked to answer our questions and choose all options that are used in the everyday life of their business. Total 66 food enterprises in Slovakia, divided by size actively use and apply principles of a social pillar in relation to customers into their daily activities and communicate them as a part of the strategy to build the brand and loyalty of customers. Food enterprises divided by size were as follows: 28% large

enterprises, 43% medium-size enterprises and 29% small-size enterprises. For statistical evaluation were used Two-sample Kolmogorov-Smirnov Z test, Exact tests, Pearson Chi-square test, Contingency coefficient C and Monte Carlo method. To process the statistical data was used the software IBM SPSS.

The representativeness of the sample number of food enterprises was tested by χ^2 test of good agreement (Table 1).

Table 1 $\chi 2$ test of good agreement – Representativeness of sample—Number of food enterprises; Source: own elaboration

Number of Food Enterprises	**358**
Result of the test	
Calculated value	16.05909
Table value	16.81298

Based on a comparison of the calculated values and test criteria can be stated that the sample number of surveyed food enterprises is representative on the significance level alpha 0.01.

3 Results

The results of research represent total 66 food enterprises in Slovakia, divided by size to small, medium-sized and large ones, that actively use and apply principles of CSR into their daily activities. The attention was paid to social pillar activities related to the customers. Table 2 shows the results of the Pearson Chi-square test, based on which we reject the null hypothesis of independence between the application of CSR and the size of companies.

Table 2 Results of Pearson's Chi-square test of CSR application – a social pillar in relation to customers - and the size of the food enterprises; SPSS, Source: own elaboration

	Value	df	Asymptotic Significance (2-sided)	Monte Carlo Sig. (2-sided)		
				Significance	99 % Confidence Interval	
					LowerBound	Upper Bound
Pearson Chi-Square	63.745[a]	6	0.000	0.000	0.000	0.000
Likelihood Ratio	69.972	6	0.000	0.000	0.000	0.000
Linear-by-Linear Association	46.850[c]	1	0.000	0.000	0.000	0.000

Note: a. 2 cells (16.7%) have an expected count less than 5. The minimum expected count is 2.43.
c. The standardized statistic is – 6.845.

This is because the asymptotic significance value and the significance value estimated from Monte Carlo are less than the determined alpha significance level of 0.05. Based on these facts, we can argue that in the analyzed sample of food companies divided by their size, the application of CSR and its social pillar is at different level, namely large companies apply CSR activities to a greater extent than smaller food companies.

Table 3 shows the contingency coefficient as a measure of association, the value of which is 0.581 and expresses a moderately strong relationship between the analyzed categorical variables.

Table 3 Results of Association Measures; SPSS, Source: own elaboration

	Value	Approsimate Significance	Monte Carlo Significance		
			Significance	99 % Confidence Interval	
				LowerBound	Upper Bound
Nomical by Nominal Contingency Coefficient	0.581	0.000	0.000[c]	0.000	0.000

Note: c. based on 10,000 samples tables with starting seed 1455697065

3.1 Applying CSR activities of a social pillar in relation to customers

The managers of food enterprises were asked to mark all those offered options from a questionnaire that use in their everyday business life. Based on this, the frequency of CSR application of social pillar related to customers for the analyzed sample of food enterprises divided based on the size was as follows- the largest share of mentioned CSR application in the social pillar related to customers was recorded in achieving high-quality standards in large food enterprises (92%) medium-sized food enterprises 63.3% and in small ones this share was 38.7%. Measuring customers´ satisfaction was used by 20.7% of small food enterprises, 42.2% of medium-sized and 62.2 % of large enterprises. Panel discussions related to CSR are used by 4.4% of small food enterprises, 18.9% of medium-sized food enterprises and 22 % of large food enterprises. Loyalty program related to CSR in relation to customers is used by 17.8% of small enterprises, 26.7% of medium-sized enterprises and 44.3% of large enterprises. Important was also to educate the customers in the CSR area, where this option was marked by 44.5 % of large food enterprises, 28.6% of medium-sized food enterprises and only 8.8 % of small ones. All other used activities in relation to customers within the social pillar of CSR can be seen in Table 4.

Table 4 CSR activities in relation to their customers divided by size of food enterprises; Source: own elaboration

CSR Activities Related to Customers	**Small (%)**	**Medium-sized (%)**	**Large (%)**
Achieving high-quality standards	38.7	63.3	92.0
Measuring customers´ satisfaction	20.7	42.2	62.2
Panel discussions related to CSR	4.4	18.9	22.0
Loyalty program related to CSR	17.8	26.7	44.3
Education of customers in the CSR area	8.8	28.6	44.5
Other CSR activities	3.6	9.3	16.2

Table 5 shows that in general are high-quality standards concerning building customers satisfaction used by 64.7 % of food enterprises of all sizes, followed by mmeasuring customers´ satisfaction (41.7%), loyalty program related to CSR (29.6%), education of customers in CSR area (27.3%), panel discussions related to CSR (15.1%), Other CSR activities use 9.7% of food enterprises in Slovakia.

Table 5 CSR activities in relation to their customers – general evaluation; Source: own elaboration

General evaluation of used activities- all sizes enterprises	%
Achieving high-quality standards	64.7
Measuring customers´ satisfaction	41.7
Panel discussions related to CSR	15.1
Loyalty program related to CSR	29.6
Education of customers in the CSR area	27.3
Other CSR activities	9.7

3.2 Increase in the value of the brand and the image of the company due to the application and communication of CSR activities

Table 6 illustrates the percentage shares of the increase in the value of the brand and the image of the company due to the application of CSR activities and their communication as part of the PR of the company divided according to the size categories of food enterprises. As many as 92.4% of large food enterprises reported a significant increase in the value of the company's brand and image due to the application of CSR activities and their communication as part of the company's PR. This share is declining with medium-sized (85.2%) and small enterprises (68%). By analogy, there is a decrease in the share of enterprises with their size, which are unable to assess whether the application of the mentioned activities has increased the value of the brand and the image of the company.

Table 6 Increase in brand value and image of the company due to the application of CSR activities in relation to customers; Source: own elaboration

Size of Food Enterprises	Yes (%)	No (%)
Small	68.0	32.0
Medium –sized	85.2	14.8
Large	92.4	7.6

Based on the results in Table 7, the asymptotic significance of Pearson's Chi-square test and significance value estimated from Monte Carlo simulations are higher than established at alpha significance level 0.05. It means, that the analyzed groups of food enterprises perceive approximately the same increase in the value of the brand and the image of the company due to the application of CSR activities in relation to customers and their communication as part of the company's PR.

Table 7 Results of Pearson's Chi-square test of brand value increase due to the application of CSR activities in relation to customers and their communication as part of PR and the size of enterprises; SPSS, Source: own elaboration

	Value	df	Asymptotic Significance (2-sided)	Monte Carlo Sig. (2-sided)		
				Significance	99 % Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	3.956[a]	2	0.138	0.156	0.147	0.166
Likelihood Ratio	3.850	2	0.146	0.150	0.140	0.159
Linear-by-Linear Association	3.556[c]	1	0.059	0.069	0.063	0.076

Note: a. 2 cells (33.3%) have an expected count less than 5. The minimum expected count is 2.5.
c. The standardized statistic is – 1.886.

4 Discussion

CSR is one of the most important development trends. This is because the world today faces problems and questions for which CSR is part of the answer. At the beginning of the 21st century, successful companies do not underestimate the need for social responsibility and, in their day-to-day activities, develop a variety of activities needed to solve a wide range of social problems and to improve society. More and more global corporations are publishing CSR reports and the public expects a visible initiative in the field of corporate social responsibility for enterprises of all sizes. Many enterprises use CSR to build their image, to create their brand, to increase customer loyalty.

The model proposed by Rifon et al. (2004) starts by proposing a direct relationship between company-CSR coherence and motivational attribution. In this regard, company-CSR coherence refers to customer perceptions of the similarity between the mission and goals of the company and the needs of its CSR initiatives and partners. The schema (Lynch & Schuler, 1994) and associative learning (Till & Nowak, 2000) theories traditionally explain the effects of company-CSR coherence on customer cognitive processes. According to these theories, learning is a mechanism by which customers establish relationships among concepts to produce an associative network in their memories.

Barone et al. (2000) demonstrate that customers positively perceive brands that show altruistic motivations in the support of CSR initiatives. For some CSR initiatives, however, companies might be perceived as the main beneficiaries and, therefore, exploitative. Along this line, Becker-Olsen et al. (2006) show that when a company's operations are guided by egoistic motivations, their CSR initiatives will generate a greater number of unfavourable perceptions in the minds of customers. These thoughts lead customers to question corporate motivations, and these negative attributions ultimately reduce purchase intentions. The opposite occurs when customers perceive altruistic corporate motivations

Bronn and Vrioni (2011) stated firms can increase their positive image by adopting CSR as a core corporative element and communicate this to the stakeholders.

It is more than important to communicate all CSR activities that are used and implemented in the enterprise, and share them with the customers as well as with other members and elements of the external and internal public as this represents the most suitable way how to create and maintain the image of the enterprise and increase the brand value.

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Application of multicriteria analysis of the macroenvironment for foreign market selection

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Abstract

The paper describes the application of market segmentation methods and multicriteria analysis for the selection of foreign markets for a specific product, which is the original Slovak alcoholic beverage. First, the segmentation of the global market was realized and on the basis of it, a database of 7 most suitable European countries was created. To evaluate the suitability of the export of investment capital to these countries, a multi-criteria analysis was subsequently applied, for which 7 criteria were created. These criteria were the same for all countries and cover as accurately as possible the macroeconomic and microeconomic situation of individual countries. Based on the methods of market segmentation and multicriteria analysis was created the order of suitability of countries for the selection of production of a particular product on a foreign market.

Keywords: International marketing strategy; International market selection; International market segmentation; International multicriteria analysis.

JEL Classification: D81, F21, M13

Article Classification: Research article

1 Introduction

Today, trade borders between countries are gradually disappearing, international trade is expanding, the impact of technological progress is increasing and global trade is growing. Market openness is constantly growing and companies are increasingly looking for opportunities to expand abroad.

Globalization supports the growth of exchanges of goods, services, information, integration of economic, but also political, cultural and other activities. It is very closely linked to internationalization, which ensures the penetration of businesses across the

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whole spectrum of the economy and beyond the borders of the home country. The interconnection of individual economies, the mutual overgrowth of activities contributes to the dynamics of business activity, to the development of business and to the growth of business entities, which are increasingly involved in international business and are forced to confront the increasing pressure of competition (Mura, 2019).

The internationalization of business is an extremely complex process that requires preparedness, systematic planning, adequate capital and also a little luck. Internationalization is taking place in the world economy as a result of international economic interdependence. The economic activity of one country by connecting with the outside world is reflected in the position and activities of other economies and at the same time is itself influenced by what is happening beyond its borders.

The management philosophy of companies that are oriented towards expansion into international markets must include decisions:

- on the selection of the target market,
- on forms of penetration into new markets and
- on the management of related activities.

The market environment is currently characterized by a constant process of internationalization and globalization, increasing concentration in the domestic market, close political and economic interconnections and intensifying competition. Businesses that have decided to enter the international environment must be aware not only of new and interesting business opportunities, but also of the accompanying risks that doing business in a larger, global space brings. International business is the result of processes that occur in the world economy. International business is a complex and broad activity and scientific discipline and cannot be identified with international trade. In terms of the future business activities of individual companies, international business is an extended approach to business philosophy, which gives the company new development resources (Mura, 2019).

The distance and size of our planet is no longer important, both for individuals and for business activities. Globalization and internationalization processes, intensified over the last 30 years, have generally contributed to the development of business activities outside the home country. The business entity enters the international environment, where it achieves the set goals through managerial functions. Basic managerial functions, such as planning, organizing, leading and controlling people, are performed not in a national environment, but in an international environment (Diačiková & Ľach, 2019).

The article discusses both aspects for the selection of foreign markets, namely the microenvironment and the macroenvironment, which includes knowledge of the economic characteristics of the country, its legislation, analysis of external and internal environment and analysis of the competitive environment.

2 Material and methods

Market selection decisions are one of the basic decisions of international marketing, so it is necessary to pay due attention to this process. If incorrect interpretations are made at the beginning of the decision-making process for entering the international market, then these errors will affect the whole process. The aim is to select a market with great potential and an acceptable forecast of return on investment. It depends on the nature and activities of the company, which region, country, general markets will be considered for selection. In general, however, it would be a priori to

exclude some countries from the global market at first, without analysis, rather short-sighted. Therefore, it is recommended to consider all countries when creating a basic database. The selection is approached only after segmentation. Different dimensions can be used as segmentation criteria, e.g., geographical, socio-demographic, economic, political-legal, security and other, resp. their combinations (Diačiková & Dudinská, 2007), which was applied in this article.

The problem analysis for finding the most suitable foreign market for the expansion of the product Tatratea from the company Karloff, s.r.o. was done by combining two methods, which were the segmentation method and multicriteria analysis. By applying the segmentation method were identified 7 European countries and subsequently, using multicriteria analysis was selected the most suitable foreign market for the expansion of the Tatratea product.

2.1 Market segmentation - step 1

The global environment on Earth is composed of the following parts:

- political-power environment,
- legislative and legal environment,
- natural-ecological environment,
- economic and financial environment,
- business and media environment,
- work-human environment,
- scientific and technical environment (Porvazník, 2014).

The following aspects take into account the choice of the market with three-stage sequential selection:

- *Probability analysis with pre-selection* (excludes all countries that are not possible for various reasons, e. g., a company interested only in contact with neighboring countries immediately excludes all other countries; or by evaluating its own competence and available resources; security risk is high);
- *Rough analysis with intermediate selection* - countries that have passed the first probability analysis are examined in more detail and are selected on the basis of predetermined criteria that meet the company's marketing intentions and the chosen method of entering the foreign market. As macroeconomic variables are most often used as selection criteria;
- *Fine analysis with final selection* (macroeconomic evaluations are approached by marketing and microeconomic criteria, e. g., profit, profitability, costs), (Diačiková & Dudinská, 2007).

2.2 Multicriteria analysis - step 2

Methods of decision analysis. There are several different methods that have basically the same principle - assessing several variants of solving a given problem according to selected criteria and determining the order of variants. The individual methods differ according to how the so-called the weight of the individual criteria and how the degree to which the individual variants of the solution meet the selected criteria is numerically evaluated. The selection of foreign markets must be evaluated from several points of view:

- analysis of foreign markets - macroeconomic analysis, SWOT analysis, trends, market absorption and market attractiveness,
- analysis of competition, resp. competitive environment (5 competitive forces according to Michal Porter
- supply chain analysis,
- quality of the business environment,
- quality of the macroenvironment,
- quality of life of the population, i.e., potential customers,
- evaluation of own competence and available resources,
- forms of entry of foreign investors into the market and their support,
- country security.

These aspects were specified and synthesized into criteria K1 to K7.

3 Results

Before to the penetration into the international environment, companies must perform detailed analyzes, which will become the basis for managerial decision-making on the chosen strategy of international business. Business management must evaluate the risk associated with doing business in an international business environment. Based on these facts, a decision should be made on how the business enters the international business and how it will do business in the new market (Aaker, 2008).

Also, in accordance with Hill (2013), which approaches international business holistically and points out that it is not possible to separate interacting factors, a multicriteria analysis was used in the present paper to take into account the widest possible range of relevant factors.

According to segmentation analysis (described in chapter 2), were selected 7 countries, whose characteristics and attractions relevant to the subject of business, i.e., production and sale of alcohol were summarized in table 1.

Table 1 Basic characteristics of selected countries and relevant points of interest; Source: modified by (Eriksson at al., 2016; Leifman at al. 2017)

Country	Characteristics	Interesting facts relevant to the subject of business
UK	**Population**: 67.112 mil. (2019) **State system**: constitutional monarchy **Head of state**: king **Form of government**: parliamentary democracy **Official language**: English **Currency**: pound sterling GBP	- The driver accepts an alcohol content of up to 0.8 per mille; - The country adheres to its traditions and customs, including when it comes to alcohol consumption; - The most popular is gin «Beefeater».
Czech Republic	**Population**: 10.65 mil. (2019) **State system**: democratic republic **Head of state**: president **Form of government**: parliamentary democracy **Official language**: Czech **Currency**: Czech koruna CZK	- According to OECD research, the Czech Republic was the worst of the countries surveyed in drinking alcohol aged 18-25; - Beer culture - Czechs drink the most beer in the world per capita; - The methanol case in 2012 affected alcohol consumption habits and strict legislation was adopted to control the production and quality of hard alcohol.
Denmark	**Population**: 5.806 mil. (2019)	- Alcohol consumption is allowed from the age of 16;

	State system: constitutional monarchy **Head of state**: king **Form of government**: parliamentary democracy **Official language**: Danish **Currency**: Danish krone DKK	- The national drink is beer; - The national alcoholic beverage is spicy bitter Gammel (38%); - The driver accepts an alcohol content of up to 0.5 per mille.
Germany	**Population**: 83.02 mil. (2019), **State establishment**: Federal Republic **Head of state**: president **Form of government**: parliamentary democracy **Official language**: German **Currency**: Euro EUR	- Alcohol consumption is allowed from the age of 18; - Alcohol is the biggest problem among addictive sources; - According to the WHO (2016), Germans already drink more alcohol on average than Russians.
Austria	**Population**: 8.859 mil. (2019), **State system**: democratic republic **Head of state**: president **Form of government**: federal parliamentary democracy **Official language**: German **Currency**: Euro EUR	- Consumption of wine and beer is allowed from 16 years; - Drinking and wine culture dominates, hard alcohol makes up 15%; - The trend of alcohol consumption has been declining slightly in the long run, causing a gradual shift to low-alcohol alcoholic beverages.
Ukraine	**Population**: 44.390 mil. (2019), **State establishment**: Republic **Head of state**: president **Form of government**: parliamentary democracy **Official language**: Ukrainian **Currency**: Ukrainian hryvnia UAH	- Alcohol consumption is allowed from the age of 18; - The national distillate is the colorless Horilka liqueur, usually based on fermented cereals with an alcohol content of 35% to 60%; - Hard alcohol is popular.
Sweden	**Population**: 10.015 mil. (2017) **State system**: constitutional monarchy **Head of state**: king **Form of government**: parliamentary democracy **Official language**: Swedish **Currency**: Swedish krona SEK	- One of the most taxed countries in the world at 57%; VAT 25%; - Alcohol can be bought in state-owned specialist shops for customers over 20 years of age only; - It is forbidden to consume alcohol in public; - Alcohol is usually drunk at the weekend; - Consumption of alcohol (spirits) is increasing, less beer and wine are drunk; - The national distillate is Brannvin; - Suitable replacement of Tatra water for the production of Tatratea is water from Little Rock Lake, the spring of which is at a depth of 200 m.

The following selection criteria that were relevant to the alcohol market (as of 2018) were selected for the application of the multicriteria analysis:

- **K1** - consumption of pure alcohol per person in liters;
- **K2** - number of potential consumers over 18 years of age;
- **K3** - Super index. Through this comprehensive index, the Business Alliance of Slovakia (PAS) compiles the so-called The PAS Superindex, also called the Business Environment Indices Index, which is composed of four indices: 1) the ranking of countries published by the World Economic Forum, which is created from the results of the *Global Competitiveness Index* for a specific year; 2) *Doing Business Index*, which is the ranking of countries according to business conditions and is created annually by the World Bank; 3) *Economic Freedom Index*, which

is the ranking of countries according to conditions created by the Heritage Foundation, and 4) *Corruption Perceptions Index*, which is the ranking of countries according to conditions created by Transparency International;

- **K4** - GDP in millions of USD;
- **K5** - corporate income tax (%);
- **K6** – unemployment (%);
- **K7** - minimum wage (€).

The selection criteria were assigned to individual countries, table 2.

Table 2 Summary of selection criteria; Source: (Štatistický úrad EÚ, 2018; Podnikateľská aliancia Slovenska)

Country	K1	K2	K3	K4	K5	K6	K7
UK	10,10	30 897 578	7	2 629 000	0,19	0,045	1 177,60
Czech Republic	11,91	8 672 900	30	192 900	0,19	0,029	430,23
Denmark	13,37	4 425 937	6	306 100	0,25	0,058	2 500,00
Germany	11,00	66 457 022	11	3 467 000	0,30	0,037	1 486,00
Austria	12,90	6 997 600	18	386 400	0,25	0,054	1 000,00
Ukraine	13,90	31 606 532	52	93 900	0,18	0,097	102,60
Sweden	8,70	7 918 746	5	511 000	0,20	0,071	3 828,00

In table 3 is the best size assignment of the criteria according to logical reasoning, i.e., if the criterion is as large as possible and it is the best, then it is marked ↑ and if the criterion is as small as possible and it is the best, then it is designated ↓. The table shows the values of the normalized values of the criteria for individual countries, which were obtained by comparing a specific criterion to the best value.

Table 3 Assignment of criteria size (max./min.) according to logical reasoning (↑ ↓) and value of standardized criteria values for individual countries; Source: own elaboration

Country	↑ K1	↑ K2	↓ K3	↑ K4	↓ K5	↓ K6	↑ K7
UK	0,73	0,46	0,71	0,76	0,95	0,64	0,31
Czech Republic	0,86	0,13	0,17	0,06	0,95	1,00	0,11
Denmark	0,96	0,07	0,83	0,09	0,72	0,50	0,65
Germany	0,79	1,00	0,45	1,00	0,60	0,78	0,39
Austria	0,93	0,11	0,28	0,11	0,72	0,54	0,26
Ukraine	1,00	0,48	0,10	0,03	1,00	0,30	0,03
Sweden	0,63	0,12	1,00	0,15	0,90	0,41	1,00

Table 4 Assignment of weights to criteria and value of a weighted standard value; Source: own elaboration

Country	↑ K1 (weight 0,20)	↑ K2 (weight 0,25)	↓ K3 (weight 0,15)	↑ K4 (weight 0,1)	↓ K5 (weight 0,05)	↓ K6 (weight 0,05)	↑ K7 (weight 0,20)
UK	0,15	0,12	0,11	0,076	0,05	0,03	0,06
Czech Republic	0,17	0,03	0,03	0,006	0,05	0,05	0,02
Denmark	0,19	0,02	0,13	0,009	0,04	0,03	0,13
Germany	0,16	0,25	0,07	0,100	0,03	0,04	0,08
Austria	0,19	0,03	0,04	0,011	0,04	0,03	0,05
Ukraine	0,20	0,12	0,01	0,003	0,05	0,01	0,01
Sweden	0,13	0,03	0,15	0,015	0,05	0,02	0,02

Subsequently, the weight of individual criterion was determined on the basis of long-term knowledge of the development of international markets and the principles of critical thinking. The assigned weight of the criteria was used to calculate the weight standard value, table 4.

From the data in tab. 4, the sum K of all criteria: K1 + K2 + K3 + K4 + K5 + K6 + K7 was calculated for each country individually, which is given in tab. 5.

Table 5 Sum K of country specific criteria; Source: own elaboration

Country	K = K1+K2+K3+K4+K5+K6+K7
UK	0,59
Czech Republic	0,35
Denmark	0,53
Germany	0,72
Austria	0,38
Ukraine	0,41
Sweden	0,59

The methodology of multicriteria analysis says that the most suitable is the evaluated subject, which obtains the highest value of the sum of all criteria. In accordance with this knowledge, the order of suitability of selected countries for investing in a particular alcoholic beverage was created, table 6.

Table 6 Order of suitability of countries for investment; Source: own elaboration

Country	Ranking
UK	2.
Czech Republic	7.
Denmark	4.
Germany	1.
Austria	6.
Ukraine	5.
Sweden	2.

4 Discussion

Communicated methods - segmentation analysis and multicriteria analysis were applied in the selection of further expansion to foreign markets for the Slovak family company Karloff, s. r. o., Kežmarok, founded in 2002. The company is known for its unique tea-herbal liqueur Tatratea, produced in various grades from 17% to 72% and in various flavors. The products have won a number of significant awards around the world. For the selection of a new production plant abroad, the components from which Tatratea is made were also taken into account - black tea (Indian province of Assan), suitable spring Tatra water, sugar, honey, alcohol, fruit extracts and spirits, oak shavings, natural herbal extracts and spices in different proportions. The quality of the individual components is strictly controlled and is protected by a trademark so that it is not easy to copy. The production process is similarly protected. The packaging is also original - colored glass bottles without a neck with a logo and modern printing. The popularity of the product since its launch is confirmed by the company's good economic results and growing sales.

In order for a company to be successful in foreign markets, achieve the set goals and function effectively, it should be well acquainted with the environment in which it

enters. A fundamental prerequisite for international business is knowledge of the local market in which the company wants to develop its further business. The second premise is predation, which is desirable when company penetrating the global market.

Before to the penetration into the international environment, companies must perform detailed analyzes, which will become the basis for managerial decision-making on the chosen strategy of international business. Business management must evaluate the risk associated with doing business in an international business environment. Based on these facts, a decision should be made on how (form of business) a business enters into international business and how it will do business in the new market (Aaker, 2008).

Also, in accordance with Hill (2013), which approaches international business holistically and points out that it is not possible to separate interacting factors, a multicriteria analysis was used in the present paper to take into account the widest possible range of relevant factors.

In Mura (2019) research, he states that the biggest barriers to the company's entry into international markets are considered by companies the financial demands of penetration, absence of a foreign partner, ignorance of the market, general fear of the unknown environment, language barriers, ignorance of local legislation. The applied methods and multispectral criteria were selected so as to eliminate the above-mentioned concerns as much as possible and to describe as accurately as possible the macroeconomic and microeconomic situation of individual countries.

Segmentation analysis and multicriteria analysis were also supplemented by macroenvironment analysis - STEEP analysis, which focuses on the social, technological, economic, ecological and political-legal characteristics of the market. Another analysis was a SWOT analysis, which combines the quality of the external and internal environment of the company and assumes the strategic position of the company in foreign markets. In order for the company to occupy significant leading positions in the market, resp. in order to be successful, he must also focus his orientation on the competitive environment described by Michael Porter's competitive forces. This basic model is focused on exploring customers, suppliers, established and new competitors and substitute products.

The entry of a business entity into a foreign market requires knowing the organizations operating in the market, the competitive environment, the macroenvironment, i.e., all factors that affect market conditions. The influence of factors results in an ever-changing environment that creates the rules for the functioning of the market. To determine the most suitable country in terms of evaluating the macroenvironment for the investment of a particular alcoholic product was used multicriteria analysis, which resulted in Germany as the most suitable country and the second suitable country is Sweden, respectively Great Britain.

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Reverse Mentoring as a Human Resources Marketing Tool

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Abstract

With the forthcoming generational shift, traditional mentoring has started to lose its relevance which has resulted in an increased demand for alternative mentoring models that could be used to utilise the diversity that the shift could contribute with. New perspectives of the challenges with reverse mentoring could be translated into success factors if utilising them in an efficient manner. A reverse mentoring programme could derive positive outcomes for the individual as well as for the organisation as a whole and could be used as a tool to support diversity, not only within male-dominated organisations but also within other organisations, as diversity is an everlasting topic.

Keywords: Reverse mentoring; Reverse mentorship; Diversity; Mentor; mentee; Personnel marketing.

JEL Classification: M12, O15, J20

Article Classification: Research article

1 Introduction

Nowadays success of any enterprise on the market largely depends on the level of professionalism, as well as on the technical and soft skills of its employees. National enterprises have to look closer on the problem as to the long-term employees' retention and their attraction on the labour markets. Each company have to make sure its attractiveness as an employer is strong enough internally and externally. First of al it will allow retaining top talents that have a required set of skills. Secondly it will play a vital role to significantly reduce the cost on attracting new employees and simultaneously the staff turnover.

One of the possible ways to solve this problem is the implementation of personnel marketing within enterprises. Personnel marketing is a managerial activity of enterprise aimed at meeting its needs in necessary personnel and needs of existing and potential

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employees by retaining or recruitmenting them through a set of measures ensuring attractiveness of positions.

The main purpose of personnel marketing activity is the development of enterprise's attractiveness as an employer and for this case it is neccessary to have a strategy. This strategy should take into account the expectations and needs of both potential and existing employees. Europe is aging the fastest of all continents.

According to the Institute of Financial Policy of the Ministry of Finance of the Slovak Republic (Dujava & Pécsyová, 2020) Slovakia will face significant demographic changes in the long run, which will also lead to changes in the labor market. The key factors are the gradual aging of today's people in their forties and the increase in the educational level of the population. While better education will push unemployment down in the future, the retirement of today's people in their forties will rejuvenate the labor market and increase the unemployment rate. Personnel management policy should aim at increasing the level of education and supporting flexible forms of employment, which would increase employment. In this context, the issue of reverse mentoring (mentorship), as a tool to foster diversity not only in male-dominated organizations, comes to the fore in the management of human resources.

Traditional mentoring can be defined as a relationship where a senior individual, with wisdom and experience, takes the role as a mentor for a younger less experienced individual (Harvey et al., 2009). Mentoring has been a phenomenon widely used in organisations and has been recognised as the most imperative tool for retaining and promoting workers (Bova & Kroth, 1999).

Taking the history of traditional mentorship into consideration, the understanding of the evolution of reverse mentoring can progress. In the 21st century, the relevance of reverse mentoring has increased and developed into one of the most popular alternative mentoring models (Brînzea, 2018).

The phenomenon of reverse mentoring has further become more valuable to investigate since professional careers have shifted from traditionally linear and stable into boundless and unpredictable (Arthur et al., 1999; Hall, 2002).

Chen (2013) further addresses the dynamic shift by explaining that organisations have chosen to apply alternative methods of mentorship due to the rapid changes of organisational structures and the generational shift. Continually, alternative mentoring models have become popular as a result of the growing diversity focus which demands a mix of gender, race, age, sexual orientation, as well as values and beliefs in the organisation (Lopez, 2013). Lastly and Brînzea (2018) addresses that in line with the advancing technology and with the younger generations entering the labour market, reverse mentorship could be a solution to meet the changes in the organisational environment.

However, even though multiple organisations globally have used reverse mentorship, there is still lack of information about reverse mentorship and how it could be used as a tool to foster diversity within organisations that obtain an inadequate level of it (Clarke et al., 2019; Kaše et al., 2019; Lopez, 2013).

2 Material and metods

The paper is the basis for clarifying how the reverse mentoring can be used as a tool to foster diversity not only within male-dominated organisations. Reverse mentoring is a rather new concept since now and is not widely implemented within organisations. Due to the dynamic business environment, where currently five

generations are working together, it becomes more vital to implement new strategies for understanding how to utilise the cross-generational differences in an efficient way. On the contrary, if we understand how a reverse mentoring programme could be implemented successfully in line with comprehending which challenges the organisation, this could be a tool to foster the diversity within the organisation.

Due to the lack of academic literature on this issue, we use the available data of various organizations that address the issue of Diversity & Inclusion (D & I) and also reverse mentoring. According to Krajčová et al. (2021) Diversity and Inclusion have different aspects, such as gender diversity. In Czech and Slovak companies, however, this theme is still in its beginning.

3 Results

According to Kaše et al. (2019), there is limited research about reverse mentoring and the phenomenon still needs to be explored further. Some authors mention diversity as one of the positive outcomes of the reverse mentorship, however, this has not been studied in depth (Chaudhuri & Gosh, 2012; Legas & Sims, 2011; Lopez, 2013).

Lopez (2013) expands on this by addressing that the existing mentoring literature has generally ignored the aspect of diversity linked to mentoring. However, some researchers claim that reverse mentorship can result in an increased understanding of the importance of diversity as it fosters cross-generational relationships (Chaudhuri & Gosh, 2012; Legas & Sims, 2011).

Messmer (2006) further states that a successful organisation will be the one who takes advantage of the different abilities, aspirations, and work styles that a diverse team contributes with. Along with a forthcoming generational shift in the workforce, organisations do not only need to concentrate on cross- generational wisdom sharing but also on the implementation of efficient methods of leveraging diversity within cross-generational relationships (Chaudhuri & Gosh, 2012).

Thus, traditional mentoring models have started to lose relevance and organisations are seeking for alternative mentoring models to meet the new demand of generational diversity and cross-generational learning, where it is suggested that reverse mentorship could be used (Chaudhuri & Gosh, 2012; Chen, 2013; Legas & Sims, 2011).

3.1 Definitions

Summary of the most important definitions about this issues from many foreign authors is in Figure 1.

3.2 Reverse Mentoring

The modern society's relationship to the advancement of technology is one of the reasons for the progress within the mentoring field. Generally, the younger employees in today's workforce have a more tech-savvy approach than their senior managers, and, therefore, this creates an opportunity for valuable knowledge to impart (Burdett, 2014). Harvey et al. (2009) address the fact that reverse mentorship is effective to use in a high-technology business operating in a dynamic marketplace. On top of that, reverse mentorship can be used to get a better understanding of the younger generations and their perspectives, which in turn will lead to a more profitable company due to the understanding of employees, as well as potential consumers (Harvey et al., 2009).

Table 1 Summary of definitions; Source: own elaboration

	Definitions
Baby boomers	Individuals born between 1946 and 1964 (Callanan & Grenhaus, 2008)
Cross- generational Relationships	A relationship that reinforce similarities and respects the differences of generations, as well as supports an understanding between the managerial degrees and divisions within an organization (Murphy, 2012).
Diversity	A population with multitudes of individuals with different attributes, such as gender or race (McKinsey & Company, 2015), as well as needs and values (Combs & Luthans, 2007; Page, 2011).
Generation	A generation could briefly be defined as a group of individuals that share demographics and fundamental life-events that so some extent have embodied different characteristics of a generation (Sutton Bell & Narz, 2007).
Homogenous organisation	A homogenous organisation is lacking diversity which means a lack of different individuals in term of gender, race, sexual orientation etc. (McKinsey & Company, 2015; Sullivan, 2009).
Male-dominated organisation	An organisation where the labour force has an absolute majority of men, which, in other words, means that more than 50 % of the organisation is consisting of men (Wright, 2016).
Millenials	Individuals born between 1979 and 1994 (Wey Smola,Sutton & Gephart, 2002).
Protegé	A protegé, also called a mentee, is an individual who is advised, coached, and counselled by its mentor (Broadbridge, 1999; Chao, 1997; Kram, 1983).

Table 2 Aspirations from a reverse mentoring relationship; Source: modified by (Burdett, 2014; Murphy, 2012)

The aspiration form the junior mentors	**The aspiration of the senior protégés**
• Establish their credentials with senior managers; • Evolve their mentoring capabilities; • Opportunity to influence the organisation's development within technology; • Exhibit their personal value for the organisation and get acknowledgement; • Acquire insights into the corporate management environment; • Advance their abilities of decision-making, communication and leadership skills; • Coaching of re-assessed goals and career directions; • Increase their social capital; • Relational learning;	• Advance their knowledge and skills within IT, tehcnology and gain new perspectives; • Consulting of planning and strategising; • Discover ways of how to transfer knowledge within the organisation; • Grant recongnition to junior employees skills, leadership abilities and exchange of knowledge; • Increase their social capital; • Relational learning;

According to Murphy (2012), reverse mentorship can be described as an innovative way of mentoring, where a junior employee acts as a mentor for an older

employee. The purpose of reverse mentorship is to share expertise and knowledge as well as creating a cross-generational relationship. Furthermore, reverse mentorship can be defined as a modernised and cost- effective professional development tool that benefits from building bridges between generations (Harvey & Buckley, 2002; Hewlett et al., 2009). Aspirations from a reverse mentoring relationship is in Figure 2.

Kaše et al. (2019) regarding the set-up of the mentor and the protégé argue that there are certain factors the managers need to take into consideration. When choosing an older employee for the protégé role, it is vital that they emphasise the importance of structure and interactivity where the older employee is offered continuous feedback from the manager. On the other hand, when attracting the younger employee as the role of being a mentor, the manager should address a rewarding system for their engagement in the reverse mentoring programme along with mentoring training as this will increase the younger employee to thrive (Kaše et al., 2019). The protégé should respect the skills of the mentor as well as have clear communication about the needs that the protégé have (Clarke et al., 2019). Continually, Kaše et al. (2019) emphasise the importance of both parties having an interest in the mentoring relationship as that will lead to a greater exchange and result of the mentoring.

As defined by Murphy (2012), five major antecedents could create challenges when establishing a reverse mentoring relationship:

- individual differences,
- cross-generational differences,
- reversed roles,
- frequency of interaction,
- trust and comfort.

These five challenges will be described and supported by other authors' perspectives.

1. Individual Differences

Within traditional mentorship, differences such as gender, ethnicity, and personality have always been a possible challenge for creating a successful relationship between a mentor and a mentee, thus could potentially be a challenge within a reverse mentorship as well. Individuals tend to connect with other individuals that are similar which can result in limitations within personal growth due to gender obstructions, lack of diversity, and stereotypes. These factors may become a challenge and are therefore important to consider when pairing a mentor with a mentee (Murphy, 2012).

2. Cross-Generational Differences

According to Murphy (2012), there are significant differences between the generations in regard to values, behaviour, and personality at the workplace. It is relevant to address these differences as reverse mentorship takes advantage of the similarities and differences between the mentor and mentee, who in most cases represents different generations. Utilising these differences may be relevant to understand to establish a successful and efficient reverse mentoring relationship (Murphy, 2012). Brînzea (2018) and Chaudhuri and Gosh (2012) argue that the multigenerational environment along with the advancements in technology derives new circumstances where anyone can become a student since wisdom and understanding no longer are age dependent. Harvey et al. (2009) argue that it is important to understand that a reverse mentoring relationship can be cross-generational, but that it is not invariably dependent on age, but rather on a willingness to share wisdom.

3. Reversed Roles

In a reverse mentorship, the junior employee has most likely no experience of previously being a mentor professionally. It is, therefore, highly relevant that the older protégé understands that he/she is in this relationship to learn and has to set aside the fact that they are usually the one in a leading position. Nevertheless, this may be a challenge for the older protégé. Therefore, the mentee needs to be open-minded and accessible for learning through a new perspective (Murphy, 2012).

4. Frequency of Interaction

Within all types of mentorships, time and energy need to be invested from both parties. This may be perceived as a potential challenge for a reverse mentoring relationship as the junior mentor most likely need to invest time in getting to know the organisation as well as managing multiple new job tasks. Further, it may also be a challenge for the protégé as he or she needs to find time to commit into the relationship at the same time as devoting time for the other responsibilities that he or she has at the organisation (Murphy, 2012). Cooke et al. (2017) and Lopez (2013) identifies that it takes time to build a trusting mentoring relationship and argue that it is important to invest time as it will be a crucial factor for a successful mentorship.

5. Trust and Comfort

To build trust and comfort in the mentorship, it is relevant that the mentor and protégé feel comfortable with each other. This will enable a more open environment where both parties are more confident to reflect and ask questions. According to Murphy (2012), comfort is created when the parties can relate to each other, which is commonly achieved when two individuals' personalities and identities match, for example, when they are of the same gender or race. A situation where the senior protégé questions the expertise of the junior mentor may occur, and it is, therefore, of high importance that both parties understand that the goal with the reverse mentorship is to learn from the mentor's expertise through sharing knowledge and skills to the mentee (Murphy, 2012). Cooke et al. (2017) address the importance of mutual trust and argues that it is when a friendship is created between the mentor and protégé that the opportunities within the mentoring relationship will arise.

4 Results

According to Chen (2013) and Murphy (2012) a successful reverse mentoring relationship awards both parties, both in terms of their individual learning as well as professional development. Burdett (2014) addresses that the mentoring programme can enhance the organisation through leadership development, knowledge creation and sharing, as well as networking and relationship building.

- **Outcomes for the Mentee**
  The mentee will gain knowledge as well as develop a clearer understanding of current and emerging trends (Chen, 2013; Murphy, 2012). Further, the understanding of the younger generations and their work values will progress along with the ease for the cross- generational communication (Burdett, 2014). Moreover, just like the mentor, the protégé will expand their social capital within the organisation (Lankau & Scandura, 2002). Clarke et al. (2019) highlight several

positive outcomes for the protégé such as a greater insight into the workplace, inspiration and enthusiasm.

- **Outcomes for the Mentor**
  Leadership development in the form of personal learning is one of the outcomes associated with reverse mentorship which can influence and increase job satisfaction as well as diminish role ambiguity (Lankau & Scandura, 2002). Murphy (2012) addresses that through the reverse mentoring programme, the mentor, i.e. the junior employee, is given the opportunity to display their competence, interpersonal skills, and coaching ability to their superior which may lead to a future promotion within the organisation. The mentor will also obtain essential organisational knowledge (Burdett, 2014), for instance, about informal procedures and gain a deeper understanding of the hierarchy of leadership (Murphy, 2012). Ultimately, reverse mentorship may broaden the mentor's inter-organisational network, and, therefore, increase their social capital in the organisation, which refers to the capability to have access to the resources of colleagues through social ties (Lankau & Scandura, 2002). Several of the mentioned outcomes for the mentor is supported by more recent literature by Clarke et al. (2019), where it is also addressed that the mentor will practice providing honest feedback to senior colleagues.

- **Outcomes for the Organisation**
  Murphy (2012) addresses, that reverse mentorship is an innovative approach for the talent management of the business. By taking part of the mentoring relationship, the mentor's and the mentee's interactions will increase in frequency as they meet more continually and also in quality as their participation will increase the quality and their willingness to deliver good results. This will, in turn, enhance the assessment for leadership development in terms of accuracy and reliability, as they will have more information to base their talent management decisions on. This might be imperative in regard to identifying future leadership talent for the organisation (Murphy, 2012). Reverse mentorship has been acknowledged as a technique for recruiting and retaining early-career employees. In the Millennial generation, the employees desire ways of being challenged and to feel that they are being seen along with their ideas being heard and appreciated (Meister & Willyerd, 2010). The reverse mentoring programme enables the mentor to be challenged and get appreciation while they are bridging the gap between the generations in the organisation, and finally discover individuals' incentives as well as disincentives (DiBianca, 2008).

4 Discussion and coclusion

This article presents how reverse mentoring could be used as a tool to support diversity within organisations. Divesity is also mentioned in UN Agenda 2030. (United Nations, 2015) This agenda contains 17 Sustainable Development Goals adopted by countries to end poverty, protect the planet and ensure prosperity for all. In particular, inclusion and diversity (I&D) is affected by the following three:

- Objective 5 Gender equality;
- Objective 10 Reducing inequalities;
- Objective 16 Peace, Justice and strong inspitations (Figure 3).

Figure 1 Sustainable Development Goals; Source: (United Nations, Department of Economic and Social Affairs, 2015)

As we mentioned above, reverse mentoring can simplify and increase the admission of females and minorities to employees in powerful organisational positions within the organisation. Compared to traditional mentorship, reverse mentoring enables a more diverse relationship and avoids the common biases that often occur in traditional mentorship, where mentors often choose mentee that remind them of themselves (Ragins & Cotton, 1991), or selecting the mentor/mentee with the same-sex or same-race (Gibson & Lawrence, 2010). Lastly, the organisation will acquire information in the way that junior mentors will introduce subjects from their individual perspective and experiences, representing the part of the market that organisations spend a lot of resources trying to investigate and figure out (Murphy, 2012).

The results of this paper suggest that reverse mentorship could be used to support diversity within male-dominated organisations. However, since reverse mentorship is a rather new concept, it is not widely implemented within organisations, regardless of being male-dominated or not. Due to the dynamic business environment where currently four generations are working together, it becomes more vital to implement new strategies for understanding how to utilise the cross-generational differences in an efficient way. If understanding how a reverse mentoring programme could be implemented successfully in line with comprehending which challenges the company may need to encounter when implementing it, this could be a tool to foster the diversity within the organisation. The findings could be applied to any organisation, not only a male-dominated organisation, the reason for this is because diversity is an issue that constantly needs to be improved and worked on, regardless of the type of company.

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Proposal for integrated management of creative cluster in chosen Slovak region

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Abstract

Creative potential of region is very important for its attractivity – e.g. for living, study, business, employement and tourism. Prešov region (regional level NUTS3) is composed of 13 districts (regional level LAU1), which have different roles in creative regional development (preference of technological innovations and start-ups or focusing on art, culture and history). Aim of this work is to suggest integrated model of management of creative cluster in Prešov region. Integrated management is composed of basic managerial functions (planning, organization, leadership and control) on regional and company level. These levels are connected and in this model is used systematic and project approach. Authors use these methods: analysis, synthesis, induction, deduction, comparative, abstraction and mathematical-startitical methods – e. g. indices. Benefits of this work can use potential cluster stakeholders (e. g. creative companies, public administration, universities, art, environmental and tourism organizations, regional development organizations).

Keywords: Management; Basic managerial functions; Creative cluster; Regional development; Prešov region.

JEL Classification: M13, O31, O32, R11

Article Classification: Case study

1 Introduction

The 21st century is also characterized by the shift of the workforce from industry to services, where there is an intangible factor, non-storability and dependence on human resources and their abilities, especially creativity, which is not imitable by artificial intelligence. Economist Richard A. Easterlin also described the paradox in the 1970s that

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the satisfaction of the population is independent on the size of the income. Nowadays is a transfer from material consumption towards other values such as. health, safety, justice, experiences associated with increased demand for tourism, arts and culture services, which contributes to the need to develop creativity (Kloudová et al., 2010; Wheelan, 2012; Madzík et al., 2015).

There are a large number of definitions of creativity in the professional literature. The word creativity comes from lat. "Creare" (to create, produce, ...) or "creatio" (creation). According to Ullrich (Mikuláštík, 2010), creativity is "the ability to know objects in new relationships and by an original way, to use them meaningfully, to see new problems in an unusual way where they seem to be, to deviate from habitual patterns of thinking" and creativity is a feature, that can be exist at the individual (the mental feature of the individual), at the corporate level (creativity of employees and innovations) and at the regional level (the concept of the creative economy). These dimensions of creativity need to be linked.

We know several types of creativity. The pioneer of the concept of creative economy Florida (2002) distinguishes 3 types of creativity, namely: technological, economic (resp. entrepreneurship) and artistic-cultural. The UNCTAD classification (2010) distinguishes between artistic creativity (dissemination of original ideas in the form of sound, text, image), scientific creativity (curiosity, desire to experiment and ask) and economic creativity (business ideas, inventions, patents), considering technological creativity as part of each of them.

In business practice, the evaluation of creativity is based on the use of creative methods in human resources management, product design and marketing communication, which are divided into systematic-analytical (the result is one correct solution, is based on convergent thinking, such as morphological analysis) and intuitive (The result are more correct solutions, it is based on divergent thinking, e.g. brainstorming) (Mikuláštík, 2013; Ali Taha & Tej, 2015; Madzík, 2017). In order to support innovation, it is necessary to support the process of creativity. According to Franková (2011), creativity is associated with problem identification and the generation of ideas (predominance of divergent thinking) and innovation is associated with implementation and commercial use (predominance of convergent thinking).

The highest level of creativity is the regional level. The first author, who studied the impact of creativity on economic development was the Austrian-American economist and sociologist Joseph Alois Schumpeter (1912), who was also the author of the term "innovation". The concept of the creative economy is based on the transformation of the Fordisitian economy to the post-industrial economy, in which services dominate, and therefore the human factor and the creative potential of the individual are taken into account (Florida, 2002; Daňková et al., 2010; Rehák, 2014; Kloudová, 2009). The actors of the creative economy are mainly economic subjects, intellectual centers (e.g. universities and research institutions), the creative workforce and others.

The author of this term is Howkins (2001), Florida (2002), Kloudová (2010), UNCTAD (2010), Landry (2016), Purnomo and Kristiansen (2018) and others also contributed to its definition. An important factor in the development of the creative economy is the development of services, their intangibility and dependence on human capital. Another element of the creative economy is the creative cluster based on the general characteristics of the cluster according to Porter (2005): "a geographically close group of interconnected companies and associated institutions, interconnected in specific areas that are common and complementary."

The development of the creative economy is determined by the presence of creative human capital, which Florida (2002) called "creative class" in Rise of the creative

class (super creative core - artists and scientists, creative professionals – e.g. educated experts in technology). Further analyzes of the creative class show that it is characterized by higher tolerance, mobility, interest in lifelong learning and social responsibility. The creative class is most concentrated in creative cities (Landry, 2016; Steward & Kuska, 2008).

The creative economy also includes various approaches to the classification of the creative industry, namely: Howkins model (2001), Throsby model (2001), UK DCMS model, WIPO author's model and UNCTAD (2010). The European Commission recommends using the Throsby model (Core creative arts, Wider cultural industries, Other cultural industries and Related industries) in the analysis of creative industries.

Creative potential needs to be effectively managed and directed, therefore the issue of the contribution belongs to the scientific department of Management. There are many definitions of management. Most generally, we can define this term as "human-to-human directing." because from a systemic point of view, there are other types of directing, namely: machine-machine (e. g. CAM, CAD, CIM, or computer-controlled production), human-machine (e. g. entering product parameters into a computer or production technology) or machine-human (e. g. pacemaker) (Závadský et al., 2012). The term management can have 3 different meanings, namely:

- management as a practical activity,
- management as a scientific discipline,
- management as a group of people (Sedlák, 2009; Kokavcová, 2012).

The term "management" is often identified with the process of performing certain activities or solving problems outside of economic practice (e.g. disease management = treatment, steps that a doctor and a patient should make to improve their health problem). The main part of management is basic and cross-sectional managerial functions. The basic managerial functions include:

- Planning (setting goals that should be SMART: S - specific, M - measurable, A - acceptable, R - realistic, T - timed and should not be contradictory);
- Organization (the task is to create an organization, to replace disorder with order, to create a system of hierarchical relations);
- Leadership (motivate people to set and to achieve goals in different styles - Authoritarian, Liberal, Democratic);
- Control (comparison of actually achieved results with planned ones, is a starting point for corrective and preventive activities) (Daňková et al., 2010; Antošová, 2010; Papula et al., 2017).

Cross-cutting management functions can be part of each of the basic management functions. This includes analysis, communication, decision-making and implementation (Sedlák, 2009; Daňková et al., 2010; Kokavcová, 2012; Papula et al., 2017).

If we want the overall performance of the company (or at the macro level of the region) to increase, it is essential to focus on the development of human potential, creativity and employee satisfaction. In the past, management was more focused on hard components, technology and standardization (e.g. Fordism), today companies and regional development actors are already aware that human capital is the most important asset. In the 21st century, the view of management, managers and employees is changing and therefore it is necessary that they have such professional and personal qualities that the company can gain a competitive advantage (Armstrong & Stephens, 2008; Vrábliková, 2019; Hlinka, 2014).

In case studies, Vrábliková (2019) summarized the trends of modern management in 4 main areas, as a transition:

- from reactive management (management as response to market change) to proactive management (management based on planning and anticipating market change);
- from unsystematic problem solving to systematic;
- from hard ingredients to soft ingredients (e. g. emphasis on creativity and development of human potential in innovative ways – e. g. coaching);
- from partial access to the systematic, resp. holistic (e. g. measuring financial performance vs. a comprehensive approach to performance within the Balanced Scorecard concept).

Creative potential management includes all initiatives that increase the development of creativity in the region, at different regional levels: transnational level (e. g. Green Paper: Unlocking of the potential of cultural and creative industries), at national level (e.g. Creative Industry Forum), at the regional level (in the case of Prešov region: Prešov Regional Development Agency) and at the local level (Košice ECOC 2013 - Master plan and the newly established project team Prešov CityPOint, which was established after the unsuccessful candidacy of the city of Prešov for ECOC 2026). The issue of creative economy is also associated with the emergence of many scientific research projects (VEGA, KEGA, APVV) and conferences (e.g. Why Creative Economy, 2011, Bratislava).

An important element of the creative economy concept is its measurement. The author of the 3T index (Talent, Technology, Tolerance) is Florida (2002). The index originated in the USA and has been modified several times since its inception to take into account specific national and regional specifics - e. g. for EU conditions it is the Euro-Creativity Index (Florida & Tinagli, 2004). However, the European Union is not homogeneous and therefore national creative indices are also created on the basis of ECI. In the case of the Slovak Republic, the Slovak Creativity Index (SCI) was created consisting of 6 main sub-indices: Openness and Diversity, Human Capital, Cultural Environment, Technologies, Institutional Environment and Creative Outputs (Neulogy, 2013; Hudec & Klasová, 2016). National creative indices can also be further modified to regional creative indices, based on regional specifics.

2 Material and methods

Aim of this work is to suggest integrated model of management of creative cluster in Prešov region. Proposal of this managerial model follows from results of previous research, which is material of this research:

1. application of competitive benchmarking for expression of the Slovak creative index (SCI) composed of 6 sub-indices: Bratislava region (1st place) and Prešov region (6th place),
2. verification of 6 differential hypotheses (in which are Bratislava region and Prešov region 2 independent variables) by Mann-Whitney U-test on research sample with 547 Slovak managers of creative companies from all regions, statistically significant differences are:

- between perception of economic benefits of creative economy (regional economic growth, regional unemployment rate),
- between perception of socio-psychological barriers of creative ecnonomy development (brain drain, lack of creative methods using),

- between using of creative methods in product design,
- between using of creative methods in marketing communication,
- between conditions for creative cluster membership (economic or knowledge),
- between perception of risks of pandemic COVID-19.

3. application of competitive benchmarking for expression of Prešov creative index (PCI) composed of 6 sub-indices: over- average evaluated districts are: Prešov (1.), Poprad (2.), Levoča (3.), Kežmarok (4.) and Sabinov (5.).

Based on these results can we generalize, that Prešov region has weaknesses in all types of creativity (individual, business and regional level). Proposal for integrated managerial model creative cluster with using of systematic approach could these regional disparities eliminate. This management model is composed of 4 basic managerial functions on regional and business level. It also uses information about regional (district) differences (technological and cultural districts) based on PCI application.

3 Results

The basis of the proposal is a model of a creative cluster, which would support the dissemination of knowledge, would cooperate with universities, grammar schools and secondary schools of technical, economic and artistic orientation. The model would take into account regionally specific of Prešov region districts according to the type of creativity applied. We divided the Prešov region districts into 4 groups as follows:

- *Cluster center:* Prešov district, in which both types of creativity are balanced (scientific-technical and artistic-cultural) and achieve high performance within the resulting PCI benchmarking value;
- *Artistic and cultural districts:* Bardejov, Kežmarok, Levoča, Stará Ľubovňa;
- *Scientific and technical districts:* Poprad, Sabinov;
- *Balanced districts with a lower PCI value:* Humenné, Medzilaborce, Snina, Stropkov, Svidník, Vranov nad Topľou.

3.1 Managerial functions in a potential PSK creative cluster focused on the regional level

Planning at regional level:

Creative potential management planning in Prešov region will consist of two aspects, namely: creative potential planning at the regional level (creative cluster in Prešov region as a whole) and creative potential planning at the level of individual companies that are part of the cluster. We propose that the overall management of creative potential be in the competence of the local government, district governments, the Creative Industry Forum (CIF) organization at the national level, the Prešov Regional Development Agency (ARRPSK in Slovak language) and the CityPOint project team.

The strategic goal of the development of creative potential could be as follows: "By systematic development of creative potential, increase the sustainability of regional development of Prešov region by ...%. As part of the planning, we suggest that the founding entities should set goals for the sustainable development of the creative cluster, which should be SMART. We recommend evaluating them once a year. Partial indicators of economic, social and environmental sustainability of regional development would be divided into regional (monitoring in the competence of regional self-government) and

district (monitoring in the competence of district self-government) and could read as follows:

- increase regional GDP by ...%,
- reduce the regional unemployment rate by ...%,
- increase the number of overnight stays in the region by ...,
- reduce brain drain, resp. the emigration rate of university graduates in the region by ...%,
- increase the number of qualified foreigners in the region by ...%,
- reduce the level of environmental pollution in the region by ...%,
- improve the ranking of Prešov region within SCI by ... partitions,
- improve the ranking of the selected Prešov region district within the PCI by ... partitions, etc.

Prior to the creation of the cluster, we also suggest that competent organizations determine the questions needed to obtain a map of potential stakeholders in the creative cluster and address them electronically, and that their answers are stored in a central information system where all competent can see. The questions could be this:

- Which companies in the creative industries are key to the dominant nature of creativity in the district? (creation of a database of perspective companies and their addressing in the competence of district self-governments);
- Which of the newly established innovative companies (technological start-ups) could be part of the cluster due to the dominant character of creativity in the district? (creation of a database of perspective technological start-up companies and their addressing in the competence of district self-governments);
- Which supporting companies could be part of the cluster? (creation of a database of perspective support companies and their addressing in the competence of district self-governments);
- Which faculties (or detached workplaces, centers of excellence) could support the district's science and research with regard to its creative specialization? (creation of a database of perspective scientific research institutions and their addressing in the competence of regional self-government and district self-governments);
- Which secondary schools could cooperate with companies in the district, e.g. in the form of a dual education contract? (creation of a database of perspective secondary schools and their addressing in the competence of district self-governments);
- Are basic art schools also important for the character of creativity in the district? (creation of a database of perspective art schools and their addressing in the competence of district self-governments);
- Which of the promising companies in the district would like to use the services of innovation consulting, ie coworking or innovation incubators? (creation of a database of perspective companies interested in innovation consulting services and addressing them in the competence of district self-governments)
- Which print and electronic media would be most effective in promoting cluster activities? (creation of a database of perspective media and their addressing in the competence of CIF, ARRPSK and CityPOint);
- Is cooperation with cultural organizations also important for the character of creativity in the district? (creation of a database of perspective cultural

organizations and their addressing in the competence of district self-governments and CIF);

- Is it necessary to fundamentally improve the state of the environment in the district through cooperation with environmental organizations? (creation of a database of perspective environmental organizations and their addressing in the competence of ARRPSK and district self-governments);
- Are local tourism organizations important for the district? (creation of a database of perspective local organizations for tourism and their addressing in the competence of ARRPSK and district self-governments).

In case the competent authorities obtain a final database of all stakeholders (formal structure) who are willing to participate in the creative development of Prešov region as a whole and its districts, the individual stakeholders should have access to this database with the consent of the GDPR, where they would have the opportunity to make contact with each other according to individual needs and exchange their experiences, which could also create an informal structure of the creative cluster. Communication within the informal structure of the cluster (e. g. between selected faculties and companies) should not only be two-way, but should also work within individual stakeholders (e. g. communication on campus in the form of organizing regular workshops, where researchers inform students with the subject and results of their research or communication within companies (e. g. in the form of the unification of all areas of business in the form of a BSC system in order to disseminate knowledge effectively).

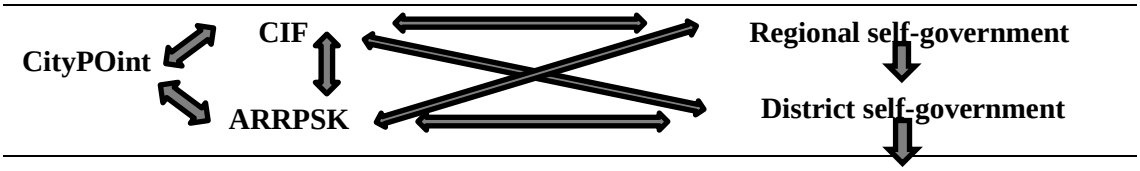
Organization at regional level:

Another function of creative potential management is organization. We have already partially described the procedure for selecting stakeholders in the planning characteristics. As we have decided to specialize Prešov region districts on the basis of creativity within PCI, we offer the following Table 1, in which possible cooperation with potential stakeholders (main companies, support companies, soft infrastructure) is indicated for each group of districts. We propose to use a network organizational structure. However, it is possible that in the framework of informal relations, cooperation may also be established in other ways (e. g. secondary art schools with the management of scientific and technical districts), while district self-governments should consider the costs and benefits of cooperation for each type of cooperation.

Leadership at regional level:

Another managerial function is leadership. Based on the proposed network organization, we recommend that the democratic leadership style of all involved stakeholders prevail in the cluster. An authoritative leadership style would not be effective because it would not contribute to the elimination of socio-psychological barriers (e. g. lack of the “out of the box thinking”), which are statistically significantly different in Prešov and Bratislava region, in favor of Bratislava region. A liberal style of leading people in a cluster would disrupt the organization and fulfillment of setted goals. The cluster management (in a formal structure) should consist of members of regional self-government, district self-governments, CIF as a representative of the development of creative potential in the Slovak Republic, ARRPSK as a representative of Prešov region development and the CityPOint project team as a representative of Prešov.

Table 1 Network organization of stakeholders in creative cluster of Prešov region; Source: own elaboration



	Type of district (based on PCI) / Stakeholder	Center (PO)	Artistic-cultural districts	Scientific-technical districts	Other districts
1	Main companies (category J)	✓	✗	✓	✓
2	Main companies (category M)	✓	✓	✓	✓
3	Main companies (category R)	✓	✓	✗	✓
4	Other creative companies	✓	✓	✓	✓
5	Technological start-ups	✓	✗	✓	✓
6	Supporting companies	✓	✓	✓	✓
7	Universities (Faculties/detached workplaces/centers of excellence focused on ecnomic and technical sciences)	✓	✗	✓	✗
8	Universities (Faculties/detached workplaces/centers of excellence focused on ecnomic, cultural and educational sciences)	✓	✓	✗	✗
9	Grammar schools	✓	✓	✓	✓
10	Secondary schols (artistic)	✓	✓	✗	✗
11	Secondary schols (technical)	✓	✗	✓	✗
12	Basic artistic schools	✓	✓	✓	✓
13	Coworking (innovation incubators)	✓	✓	✓	✓
14	Media	✓	✓	✓	✓
15	Cultural organizations	✓	✓	✗	✗
16	Environmental organizations	✓	✓	✓	✓
17	Local tourism organizations	✓	✓	✓	✓

We recommend integrate leadership as a managerial function with leading people at individual level in the participating companies. Therefore, we recommend that the cluster website allow exchange experiences between participating companies, mainly in the use of creative methods (especially in the design of new products and marketing communication) and in application of motivational tools to support creativity and its measurement in the company. In this way, we could create a space for the dissemination of knowledge, know-how (only to the extent necessary) and inspiration based on "best practices" in the creative industry in which the company operates. The guidance can also take place outdoors. It is also important for the existence of a creative cluster to attract ambitious students and university graduates. The solution would be to establish contact with selected faculties, detached workplaces and research centers within the framework of informal communication and finding out the interest of engaged students and graduates in various forms of employment in one of the participating companies (according to the study program). It is the knowledge conditions of participation in the creative cluster (sharing of know-how and creative human capital from the university environment) that are a statistically significant difference between Prešov region and Bratislava region. At the same time, this eliminates the brain drain to western Slovakia and abroad.

Control at regional level:

Control is a managerial function that aims to compare actual values and planned values, based on which we can take corrective and preventive measures. If a creative cluster were to be established on the territory of Prešov region, we would recommend evaluating selected indicators of the effectiveness of the connection for the sustainability (economic, social and environmental) of regional development during its existence. These are the same indicators that we mentioned in the characteristics of planning (sustainability goals). We recommend evaluating the indicators of the effectiveness of the creative cluster at the regional level once a year, while the regional self-government would be responsible for monitoring regional indicators and the district self-governments. They could look like this:

- growth of regional GDP during the annual existence of the cluster in% / growth of regional GDP before the existence of the cluster in %;
- regional unemployment rate before the existence of the cluster in% / regional unemployment rate in the region during the annual existence of the cluster in%, etc.

Based on the calculated indices of change, regional development actors can see which areas of sustainable regional development in Prešov region benefit most from the existence of a creative cluster. It is also possible to express these indicators with respect to Prešov region districts and to find out in which of the areas of sustainable regional development individual districts achieve weaknesses, which can be used for further plans of regional development of the creative cluster.

3.2 Managerial functions in a potential PSK creative cluster focused on the company level

Planning at company level:

Creative potential management in Prešov region should form one system. The creative potential of the region is the sum of the creative potentials of the main actors in its development. Therefore, we direct our further recommendations focused on the main

management functions to the individual (corporate) level, which should be integrated with the regional level.

In enterprises belonging to the creative industries (SK-NACE, categories: J - Information and communication, M - professional scientific and technical activities, R - Arts and recreation, another subject of activity that uses creativity as a "working tool"), we recommend in increase the level of individual creativity within the planning by setting creative goals of the company. One option would be to apply the Balanced Scorecard (BSC) concept, which consists of 4 perspectives: financial, customer, internal processes and learning and growth. A creative and committed employee is a source of effective processes and innovations, which leads to higher customer satisfaction and loyalty and consequently to better financial results. For the needs of developing creativity, we will focus on possible indicators (KPI - Key Performance Indicators) in the field of learning and growth. The tendency (T) of the indicator (KPI) would, similarly to benchmarking, express whether we want to increase or decrease it. Target values (TV) are given by way of illustration for clarity (Table 2).

Table 2 Proposal of creative goals of HR Scorecard; Source: own elaboration

Objective	KPI	TV (T)	Competence
Increasing of the creative potential of employees	1. Average score of the test of creativity of key employees 100	100 (+)	HR manager, employee training specialist
	2. Number of new introduced methods of creativity development in the company in year	3 (+)	
	3. Total number of interactions with institutions providing innovation advice (e.g. coworking) or with other real or potential actors in the creative cluster by year	4 (+)	

Companies in the creative industries should also address the benefits of their membership of the cluster from an economic (ignorance) and knowledge perspective, and which motivation for membership is dominant for it. Therefore, we recommend that companies also set the goals of their membership, which we divide into economic and knowledge.

The economic objectives of the effectiveness of cluster cooperation could be formulated as follows:

- increase the profitability of the company during the annual membership in the creative cluster by ...%,
- reduce the company's costs during the annual membership in the creative cluster by ...%,
- increase the number of new customers (or market segments) of the company during the annual membership in the creative cluster by ...%,
- reduce the company's marketing communication expenses during the annual membership in the creative cluster by ...%,
- increase the total amount of subsidies from the public administration for the operation of the enterprise during the annual membership in the creative cluster by ...% (in the case of enterprises that receive subsidies from the public administration), etc.

The knowledge objectives of the effectiveness of cluster cooperation could be formulated as follows:

- increase the number of registered patents, trademarks and designs of the company during the annual membership in the creative cluster by ... (in the case of companies in the scientific and technical creative industries),
- increase the number of organized cultural, resp. event events of the company during the annual membership in the creative cluster about ... (in the case of companies of artistic and cultural creative industries),
- increase the number of product and process innovations of the company during the annual membership in the creative cluster by ...,
- increase the number of marketing and organizational innovations of the company during the annual membership in the creative cluster by ...,
- increase the number of recruited engaged students and graduates for job during the annual membership in the creative cluster by ..., etc.

Organization at company level:

As part of the organization for member companies, we recommend that they modify their organizational structures so that the creative potential of employees is supported. The solution would be greater decentralization and flexibility of organizational structures. In companies where the nature of the final product or service allows, we recommend that a process approach be applied that is holistic and systematic. It is characterized by a new view of employees, which talks about the role they play in the value chain and eliminates the strict definition of superiority and inferiority, thus unleashing the creative potential of employees. Another proposed concept for organizing creative potential is the personality typology known as " Wealth Dynamics" created by Rogers James Hamilton, which allows you to analyze whether the right employees are in the right places, because each person is creative, only in a different way (http://profildynamikybohatstvi.cz/).

This analysis can lead to organizational changes (eg changes in job descriptions and specifications). In general, everyone is creative in their own way, but there are employees who are more focused on ideas (they can make innovation effective, the predominance of divergent thinking) and those who are more focused on implementation (they can make innovation effective, the predominance of convergent thinking). There are also employees who are more focused on business and new contacts (ideal employee of the PR department) and those who are more focused on technology and systems (ideal employee of the production or quality management department). Based on this, it is necessary to find out the structure of our employees and their job classification, we can also proceed in job interviews. When employees do what they have the potential to do and what they enjoy, they are more motivated and satisfied, which increases the performance of the entire company. "Wealth Dynamics" consists of 8 personality types:

1. Creator - creates innovative products,
2. Star - builds an influential brand,
3. Supporter - builds executive teams,
4. Connector - supports business opportunities,
5. Merchant - conveniently buys and sells,
6. Accumulator - buys and values assets,
7. Lord - has under control the assets they earn,
8. Mechanic - creates systems.

Leadership at company level:

As part of the managerial function aimed at leading creative potential, we focus on the processes that should take place in the member companies of the creative cluster, so that employees are motivated to participate in the creative development of the company and thus Prešov region as a whole. Both in the management of the creative cluster as a whole, as well as in the management of member companies, we prefer a democratic style of people management. At the same time, we focus on the application of creative methods, because in the research there is a statistically significant difference in their use in the design of new products and marketing communication between Prešov region and the region with the highest SCI value, i. e. Bratislava region.

Creativity is a mental feature that is difficult to measure, but there are several standardized psychological tests that we can use. In order for member companies to get a overview of the level of creativity, we recommend finding out the level of individual creativity of key employees using these tests, e. g. Torrance's test of creativity, resp. figural test of creative thinking, which consists of measuring 4 main dimensions of creativity, namely: fluency, flexibility, originality and elaboration, the frequency of application of the test is proposed during job interviews and regular evaluation of employees. At the same time, when applying the test, we can see in which of the 4 dimensions the employee has above-average and in which below-average results, which we can later use in the application of creative methods "tailored".

From the point of view of Maslow's pyramid of needs, creativity belongs to the highest degree, resp. to the self-realization of the individual. Various forms of non-financial and financial motivation are a prerequisite for developing creative potential, which is suppressed in many cases. Among the proposals we can include the application of some of the new management concepts to improve the physical and mental health or satisfaction of employees, e. g. COMM-PASS Vitality program - management focused on a healthy lifestyle and prevention of psychosomatic diseases or Hapiness management focused on the overall happiness and satisfaction of the employee, which will support the non-financial motivation of employees. The precondition for the application of these concepts is the decentralization of current organizational structures, the democratic style of management and openness to change.

Another recommendation is the use of coaching in comparison with the often used mentoring. The coaching method for member companies of the creative cluster was also recommended in the strategic document Master plan at the organization of the ECOC Košice 2013. We think that the application of coaching would be effective for the development of the creative potential of PSK. This can be done either by applying coaching to human resource management or by outsourcing, ie by using the professional services of professional coaches registered in SAKo (Slovak Coach Association) and ICF (International Coach Federation). Compared to counseling or mentoring, coaching tries to move to the essence of the problems of employees and managers so that they come up with possible solutions themselves and thus increase their potential. A coach is a guide who helps the coachee get from point A to point B. He uses various methods to catch the problem, e.g. scaling (On a scale of 1 to 10, where 10 means reaching your goal and 1 the complete opposite of where you stand now? What makes the difference that you are already on the scale on ..., and not just on 1? / still on ..., and not 10?) As an example we can mention the most famous model of coaching Whitmore's model GROW, which consists of the following 4 steps:

1. G (goal) - the need to express goals in measurable requirements (e. g. SMART - specific, measurable, acceptable, realistic, timed), which represent a step towards development;
2. R (reality = reality) - specification of the current state;
3. O (options) - opening of options, resources, in this phase it is also possible to apply various auxiliary methods of solving the problem, e. g. methods of developing creativity with regard to the problem of launching a new product on the market or an engaging advertising media (e. g. mind maps, brainstorming, brainwriting, lotus flower, morphological analysis, SCAMPER, etc.);
4. W (will = wrapping up) - defining specific SMART steps in which the coach finds that the coachee is ready for action (Whitmore, 2005; Ali Taha & Tej, 2015; Vrábliková, 2019).

Another of the proposals for improving leadership in business practice is the application of selected methods of creativity development depending on the subject of activity of the creative industry. Methods of creativity development are divided into systematic-analytical and intuitive, while the first group has a precisely described solution procedure and uses mainly convergent thinking. Intuitive methods have an unlimited number of possible solutions and use mainly divergent thinking. However, both types of methods have their place in the development of creativity, and their combination contributes to the efficiency and effectiveness of innovation. In the territory of Prešov region, compared to Bratislava region, creative methods are used to a lesser extent in all areas of management (design of new products, marketing communication), but in the case of design of new products and marketing communication, this difference is statistically significant. Also in the examination of the situation in Prešov region using PCI, the rate of use of creative methods is higher in companies located in districts with higher cultural or technological potential (Prešov, Poprad, Kežmarok). As the creative industries are diverse and have different target groups of customers, we have divided them according to SK-NACE as follows:

- *J - Information and communication* - we recommend that systematic-analytical methods such as e.g. competitive benchmarking, which is used to find and quantify weak points of parameters in comparison with the competition, Design Thinking or morphological analysis. When designing an appropriate way of marketing communication, the marketer should also emphasize the quality and functionality of the products / services offered. Apart from the Prešov region center (Prešov), it is a sector that has a more significant representation in districts with the dominance of scientific and technical creativity on the basis of PCI (Poprad, Sabinov) and occurs in a balanced way in districts with below-average PCI value (eastern part of Prešov region).
- *M - Professional scientific and technical activities* - due to the diverse subject of activity of this industry, we recommend a balance of systematic-analytical and intuitive methods. The industry mainly includes advertising agencies, media, libraries and publishing activities and is evenly represented in all Prešov region districts.
- *R - Arts and recreation* - due to the subject of activity and the emotional nature of the industry, we recommend that intuitive methods such as e. g. brainstorming, lotus flower, SCAMPER, 6 thinking hats (lateral thinking). When designing a suitable way of marketing communication, the customer could be approached by new creative forms of marketing communication - e. g. guerilla marketing, buzz marketing, product placement. References are an important source for customers

in this sector (tourism, design and culture services). In the case of accommodation services, we recommend using the Airbnb web service. Based on the PCI determination, we can see that the type of creativity contained in this sector is more represented in districts with cultural and historical potential (Prešov as the center of Prešov region, Kežmarok, Levoča and Bardejov).

In order for member companies of the creative cluster to be able to maintain, increase their creative potential and be an attractive employer of the creative class, it would be appropriate for them to use advice on creativity and innovation in the form of cooperation with coworking organizations or innovation incubators (in Prešov region Eastcubator Prešov, Fitcubator Poprad). Another form of cooperation is the creation of a system of open innovation by customers (e.g. on the company's website, Facebook and Instagram social networks) and by other entities (e. g. monitoring new industry trends through active and passive participation in trade fairs and exhibitions, competitive news, etc.).

We consider the most important form of cooperation to be participation in a creative cluster, which contributes not only to increasing individual and corporate creativity, but also regional. Through cooperation with educational institutions, it also eliminates brain drain, which is a socio-psychological barrier to the development of Prešov region and contributes to reducing regional disparities. Within the tested hypotheses, the perception of socio-psychological barriers to the development of creativity is statistically different in Prešov and Bratislava region in the creative cluster, where the Bratislava region is significantly dominated by knowledge conditions (acquisition of know-how and the best students from the university environment).

Control at company level:

At the end of the period under review, we recommend evaluating the performance of the entire HR Scorecard perspective using the coefficients of meeting the set goals, which we set when planning them. If the KPI trend is positive, we will express the ratio of actual and target value, and if the KPI trend is negative, we will express the ratio of target and actual value. We set the weights with indicator (w) at 33.3% for simplicity, but if the manager has specific preferences within the creativity goals, this would be possible using pairwise comparison, similar to the calculation of SCI and PCI using benchmarking. The actual values of the objectives are illustrative in order to achieve a better clarity of the calculation methodology (Table 3).

Table 3 Control of creative goals in HR Scorecard; Source: own elaboration

KPI (T)	w	TV	SV	Coef.
1 (+)	0,333	100	90	0,90
2 (+)	0,333	3	2	0,67
3 (+)	0,333	5	5	1,00

As part of the planning of creative potential, we also proposed a possible system of goals of cluster cooperation, which we divided into economic (ignorant) and knowledge. Since the inspection follows the planning, we propose to evaluate them in relation to the period when the company was not yet a member of the creative cluster. Here again, we take into account the tendency of indicators (maximalist or minimalist).

Economic indicators of the effectiveness of cluster cooperation:

- profitability of the company during the annual membership in the creative cluster in % / profitability of the company before the start of cluster cooperation in %;
- cost of the company before the start of cluster cooperation in % / cost of the company during the annual membership in the creative cluster in%, etc.

Knowledge indicators of the effectiveness of cluster cooperation:

- for companies belonging to the scientific and technical creative industries: number of registered patents, trademarks and designs of the company during the annual membership in the creative cluster / number of registered patents, trademarks and designs of the company before the start of cluster cooperation;
- in the case of enterprises belonging to the artistic-cultural creative industries: the number of organized cultural, resp. event events of the company during the annual membership in the creative cluster / number of innovations of the company in the cluster / number of organized cultural, resp. event events of the company, number of innovations of the company before the start of cluster cooperation, etc.

Based on the number of achieved coefficients higher than 1, we recommend placing member creative companies in one of the 4 quadrants of the matrix proposed by us (knowledge - effective participation, economic- effective participation, knowledge and economic - effective participation, ineffective participation).

The aim of the existence of the Prešov region creative cluster is to support innovations that are the output of creativity, contribute to the sustainable development of the region and the satisfaction of the region's customers. Therefore, we recommend that member companies regularly evaluate their effectiveness and efficiency. Effectiveness expresses the value of a given innovation for the company and society (in our case, regional development), resp. its ingenuity and functionality. Efficiency refers to the company's ability to bring innovation to the market and make money on it. Some companies excel in efficiency and some in efficiency, which is used in diagnostics, which we would propose to similarly divide the cluster member companies into 4 quadrants (EE - Effectiveness & Efficiency, Ee - Effectiveness & efficiency, eE - effectiveness & Efficiency, ee - effectiveness & efficiency). At the same time, we can see here whether the recommended methods of developing creativity in companies, in our case in the design of new products and in marketing communication, were applied correctly (Chaľ, 2011).

3.3 Framework proposal of marketing communication of the creative cluster PSK and recommendations for creative industries in the time of the corona crisis

The existence of a creative cluster can increase the regional competitiveness and its attractiveness for business, employment, study, tourism and life, as it leads the population to self-realization. Marketing communication of the cluster could be in the competence of CIF (forms of impersonal marketing communication such as advertising, online marketing tools), ARRPSK (forms of personal marketing communication such as PR), CityPOint project team (marketing communication focused on the city of Prešov) or use services advertising agencies, as advertising agencies also belong to the creative industries.

Due to the current anti-pandemic activities to reduce the spread of COVID-19, many companies in the creative industries (especially cultural industries) have remained

closed. However, these are not only performers, but also other staff, such as illuminators, sound engineers, technicians. Therefore, in October 2020, the questionnaire of the Ministry of Culture of the Slovak Republic "Culture and creative industry after 6 months of pandemic" was launched. The aim was to detect a decline in revenues in the creative industries, which was reflected most in companies in the field of audiovisual and events. The Ministry published 3 calls on its website, to which the creative companies affected by the crisis could respond. The condition for the aid is a decrease in turnover in the period from 1 March to 31 December 2020 by at least 30% compared to the same period in 2019. On the contrary, the creative sector J - Information and Communication achieves better results during the coronacris use of digital technologies.

The research confirmed a statistically significant difference between the perception of possible risks of the COVID-19 pandemic on the creative economy (negative business results, change in the structure of creative industries) between Prešov region and Bratislava region, with these risks being perceived to a lesser extent in companies in Prešov region than in Bratislava region, which represents the potential for improving the market position of these companies. The reason may be higher sustainability of creative industries in the territory of Prešov region, because their structure is different. While Bratislava region, which is the cultural center of Slovakia, has a significantly higher share of core creative industries (cultural industries), Prešov region is dominated by IT and design industries within the creative industries. In examining the perception of possible challenges of the pandemic (space for innovation, increased demand caused by the preference for intangible assets), the difference between the two regions is not significant and we can say that respondents are optimistic about the future.

However, companies in selected types of creative industries can eliminate the consequences of a pandemic by digitizing and thus increase their sustainability. We will divide the proposals into 2 groups, namely: proposals for the cultural and event industries and proposals for the design industries.

Suggestions for cultural and event industries:

For cultural industries, resp. operators of cultural and event events, we recommend moving to the online space as follows:

- creation of a contract with a selected reservation system with a payment gateway (e.g. Ticketportal, Tickpo),
- creation of a partnership with IT companies that offer streaming services, which is also advantageous from the point of view of the already mentioned creative cluster,
- promotion of the event on social networks and in the media,
- before the event, send potential participants a link to the event and a login password by e-mail, under which they can join the event online,
- the possibility to send participants a confirmation of participation,
- the possibility to send participants a satisfaction questionnaire, which would include an evaluation of the price and quality of the event, image and sound quality, interest in other organized events),
- the possibility to send an e-mail with a streamed recording of the event to a participant who could not join at the time of the event, which is an advantage compared to the actual participation in the event,
- a system of discounts on the ticket price for regular online participants after overcoming a pandemic, when it will be possible to attend the event in person,

- creation of a personalized database of participants (based on finding out, for example, the genre of the event in which the participant regularly participates), or regular sending of a newsletter via e-mail,
- in the case of a visit to a gallery or museum, to organize a virtual tour using a webcam with the possibility of a discount for customers at the next personal participation,
- use an online reservation system in libraries, which will be transparent even for readers who have a lower level of digital literacy,
- at present, the interest of customers is growing, resp. participants of events on social responsible activities, therefore we recommend to combine the mentioned online cultural events and shows with charitable activities, where the proceeds from the income from tickets can go to the account of the selected foundation,
- it is also possible to look for strategies to provide participants with a real experience of a cultural event in compliance with the established ban on gatherings, e. g. In April 2020, MSKS Kežmarok, with the financial support of sponsors from local companies, organized a concert by the band Smola a hrušky on the roof of the local kindergarten in the housing estate, where the residents of the housing estate experienced directly from their balconies.

Suggestions for design industries:

The advantage of the design industries over the cultural industry is the combination of product and service provision. It goes e.g. o fashion industry, interior design, production of decorative items, building and garden architecture, 3D printing. As the products are highly specialized, most of these companies work to order. Therefore, we recommend expanding the e-shop with online designs depending on the type of design, in which customers should have the opportunity to express their ideas about the product, such as. the maximum budget for the production, color design, material design, the possibility of pasting a photograph or a hand-drawn drawing of the required product, etc. The advantage of this application is not only the prevention of the spread of a pandemic, but also the acceleration of logistics processes and a system of open innovations where a potential customer would be their source.

4 Discussion

The importance of the development of creativity is currently growing mainly due to the fact that it is a property that is typical for humans and is not substitutable by technology. It can be an input as well as an output of production and service processes. Creativity is one of the main factors in the development of regions, and therefore research into the creative economy is justified today. We can develop it on an individual, corporate and regional level. Creativity at the regional level is the sum of the creativity of individual companies and individuals. Therefore, each of us can contribute to its development. The aim of the paper was to design a model of integrated management of a creative cluster in a selected Slovak region. The object of the paper is the NUTS3 level region - Prešov self-governing region and managerial functions are designed at the regional and corporate level (for companies that would be interested in being members of this cluster). The basis and main material for our proposal is the elaboration of SCI (Slovak Creativity Index), research conducted on a sample of 547 Slovak managers from all regions of Slovakia, verification of 6 differential hypotheses (Prešov vs. Bratislava region) focused on individual dimensions of creativity and regionalization of the index at LAU1 level for conditions of Prešov region. The contribution of the paper is a systematic and project

approach to the development of creativity at the regional and corporate level in case of the Prešov region. We were inspired by the methodology of business and marketing plans, where one design results is connected with others and forms a comprehensive system. We believe that the contribution will be beneficial for the development practice of the stakeholders of the potential creative cluster of the Prešov region and for further research in this area.

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Assessing neuromarketing attributes by sellers and customers

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Abstract

The issue of neuromarketing, its effective use but also abuse, attracts attention of both professional and lay public. Based on a theoretical analysis of neuromarketing, the study presents the results of the verification of a new, original methodology: Assessment of Neuromarketing (ANM). Basic psychometric parameters of this methodology are presented, allowing specification of two factors: Behavior regulation (Cronbach's alpha – .762) and Ethics (Cronbach's alpha – .630). The extracted factors explain 57% of the variance. Based on the ANM methodology, a statistically significant difference was identified in the assessment of the factor Behavior regulation between sellers and customers. Sellers believe companies can control the behavior, needs, and purchases of customers through neuromarketing. In this context, customers are more neutral in assessing this neuromarketing attribute.

Keywords: Neuromarketing; ANM methodology; Assessment of neuromarketing; Seller; Customer.

JEL Classification: M31, M39, C38, C91

Article Classification: Research article

1 Introduction

Neuromarketing is an interdisciplinary concept based on marketing and neuroscience knowledge (Morin, 2011). It seeks to clarify spontaneous and involuntary incentives for customer action that are important in purchasing decisions. The author claims that the main intention of neuromarketing is to intensify the effect of communication in marketing through the most appropriate product setup, such as its location and promotion. It is a science that seeks reasons for giving preference to a

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product over another, while analyzing the wishes and desires of the buyer (Telpaz, 2015). It has two faces: it is either a way of understanding or a system of abuse of human judgment. Only a thin threshold divides them.

Neuromarketing is a scientific field in cognitive science that deals with customer responses as well as product selection decisions in terms of brain processes. It monitors, for example, how popular company brands invoke engagement of the human memory system, examines the direction of people's eye contact in ads, and whether advertising affects their attention. It also studies whether electrical activity in the human brain changes when viewing various ads (Guixeres et al., 2017). Companies use neuromarketing for their hidden experiments in a variety of ways, for example by using simple descriptions, original writing aimed at the first impression, designing advertising to accommodate direct customer attention, building trust towards their customers, and smiling (e. g. Constantinescu et al., 2019; Gountas et al., 2019).

Wilson et al. (2008) constructed a model of buying behavior and decision-making of customers, which uses the attributes of neuromarketing. It differs from the classic model in terms of assessing and measuring the customer's brain activity during shopping. It consists of the screening, intervention and decision-making stage. The last stage contains the final verdict of the customer about buying or not buying a product or service. The consequence of the decision contains positive or negative reactions and information about the company and the customer (Dražová & Vasiľová, 2010).

There are several ways or methods of applying neuromarketing (e. g. Baños-González, 2020). For instance, it involves attracting observers i.e. promoting a product or service; the use of impressive packaging (Rambabu & Porika, 2020); using color as an important element in advertising; paralysis of the choice or final decision (Bault & Rusconi, 2020); satisfaction classification; loss resistance; disclosure of classified data; bonus and punishment; testing new products; regulating the appropriate price; the appearance and systematic nature of the website; captions and headlines.

Neuromarketing is easy to use in a variety of areas, not only in business and trade. Hegazy (2019) describes its use also in political campaigns, and Stanton et al. (2017) emphasize the induction of energy and courage, but also ethical standards.

Neuroscience research has put neuromarketing at the forefront of marketing attributes. In defining and examining the issue of neuromarketing, it is necessary to accept a holistic concept as well as an interdisciplinary approach. In this paper, attention is paid to the perception of neuromarketing as one of the important aspects of the application of this method in practice. Specifically, aspects of assessing customer behavior regulation and ethical issues of how neuromarketing works from the point of view of both sellers and customers were examined.

2 Material and methods

The aim of the presented research was to verify the original methodology for assessing neuromarketing (ANM) and, based on this methodology, to identify differences in the assessment of neuromarketing attributes between sellers and customers. We assumed that there is an internal factor structure of neuromarketing assessment. At the same time, we assumed that there were statistically significant differences in the assessment of neuromarketing attributes between sellers and customers.

Data from the respondents were collected using the original ANM (Assessment of Neuromarketing) questionnaire, which was verified in the presented research. The questionnaire contains 8 items to which the respondents responded on a 6-point scale (1

= definitely no; 2 = no; 3 = rather no than yes; 4 = rather yes than no; 5 = yes; 6 = definitely yes).

3 Results

Est id vitae aliquip, ut justo aeque legimus vim. Vis te eius elaboraret, ei vim decore ridens theophrastus, ex eam ancillae singulis. Vel ridens honestatis dissentiunt ut. Inani consetetur reprimique an nec, an veri debet eum, pri debet ancillae in. Et propriae partiendo vim. Nemore deterruisset in qui, nemore gloriatur te sed. Cu qui delectus gloriatur appellantur, enim velit in usu. An porro eruditi nec. Consul scaevola ad est. Ut vide accusata reprehendunt eam, et decore nullam ius. Quot molestie concludaturque vim et. Lobortis complectitur has ei.

Research data were obtained from a sample of 140 women (60%) and 92 (40%) men aged 17 to 88 years. The average age of the sample is 34 years and the standard deviation is 13.788 years. Out of this number, 116 respondents were sellers (50%) and 116 were customers (50%).

Based on the results of the KMO test (.836), the *Bartlett's test* (447.7, p – .000) and the Communalities values, the Principal Component analysis with Varimax rotation was conducted to extract two factors of neuromarketing assessment by ANM (Assessment of Neuromarketing; Table 1, Figure 1), which can be characterized as follows:

- *Behavior regulation:* respondents who score higher in this factor believe that companies using neuroscience are able to control the behavior, needs and purchases of their customers. At the same time, they think that the attributes of neuromarketing will be increasingly used by companies in the future (Cronbach's alpha – .762).
- *Ethics:* respondents who score higher in this factor believe that companies can abuse the attributes of neuromarketing and behave unethically towards customers. At the same time, they think that its use worsens the relationships between customers and sellers (Cronbach's alpha – .630).

The extracted factors explain 57% of the variance (Tables 2 and 3).

Table 1 Saturation of the extracted factors by individual items; Source: own elaboration

Items	Factors	
	Behavior regulation	**Ethics**
Companies which use neuroscience are able to control behavior, needs, and purchases of customers	.726	
Companies can use neuromarketing to control the thoughts of customers		.603
Neuromarketing will always work	.771	
In the future, all companies will use neuromarketing attributes	.757	
By means of neuroscience, companies will improve their skills	.710	
Using neuroscience in companies worsens the relationships between customers and sellers		.563
Companies may misuse knowledge and methods of neuroscience towards customers		.708
Using neuromarketing in companies is unethical		.846

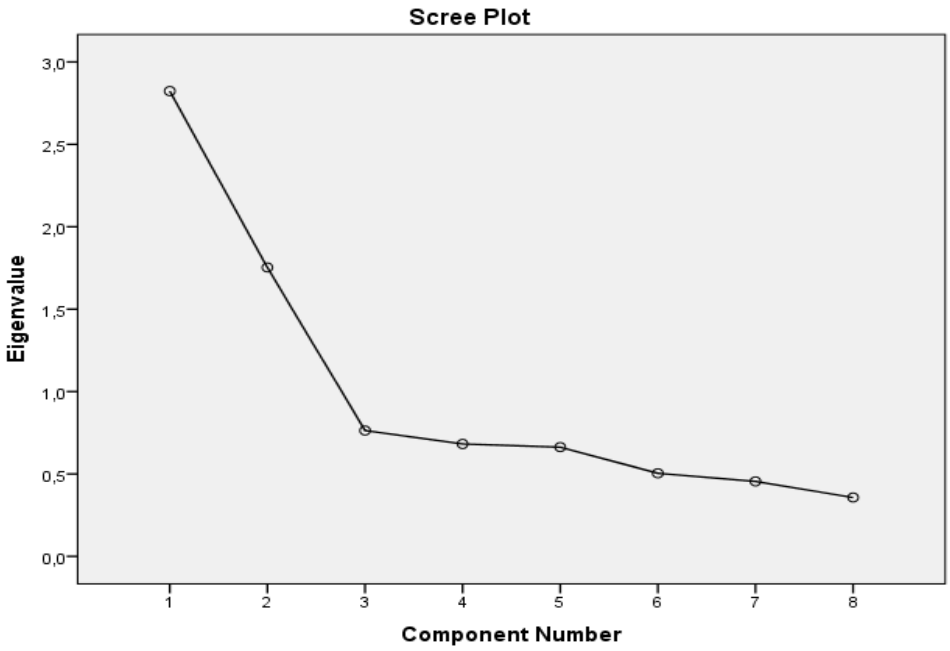

Figure 1 Graphical representation of neuromarketing factors by Scree plot;
Source: own elaboration

Table 2 Explained variance values of the extracted factors of neuromarketing assessment achieved before rotation; Source: own elaboration

Factors	Initial Eigenvalues		
	Total	**% of Variance**	**Cumulative %**
Behavior regulation	2.823	35.288	35.288
Ethics	1.753	21.912	57.201

Table 3 Explained variance values of the extracted factors of neuromarketing assessment achieved after rotation; Source: own elaboration

Factors	Rotation Sums of Squared Loadings		
	Total	**% of Variance**	**Cumulative %**
Behavior regulation	2.630	32.872	37.440
Ethics	1.946	24.329	57.201

The presented percentage of the explained variance as well as the reliability indicators suggest satisfactory psychometric parameters of the validated ANM methodology. The skewness and kurtosis values of the data obtained indicate that the conditions for normal data distribution are met (Table 4).

Table 4 Data distribution of the extracted factors; Source: own elaboration

	Behavior regulation	**Ethics**
Skewness	-.183	-.344
Kurtosis	-.188	.898

Based on the data distribution parameters and the measurement scale used, the differences between sellers and customers in assessing neuromarketing attributes were tested by means of the t –test (parametric test).

The results of the analysis confirmed the existence of a statistically significant difference between the seller and customer responses in the context of the Behavior regulation factor. On the contrary, this difference was not found in assessing the Ethics factor (Table 5).

Table 5 Assessment of neuromarketing attributes by sellers and customers; Source: own elaboration

		M	**SD**	**t-test**	**Sig.**
Behavior regulation	sellers	4.34	.750	3.980	.000
	customers	3.92	.817		
Ethics	sellers	3.84	.950	1.085	.279
	customers	3.96	.580		

The results of the analysis confirmed the existence of a statistically significant difference between sellers and customers in assessing the Behavior regulation factor. Sellers believe that companies can use neuromarketing to control behavior, needs, and purchases of their customers, and that they will increasingly use neuromarketing attributes in the future to greatly improve the efficiency of their marketing processes. In this context, customers expressed a lesser agreement in the assessment of these neuromarketing attributes.

There was no statistically significant difference found between sellers and customers in assessing ethical attributes in the context of neuromarketing. Respondents from both groups expressed agreement with that neuromarketing may violate ethical standards.

4 Discussion

The development of knowledge in the field of business management is related to the development of several scientific areas and has a holistic and inter-disciplinary character. One typical example of this concept is the use of neuromarketing attributes. It should be emphasized that the knowledge of neuromarketing is sensitive and ultimately used counterproductively. On the one hand, this knowledge can increase the effectiveness of communication in business management, on the other it can also be misused (Stanton et al., 2017). In this respect, ethics is one of the most important attributes of research and use of neuromarketing (Stanton et al., 2017). It is also one of the decisive factors in the use of neuromarketing knowledge in the future.

The results of the presented research contribute to the theoretical and methodological development of knowledge of neuromarketing. From a methodological point of view, a new original methodology for assessing neuromarketing (ANM) was verified in the research. Two factors of neuromarketing assessment were extracted by factor analysis.

The first factor was related to the assessment of the possibilities of influencing the decision-making and behavior of customers. Both customers and sellers agreed with this attribute, but sellers expressed a higher level of agreement. It can be assumed that this difference is due to the fact that sellers are more experienced in applying the neuromarketing attributes to sales. They see more into this issue, and are also trained in these techniques.

The second factor was related to the ethical issues in the context of neuromarketing. Sellers and customers are aware of the importance and significance of these issues.

The findings presented suggest that respondents are aware of the impact of neuromarketing on their decision-making and behavior, as well as the possible misuse of neuromarketing knowledge (Stanton et al., 2017). The future of using neuromarketing to increase the effectiveness of communication between sellers and customers is significantly influenced by the adoption and adherence to the principles of ethical behavior also in the context of neuromarketing (Morin, 2011).

Acknowledgements

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Support of the process of a creative idea's preparation and implementation

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Abstract

The main purpose of the article was *to design a process for the implementation of a creative idea,* which together with the created *overview of recommended methods for the support of creativity* represents the basis for the development of creativity in the organization. To obtain the necessary information, research was carried out in 2019, where the main method was sociological questioning. The questionnaire survey technique was applied in the Slovak environment and the sample consisted of university students. The returned responses, *n = 419,* are a representative sample. The results suggest that similar factors influence the motivation and creativity of the respondents, and therefore it is possible to support both processes in the same way, by similar methods. In relation to the findings and verification of the established hypothesis, it was possible to create main results and recommendations, which form the main part of this article.

Keywords: Motivation; Creativity; Factors; University; Research.

JEL Classification: M12, I23, O31

Article Classification: Research article

1 Introduction

Motivation is one of the most complex processes in the development of people in organizations (Blašková et al., 2018; Kucharčíková et al., 2019). To fulfil a person's creative potential, it should be linked to creativity. Creativity itself can be characterized as the behaviour of the individual focused on the creation of new or useful ideas (Anderson et al., 2014; Montag et al., 2012; Somech & Drach-Zahavy, 2013; Yu-Qian

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Zhu et al., 2016; Demjanovičová & Varmus, 2021). Creative thoughts can be categorized as radical or incremental. They can also be provoked by a need or created regarding a benefit for the individual, team, or the whole organization (Tapomoy, 2006).

The connection between motivation and creativity is pointed out by several authors. For example, Agnoli et al. conducted research that discusses motivation as a force that activates the creative process (2018). An essential element of creative thinking is the relationship between motivation and the process of motivating. This direct connection of the main areas of the article is also supported by Leung and Chen (2014).

To appeal to creativity and its support, it is important to know the characteristics of creative thinking. Many authors state that creative thinking can be described by several characteristics (Ďurič, 1991; Jurčová et al., 2009; Lokšová & Lokša, 2003). Managers should focus on promoting creative thinking and its characteristics in themselves and their employees. It is only a response to the situation in the company. A more effective way could be proactivity in terms of acting to support and build creative thinking for students who will become employees of these companies in the future. World Economic Forum (2018) stated that creativity is among the top 10 emerging skills for 2022. It is important to encourage students to be better prepared for business practice, so that they can contribute to the creation of innovation in companies.

That is why the authors of this article focused their research on young people – university students. The authors' assumption focuses on the positive impact of the recommendations (which will be presented), and thus based on the support of creativity in young people, the support of creativity in the business environment will be achieved – the creation of innovations.

For a clear explanation of the overall logic of the article, a research model was created (Figure 1).

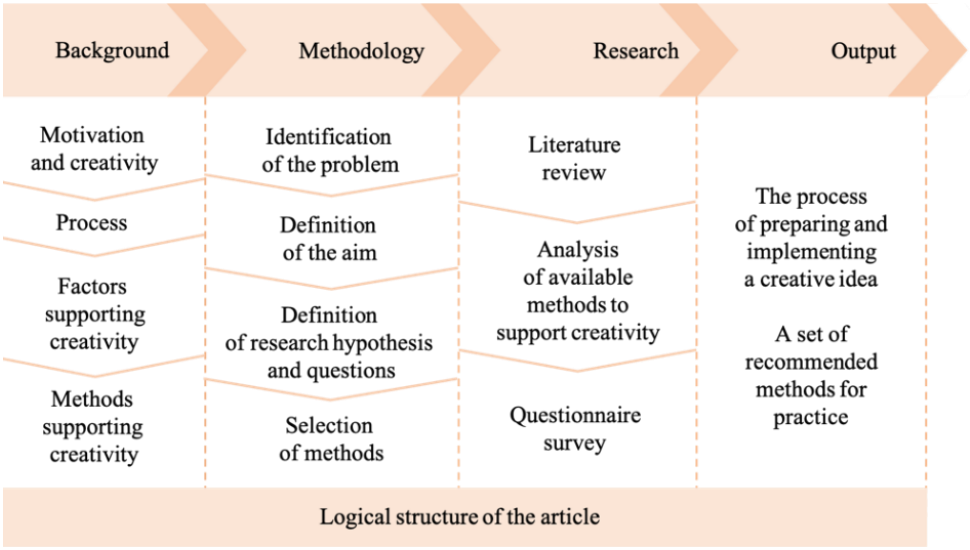

Figure 1 Research model; Source: own elaboration

Process of motivation and creativity

Motivation can also be described as a link between a person's mental and physical activity that leads to the achievement of a goal. Unsatisfied needs create psychological stress, which in the next step creates an impulse for the beginning of a person's actions (Veber, 2009). Thanks to the mentioned impulse, a person can create a new proposal or

solution to a problem. This impulse of creativity often leads to innovation, and therefore the authors of the article also focused on the effects of creativity in the innovation process.

Motivation

As the article focuses on the field of creativity and its impact on the innovation process, it is necessary to first know how to influence creativity in individuals. Many authors are inclined to the fact that increasing the level of motivation also affects the promotion of creativity. When an organization knows the behaviour of its employees with respect to the current situation, it can act on it by chosen factors (Lutz von Rosenstiel, 2014).

To be able to influence motivation, it is necessary to understand its expression. The behaviour of members of the environment is closely linked to their motivation and can therefore be defined as the interaction between the reactions and the goals that the employee wants to achieve. In the process of motivation, the member of the environment is influenced not only by their inner side but also by external factors (Steiger, 2012; Blažek, 2014; Brown, 2017; Plamínek, 2010).

Creativity and methods to support it

Creativity can be considered a natural trait of every human being. According to this approach, everyone has a certain degree of creativity (Gavora, 1999). Creativity can also be characterized as an individual, social, team, and organizational phenomenon (Franková, 2011). The innovation process is a never-ending activity of the company, the aim of which is to bring more effective solutions (Amabile, 1998).

Business innovation process

According to Keruľová (2013), the company's innovation process starts with a comprehensive analysis of the environment. It is then necessary to interpret the analysis of the external environment. Different ways of presenting and visualizing solutions and desired goals are used for this way of designing these innovations. After collecting data and defining the goals of the innovation process, these outputs represent the stimuli for the process of creating ideas.

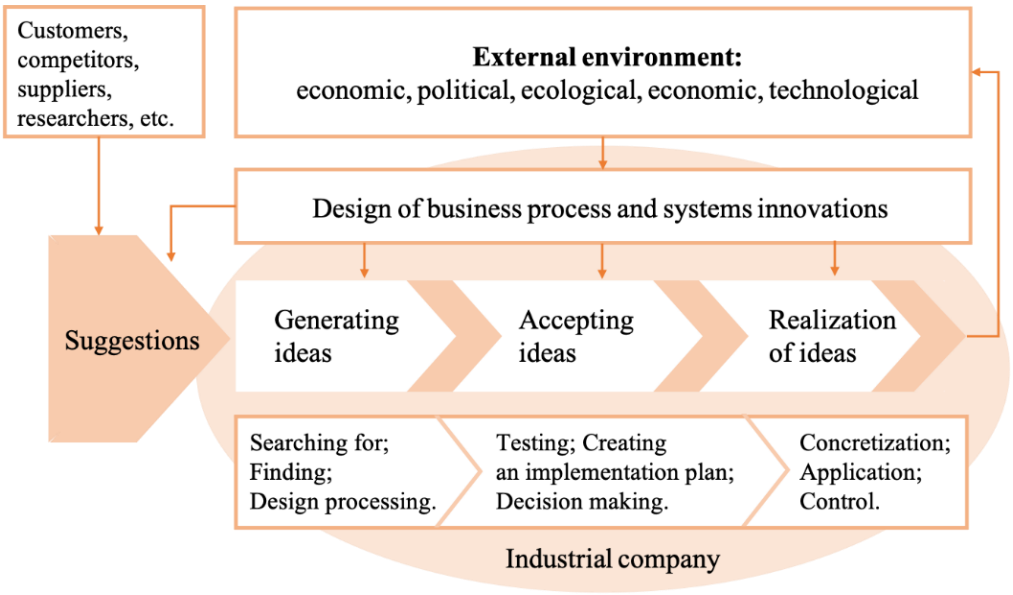

Figure 2 Business innovation process; Source: (Keruľová, 2013)

The process of creating ideas is a major part of the innovation process. It is about generating, accepting, and implementing ideas with an emphasis on creativity, internal motivation of members of the innovation team. After a summary of suggestions, the innovation process proceeds to the phase of analysis, definition, and validation of the given innovation proposals. The last part of the process is the implementation phase with the necessary control.

2 Material and methods

The primary source of information was the analysis of literary sources, which was followed by the main research activity. It focused mainly on the analysis of primary data obtained through the method of sociological questioning. Specifically, it was the technique of a questionnaire, conducted in 2020. Subsequently, an analysis of secondary data was performed.

2.1 Research questions and hypothesis

To set recommendations for the promotion of creativity in the business environment, the authors defined several research questions and hypothesis HA_1. The implemented questionnaire survey reflected on the defined questions and the established hypothesis was subsequently verified.

The defined research questions were:

1. *What factors influence the environment members' motivation?*
2. *What factors positively influence the environment members' motivation?*
3. *Which factors are the most important for the environment members in terms of effectiveness in supporting motivation?*
4. *What factors influence the environment members' creativity?*
5. *What factors positively influence the environment members' creativity?*

The research hypothesis focused on the relationship between factors that affect motivation and creativity of university students. As mentioned above, it is necessary to know the factors supporting creativity of young people – students, so that they can use the increased creativity in the work process. In this case, they bring added value to the organization. The authors assume that the chosen factors will influence (positively or negatively) both motivation and creativity.

Therefore, they defined the main research hypothesis:

- *HA1 as follows: Semantically equal factors will influence the increase of motivation and creativity of particular environment members (in a positive or negative way);*
- *HA0: Factors identical in meaning will not affect the positive increase in motivation and creativity of members of the environment.*

2.2 Research sample and statistics tests

The sample consisted of full-time university students, the number of which was 105,393 in Slovakia in 2019 (ŠÚSR, 2019). With a confidence interval of 95% and a tolerable error of 5%, a minimum sample size of 383 respondents was calculated using Raosoft software (Raosoft, 2020). The real sample size (number of responses obtained) is 419 respondents with a tolerable error of 4.78%, and thus this sample can be marked as representative.

The questionnaire survey consisted of 25 questions, which were categorized into sections: (1) basic characteristics, (2) approach by teachers or faculty, (3) motivation, (4) creativity, and (5) suggestions and recommendations. In connection with the main topic of the article, only selected questions from the total number were evaluated in relation to the defined research questions and hypothesis. Chi-Square Test was used in the evaluation:

$$x^2 = \sum_{i=1}^{R} \sum_{j=1}^{C} \frac{(n_{ij} - E_{ij})^2}{E_{ij}} \quad (1)$$

where: ***R*** the number of rows,
C the number of columns,
nij the frequency in the i-th row and the j-th column,
Eij the expected frequency in the i-th row and the j-th column (Rimarčík, 2007).

3 Results

For a complex description of the respondents, a clear representation of their characteristics in Table 1 was used. It shows that the ratio of women and men involved in the survey is almost equal.

Table 1 Basic characteristics of respondents; Source: own elaboration

Characteristics	Gender		Degree of study			Year of study		
	Male	Female	Bc.	Ing./Mgr.	Ph.D.	1.	2.	3.
Frequency	219	200	280	131	8	172	141	106
	52.27%	47.73%	66.83%	31.26%	1.91%	41.05%	33.65%	25.30%

The evaluation of specific results was divided into two separate parts, namely: *descriptive statistics* and *relationship analysis.*

3.1 Descriptive statistics

One of the questions in the questionnaire survey focused on the elements that have *contributed to changing the motivation of respondents in the past.* The focus of the change in the positive or negative direction was not specified in any way, and therefore it was analytically interesting to examine the negatively oriented elements as well (Table 2).

At the first four places, there are mostly such elements that ensured a positive change in the motivation of respondents. At the first place is the *"gradual maturation and development of personality."* which was chosen by the majority of respondents (247 out of a total of 419 respondents = 58.95%). However, besides the positive elements, there was also the element *"long-term fatigue, stress and burnout"*. It is alarming that this element is so high in the ranking (36.28%).

Table 2 The frequency of factors that influence the change of motivation; Source: own elaboration

Options	**Frequency**	**[%]**
Gradual maturation, development of your personality	247	58.95%
Significant success in the field of study	154	36.75%
Long-term fatigue, stress, burnout	152	36.28%
Awareness of your qualities and benefits	146	34.84%
Getting to know a person you respect	123	29.36%

The specific factors influencing its change were examined in the case of creativity too (Table 3). The most frequently chosen factor was the *"pleasant study environment"* (65.87%). At the second place in terms of frequency is the factor *"good friends"* (63.48%) and the third place is occupied by *"good team and cooperation at school"* (42.48%). The presented factors together characterize the social aspect of the academic environment for students, which is supported by decision-making processes applied by employees and managers in the academic environment.

Table 3 The frequency of factors that influence the change of creativity; Source: own elaboration

Options	**Frequency**	**[%]**
Pleasant study environment	276	65.87%
Good friends	266	63.48%
Good team and interaction at school	178	42.48%
An important person (parent, teacher, friend, etc.)	173	41.29%
Long-term fatigue, stress	169	40.33%

3.2 Relationship analysis

As neither the names nor the number of factors influencing motivation (Table 2) was identical with the factors influencing creativity (Table 3), they were categorized. First, five categories were created, displayed in Table 5. Subsequently, for each of the two factors falling into one category, values representing their selection or omission by respondents (values 0 or 1) were calculated, expressing *the sum for the specified category*

(value 2 expressed the selection of both factors; a value 1 indicates that only one of the two factors was selected; and a value 0 expressed that no factor in the category was selected). These values can be interpreted as *the strength of a given category's influence on motivation or creativity.*

The software-based analysis confirmed the significance of the interrelationships in all the above areas (categories) in terms of their impact on motivation and creativity (Table 4). The detection of statistical significance was performed by calculating the Chi-Squared Test at a tolerable error of 5% and a confidence interval of 95%, the dependence was confirmed if $\chi^2 > c$; $c = 9.488$ at χ^2 (4).

For an overwhelming majority of respondents, the category *"pleasant study environment and study success"* influences both motivation (51.07%) and creativity (75.89%). Overall, out of 214 respondents who are motivated by the first category, up to 84.58% of them stated that this category also affects their creativity – *this finding confirms the validity of the HA_1 hypothesis.*

Table 4 Statistical significance of the influence of categorized factors on motivation and creativity; Source: own elaboration

Influence on motivation	Chi-Square Test	Influence on creativity
Pleasant study environment and successes in the field of study	χ^2	32,676
	P-value	<0,001
	Significance	**Yes**
Failures and negative impact of the environment	χ^2	50,174
	P-value	<0,001
	Significance	**Yes**
Friends and family	χ^2	14,068
	P-value	0,007
	Significance	**Yes**
Stress, fatigue, and health problems	χ^2	155,641
	P-value	<0,001
	Significance	**Yes**
Personal development	χ^2	32,318
	P-value	<0,001
	Significance	**Yes**

In the second category, *"failures and negative environmental impact."* a statistically significant relationship between the impact on motivation and the creativity of respondents was also revealed. As many as 85.95% of respondents from those who consider the second category to be ineffective in increasing their motivation (n = 242) stated that it does not affect their creativity either. As the second categorized factor is negative, it is favourable that the respondents agreed on its low impact on both motivation and creativity – *this finding confirms the validity of hypothesis HA_1*. Categorized factors 3 to 5 were also investigated in a presented way.

The conclusion is that the findings above represent a valuable basis for the setting of the decision-making process on motivation and creativity. If employees and managers strive to increase motivation and support creativity at the university via decision-making, the results suggest that semantically identical factors can be used to improve both processes.

3.3 Analysis of the current situation in the area of factors and methods supporting creativity

In companies, it is necessary to work with creativity. A prerequisite for this process is the identification of creative personalities and work with their creative potential. Each person has their own personality as well as different levels of abilities that are manifested in the action in different situations. Significant personality characteristics of members with creative potential include: perseverance, originality, analytical skills, imagination, curiosity, self-confidence, intelligence, entrepreneurial talent, optimism, etc. (Kováč, 2003).

Based on individual personal characteristics, the management can identify a team with creative potential. Figure 3 shows the influence of individual methods of affecting human potential on the creativity of people. Freedom and sufficient time for creativity are the most effective elements in influencing the creativity of employees.

Influence on creativity	**Preferences** 0 % → 100%
Freedom in work mode	
Plenty of time for creativity	
Possibility to choose tasks	
Information resources	
Management support	
Collaborative support	
The quality of the working environment	
Material motivations	

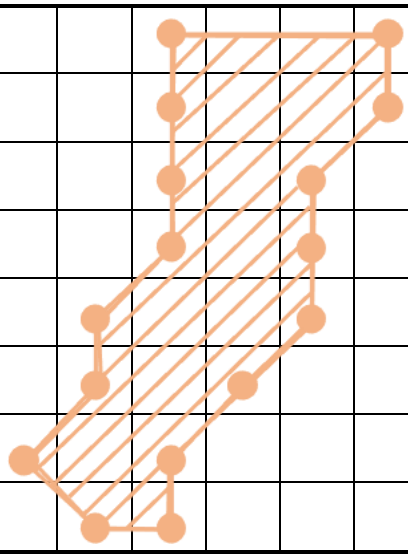

Figure 3 Preferences of supporting factors of creativity; Source: (Kováč, 2003)

4 Recommendations

The recommendations were created not only based on a detailed analysis of literature sources but especially on the interpretation of data obtained through a questionnaire survey. The purpose of this article was to create a comprehensive design consisting of two main parts: *(1) a model for the preparation and implementation of a creative* idea (Figure 4); *(2) an overview of recommended methodologies for promoting creativity.*

4.1 Preparation and implementation of a creative idea

As creativity can be described as an individual quality, it is appropriate to use the individual dispositions of a given person. The graphic representation and written description of the proposed *process of preparation and implementation of a creative idea*

is a tool that should help the implementer not only to effectively perform the assigned activity or meet the goal but also to introduce a new idea into the organization (Figure 4).

The proposed process consists of several activities divided into two groups. These are individual and group activities (Figure 3). All members of the environment should be involved in the process. These activities can be presented in more detail as follows:

- The beginning of the process depends on the knowledge of the topic in which the creative idea should be implemented. The implementer must have enough information and meets the preconditions for effective application.
- The second activity is characterized by the phrases "right place" and "right time". As this is a creative process that relates to the individual side of the implementer's personality.
- The third activity consists of the selection and subsequent application of specific methods that will support creativity. The choice of methods should also be based on the individual preferences of the implementer.
- Another activity is visualization containing three separate components. The process implementer should therefore be aware of: *(1) what medium is appropriate; (2) what form of materialization of the idea should they choose; (3) what elements they should use in drafting the proposal.*
- Once the idea has been recorded, it is possible to move on to the discussion. The first "discussion" should take place between the implementer and himself. This is followed by a discussion with colleagues who will provide feedback regarding the environment they are familiar with. Finally, it is a discussion with an unengaged person.
- After carrying out the activities presented above, the recording of one's own thoughts as well as the stimuli from the discussion should take place.
- The following activity consists of creating a proposal for a specific solution, where the ideas will be clearly interpreted via a document.
- Through the document processed in this way, the information can be easily conveyed to both superior and subordinate employees. The consultations should gather valuable comments on the proposed solution.
- In the light of the comments, the proposal should be adapted.
- The actual implementation of the proposed solution is based on the chosen procedure. A solution will be implemented in the form of introducing a creative idea.
- The whole process should be completed with an evaluation and feedback, which should be linked to all activities performed.The proposed process also includes such activities marked in the graphic representation by multiple framing. These activities can be performed repeatedly, at any other point in the process.

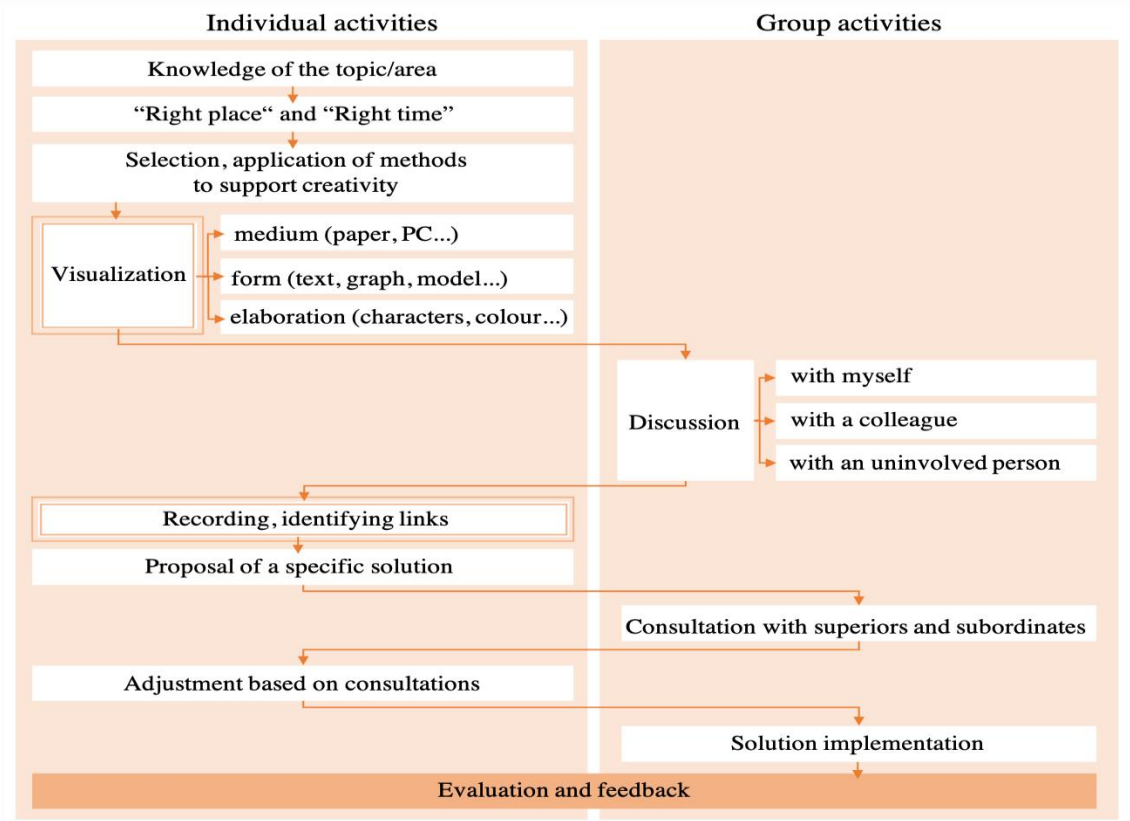

Figure 4 The process of preparation and implementation of a creative idea; Source: own elaboration

4.2 Methodologies to support creativity

Working with creativity is an essential part of the business environment. As part of the support of creativity, it is necessary to try to adhere to the principles for creating an atmosphere of trust within the team. The process of creativity can then be supported by methodologies which provide direct physical instructions on how to proceed in creating a creative environment. It is recommended to alternate the individual methodologies to ensure that team members do not get routine in these processes (Sherry et al., 2015).

Visualization – methods supporting the visual ability of creative thinking

- *Brainstorming* is a semi-controlled generation of ideas in a heterogeneous team composed of various stakeholders. It is a methodology of physical writing with visual accompaniment, where personal contact is preferred. This way of creativity allows team members to generate ideas without conditions and barriers (Sutton & Hargadon, 1996);
- *Crosstab method* is a morphological analysis that is in a structured form. It is based on creating a combination of the examined object parameters using tables;
- *Mind map method* replaces the classical notation of analysis and solution through a map of ideas. During the process the problem is written in the middle of the page, individual ideas are divided into branches, and different colours are used;

- In the *method of morphological analysis* each product or process is a system of its parts. The decomposition of an object into its simple components and their description by characteristic parameters enables in-depth analysis.

Discussion – methods of creativity management in verbal design

- *"And more" method* takes place within the team, with attention to each proposal. The organizer manages the whole team so that each topic is first elaborated in its positive aspects;
- *"Discussion 66" method* is preferred for larger teams. In this case, the innovation team is divided into six-member teams, each with its own spokesperson. It takes six minutes for each team to discuss and generate ideas. If new problems arise even after the proposals, the whole team is again divided into other six-member teams, and solutions are generated until the results without problems are presented;
- *Synectic method* is a form of guided discussion, the result of which are ideas obtained by combining seemingly unrelated and different elements as the results of an analogy using free association. The application of the method takes the form of a team meeting of professionally diverse participants and a leader;
- *6-word method* assumes that most activities and processes have common attributes., and these can be researched and analysed based on the following questions: What? How? Why? When? Who? Where? Again, this is a principled procedure as in brainstorming. After defining the problem, ideas are written on the record sheets, which are the answer to the relevant questions;
- *Method of incompetence* lies in the collection of opinions of non-experts, or experts working in other areas on the issue. A layman does not have so many barriers and therefore can make more use of imagination and intuition and thus bring a completely new creative solution.

All these methods are tested in business and organizational practice and represent proven methodologies for managing and working with the innovation team and its creativity (Ramp & Agogué, 2021).

5 Discussion

The necessary need for change – innovation is a consequence of progress and change in the competitive environment. If a company or organization wants to gain its audience and maintain its interest, it is necessary to change individual processes, products, and activities – to innovate. Creativity is a fundamental aspect of effective innovation, and it is the process of constantly combining and recombining the experience and knowledge gained so far to acquire, design a new solution that is more effective than previously available knowledge. A creative solution can also be defined as a solution to a problem or question that does not have an obvious solution and requires an increased concentration of ideas, experience, and knowledge to present improvements (TU Košice).

The research was focused on supporting the creativity of young people – current university students. The reason for this focus was their *future potential to support creativity in companies.* They will become the driver of innovation for the company in which they will work after their studies (Koman et al., 2018; Holubčík et al., 2018).

Support and management of creativity is an indispensable parameter of working with human potential. Management is made up of people and their capacities. The

primary goal of any organization should be to maximize the capacity requirements of individual team members. In this case, it does not matter whether the teams are in a business or university environment. Working with human potential should be the primary goal of streamlining processes at all levels of management. Motivation and creativity represent the innovative potential of companies and organizations, and for this reason, this topic is considered a constantly current area of development and exploration of its possibilities.

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Burnout syndrome and Coping strategies: knowledge, approaches, foundations concerning its incidence among entrepreneurs

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Abstract

The occurrence of the matter frequently points to health specialists; however, it is needed not to be indifferent in other professions. Burnout syndrome can affect anyone of us and certain differences in its occurrence are noticeable in personality traits, gender and in the behavior of entrepreneurs. It is a serious gamble for individuals so-called *high achievers*, who ignore that they work for a long time and take on burdensome tasks. Burnout syndrome has become a serious problem and entrepreneurs tend be withdrawn, alienated, unstable, disturbed and angry that leads to conflicts not only at the workplace. After all, stressful situations are conventional and learn entrepreneurs how to respond to them, forming a balanced approach to life. When and how coping strategies are applied depends on the context of how stressful the situation is. How urgent it is? Do we have control? Entrepreneurs use a mixture of strategies, depending on the situation and their state of mind. There exist other ways that burnout can be mitigated and avoided, while restoring a healthier work–life balance. We focus on the matter since it is linked with factors like social roles, occupation, expectations, or educational background. If stress sourcing from the factors is not controlled, it leads to problems like emotional overtiredness. Business behavior includes techniques of attitudes, behaving, or creating standards of behavior that should be accepted by all who are interested in any business processes. The basic ones are personal integrity, loyalty, appropriate communication, respect, professionality, probity. Sometimes it is decisive to have sufficiently developed personality traits or skills in every area of activity. What entrepreneurs say matters since every word matter – those who are aware of this, use the right words to influence coping skills in a positive way.

Keywords: Coping strategies; Burnout syndrome; Entrepreneurs; Occupation.

JEL Classification: M2, M5

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1 Introduction to subject matter

Burnout can affect anyone of us and what is more, differences are noticeable in its occurrence, especially personality traits and in the behavior of entrepreneurs. We chose to focus on this matter since it is confounded with other factors, such as occupation, educational background, social roles, expectations, or even political or economic realities (Maslach & Leiter, 2008). Publications regarding the burnout syndrome phenomenon are grounded on specific professions (Maslach & Leiter, 2008; Schaufeli et al., 2009; Galdino et al., 2016). What people do in the work is related to a role that they perform (Gross et al., 1958; Jackson & Schuler, 1985; Kahn et al., 1964). The main role of the entrepreneur is to combine resources to create revenue from a market opportunity – the role which intrude predefined structures and systems for value creation (Kirzner, 1979; Schumpeter, 1936; Shane & Venkataraman, 2000). The role can facilitate benefits, the improvement of wealth, but it is oriented to generate value from resources of organization (something that must be successfully accomplished to meet the entrepreneurial role). When performing the role well, entrepreneurs cope well with disequilibrium, whether passive (Kirzner, 1979) or active (Schumpeter, 1936).

Trading is not just about getting rich quickly – at the expense of the others. It is expected that entrepreneurs should know to control their emotional maturity, have enough motivation, manifest assertive behavior, has good communication skills, be purposeful so they set a favorable example for others. It can be a valuable tool for entrepreneurs as well as for companies. Business success depends on knowledge of psychology, as well as on choosing the right strategy. This is important for more effective gratification of needs and the choice of appropriate incentives and marketing tools. Business behavior includes the question of why and what product customers buy, how often and where they consume it or use it, how long products serve them, when and why they stop using it, and how they put it away (Koudelka, 2010). But obviously, business existence is not just about offering tangible products and material ones. It is something more what businessmen may offer.

The authors assume that entrepreneurs should possess a number of psychological characteristics to a greater or lesser degree than their corporate counterparts (Sexton & Bowman, 1985). These can lead to serious problems in delegation, communication, or it can cause intense stress and loneliness of the entrepreneur. Given the nature of their role as described earlier, entrepreneurs have to cope with potential role conflicts, employ a universal perspective for avoiding role ambiguities, and deal with role overloads when systems intrude on structures designed to create value. As such, stress reactions and insufficiencies are an inherent part of the entrepreneurial role (Wincent & Örtqvist, 2006).

Business behavior is closely linked to the psychological processes of personality. Anyone could be a businessperson; it is supposed to be talkative and extroverted. That is what people think, but of course, this is not 100% true. According to Vanko (2011), it is a substantial to have a true spirit of a salesman and to be interested in maintaining talent to perform such activities and to ensure long-term relationships based on trust and be stress-proof. Several successful organizations built a reputation on the work of efficient salespersons who can produce excellent results and a truly high level of morale (McClelland & Burnham, 2003). In the field of business, it is an excellent asset to master the psychology of sales, a typology of customers, to listen actively, to understand different types of conversations, to overcome customer's objections with reasonable arguments, to build mutual trust, to learn assertiveness while meeting an aggressive client, to master techniques of initiating business conversations and small talk (Straňák, 2020). Success will arrive when the way of thinking of people in the business sphere changes.

Entrepreneurs' well-being receives growing attention (Wiklund et al., 2019) since it is linked to a range of positive outcomes including certain performance (Stephan, 2018)

and feeling successful (Wach et al., 2016). Yet not all stressors appear to have such universally adverse effects on entrepreneurs. For example, in a study across 15 European countries, Millán et al. (2011) find that long working hours positively affected work satisfaction (a form of work-related well-being). Moreover, entrepreneurs even enjoyed the challenge that work stressors posed (Baron et al., 2016). We realize that these findings challenge traditional view of stressors that impair well-being – theoretical understanding of stress of entrepreneurs is underdeveloped. Stressors are generally defined as the stimuli which induce the stress processes that result in psychological strain like tension, anxiety or exhaustion (Podsakoff et al., 2009). Work stressors (known as job demands) are physical, social, organizational aspects of the work that require sustained mental or physical effort and are associated with physiological and psychological costs (Demerouti et al., 2001). For instance, emotionally demanding interactions with clients or customers, or a high work pressure (Bakker & Demerouti, 2017).

2 Theoretical views of Burnout syndrome

Each of us is unique and, therefore, the symptoms of burnout syndrome vary from person to person. 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). Burnout has become a serious problem and we can see that businessmen suffer from feelings of being alienated or angry, which can lead to workplace conflicts (Maroon, 2012). Work burnout is a type of overstraining that results from prolonged exposure to chronic and job-related stressors (Purvanova & Muros, 2010).

In 2018 was burnout syndrome included in the 11th Revision of the International Classification of Diseases. It was described as a syndrome resulting from unsuccessfully managed, chronic work stress that activates cynicism, emotional exhaustion, withdrawal, loss of idealism, unsuccessfulness, feelings of unproductivity, 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). Burned-out individuals distance themselves emotionally and cognitively from their work activities, and often experience high levels of chronic fatigue (Bakker & Costa, 2014). The widespread problem affects dissimilar professions but mostly medical or doctoral students, lawyers, nurses, athletes, artists, teachers, early-career people, managers, people in leading positions, businessmen, and individuals who put the greatest effort into passion or work – known as perfectionists (Brubaker & Beverly, 2020; Carter, 2013). 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 aspects of Emotional Exhaustion, Personal Accomplishment, Depersonalization.

Self-identity, defined as a perception of individual of himself as he relates to his environment (Hall, 1972), is the foundation of roles. People have several sub-identities, which must be accounted for to understand the nature of roles. Miller (1963) was the first to introduce sub-identity, defined as aspects of the total identity engaged when a person is behaving in a given role. In the entrepreneurial context, entrepreneurs possess several sub-identities and attribute themselves to several roles above and beyond that of entrepreneur. Besides being new venture creators, entrepreneurs can hold roles outside the venture but still in the realm of business (e. g. salesperson, accountant). They may also be volunteers if they participate in community life or students if they continue in education. Moreover, they hold family roles, such as partner, parent, or housekeeper. In contextualizing role of overload, we imagine that role overload can result from the lack

of time to finish the job tasks, being rushed to perform the work tasks, or having no free work time (Wincent & Örtqvist, 2006). Social roles seem to be relevant in the stressful life experiences of women and men. It differs in the frequency of using of social roles and their experiences, e. g. women's position in the family and at work is less favorable since they carry a greater burden of many limitations (Matud, 2004). Anbumalar (2017) adds that women and men are stressed by different types of situations – men listed work-related events and finances as the main sources of their stress, and women had the tendency to list family and health-related situations.

Entrepreneurs may transfer positive emotions through the tone of positivity in the workplace, which improves cooperation and decreases conflicts. Also, their followers in the positive leadership condition generate more original and valuable problem solutions (Morganson et al., 2014). It should be used in appropriate 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 also (Todd & Binns, 2013).

The burnout syndrome is characterized by a model of emotional suffering. It includes the three main categories of symptoms, the first aspect is Emotional Exhaustion (EE) 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; Depersonalization (DP) or Cynicism, means 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 the others, who are considered to be callous or dehumanized, may lead members of staff to see the clients, colleagues, patients, etc., as someway deserving of their troubles. The aspect of Personal Accomplishment (PA) characterized as a negative self-evaluation, loss of satisfaction and motivation, by a low efficiency on work-related actions (Fontana et al., 2020). The Harvard medical school study reported that about ninety-six percent of senior executives feel burned out. The remaining percent describes the state as an extreme burn out (Nisen, 2013). There exist three types of burnout, overload syndrome – frenetic, due to perpetual demands and responsibilities, then under-challenged syndrome – demotivating, produces feelings that everything is developing in the bad direction, then it comes total apathy, and the last one is worn-out syndrome – wear out, brings chronical or repeated need to avoid or ignore all duties (Gold, 1984). Burnout is considered as 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 a free time properly, and learn to be assertive means a perfect help from the perspective of prevention (Kohoutek, 2018).

It was conducted a study with the aim to see *what factors lead to a higher level of burnout* among entrepreneurs. It observed whether job passion, destiny beliefs (the belief that a successful carrier is ‘meant to be’), and job fit make entrepreneurs more likely or less likely to experience some stages of burnout. In a region in the southwest of the United States, were surveyed 326 members of the largest entrepreneur networking organization in the world, BNI (Business Networking International). Within the sample, almost 60% were male and the average age was forty-seven years. All individuals worked in a range of industries (finance, services, trade, manufacturing). But 95.6% of respondents worked in small businesses with approximately two hundred workers. The study showed that the majority of entrepreneurs (4.26 on a five-point scale) reported a high level of job fit, 25% of entrepreneurs felt relatively burned out, while 3% felt strongly burned out. The individuals who reported a high score of obsessive passion (2.58) were more prone to say that they experienced burnout than those who reported a high score of harmonious passion (3.90). The obsessively passionate individuals explained that work was emotionally

draining. Among these individuals were some with an unchanging mindset and more prone to burnout (Mol et al., 2018). Considering this, we may understand the seriousness of associations between challenging demands of entrepreneurial work and the resulting stress, often causing mental exhaustion, depersonalization or severe health problems.

Factors such as too long screen time and hours of work, poor personal interactions, pollution of the air, poor food quality, feelings of a total loss of meaning in professional life often contribute to it (Beck et al., 2011; Koutsimani et al., 2019). Research papers appear to distinguish between existential and circumstantial types of burnout. The first one is based on the loss of meaning in professional life, poorer communication with clients, colleagues, or employees, low sympathy for professional identity, lack of self-affirmation. The second one is based on workplace requirements, disrespect for personal life, or not making time off (Ghanimeh, 2019). A report about professional identity, burnout syndrome, and work in managers investigated the argument that a weak confirmation of professional identity of managers is linked with a higher stage of burnout syndrome. Conclusions showed an important connection between the syndrome and a weak level of confirmation of certain standards of the professional identity, mostly gratitude and work requirements (Hamouche & Marchand, 2021).

3 Theoretical views of Coping

Coping is an evolving process that changes in response to the context, in an effort to manage internal or external demands. Successful coping involves the ability to adjust and change coping strategies in a way that facilitates positive results (Lazarus & Folkman, 1987). According to Hybenová (2010) coping is a disposition trait or addictive preference for approaching every problem but the others believe that it is a real effort or particular strategies which are applied in different types of burden. Coping strategies begin in early childhood with physiological and psychological responses to stress. Research using psychobiological models reports that sensitivity to input from the situation in early life contributes to physical and mental health problems as adults (Wadsworth, 2015)., and the occurrence of anxiety negatively influences the way how entrepreneurs face stressors everyday which can be related to the usage of ineffective strategies (Govêia et al., 2018). According to Roger et al. (1993) categorized coping strategies as *adaptive* that include rational coping; and *maladaptive strategies*, which include emotional coping.

Unhelpful coping techniques vary in terms of frequency of use and degree of undesirable impact. Maladaptive coping techniques include: *substance abuse, rumination* (extreme and ongoing focus on “depressive symptoms and on the implications of those symptoms”), *emotional numbing* (shutting down feelings to provide relief from stress and anxiety, *escape* (changing behavior to avoid the situation and difficult feelings), *intrusive thoughts* (involuntary ideas and thoughts that may be upsetting and difficult to manage), *daydreaming* (*maladaptive daydreaming* is a form of addiction to daydreaming that can last for hours at a time), *procrastination*, *self-harm*, *binge eating*, *blaming and self-blaming*, *behavioral disengagement*, *risk-taking behavior*, *sensitization* (excessive worrying and hyper-vigilance), *safety behaviors* (tendency to rely on someone, something to help cope with extreme anxiety), *anxious avoidance* (Thompson et al., 2010; Enns et al., 2018; Wadsworth, 2015; Tapu, 2016). Long-term use of such coping styles – and there are many others – is unhealthy. Such strategies are associated with high levels of psychological distress, including anxiety and depression (Thompson et al., 2010). Coping is defined as an effort of an individual to handle demands that are perceived as exceeding our forces (Monat & Lazarus, 1991). According to Lazarus and Folkman (1984), two major types of coping strategies exist in general, first as *problem-focused* coping

strategies and second *emotion-focused* coping. Problem-focused coping is much more effective, it involves making a direct effort to change or modify stressors from the external environment, e.g., learning some new skills or finding alternative solutions. Emotion-focused coping is less effective because it involves the change of individual appraisals of the stressful situation with the aim to eliminate the necessity to take actions, e.g., wishful thinking or seeking any emotional support. Coping strategies characterize cognitive and behavioral strategies used to control strains, crises, and conditions that are assessed as disturbing (Carr & Pudrovska, 2007). To put it another way, coping can refer to reasoning and acting which people use to accomplish specific demanding situations as well as their emotions (Janney, 2017). Emotional management can be utilized in a broader range of situations. For instance, regulation of emotions may include managing positive emotional reactions such as smiling whilst we meet somebody, but coping strategies are restrained by reactions to stressors (Compass et al., 2020). Coping strategies are linked with decreasing undesirable emotions, intensifying of perception of optimistic emotions, and empowering adaptable responses of people (Carlson et al., 2015). For example, emotion-focused strategies of coping incorporate self-blaming, positive reassessment, or venting. Positive reassessment means an adaptive self-regulatory strategy focused on emotions linked to insignificant pessimistic impacts (Garnefski & Kraaji, 2006). The application of strategies focused on emotions can improve self-adaptation; these strategies increase the ability to overcome potential difficulties the self-confidence (Bisri et al., 2021).

Coping may be rationalized as persistently changing determination of cognitive and behavioral personality to regulate specific external or internal requests considered as demanding or exceeding the strength of the individual (Janney, 2017). Prior studies have surveyed relationships between employee burnout and styles of leadership. It was detected that styles of leadership are determined by competence to implement ethical or compassionate problem-solving attitudes, sympathize with workforces or collaborators, by the ability of a leader to participate in active listening, communication, the ability to reveal willingness and receive recommendations associated with a lower prevalence of burnout syndrome (Kelly & Hearld, 2020). The study about the relationship between leadership procedures and the working life of managers revealed the importance of a transformational leadership style. It consisted of empowering leaders to use suitable methods to address the accurate level of control and relevance of remuneration in order to optimistically affect the gratification of work of a manager (Lee & Cummings, 2008). Although directors do not place requirements on workers outside of business hours, they can barely reach a psychological rest, generally when they realize that a manager may get in touch with them at any moment. It is beneficial when managers notice symptoms of anxious employees, as unfinished activities, reduced productivity, diminished quality of work, or missteps (Wilkie, 2020). All issues generate a working strain and a final stage of burnout often incorporate handling with a high level of personal stress, conflicts with colleagues, family members, exceeding workload, uncertainty in life, violence, or abuse from colleagues, clients, ambiguity or role conflict, insufficient access to education, dissatisfaction with work-life balance (Cañadas-De la Fuente et al., 2015).

The overall success of an organization and its managers cannot be achieved only by implementation a particular business strategy – it should be supported by human resources (Susanto, 2016). Appropriate strategies should encourage engagement and reduce manifestations of burnout from occupation. Some concepts are expensive but demonstrate a significant impact (Shanafelt & Noseworthy, 2017). A study about certain coping strategies and the perception of employees of organizational work-life balance programs indicated that individuals with positive life coping strategies and attitudes were

more efficient in achieving overall well-being (Zheng et al., 2016). In other words, coping can refer to thoughts and acts that entrepreneurs use to accomplish a specific stressful situation as well as their emotions.

4 Discussion

Entrepreneurs suffering from depression or stress tend to focus disproportionately on negative experiences while failing to recognize positive ones – on the other hand, activities can seem pointless and hopeless. While reactions to situations are emotional, the strategies are frequently avoidant, removing the need for engagement with people and situations (Beck, 2011; Orzechowska et al., 2013). This goes with thoughts like *I am not going to apply for this job because probably I will not get an interview anyway*, or *I am not going to text my friend because he will not want to meet me; a*nd the stress resulting from the thoughts threatens career of entrepreneurs; avoiding small talk, not smiling, or poor dressing (make the individual less visible) are situations when individuals need to realize positive qualities, identify automatic thinking, create effective solutions to problems and of course learn new skills of effective coping. *Approach-oriented* coping focuses on changing situations to ones that are less stressful (Joseph, 2013). That is why we suggest to entrepreneurs to engage in more appropriate approach-oriented behavior that focuses on managing, reducing, or eliminating stressors. Literally replace negative thoughts with healthy, positive ones. Sutton (2020) suggests *challenge irrational thoughts* via the Cognitive Restructuring Sheet that use Socratic questioning what is a series of focused and open questions usually between two people. Also, he suggests trying the Decatastrophizing Steps Sheet that uses five items of taking person through deconstructing a catastrophe. We found that really very interesting and highly effective as a good start to effective coping. When a difficult situation happens, entrepreneurs can distract themselves from negativity through favorite music, meditation, breathing techniques, writing down thoughts, talking to relatives, etc., since we believe that these strategies have a calming effect and redirect attention away from the stressor. We also believe that very effective for entrepreneurs could be literally *breaking the cycle of negative thoughts* as they arise – the domino effect of negative thoughts will not follow. Shapiro (2020) says that confronted by difficult situations entrepreneurs have a tendency to respond by either increasing their *self-esteem* or deepening their *shame*., and it does not work at all. Instead, it creates an opposite biological response of releasing hormones of stress, norepinephrine, cortisol that distract cognitive flexibility and remove capacity to learn. Based on this fact we suggest to entrepreneurs do not repeat the same mistakes and start to learn from them. Use it as new coping strategy even if it will be not easy. We suggest implement self-care habits, practice saying no and setting boundaries, schedule regular breaks through the day, separate work from personal life (not checking e-mails after work hours), avoid multitasking whenever you are feeling exhausted and worn-out, practice favorite sports, do art, devote time to favorite hobby, take a walk-in nature, etc.

Work burnout is a condition that can be difficult to treat. But we understand that not everyone can quit the current occupation just to avoid stress. After all, stressful situations are a part of life, they are natural and essential, encourage us to develop and respond to stress, and to form a balanced approach to life. We become more independent and develop a toolkit of coping skills – more or less appropriate – to handle demanding situations.

There exist situations when not only entrepreneurs need help, support, adjustment of work conditions, and strengthening of competencies to solve problems. Even if empathetic compassion and communication exist, treatment is always the most effective.

Satisfaction is higher, the achievement of goals is more probable. We suggest at least to think about talking to a mental health provider or a doctor since symptoms appear to be related to burnout syndrome, e.g., have the constant feeling of lacking energy, dragging yourself to work, having trouble getting started, lacking satisfaction from any achievement, disturbed sleeping habits, feeling disillusioned about work, using drugs or alcohol to feel better, etc. (Shanafelt & Noseworthy, 2017). We recommend to entrepreneurs to find resources or perspectives to overcome difficult situations, to ensure a sufficient number of staff, to reduce and delegate administrative activities, to create an adequate workload, or to select high quality employees. Highly advised is to strengthen the occupational programs aimed at reducing the effects of hazardous work conditions, which support the development of burnout and formation of different long-term and mid-term health complaints (Useche et al., 2019). A direct prescription or standard treatment for burnout does not exist, the prevention is the best cure that may strengthen organizational performance and the life of managers (Brown & Quick, 2016). We suggest as preventive coping strategies to stop thinking negatively about yourselves as soon as possible, try to avoid any form of technologies and just relax by being offline from e-mails, also be grateful for the simplest things in life since we believe that the development of a sense of gratitude brings a better mood, more energy and individuals may feel much better not only mentally. Several factors of burnout are related to the work and lifestyle of the manager. Some preferences and tendencies to which they are accustomed, contribute to how managers react in demanding situations. Mostly, they are exposed to an increased risk of burnout syndrome, originated from e. g., unfulfilled goals, perfectionism, lack of self-belief, pessimism, bad relationships among colleagues or employees, emotional instability, mutual rivalry, which motivates to achieve better results but usually ends as a failure, loss of motivation, fear of risk-taking, etc. The point is that female or male managers may have a totally different approach to work since they handle the same situations differently. The style of work of every entrepreneur is slightly influenced by previous experience and personality traits. The foundation of every success are strengths of entrepreneurs, appropriate coping strategies in the certain time, well-used and flexible methodologies. The entrepreneur must be a salesperson, money manager, negotiator, dispute settler, spanner, etc., and these overlapping demands can lead to overburden, depersonalization, emotional exhaustion, or low personal accomplishment. Some entrepreneurs take time to recharge to deal with stressful work. We suggest that a key pathway of impact of stressors on well-being of entrepreneurs is via recovery from working non-work time and impairing detachment; that is, high levels of stressors deny entrepreneurs their time to recharge. Sonnentag and Fritz (2015) add that recovery is a mechanism that helps individuals to stay healthy and engaged, despite extreme levels of work stressors, by allowing the body to reset and avoid physiological accumulation of stress. We believe that one way to recover from work stress is by detaching mentally from work during non-work time, and not thinking about work in the evening.

5 Conclusion

As work of entrepreneur is highly uncertain and demanding, it might be difficult to ease high levels of work stressors. Instead, they might reduce the negative impact of work stressors on well-being by completely disengage from work during non-work hours to enable recovery. Psychological detachment from work appears to be powerful approach for entrepreneurs to sustain high well-being. Possible strategies include leisure activities, meditation and mindfulness, and physical exercise or socializing. Nevertheless, it might be rough for entrepreneurs to stop work-related thinking in the evening. They

can try to turn perseverative thinking into reflection on the positive aspects of their work. Such positive reflection might allow reappraisal of stressful work situations, potentially leading to stress reduction. Finally, mentors, coaches, and board members of entrepreneurs should encourage them to care for their well-being and to make time for recovery to protect it. Eventually, well-being of entrepreneurs is a driver of good performance. We conclude that entrepreneurs should support the necessity of increasing directed prevention and make time for relaxation, sports, activities that help to feel happy, not frustrated. Although the issue of burnout considers predominantly medical workers, we tried to point out another field of occupation that brings a burden on its workers – entrepreneurs.

Like other research we referred to in the paper, the study has certain limitations, resulting from self-expression and self-selection. The findings that point to a situation in connection with burnout, do not give the impression that the answers of respondents were embellished 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, or in family habits in the upbringing. For example, the specificity of the position of women in society, different working conditions, the legal framework for the performance of the managerial profession, etc. These could explain inconsistent findings of the role of gender in the incidence and intensity of burnout symptoms in entrepreneurs. We plan to compare burnout syndrome and coping strategies in terms of gender or demographic perspectives, and we propose the implementation of meta-analyzes that provide conclusions.

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Determinants of time allocation of self-employed persons in Slovakia

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Abstract

The paper deals with the time allocation of self-employed persons in Slovakia and determinates that influence it. Self-employed is a person who perform independent work for a profit (business, entrepreneurial activity). Each self-employed person must divide the time during the day into the time devoted to the performance of the business (time for paid work) and other activities. The main aim of this study is to analyse the time allocation and to identify the main factors that influence time allocation of self-employed persons. The time allocation is associated with the division and use of 24 hours a day into paid work, unpaid work, free time, and other non-productive activities. The unique method based on time diary (modified Time Use Survey methodology) was used to collect data on time allocation and data on 161 self-employed persons were included in the analysis. Descriptive statistics as well as correlation analysis have shown that gender plays an important role in the time allocation of self-employed persons. The presence of children under 14 years of age in the self-employed person´s household has also a significant impact on the length of time in paid work. On the other side, age was not confirmed as a significant factor of time allocation of self-employed persons.

Keywords: self-employed persons; paid work; unpaid work; free time; non-productive activities; time allocation.

JEL Classification: J22, L26, M21

Article Classification: Research article

1 Introduction

Time as a scarce source has the same limit for everyone, but its use is considerably differentiated. This applies to all components of the day - paid work, unpaid work, as well as free time and other non-productive activities of the individual. Time is one of the scarcest sources available to self-employed persons (Cooper et al., 1998). As part of their

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business activities, they have to decide on a daily basis how much time they devote to business and how much for personal life and care for the household. Their decisions on time allocation are not influenced by legislative restrictions, but reflect their current needs, the life cycle phase of their business, the availability of human and other resources, but also the requirements of other members of the household in which they live. Time allocation thus represents an important attribute in the life of self-employed persons, which requires specific attention.

Several studies and research deal with the issue of time distribution of individuals from different perspectives. In their study, Bhat and Misra (1999) developed a model for dividing the total weekly time of individuals between activities performed at home and activities performed outside the home, separately for working days and weekends. The age of the individual appears to be one of the most important factors determining time allocation. Working hours on working days is another important factor in time allocation. Aguiar and Hurst (2007) focused on the time allocation primarily from the leisure time point of view. In addition to gender, education had an impact on increasing leisure time. Bittman and Wajcman (2000) focused on the leisure time of men and women in Australia and selected OECD countries. Nässén and Larsson (2015) pointed out that Europeans tend to prefer leisure time to higher income (which is usually associated with longer time in paid work).

Several surveys focus on the allocation and use of time from the perspective of families (Lewis & Cooper, 2005) and in terms of the relationship between paid work and family, or the balance/imbalance between paid work and private life. Bailyn et al. (2001) reported that many working adults, especially single parents, and those living in dual-income families, have difficulty providing the daily attention needed to maintain the well-being and satisfaction of family members, including themselves. Caproni (1997) focused on work-life balance in families with two incomes and two children under the age of four. Smithson and Stokoe (2005) elaborate the interrelationships between gender and flexible working conditions, as aspects of work-life balance. In his study, Thornthwaite (2004) pointed that total working time, availability of part-time work and flexibility are the key aspects of work-life balance. Major et al. (2002) compiled and tested a model of factors/predictors of working time and the relationships between the length of time in paid work, the interference of paid work in family relationships and the psychological difficulties of employees.

In recent years, several studies have focused on differences in the allocation and use of time between men and women (including self-employed ones). According to many studies to date, gender is a significant factor in time allocation. Hagqvist et al. (2016) analysed the allocation and use of time of men and women in Sweden and compared the allocation and use of time between self-employed persons and employees. Their results show that self-employed women and men distribute and use their time during the day in a more gender-traditional way than employees use. Thriveni and Rama (2018) analysed the impact of demographic variables on women's work-life balance. They pointed out age, work experience, marital status, income, family type (nuclear family or extended family) and the number of dependents have a significant impact on women's perception of work-life balance. Gurley-Calvez et al. (2009) examined the amount of time that self-employed women use for paid work and childcare and housework. Their results suggest significant differences in time for paid work, childcare and domestic activities by gender and employment sector. Maeda et al. (2020) pointed out that women entrepreneurs are more likely to lack sleep than men entrepreneurs are. The results in European conditions point to other specific factors of time allocation of self-employed persons. Hyytinen and Ruuskanen (2007) found that self-employed people work more hours per day but also in

the evenings and on weekends than employees. Gimenez-Nadal and co-authors (2018) found that self-employed mothers spend less time on paid work and more time on non-productive activities (such as sleeping, eating) and leisure activities during the working day than employed mothers.

A summary of the main factors related to the time allocation of self-employed persons is included in Table 1.

Table 1 Factors influencing time allocation; Source: own elaboration

Authors	**Factors influencing time allocation**
Bhat and Misra (1999)	age, working time, number of small children and adults in the household, gender, commuting time, paid weekend work
Aguiar and Hurst (2007)	gender, education, marital status, parenthood
Nässén and Larsson (2015), Nie et al. (2002)	gender, marital/ family status, age
Thornthwaite (2004)	working time, availability of work for shorter working hours, work flexibility
Hagqvist et al. (2016)	employment versus self-employment
Thriveni and Rama (2018)	age, work experience, marital status, income, type of family (nuclear family or extended family), number of dependents
Gurley-Calvez et al. (2009)	gender, employment sector, employment versus self-employment
Gimenez-Nadal et al. (2018)	employment versus self-employment, parenthood, gender
Hyytinen and Ruuskanen (2007)	employment versus self-employment, parenthood

In this article, we focus on time allocation of self-employed persons and identification of factors that determine it. Self-employed persons represent a specific group of individuals because there are no any legal limitations concerning the time they can dedicate to paid work (business activity).

2 Material and methods

To meet the aim of the paper we needed to gather data on the distribution of the time during the working day and free day. In Slovakia, there are no official time use surveys In 2017, a multidisciplinary team of researchers at the Faculty of Economics, Matej Bel University in Banská Bystrica conducted an original research focusing on determining the time that individuals devote to various activities during the working day and free day. The research was based on the modified Time Use Survey methodology and data was collected by the means questionnaires and time diaries.

The survey was conducted in March 2017 and 833 households were included in the research. Within the households, 1,767 individuals (members of households) were interviewed. Households were personally visited and interviewed by volunteer students (students were trained to ask questions and to collect the data). Each student interviewed three different households: one household from Bratislava or Western Slovakia Region, second from Central Slovakia and the last from Eastern Slovakia Region. We divided all acquired data into two databases, namely database of households´ responses and database of individuals´ responses (the research was conducted as part of the VEGA project No. 1/0621/17). For this article, we use data from the database of individuals´ responses.

From all 1767 individuals, self-employed persons represented 9.1% (a total of 161 self-employed persons; 110 men and 51 women).

We used IBM SPSS statistical software, version 25 and Jamovi, version 1.2.27 for data processing. We used descriptive statistics and correlation coefficients (nonparametric Spearman coefficient) for statistical data processing. We tested the hypotheses at the significance level $\alpha = 0.05$.

As part of the survey of the allocation and use of time, we focused on all four categories of activities during the day - time spent in paid work (including business) and commuting to and from work, time spent on unpaid work, time spent on free time activities and time spent on other non-productive activities.

The questionnaire and time diaries used for data gathering were based on the classification of activities according to HETUS 2008 (European Communities, 2009). Table 2 provides an overview of the activities involved in the 2017-time allocation survey.

Table 2 List of activities included in 2017 survey; Source: own elaboration

Group of activity	**Included sub-activities**
Paid work	Paid work
	Commuting
Unpaid work	House case
	Children car
	Adults care volunteering
Free time	Leisure time
	Cultural and social activities
	Sport
	Utilisation of modern technologies
Other non-productive activities	Sleeping
	Personal care

3 Results

3.1 Time allocation of self-employed persons

We analysed time allocation of self-employed persons during the working day (when the paid work prevails), as well as during free day. In the Figure 1, there are results describing the time allocation of self-employed persons, divided by gender, during the working day and during the free day. The time allocation is described as percentual part of the day corresponding to each group of activity (it means paid work, unpaid work, free time, other non-productive activity).

During the working day, self-employed men dedicate up to 41.67% of the day on paid work, while self-employed women 37.05% of the day. Both, self-employed men and women are involved in business activities also during the free days (men 2.34% of the day, women on paid work. Businesswomen spend a shorter part of the day on paid work (1.37% of the day). We assume that this is related to the greater freedom of self-employed persons, who can regulate their time spent in business, as they are not limited by employer requirements or restrictions of the Labour Code. However, they must fulfil their business obligations even during the free days.

In the area of unpaid work, unpaid work of women prevails, both during the working days and free days. It is interesting that businesswomen devote a relatively large part of the day to unpaid work (10.79% during working days and 23.11% during free days). This may be related to a greater degree of time freedom and better arrangement of work-life balance.

Interesting findings relate to free time activities. Self-employed men and women devote only a small part of their working day to free time activities (14.55% and 11.53% of the day). One would expect that self-employed persons will be more focused on free time activities, which should contribute to their regeneration after the hard time devoted to entrepreneurship. However, self-employed men seem to do paid work and self-employed women unpaid work at the expense of free time. In this regard, it would be interesting to find out why self-employed women do not substitute (or do not substitute to a greater extent) unpaid work with market substitutes. During the free days, the situation is changed for both self-employed men and women (men devote 35.55% and women 28.6% of the free day for free time activities). The difference between men and women is again in favour of unpaid work (in case of women).

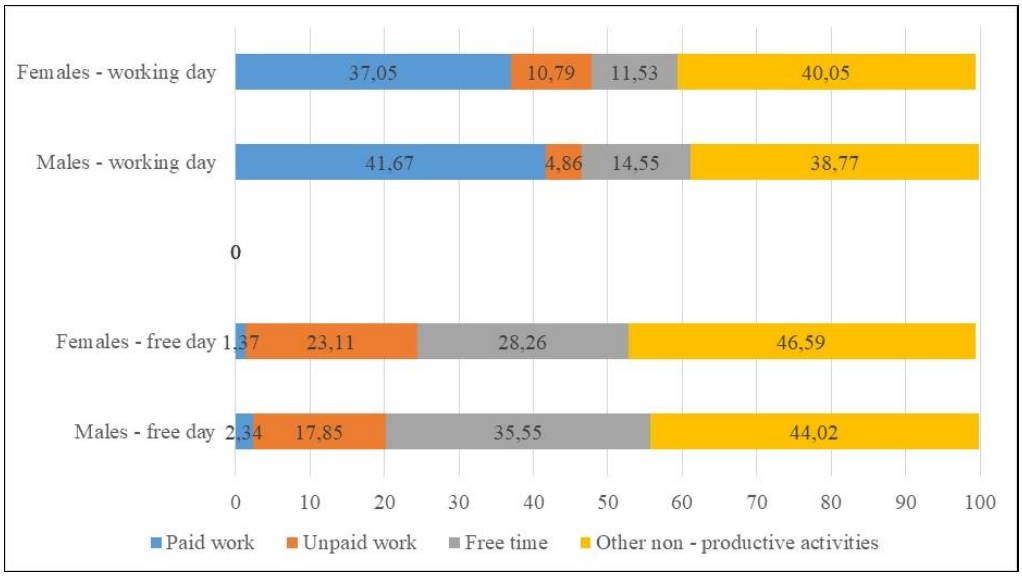

Figure 1 Time allocation of self-employed persons during the working day and free day, divided by gender (in %); Source: own elaboration

Other non-productive activities are performed by both men and women equally during the working day (slightly in favour of women). Men spend 38.77% of the working day in these activities and women 40.05% of the working day. Even during free days, women perform these in a greater extent (46.59% of the day, while men 44.02% of the day). In the case of self-employed men, there is a reduction in the time allocated to other non-productive activities due to the higher time burden (both during working days and free days).

3.2 Determinants of time allocation of self-employed persons

In addition to identify time allocation of self-employed persons, we were also interested in the determinants that affect their time allocation. We analysed the influence of various determinants by the means of correlation analysis. For the correlation analysis, we set the null and alternative hypothesis, as follows:

- *H1 = there is a relationship between variables (positive or negative);*
- *H0 = there is no dependence between variables (they are independent).*

We test the hypothesis at a significance level of $\alpha = 0.05$. If the p-value is lower than the significance level of 0.05, we reject the null hypothesis and accept the alternative hypothesis (the variables are dependent). Since not all data obtained meet the assumption

of normality, we used a nonparametric (Spearman's) correlation coefficient to determine the degree of dependence. If the Spearman correlation coefficient acquires values from -1 to 0, there is a negative dependence between the variables, if values from 0 p 1, there is a positive dependence between the variables.

When selecting the analysed determinants, we relied on the research carried out so far, which focused on the time allocation of entrepreneurs and its determinants. The most usual factors (variables) of time allocation are the presence of dependent children (up to 14 years) in the household (Thriveni & Rama, 2018; Gimenez-Nadal et al., 2018; Hyytinen & Ruuskanen, 2007; Virkebau & Hazak, 2017), gender (Gurley-Calvez et al., 2009; Gimenez-Nadal et al., 2018), age (Thriveni & Rama, 2018), length of time in paid work (Thornthwaite, 2004; Major et al., 2002) and income (Thriveni & Rama, 2018). In addition, we included time spent on unpaid work, time spent on leisure activities and time spent on other non-productive activities in the correlation analysis. The result of the correlation analysis is displayed in Figure 2.

Correlation Matrix

		No. of children up to 14		Income		Age		Gender		Paid work		Unpaid work		Free time	Other non-productive activities
No. of children up to 14	Spearman's rho	—													
	p-value	—													
Income	Spearman's rho	0.176	*	—											
	p-value	0.024		—											
Age	Spearman's rho	0.128		-0.014		—									
	p-value	0.101		0.862		—									
Gender	Spearman's rho	0.057		0.057		0.234	**	—							
	p-value	0.461		0.471		0.002		—							
Paid work	Spearman's rho	-0.191	*	0.079		-0.036		-0.312	***	—					
	p-value	0.014		0.312		0.646		< .001		—					
Unpaid work	Spearman's rho	0.381	***	0.006		0.102		0.311	***	-0.427	***	—			
	p-value	< .001		0.940		0.191		< .001		< .001		—			
Free time	Spearman's rho	-0.149		-0.153		-0.056		-0.200	**	-0.359	***	-0.312	***	—	
	p-value	0.055		0.051		0.475		0.010		< .001		< .001		—	
Other non-productive activities	Spearman's rho	-0.095		-0.107		0.094		0.174	*	-0.461	***	-0.153	*	-0.002	—
	p-value	0.225		0.171		0.228		0.025		< .001		0.049		0.980	—

Note. * p < .05, ** p < .01, *** p < .001

Figure 2 Correlation analysis; Source: own elaboration

Using the correlation analysis, we determined the dependence of various components of the day (paid work, unpaid work, free time, other non-productive activities) and selected socio-demographic factors. We found that for self-employed persons there is a negative correlation between the length of time in paid work (business activity) and the number of children under 14 in the household (the more children under 14 live in the household of self-employed person, the less time self-employed one spend in paid work, and between the length of time in paid work and gender (women spend less time in paid work than men do).

In the case of the length of time devoted to unpaid work, there is a positive correlation with the number of children under 14 years of age (the more children under 14 years of age live in the household, the more time the self-employed person devotes to unpaid work), and a positive correlation with gender (self-employed women dedicate

more time to unpaid work than self-employed men do). We found a negative correlation between the length of time in paid work and time dedicated to unpaid work (the more time a self-employed person spends on paid work, the less time he has for unpaid work).

In case of time devoted to free time activities, we found a dependence only with the gender (negative correlation, it means that self-employed women dedicate to free time activities less time than self-employed men). We also confirmed a negative correlation between the free time activities and paid work, as well as unpaid work (the more time a self-employed person devotes to paid or unpaid work, the less time he has for free time activities). For other non-productive activities, we confirmed only a positive dependence on gender (self-employed women engage in other non-productive activities for longer than self-employed men do). There is a negative correlation between the time devoted to other non-productive activities and the length of time in paid and unpaid work (the more time a self-employed person devotes to paid or unpaid work, the less time he has for other non-productive activities).

Table 3 summarizes the identified factors (including information on their positive or negative dependence) affecting the allocation of entrepreneurs to Slovakia.

Table 3 Summary of factors influencing the time allocation of self-employed persons in Slovakia; Source: own elaboration

Group of activity	Positive correlation	Negative correlation
Paid work		No. of children up to 14 years of age in the household
		Gender
		Time in unpaid work
		Time for free time activities
		Time for other non-productive activities
Unpaid work	No. of children up to 14 years of age in the household	Time in paid work
		Time for free time activities
	Gender	Time for other non-productive activities
Free time		Gender
		Time in paid work
		Time in unpaid work
Other non-productive activities	Gender	Time in paid work
		Time in unpaid work

4 Discussion

This paper focuses on the time allocation of self-employed persons in Slovakia and factors that influence it. Self-employed persons spend significant part of their working day in paid work (business activity) and the time dedicated to paid work is not legally limited (the Labour Code and the maximum weekly working time is not applied on self-employed persons). This fact influences the overall time allocation of self-employed persons, during the working days but also during the free days.

We consider necessary to continue with the research of allocation and use of time of self-employed persons. Today, work-life balance and individual well-being are becoming increasingly important not only for individuals but also for the whole society. Self-employed persons can use data on the allocation and use of time to make more efficient decisions not only on the allocation of their time, but also on the possibilities of substituting unpaid work with market substitutes (for example, to use more time for paid work – entrepreneurship required by the market).

Information on time allocation of self-employed persons can also be used in research that is not related to time allocation. Such application usage of time allocation data may include research of energy or water consumption, waste separation and environmental behaviour as such. Furthermore, they can also include analysis of the use of the Internet (whether for paid work/business or as a leisure activity), consumer behaviour, or the use of restaurants, cultural and sports facilities.

In future research on the time allocation of self-employed persons in Slovakia, it will be necessary to consider the changes in the business environment that occurred in connection with the Covid-19 pandemic. We assume that the allocation of time of self-employed persons was significantly influenced by the extension of the work from home. Restrictions on travel (not only to and from work, but also while carrying out direct business activities) also affected the time devoted to paid work of self-employed. Restrictions on movement and temporary or complete restrictions on leisure activities spent away from home (cinemas, theatres, restaurants, bars, sports grounds, etc.) have a significant impact (if not on time, then certainly on the structure) of leisure activities. It can also be assumed that the structure and probably also the time burden related to performing unpaid work in households has changed.

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VEGA project No.1/0621/17 "Decision-making Process of Slovak Households about Allocation of Time for Paid and Unpaid Work and Household Strategies' Impact on Selected Areas of the Economic Practice

Eating Habits of Czech Youth in Tourism

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Abstract

The share of youth tourism in all arrivals globally was approximately 20% before the COVID-19 pandemic. This segment of young people assumes in the future a significant increase. Over time, however, changing their preferences in participation in tourism and increasingly focus on health encouragement. A healthy lifestyle becomes a philosophy for them. The paper aims to evaluate the orientation towards a healthy lifestyle in terms of the eating habits of young people who participate in tourism. We used the primary data via a questionnaire survey. This pilot study took place in February 2017 and was conducted in three classes of the Ludvík Daňek grammar school in Brno. The total sample of respondents for the research was composed of 65 questionnaires. We state minimal differences in comparison with the on-holiday regime. Larger values were observed concerning the consumption of salty and sweet snacks and alcohol; however, the increase is not significant.

Keywords: Eating habits; Healthy lifestyle; Youth tourism; Brno.

JEL Classification: I18, J13, L83

Article Classification: Research article

1 Introduction

The share of youth tourism in all arrivals globally was approximately 20% before the COVID-19 pandemic. Young people generate a significant proportion of visitors in tourism. In the coming years, the share of young people in tourism is expected to grow even more. The 1991 UNWTO statistical definition considers young people aged 19 to 25 to be traveling youth. Eleven years later, however, the same organization defined youth traveling as persons under 25 aged. Gúčik (2010, In: Linderová & Nixová, 2014) states that young people can be considered as people who are no longer children, do not go on holiday with their parents, do not yet have their own families, and not all are included in

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a particular socio-economic group, or are preparing for a specific profession. In Czechia, generally, the age limit of youth is to 26 years. We note that, in general, we classify young people aged 15 to 25 as traveling youth. Pauchant (2003, In: Linderová & Nixová, 2014) distinguishes two groups of young travelers, namely young people who travel with a backpack, have a limited budget, and a large leisure fund, so-called backpackers and young people with a higher budget but limited leisure fund. At the same time, however, in the case of youth as a target group, we must distinguish between studying and working youth. We must also take the amount of funding available to young people into account. Linderová and Nixová (2014) state that the purchasing fund of young people influences their inclusion in the work process, job position, study and work while studying, the economic situation in the family, etc. We classify young people working in lower job positions with oscillating salaries among socially disadvantaged youth around the minimum wage level (2021 - 15,200 CZK), high school and university students, and unemployed young people.

Without good health, one can hardly fully participate in tourism and consider one's quality of life. Health is, therefore, a primary indicator and prerequisite for a happy life. The World Health Organization (WHO) defines the quality of life as the individual perception of a person or his position in life in the context of the cultural and value systems in which an individual lives concerning his intentions and expectations. People usually express the fact that they are doing well, that they are satisfied, in different ways. They evaluate their standard of living, material wealth, a certain standard or lifestyle. However, agreement in the concept of "I'm fine" is found in health (Chalupa & Novák, 2010). Health does not have to be the ultimate goal of a person's life. However, we can accept that it is a precondition for a person to achieve his goals, including spiritual ones (Dobrý & Hendl 2010; In: Marcus & Forsyth, 2010). A healthy lifestyle depends on the rapid adoption of healthy habits.

Eating and its habits are an acute problem today. The problem is not only in the adult population but also in young people and children. We can state that youth often skip meals during the day (Kabakuş Aykut & Bilici, 2021). The issue of food intake in the adult population is mainly caused by today's hectic times. A large part of the population is not aware of this fact. Thanks to a broader range of food services and a better economic situation in many countries, fast food (McDonald's, KFC, Burger King, Subway, and others) are gaining prominence. Excessive sugar intake has been associated with multiple health conditions (Prada et al., 2021). Lee and Allen (2020) conducted a research between 2,983 young adults. They state that young men were overall more likely than young women to engage in negative eating habits. The consumption of healthy foods, which included fruits and vegetables, had a very significant inverse relationship with depression. The offer of catering services and facilities has also undergone a major transformation. The most common is the offer of half-board, full-board, and all-inclusive. However, self-catering is still used when traveling to some countries, and this is due to the fact that the food offered is at the same price level as in Czechia. For this reason, Croatia is still popular, where this type of regime is still prevalent. A large part of this trend is that there are still many guesthouses and apartment houses in Croatia, which in most cases do not offer accommodation and meals, so the guest is forced to procure food himself.

We note that the population should avoid fried foods that are more depleting than intensifying (Ševčík, 2017). Every balanced meal contains quality proteins, gradually releasing carbohydrates and healthy fats. People should not overeat for lunch and should pay increased attention to dinner, for which this is doubly true (Kunová & Poštulka, 2006). Currently, there is a significant proportion of high school students who consume sugary drinks, including carbonated soda, sports and energy drinks, and teas. Sweetened

beverages are a leading source of added sugar in the diet (Reedy et al., 2010). According to nationally representative data, young people who are overweight and obese get more than 300 kcal per day from these drinks, which represents an average of 15% of their total daily energy intake (Wang et al., 2008). The population of Czechia underestimates the importance of the preventive effect of a healthy lifestyle. We can state that repeated breaking of even the most straightforward principles of healthy living is a possible stimulus for the emergence of any disease. According to the State Health Institute, in 2019, 56% of adults in Czechia were overweight, of which 17% were obese, so their BMI is over 30. We fear that during the COVID-19 pandemic, the number of obese and overweight people will increase. Besides, Czechs consume large portions of food, drink numerous sugary drinks and beer. Thus, eating is not following the correct principles of healthy nutrition and is very far from it. The International Labor Organization (ILO) has noted that employees who have problems attending work and lower productivity are often facing obesity and chronic diseases.

2 Material and methods

This paper aims to evaluate the healthy lifestyle orientation in terms of the eating habits of young people participating in tourism. Following the research goal, we set a research question: Are there differences in the everyday diet of young people in comparison with the holiday regime? When processing the issue of a healthy lifestyle and traveling youth, we used primary data collected by the technique of a questionnaire survey and secondary data. The questionnaire survey consisted of twenty-four questions. These were primarily closed and semi-open questions. At the end of the questionnaire, we asked two segmentation questions and gave the respondents space for their opinions and comments. This pilot study was conducted in three classes of the Ludvík Daňek grammar school in Brno, and a total of 68 questionnaires were distributed in person. The research took place in February 2017. Of the total number of questionnaires, three questionnaires were excluded due to incomplete or illegible data. The total sample of respondents for the research was composed of 65 questionnaires. After deducting incomplete or illegible questionnaires, 36 girls (55.38%) and 29 boys (44.62%) participated. The respondents were in the age range of 16 - 17 years. Our results come from quantitative research methods. In this research, we used mathematical, statistical methods, i.e., Correspondence Analysis (CA). For evaluating the results, the Statistica 13 EN Program was used.

Using the graphic tools of this CA, it is possible to describe an association of nominal or ordinal variables and to obtain a graphic representation of a relationship in multidimensional space – for the readers; it is easier to understand. The analysis provides further evidence that correlations exist between variables.

Correspondence analysis (CA) is a multivariate statistical technique. It is conceptually similar to principal component analysis but applies to categorical rather than continuous data. In a similar manner to principal component analysis, it provides a means of displaying or summarizing a set of data in a two-dimensional graphical form (Zámková & Prokop, 2014).

All data should be non-negative and on the same scale for CA to be applicable, and the method treats rows and columns equivalently. It is traditionally applied to contingency tables. CA decomposes the chi-squared statistic associated with this table into orthogonal factors. The distance between single points is defined as a chi-squared distance. The distance between the i-th and i'-th row is given by the formula:

$$D(i,i') = \sqrt{\sum_{j=1}^{c} \frac{(r_{ij} - r_{i'j})^2}{c_j}} \quad (1)$$

Where: rij are the elements of row profiles matrix,
R and weights,
cj correspond to the elements of column loadings vector cT,
which is equal to the mean column profile (centroid) of the column profiles in multidimensional space. The distance between columns j and j‘ is defined similarly, weights correspond to the elements of the row loadings vector r and sum over all rows.

In correspondence analysis we observe the relation between single categories of two categorical variables. The result of this analysis is the correspondence map introducing the axes of the reduced coordinates system, where single categories of both variables are displayed in graphic form. The aim of this analysis is to reduce the multidimensional space of row and column profiles and to save as far as possible original data information. Each row and column of the correspondence table can be displayed in c-dimensional (r-dimensional respectively) space with coordinates equal to the values of the corresponding profiles. The row and column coordinates on each axis are scaled to have inertias equal to the principal inertia along that axis: these are the principal row and column coordinates (Hebák et al., 2007).

For the correspondence analysis model, the degree of dispersion of points is defined, i.e., row and column categories, the so-called total inertia. The term inertia comes from mechanics, where it is defined as the sum of the product of mass and square distances from the centroid of all the object’s particles. Geometrically, inertia expresses the degree of dispersion of points in multidimensional space and it can be understood as an analogy to the dispersion known from statistical modelling. In a correspondence analysis, the total inertia (I) is equal to the weighted average (with weights pi+) chi-square of the distance of the row profiles from their average/mean (vector c), (Hebák et al., 2007; Peréz, n. d.):

$$I = \sum_{i=1}^{r} p_{i+} (r_i - c)^T D_c^{-1} (r_i - c) \quad (2)$$

The same as the weighted average (with weights p+j) chi-square of the distance of the column profiles from their average (vector r)

$$I = \sum_{j=1}^{c} p_{+j} (c_j - r)^T D_r^{-1} (c_j - c) \quad (3)$$

A significant part of the total inertia of the original table is usually explained by the first several axes. That is why it is generally sufficient for the result of the correspondence analysis to be represented in the space of the first two or three ordinal axes. Total inertia equals the sum of all eigenvalues of the matrix. Therefore, it is possible to specify how many ordinal axes it is reasonable to interpret. This can be decided in either of two ways. 1) We set a threshold value (e. g. 80%) and determine how many axes have a cumulative inertia higher than the set threshold value. 2) We interpret the ordinal axes whose eigenvalue is above-average, i.e., higher than the average of all eigenvalues (Hebák et al., 2007; Peréz, n. d.).

The contributions of the row points to the inertia in the corresponding dimension are defined by the quotient:

$$\frac{r_i f^2 ik}{\lambda_{(k)}} \quad (4)$$

Where: ∫ik corresponds with the elements of the matrix F (the score of the i-th row category in the k-th dimension),
ri elements of the row loadings vector,
λ(k) is inertia expressed by the k-th dimension (an eigenvalue of the matrix).

A contribution of the row points to inertia expresses the relative degree of the effect of the given category on the final orientation of the main axes (Hebák et al., 2007; Peréz, n. d.).

In a similar fashion, the contributions of column points to inertia are expressed in the corresponding dimension

$$\frac{c_j g^2 jk}{\lambda_{(k)}} \quad (5)$$

For each row category, we can calculate the total row inertia, defined as

$$\sum_{n=1} r_j f^2 jk \quad (6)$$

Similarly, for column categories, the total column inertia is defined as

$$\sum_k c_j g^2 jk \quad (7)$$

The values of inertia for individual columns and rows give us an indication of the significance of the various categories on the resulting ordination (Hebák et al., 2007; Peréz, n. d.).

3 Results and discussion

As far as the diet composition is concerned, we state that more respondents consumed fruit when participating in tourism than during the everyday regime. Consumption of fruit 2-3 pieces per day increased by 12.30% compared to the everyday regime, and consumption of fruit one piece per day increased the proportion of fruit in the diet by 10.77%. In the case of vegetables, consumption also increased when participating in tourism; 27.69% of respondents added 2-3 pieces of vegetables a day to their diet, increasing 6.15% compared to the regular regime. One vegetable per day occurred during the holiday regime in 38.46% of respondents. In the everyday regime, vegetables occurred in 26.15%, and the increase between holiday and the everyday regime was 12.31%.

White bread was more frequently searched during the everyday regime. In the normal daily routine, 30.77% of respondents included this type of bread daily in their meals; during the holiday regime, the number of respondents who consumed white bread daily by 10.77% decreased.

Sour dairy products were also trendy. Undoubtedly, yogurts are among the most widespread acidic milk products worldwide; this group also includes yogurt drinks, acidophilic milk, kefir, etc. These products were consumed in the everyday regime by more respondents daily (35.58%) than when participating in tourism (15.38 %). The decrease in the share of sour milk products consumption when participating in tourism is

by 20.00%. Consumption of acidic milk products when participating in tourism every other day increased by 12.31% compared to the everyday regime. Cheese and other non-sour milk products were consumed more during the everyday regime.

Meat and fish consumption was higher in the holiday regime; twice a day (23.08%) and once a day (58.46%). The increase in meat consumption in the everyday regime is by 13.85% and 4.61%. Cold cuts were represented daily in the everyday regime in 13.85% of respondents. When participating in tourism, the daily consumption of cold cuts was reduced by 3.08%. In the everyday regime, almost a tenth of the respondents (9.23%) did not eat cold cuts; in the holiday regime, it was more than one-quarter of the respondents (21.54%). Sweet treats were consumed in approximately the same way in the everyday and the holiday regime. Salty snacks were consumed more daily on holidays (23.08%); in the everyday regime, the consumption of salty snacks was lower by 15.39%. Nutritional supplements were represented daily by 26.15% of respondents in the everyday regime; reducing the consumption of supplements when participating in tourism is by 15.38%. One-fifth of respondents did not consume nutritional supplements in the everyday regime; on holiday, more than twice as many respondents (43.08%; table 1).

Table 1 Diet composition (%); Source: own elaboration

Fruits					
daily 2-3 pcs	daily 1 pc	every other day	irregularly	sometimes	I do not eat
33.85	35.38	7.69	21.54	1.54	0.00
46.15	46.15	1.54	4.62	1.54	0.00
Vegetables					
daily 2-3 pcs	daily 1 pc	every other day	irregularly	sometimes	I do not eat
21.54	26.15	26.15	24.62	1.54	0.00
27.69	38.46	7.69	18.46	6.15	1.54
White bread					
daily	2-3 times a week	sometimes	irregularly	I do not eat	
30.77	23.08	13.85	18.46	13.85	
20.00	23.08	27.69	18.46	10.77	
Wholemeal bread					
daily	2-3 times a week	sometimes	irregularly	I do not eat	
30.77	32.31	21.54	15.38	0.00	
16.92	24.62	35.38	21.54	1.54	
Sour dairy products (yoghurts, yoghurt drinks, acidophilic milks, kefir…)					
daily	every other day	2-3 times a week	irregularly	I do not eat	
35.38	29.23	13.85	21.54	0.00	
15.38	41.54	12.31	24.62	6.15	
Other dairy products (cheese)					
daily	every other day	2-3 times a week	irregularly	I do not eat	
27.69	23.08	24.62	21.54	3.08	
29.23	29.23	15.38	18.46	7.69	
Meat and fish					
twice a day	once a day	every other day	2-3 times a week	irregularly	I do not eat
9.23	53.85	18.46	12.31	6.15	0.00
23.08	58.46	10.77	3.08	4.62	0.00
Cold cuts					
daily	every other day	2-3 times a week	sometimes	I do not eat	
13.85	7.69	9.23	60.00	9.23	
10.77	12.31	1.54	53.85	21.54	
Sweet treats (candies, cookies, chocolate …)					

daily	every other day	2-3 times a week	sometimes	I do not eat
35.38	26.42	13.85	23.08	3.08
38.46	26.15	12.31	20.00	3.08
Salty snacks (crackers, sticks …)				
daily	every other day	2-3 times a week	sometimes	I do not eat
7.69	21.54	10.77	46.15	13.85
23.08	21.54	10.77	38.46	6.15
Nutritional supplements				
daily	every other day	2-3 times a week	sometimes	I do not eat
26.15	12.31	10.77	30.77	20.00
10.77	18.46	3.08	24.62	43.08

*Blue color – everyday regime; Red color – holiday regime;

When participating in tourism (20.00%), water was consumed in quantities of up to 1 liter less than in the everyday regime (29.23%). Sweetened water was represented in the everyday regime in 73.85% of respondents; in the holiday regime, its representation in the drinking regime decreased to 67.69%. Almost one-half of respondents (47.69%) did not drink other sweetened drinks in the everyday regime; only less than a third of respondents (30.77%) in the holiday regime. Increased consumption of other sweetened drinks was most pronounced in quantities up to 0.5 liters; in the holiday regime, consumption increased by more than a quarter (26.15%). The juice was more often included in fluid intake when participating in tourism than the everyday regime (73.85% vs. 72.31%). According to the questionnaire results, the proportion of milk in the everyday regime was higher than in the case of participation in tourism. Almost a third of respondents (30.77%) did not drink milk during the holiday regime. In the everyday regime, milk consumption was increased by 7.69%. Fruit or herbal tea was drunk more often in the everyday regime. However, the most significant difference was noted during the holiday regime, where more than a third of respondents did not drink tea (36.92% vs. 12.31%). More than two-thirds of respondents (69.23%) did not drink black tea on holiday than the everyday regime (table 2).

Table 2 Beverages composition (%); Source: own elaboration

Water				
daily max. 1 l	daily max. 1.5 l	daily max. 2 l	≥ 2.5 l per day	I do not drink
29.23	29.23	29.23	12.31	0.00
20.00	30.77	32.31	16.92	0.00
Sweetened water				
daily max. 1 l	daily max. 1.5 l	daily max. 2 l	≥ 2.5 l per day	I do not drink
73.85	15.38	7.69	3.08	0.00
67.69	18.46	10.77	3.08	0.00
Other sweetened drinks (coca-cola, fanta, sprite…)				
daily max. 0.5 l	daily1 l	≥ 1 l per day	occasionally	I do not drink
9.23	0.00	0.00	43.08	47.69
35.38	9.23	0.00	24.62	30.77
Juice				
daily max. 1 l	daily max. 1.5 l	daily max. 2 l	≥ 2.5 l per day	I do not drink
67.69	4.62	0.00	0.00	27.69

60.00	12.31	1.54	0.00	26.15
Coffee				
daily 1-2 cups	daily 3-5 cups	≥ 6 cups	occasionally	I do not drink
27.69	1.54	0.00	29.23	41.54
29.23	3.08	0.00	20.00	47.69
Milk				
daily max. 0.2 l	daily max. 1 l	≥ 1 l per day	occasionally	I do not drink
40.00	6.15	0.00	30.77	23.08
41.54	4.62	0.00	23.08	30.77
Fruit or herbal tea				
daily 1-2 cups	daily 3-5 cups	≥ 6 cups	occasionally	I do not drink
44.62	6.15	0.00	36.92	12.31
36.92	1.54	0.00	24.62	36.92
Black tea				
daily 1-2 cups	daily 3-5 cups	≥ 6 cups	occasionally	I do not drink
10.77	1.54	1.54	33.85	52.31
10.77	1.54	0.00	18.46	69.23
Alcoholic beer				
daily max. 0.5 l	≥ 0.5 l per day	sometimes	I do not drink	
1.54	0.00	53.85	44.62	
7.69	15.38	38.46	38.46	
Wine				
daily max. 0.2 l	≥ 0.2 l per day	sometimes	I do not drink	
0.00	0.00	55.38	44.62	
9.23	0.00	52.31	38.46	
Liqueurs				
daily max. 0.1 l	≥ 0.1 l per day	sometimes	I do not drink	
0.00	0.00	26.15	73.85	
4.62	0.00	23.08	72.31	
Hard liquor				
daily max. 0.04 l	≥ 0.04 l per day	sometimes	I do not drink	
0.00	0.00	72.31	27.69	
10.77	1.54	43.08	44.62	

*Blue color – everyday regime; Red color – holiday regime;

When participating in tourism, the consumption of alcoholic drinks increased, except the consumption of hard alcohol. More than half of the respondents (53.85%) drank alcoholic beer in the everyday regime; in the holiday regime, the consumption of alcoholic beer occasionally decreased to 38.46%. Drinking wine reached approximately the same values in the everyday and the holiday regime. The same was true of liqueurs. Hard liqueur was consumed less in the holiday regime but more often than in the everyday regime (figure 1, 2).

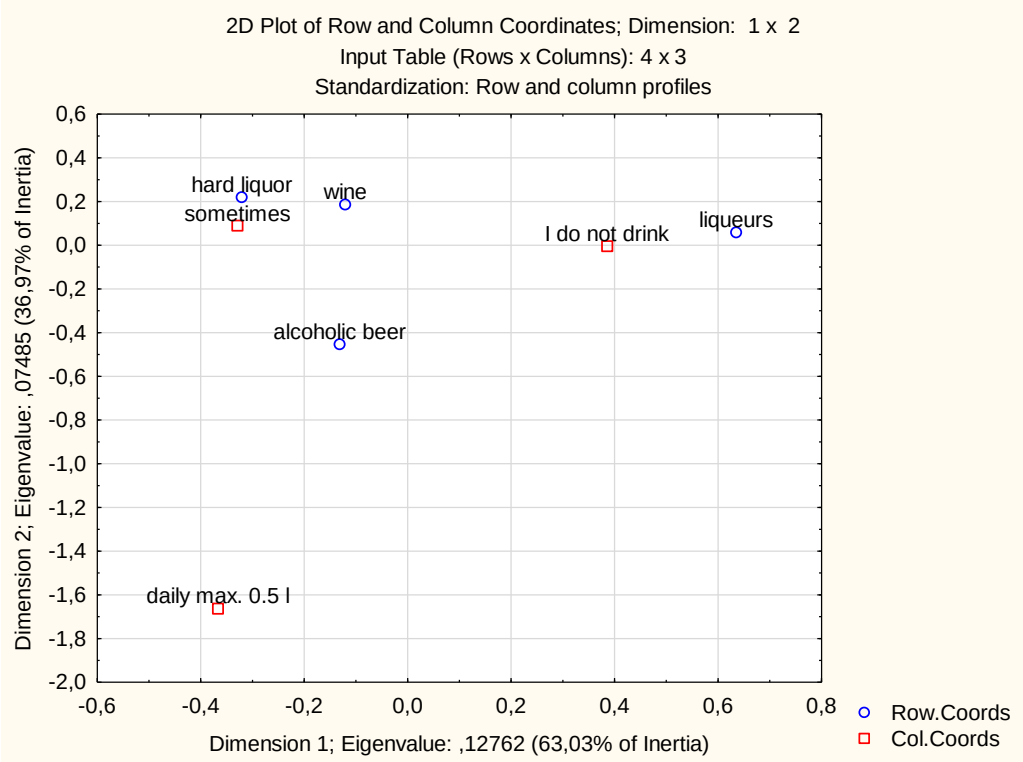

Figure 1 Beverages composition in the everyday regime; Source: own elaboration

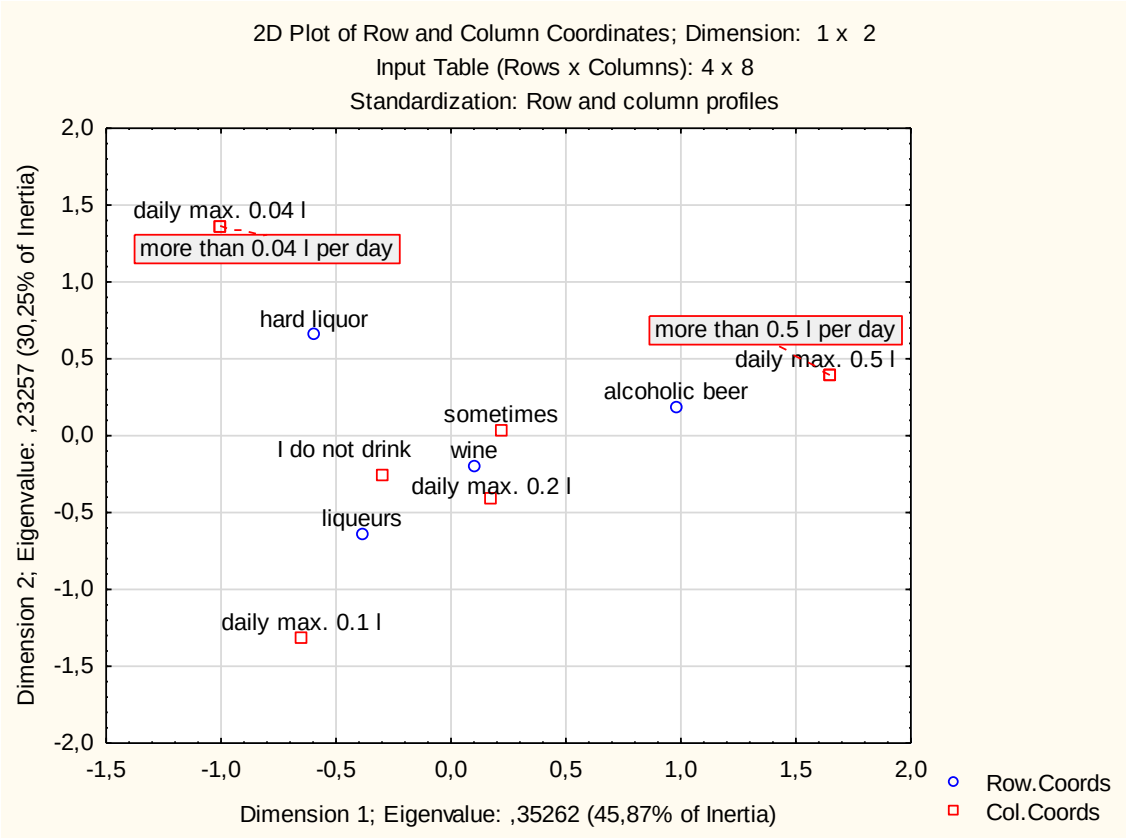

Figure 2 Beverages composition in the holiday regime; Source: own elaboration

4 Conclusion

This paper aimed to evaluate the healthy lifestyle orientation in terms of the eating habits of young people participating in tourism. We found that the biggest influences on dietary change when participating in tourism were the change of cuisine (52.31%) and sport (20.00%).

Consumption of alcoholic beverages increased among youth when participating in tourism. Hard liquor was consumed less in the holiday regime but more frequently compared to the everyday regime. Fruit and vegetable consumption increased when participating in tourism due to the lower price of the range of products offered in the summer months and the greater availability. Given the wide range of destinations and services provided, we can expect that in the future, the differences between the everyday and holiday regime will be even more noticeable than at present.

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Effect of Food Preparation Technology on Their Selected Parameters: Evidence from Hospitality

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Abstract

Trends in food service are reflected in technology, technique, raw materials, waste, etc. The aim of the paper is to determine the possibility of survival of microorganisms in meat using low-temperature roasting and cooking in a sous-vide vacuum. The technology of food preparation has a significant influence on the quality and the safety of heat-processed foods since heat processing improves the digestibility and properties of foods. New technologies sous-vide, which means cooking in a vacuum, and roasting meat at low down temperatures utilizing modern technologies, enable the augmentation of the quality of prepared foods; however, they contain a risk of survival of microorganisms. In our paper, we focused on the tests with pork minced meat roasted parallelly at low down and high temperatures. Our findings confirm that several factors influence the survival of the microorganism, such as the temperature, duration of cooking, and the content of protective substances from the spice or destroyed cells in the minced meat.

Keywords: Roasting; Sous-vide; Meat; Microorganism; Nutrition.

JEL Classification: I18, L83

Article Classification: Research article

1 Introduction

Trends in food service are reflected in technology, technique, raw materials, waste, etc. These are mainly local or hyper-local. These are trends that convey a clear message - both chefs and guests in restaurants are clearly aware that the closer the food is grown to the plate, the fresher, tastier, and often offers better quality. With meat, it is also essential to know its origin and how the animal was raised, fed, killed, and processed.

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The emphasis on locally, respectfully, and gently increased and naturally fed animals is already a natural in better restaurants. Guests no longer choose their meals based on taste preferences themselves and demand that their food has high nutritional value and a positive effect on their bodies. The fast-casual concept is increasingly coming to the fore and combines the best of two traditional ways of eating - fast food and classic restaurants. Another trend is the use of multifunctional facilities that can save time, energy consumption, and staff workload. The combi oven defrosts, cooks, bakes, grills, and fries. The multifunctional pan replaces the boiler, the classic frying pan, the grill plate, and the deep fryer. The thermal blender helps prepare sauces, batters, ice cream, sorbets, reductions, and creams. A blast chiller (shock freezer) is a cooking appliance that allows you to increase the capacity of your kitchen during emergency events when you need to stock up. If the technological procedure is followed, there are five days to recover and dispense the food. Regeneration takes approximately 5–10 minutes. In our paper, we will discuss the sous-vide method.

This cooking method represents cooking in a vacuum, which is technologically based on the thermal pre-boiling of meat, e.g., a maturation in a water bath. In terms of the risk of microbic contamination, this technology is potentially risky for the survival of psychrophilic microorganisms, heat-resistant bacteria. This technology began to develop in the 1960s and the 1970s due to the needs of hospital catering in two systems in Switzerland and the USA. The vacuum packaging method is based on a dual principle. You can either pasteurize hot ready-made meals or raw food portions. Currently, the technology is used in top restaurants to achieve maximum fragility, succulence, and food flavor (Kadlec, 2002a). This technology can be summarized in the following steps. Portions of the flavored meat are placed into a food bag. The air is sucked out in a vacuum suction machine, and vacuumed meat is placed into the containers with water content from 5 to 20 liters. The heating with the immersion heater SouVi 1000 follows. It is essential to provide the smooth circulation of the water, whose temperature can be set from 20 to 85°C. The boiling time depends on the portion size (can be up to 70 hours). The cooling in a blast chiller follows; thus, the portions' shelf life is extended to 7–10 days. Before serving the food, the meat is browned in the pan. A significant advantage is minimal weight loss, maximum flavor, and flavorings preserving, maximum succulence, and the beautiful color of the meat cut. Currently, the risk of microbic contamination during reheating is examined. These dishes are very desirable abroad (Kadlec, 2002b).

Staphylococcus aureus (S. aureus) a pathogenic bacterium accountable for emerging foodborne diseases globally. Food related outcomes of the staphylococcal diseases characterized by nausea, weakness, abdominal cramps, vomiting (Abbasi et al., 2021). Ten sliced beef samples were collected aseptically and 90 mL peptone water (BPW, Oxoid Ltd., UK) was added and homogenized for 3 minutes in Stomacher Lab-Blender 400 (London, UK). Plate count agar (PCA Oxoid CM463, Oxoid) was used to determine the total viable counts (mesophilic aerobic bacteria) and Psychotropic bacteria by incubating the plates for 24–48 hour at 37°C and 10 days at 7°C, respectively. Moreover, coliform bacteria was counted with after the incubation at 35°C for 24 hours (Gök et al., 2019).

During the cooking process there is a loss of minerals from the meat into the water. Although, when the sous vide method is applied, this loss is minimized because there was no direct contact between the food and the water beyond that coming from the food itself, which reduced the leaching of the minerals (da Silva et al., 2017). The cooking temperature is often close to 60°C or lower, and the product is kept isothermally for a long time, from hours to even days. Cooking in this way has been long known to produce meat of a high sensorial quality. Total plate counts and total viable cell counts were used

to evaluate LTLT processes applied in beef (50–62°C), resulting in significant reductions of microorganism counts for mesophiles and psychrotrophs after cooking (Dominguez-Hernandeza et al., 2018).

Green sauce (olive oil, wine vinegar, garlic, fresh parsley, black pepper, basil, and salt) and 60℃ of cooking temperature were chosen by the panelists for the sous-vide cooking process. In the conditions used, the microbiological counts remained stable, and Salmonella and Listeria monocytogenes were absent (Espinosa et al., 2016). This study examined the fatty acid and mineral compositions of raw and cooked beef and liver from bonsmara (bd) and non-descript (nd) cattle, raised on natural pasture. samples were collected from 80 cows and thermal-processed at 65℃ for 120 minutes and 85°C for 60 minutes using sous-vide techniques, and then analyzed for fatty acid and mineral compositions. The results did not show differences in individual fatty acid composition of meat samples between the breed ($p>0.05$) (Falowo et al., 2017).

Microbiological analysis of the sous-vide cooked chicken breast was performed to determine total viable cells, coliform count, and detection of Salmonella. In this study, the sous-vide method using low temperature (60°C) pathogenic bacteria was eliminated without decreasing tenderness (Hong et al., 2016). The combination of proper temperature and time duration in sous-vide cooking could provide good water-holding capacity, color parameters, and tender cooked meat. In this study, goat muscles gluteus medius (GM) and biceps femoris (BF) treated with single stage sous-vide (cooked at 60°C, 65°C, 70°C) and two-stage sous-vide (cooked at 45°C and 60 °C, 45°C and 65°C, 45°C and 70°C) methods for 6 and 12 hours were compared. Cooking loss decreased by 5–10% for GM and 10–13% for BF after 6 h of heat treatment with two-stage sous-vide likely due to high sarcoplasmic solubility. Therefore, at a lower cooked temperature (60°C), sous-vide samples (GM and BF) showed higher protein solubility and greater water retention, resulting in the lowest cooking loss (Ismail et al., 2019a).

Heat treatment of meat at temperatures between 50 and 65 °C, for extended periods of time, is known as low temperature long-time (LTLT) cooking. This cooking method produces meat that has increased tenderness and better appearance than when cooked at higher temperatures (Dominguez-Hernandeza et al., 2018).

Pathogens may remain in very lightly processed products so the quality of the initial materials is vital and products should be consumed shortly after preparation. These process criteria are based on worst case scenarios of contamination levels and heat resistance. To move away from these criteria requires better understanding of the many interconnecting factors that will impact on the ability of an organism to survive cooking and subsequently grow in sous vide foods (Stringer and Metris, 2018).

Process optimization provided a sous vide temperature and time to obtain optimum meat quality parameters such as tenderness, cooking loss, and meat color for PEF-treated meat as 60°C for 24 hours (Alahakoon et al., 2018). Under the condition of this study, it seems that double combination of temperatures-times either at 45℃–60℃, 45℃–65℃, or 45℃–70℃ of cooking beef and goat meat leads to different meat features. Notably, the combination at 45℃–60℃ produced dramatic lower toughness values of semitendinosus muscles from cattle and goat (Ismail et al., 2019b). Despite the SV process being conducted at a moderate temperature (50℃, 55℃, and 60℃), long processing time (12 and 24 h) diminished the risk of microbial growth and residual uncooked color (Hwang et al., 2019). Also, processing the psoas minor muscle and edible offal with sous vide at 100ºC in the shortest cooking time of 30 minutes had the greatest effect on tenderness of the meat samples. In descending order, the psoas minor muscle,

liver and tongue from the lambs were found to be inherently more proteinaceous than other meat samples (Fayemi & Muchenje, 2019).

2 Material and methods

The aim of the paper is to determine the possibility of survival of microorganisms in meat using low-temperature roasting and cooking in a sous-vide vacuum. We conducted this research in May 2015 and made the tests with pork minced meat roasted parallelly at low down and high temperatures. The minced meat of 1650g was not seasoned. We added only a small quantity of salt. We mixed the meat, made 20 rollers of 80g each, and separated them into five samples for the tests. The first ten rollers were roasted at 60°C in a convection oven for 8 hours, and the other ten rollers were roasted at 180°C for 1 hour. After the roasting and cooling, 10 g for the subsequent tests were separated from each roller's middle. The samples were mixed with the physiological solution in BagMixer. We added 1 ml of the solution to the Petri dish or Petrifilm to find numbers of Staphylococcus colonies. We used Plate Count Agar (PCA), Violet Red Bile Agar (VRBA), Chrom agar pro E. coli (Chrom), and Petrifilm for Staphytest (Staphy) for growing the bacteria. The producer of the soils is Himedia, the producer of Petrifilm is 3M. Weight losses have been compared during both types of roasting.

3 Results

The following table shows the occurrence of the bacteria Staphylococcus and Staphylococcus aureus in the sample of raw meat. We used the terms “present” or “absent” because the concentration of colonies was too high.

Table 1 Changes of the microbiological cultivation of microorganism 1, Source: own elaboration

Results of the minced meat roasted at low down temperatures				**Results of minced meat roasted at high temperatures**			
Sample	Dilution	Soil	No. of colonies	Sample	Dilution	Soil	No. of colonies
N1	10^{-1}	PCA*	1	K1	10^{-1}	PCA*	7
N1	10^{-1}	PCA	11	K1	10^{-1}	PCA	7
N2	10^{-1}	PCA	3	K2	10^{-1}	PCA	6
N2	10^{-1}	PCA	6	K2	10^{-1}	PCA	7
N3	10^{-1}	PCA	0	K3	10^{-1}	PCA	13
N3	10^{-1}	PCA	0	K3	10^{-1}	PCA	16
N4	10^{-1}	PCA	0	K4	10^{-1}	PCA	11
N4	10^{-1}	PCA	4	K4	10^{-1}	PCA	10
N5	10^{-1}	PCA	7	K5	10^{-1}	PCA	16
N5	10^{-1}	PCA	5	K5	10^{-1}	PCA	12
N6	10^{-1}	PCA	9	K6	10^{-1}	PCA	13
N6	10^{-1}	PCA	4	K6	10^{-1}	PCA	18
N7	10^{-1}	PCA	3	K7	10^{-1}	PCA	10
N7	10^{-1}	PCA	3	K7	10^{-1}	PCA	12
N8	10^{-1}	PCA	4	K8	10^{-1}	PCA	15
N8	10^{-1}	PCA	5	K8	10^{-1}	PCA	11
N9	10^{-1}	PCA	6	K9	10^{-1}	PCA	5
N9	10^{-1}	PCA	5	K9	10^{-1}	PCA	6
N10	10^{-1}	PCA	11	K10	10^{-1}	PCA	2
N10	10^{-1}	PCA	7	K10	10^{-1}	PCA	4

The next table shows the occurrence of the bacteria Staphylococcus and Staphylococcus aureus in the meat roasted at low down and high temperatures. At high roasting, all samples were negative. We should take N7 – N10 Petrifilmes from another package for the samples, but they were unusable.

Table 2 Changes of the microbiological cultivation of microorganism 2; Source: own elaboration

Results of raw minced meat			
Sample	**Dilution**	**Soil**	**No. of colonies**
S1	10^{-4}	PCA*	61
S1	10^{-4}	PCA	44
S2	10^{-4}	PCA	267
S2	10^{-4}	PCA	205
S3	10^{-4}	PCA	158
S3	10^{-4}	PCA	156
S4	10^{-4}	PCA	105
S4	10^{-4}	PCA	153
S5	10^{-4}	PCA	161
S5	10^{-4}	PCA	197
Sample	Soil	Staphylococcus	Staphylococcus aureus
S1*	Petri*	present	present
S2	Petri	present	present
S3	Petri	present	present
S4	Petri	present	present
S5	Petri	present	present

PCA* Plate Count Agar, Petri* Petrifilm, S* raw meat

The following table presents weight losses between different types of roasting.

Table 3 Changes of the microbiological picture; Source: own elaboration

Roasted minced pork meat			
Sample	**Soil**	**Staphylococcus**	**Staphylococcus aureus**
N1*	Petri	no	no
N2	Petri	yes	yes
N3	Petri	yes	yes
N4	Petri	yes	yes
N5	Petri	yes	yes
N6	Petri	yes	yes
N7	Petri	do not evaluated	do not evaluated
N8	Petri	do not evaluated	do not evaluated
N9	Petri	do not evaluated	do not evaluated
N10	Petri	do not evaluated	do not evaluated
K*	Petri	no	no

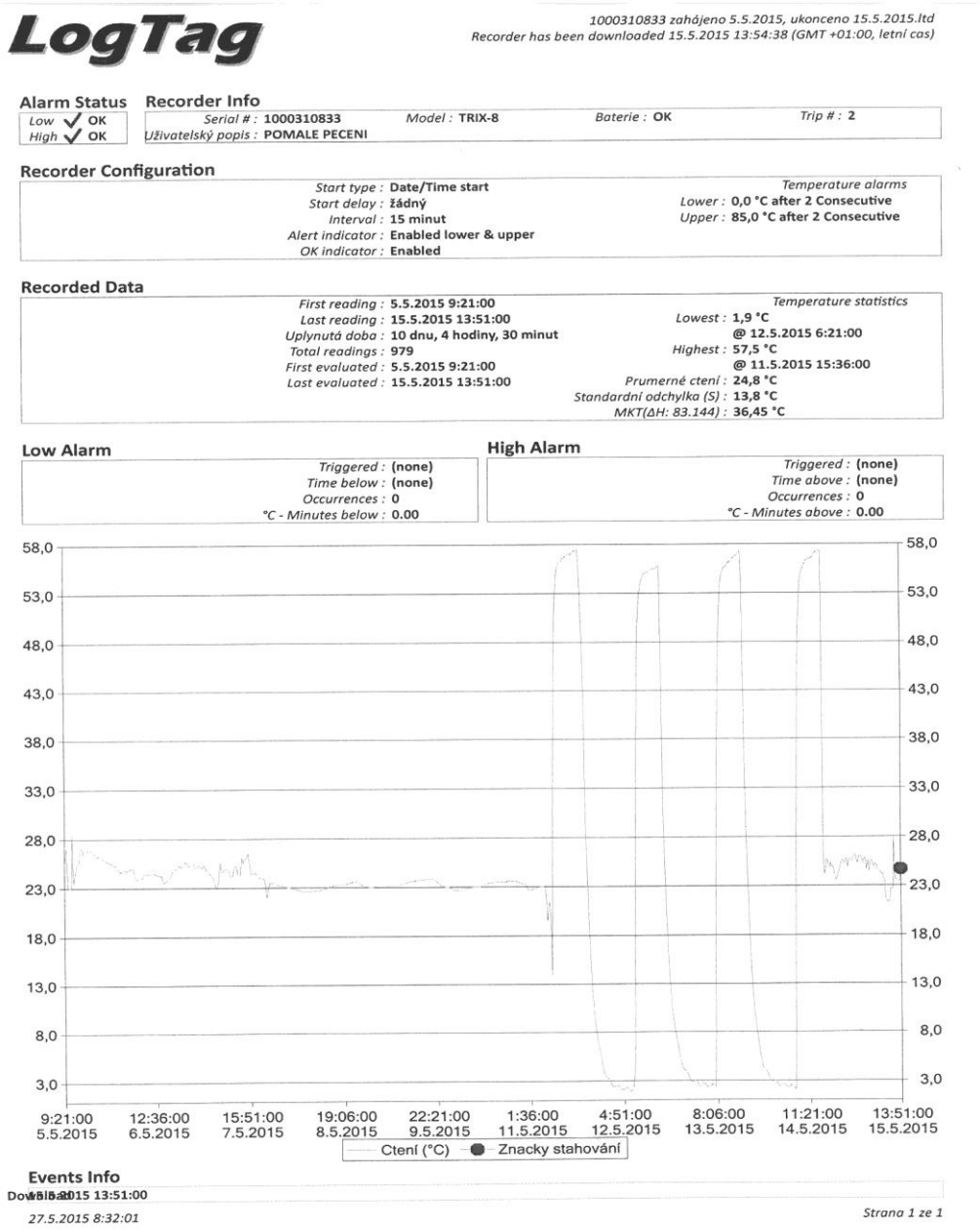
N* roasting at low down temperatures, K*roasting at high temperatures

We researched minor temperature differences during the measuring of roasting in a convection oven. During the roasting, the temperature should have been 60°C in the middle of the meat. Still, we ascertained the temperature differences from 1 to 3°C by

precise measuring with the temperature sensor Log Tag. The following graphs (1, 2) present the results of the temperature sensor.

Table 4 Cooperation of weight losses; Source: own elaboration

Kind of roasting	Roasting at 60°C	Roasting at 180°C
Raw pork minced meat	800 g	800 g
Roasted pork minced meat	644 g (8 hours)	445 g (1 hour)
Losses	156 g (19.5%)	355 g (44.4%)
Raw pork joint	600 g	600 g
Roasted pork joint	480 g (10hours)	340 g (1 hour)
Losses	120 g (20.0%)	260 g (43.3%)



Graph 1 Log Tag 1; own elaboration

LogTag

1000310833 zahájeno 15.5.2015, ukonceno 26.5.2015.ltd
Recorder has been downloaded 26.5.2015 16:42:25 (GMT +01:00, letní cas)

Alarm Status

Low	✓ OK
High	✓ OK

Recorder Info

Serial # : **1000310833**	*Model :* **TRIX-8**	*Baterie :* **OK**	*Trip # :* **3**
Uživatelský popis : **POMALE PECENI**			

Recorder Configuration

Start type :	**Date/Time start**	*Temperature alarms*	
Start delay :	**žádný**	*Lower :*	**0,0 °C after 2 Consecutive**
Interval :	**15 minut**	*Upper :*	**85,0 °C after 2 Consecutive**
Alert indicator :	**Enabled lower & upper**		
OK indicator :	**Enabled**		

Recorded Data

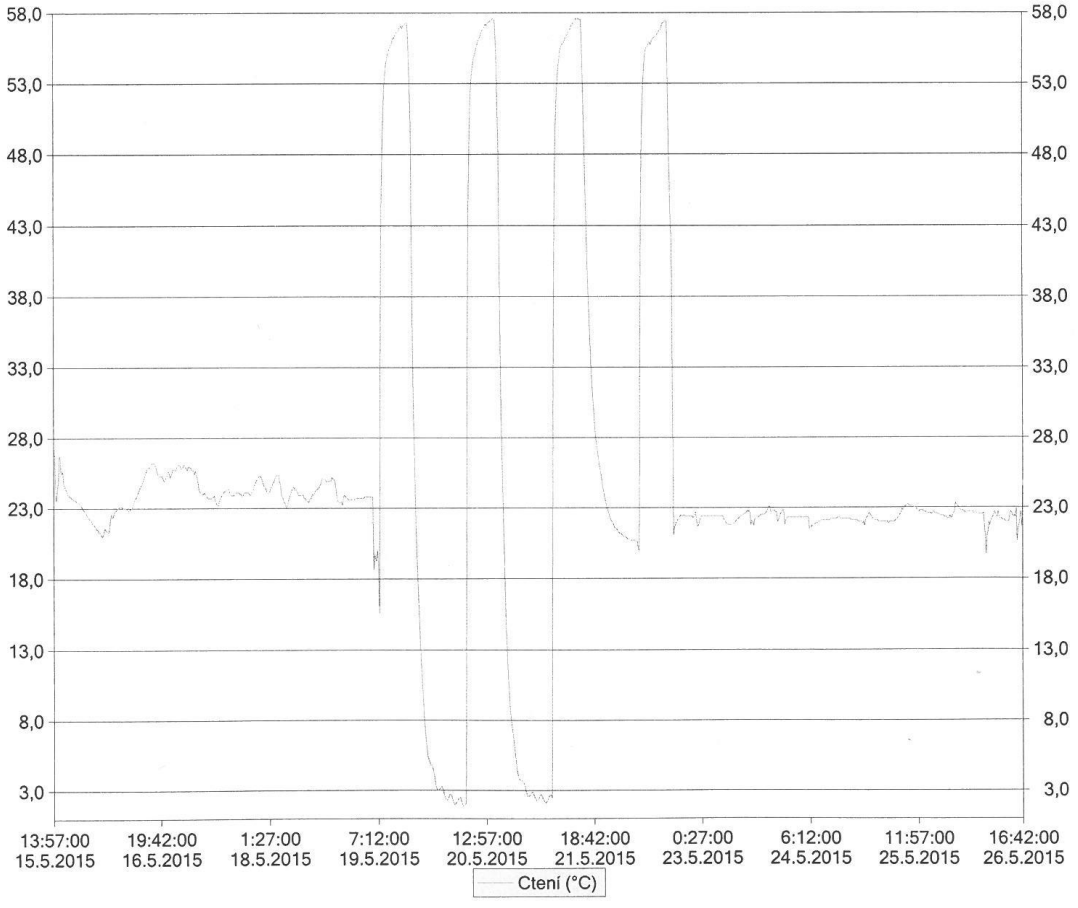
First reading :	**15.5.2015 13:57:00**	*Temperature statistics*	
Last reading :	**26.5.2015 16:42:00**	*Lowest :*	**1,9 °C**
Uplynutá doba :	**11 dnu, 2 hodiny, 45 minut**		**@ 20.5.2015 6:27:00**
Total readings :	**1068**	*Highest :*	**57,6 °C**
First evaluated :	**15.5.2015 13:57:00**		**@ 20.5.2015 14:57:00**
Last evaluated :	**26.5.2015 16:42:00**	*Prumerné cteni :*	**25,5 °C**
Evaluated Time :	**11 dnu, 2 hodiny, 45 minut**	*Standardní odchylka (S) :*	**12,9 °C**
Evaluated Readings :	**1068**	*MKT(ΔH: 83.144) :*	**36,60 °C**

Low Alarm

Triggered :	**(none)**
Time below :	**(none)**
Occurrences :	**0**
°C - Minutes below :	**0.00**

High Alarm

Triggered :	**(none)**
Time above :	**(none)**
Occurrences :	**0**
°C - Minutes above :	**0.00**



26.5.2015 16:46:03

Strana 1 ze 1

Graph 2 Log Tag 2; own elaboration

4 Discussion

The aim of the paper was to determine the possibility of survival of microorganisms in meat using low-temperature roasting and cooking in a sous-vide vacuum. We agree with Panea and Ripoll (2019) that the percentage of cooking losses increased as the temperature did. The solubility of collagen was slightly affected by the temperature in the range 50°C 70°C. In the range, 50°C 70°C muscles suffered great conformational changes. In general, toughness decreased until 55°C and increased slightly since then. In view of the results, we would not recommend cooking the meat above 65°C since the above texture would be adversely affected.

The thermal-death times of Listeria monocytogenes were determined in inoculated restructured goat steak at 60°C, 65°C, and 70°C of sous-vide temperatures. D values of L. monocytogenes in inoculated restructured goat steak ranged from 7.27 min at 60°C to 0.46 min at 70°C (Tangwatcharin et al., 2019).

We researched pork meat because it is much riskier for surviving microorganisms and parasites than beef. We ascertained in the first tests that the minced pork meat was more problematic than roasted pieces of meat. We seasoned the meat only with a little bit of salt without spice. During the roasting at low and high temperatures, the bacteria E. coli was negative. The subsequent work will deal with measuring of surviving of Staphylococcus at low down temperature roasting, surviving the microorganism in meat seasoned with spice roasted at low and high temperatures, and also with the method sous-vide. We will test the vegetable, fruit, eggs, and other problematic foods as well.

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Google Trends data and the popularity of Sports

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Abstract

Google Trends is a great source of free and clean data, that is being used by researchers to study a particular field of research and also to forecast data. This paper analyses the data from Google Trends with the use of R-programming language to learn about the popularity characteristics in time and the paper also discusses the potential options to implement the data into the Sports funding system in Slovakia to make it more objective and precise. The potential to uncover important characteristics about the sports popularity by analysis the data is high, but the potential of numerically incorporating the data directly into the system is limited. However, it could be used to take the characteristics of representative (of a particular sport, which requires an analysis of keywords) timeseries into consideration, such as type of trend – positive, negative; linear, exponential, …; which could be a new component in the funding system. Additionally, the data could be used for the timing of potential survey for mapping the population sports preferences, to make sure, the gathered sample would not be biased; or it could also be used to identify new trending keywords to make the system more flexible.

Keywords: Google Trends; Sports; popularity; Slovak funding system of sports.

JEL Classification: C80, M15, M31

Article Classification: Research article

1 Introduction

Google Trends (GT) is a tool provided by Google that allows to study the search frequency of a particular key word in a specified timeline and a specified region. The data are downloadable, therefore, one could use other statistical tools to study the data, such as R programming language. Additionally, the data are clean and free to use. The important part is – the data are normalized by dividing each datapoint by the maximum

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point of a given time series, which results in a scaled dataset between 0 and 100, where the 100 represents the maximum point in a given dataset (support.google.com, 2021). GT data are used in a number of publications for a different purposes, such as that of Çimke and Gürkan (2021) where the GT data are used to determine the interest in vitamin use during the COVID-19 pandemic; or that of Pullan and Dey (2021) where the GT are used to study the vaccine hesitancy and anti-vaccination in the time of COVID-19; but the GT data are also used to forecast the future by implementing a fitting prognostic model, as in Aaronson et al. (2021) where the effort is made to forecast the US unemployment insurance claims in realtime. The importance of the use of big data is also pointed out by other authors (Koman et al., 2018; Vodák et al., 2017; Zrakova et al., 2017).

Popularity of Sports is an important part of the Sports funding system in Slovakia, as the component of domestic and foreign sports popularity is a part of a formula for the calculation of the (freely translated from Slovak) 'Contribution to Recognized Sports'. The whole popularity component (or coefficient) has been a target of criticism, and it has been marked as biased and unfair (olympic.sk, 2020). But since there are positive effects of nations' success in (to be specific) football tournaments on the tourism industry (Nicolau, 2012), it might be argued, that the popularity component is meaningful for the sports funding system, assuming that the more the sport is popular, the higher the effect should be. Because of these reasons, the sports popularity should be examined in more detail, and the effort should be made to make the popularity component as objective as possible. This is where the GT might help. This paper examines the potential usage of GT data for mapping the sports popularity.

2 Material and methods

The GT data were analysed with the use of R-programming language in the RStudio enviroment, with the use of various pre-made packages. The data were extracted with the use of 'gtrendsR' and the plots were made with the use of 'ggplot2' package. The search frequency of 'hokej' (the Slovak word for ice hockey) between 2010 and 2019 for the region of Slovakia was analysed with the time-series decomposition to trend, seasonal and random component. Also, the seasonal plot was constructed, and the time-series was tested for the stacionarity (KPSS test, ADF test). Then, the attempt was made to explain the course in time and see, whether there is a correlation with the most important ice hockey tournaments where the Slovak national representation plays.

3 Results

As observed in the figure 1 with the search frequency of key word 'hokej' (the red line represents the original data, the blue line is the smoothed line), there are great sudden spikes each year around the same time and the linear trend seems to be mild at best. The single spikes repeated each year without exception seems to correlate with the time, when the IIHF World Championship takes place (the month of may). It makes sence, because this event always grabs an attention of media and people talk about it a lot in Slovakia. It might be, that people are searching for results of games. But ocassionally, there is a second spike (for example) at the start of the year 2014 and 2018 when the Winter olypic games took place. It is important to add, that the Slovak representation was in play of all of those mentioned tournaments.

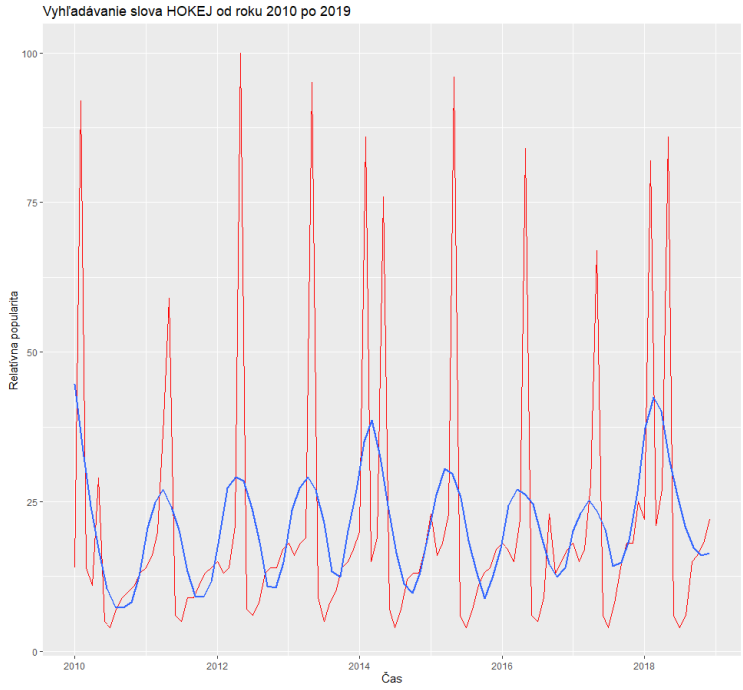

Figure 1 The search frequency of keyword 'hokej' (the Slovak word for ice hockey) between 2010 and 2019 for the region of Slovakia; Source: own elaboration

Furthermore, as seen in the figure 2, the second spike of the search frequency in 2014 and 2018, was present in the random component of the timeseries. The rest of the random component seems to include mainly negative spikes, which means some drops of the search frequency are more random, than others. The trend component is not that consistent (as a strict linear trend), but is generally positive. The seasonal component appears to be the same every year, which means, the timeseries is seasonal.

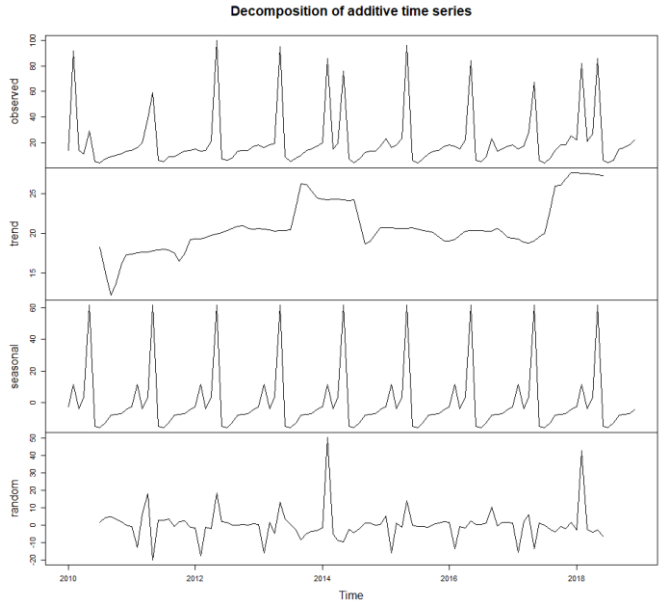

Figure 2 The decomposition of the timeseries to trend, seasonal and random component; Source: own elaboration

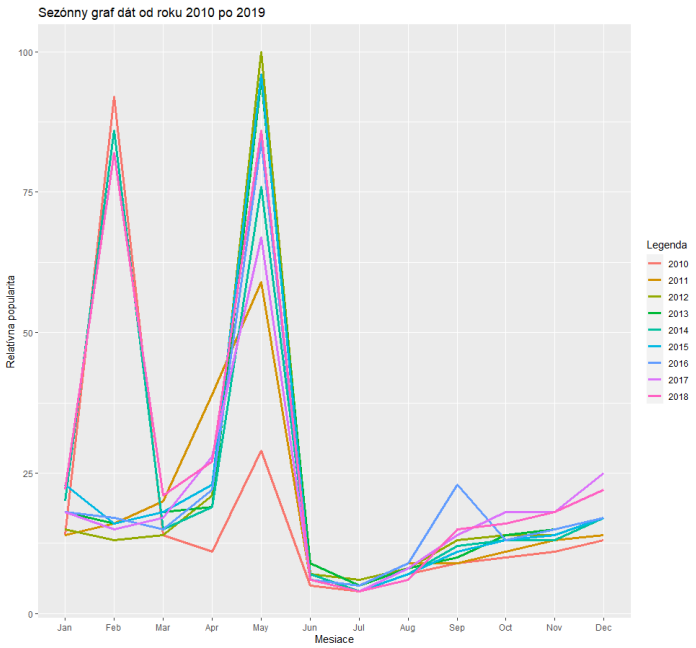

Figure 3 Seasonal graph of the given timeframe; Source: own elaboration

The KPSS tests for stationarity lend both (for level and trend) the p-value greater then the significance level of 0,05; which means, there is not enough evidence to dismiss the null hypothesis of stationarity. Additionally, the p-value of ADF test (0,01) was lower, than the significance level of 0,05; so there is enough evidence to accept the alternative hypothesis of the sationarity. Therefore, as both types of tests agree, the time frame is stationary. The results of tests are shown in the figure 4.

```
        KPSS Test for Level Stationarity

data:  hokej_2010
KPSS Level = 0.050645, Truncation lag parameter = 4, p-value = 0.1

Warning message:
In kpss.test(hokej_2010, null = "Level") :
  p-value greater than printed p-value
> kpss.test(hokej_2010, null = "Trend")

        KPSS Test for Trend Stationarity

data:  hokej_2010
KPSS Trend = 0.022599, Truncation lag parameter = 4, p-value = 0.1

Warning message:
In kpss.test(hokej_2010, null = "Trend") :
  p-value greater than printed p-value

        Augmented Dickey-Fuller Test

data:  hokej_2010
Dickey-Fuller = -5.7968, Lag order = 4, p-value = 0.01
alternative hypothesis: stationary

Warning message:
In adf.test(hokej_2010) : p-value smaller than printed p-value
```

Figure 4 KPSS and ADF tests for stationarity of the timeseries; Source: own elaboration

As the timeseries is stationary, there is should be no need to differenciate the data in order to (potentionally) use them in a forecasting model, but since the timeseries is seasonal, the model of exponential smoothing would be adviced in order to take care of the seasonal component, or SARMA model could fit the data well.

4 Discussion

The GT data can reveal useful information about the behaviour of sports popularity in time, as has been shown in the paper. The use case of the ice hockey shows, that the popularity is seasonal and spikes up whether an important international tournament takes place, and Slovak national representation is in play.

So how could these data be used to improve the Sports funding system in Slovakia? First – for the timing of potential survey for mapping the population sports preferences, to make sure, the gathered sample would not be biased. For example, in may, the ice hockey would be voted for the most favourite sport, because the IIHF World Championship takes place at that time. So the ideal time to conduct such survey, would be around the time, when no important sport even takes place. If that would not be possible, it is good to interpret the results in mind with the potential bias.

The dissadvantage of GT data is, it is always scaled according to the maximum point of the timeseries, that represent 100, which means, the results differ according to the region and time interval. Then – the comparison of two or more individual timeframes is difficult, because the original values are unknown and the maximum point might be (for example) represented by 10.000 in one timeframe and 100.000 in the other timeframe and it would be 100 in both timeframes. However, Google decided to scale the data to take care of the differences in the overall search volume, as there were way less people using the Google Search engine in 2004. Because of the scaling, it might not be a good idea to simply take the mean of each of the timeseries and compare it, because one random spike might distort the whole picture.

GT allows to compare up to 5 keywords at once, but those are scaled to the single maximum point of one of the keywords, which means, the results will be potentionally different, than when analysing each keyword at a time.

Another barrier could be the fact, that objectively, simply taking the keyword ‘hockey’ as a representative term of the popularity of ice hockey, would not be sufficient, and the keyword analysis should be conducted.

Although the numerical side of the GT data is hard to directly implement into the Sports funding system, perhaps individual characteristics of each representative timeseries could be used in the popularity analysis, such as type of trend – positive, negative; linear, exponential; which could be a new factor (component) in the funding system. GT data could also be used in determining new trending terms (or perhaps even new sports) to make the system more flexible.

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The analysis of top Slovak travel influencers and their impact on the destination´s online reputation

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Abstract

This article discusses an actual topic and analyzes the possible link between the field of travel influencer marketing and the destination´s online reputation. The detailed content analysis brings interesting facts and interconnections with the topic with the list of the top travel influencers in Slovakia. As it is alrady proven that e-WOM created on social media by the influencers, directly and indirectly, influences travelers' preferences and online image of the destination in the online environment. The focus has been made on Slovak travel influencers traveling abroad and also on the period of the global pandemic and possible change of behavior and adapting to the situation.

Keywords: Influencer marketing; online reputation; Travel.

JEL Classification: M31

Article Classification: Research article

1 Introduction

People have always loved to travel, discover new places and therefore thank you now with the expansion of social media, the power of e-WOM has taken travel to a higher level. People are increasingly using their social media channels to search for verified travel inspiration. It is more attractive, more efficient and more authentic for the people (consumers) to reach for recommendation on the destination through various social media channels. Also, the combination of different types of social media can increase engagement and audience attractiveness. (Macdonald) Instagram as the 6th most favorite and used social network worldwide (Chaffey) is a very useful social media channel for sharing information and information about the travel destination because it contains more than 450 mil. of hashtags #travel. (Revenue-hub). The number of Slovak Instagram users is high about 1,293,000 users, and it has an increasing trend (10 % annual increase; about

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53% of women and 47% of men audience) (Tankovská, 2021)., and therefore the number of influencers is enormously raising and the Slovak influencer market size is no exception (Statista). Nowadays according to Pollák at al "if a user is searching for relevant information and at the same time does not have his/her own experience with a particular subject, in the absence of positive reputators, his/her perceptions of the particular subject can be significantly deformed despite the and physical demonstration of the perfection of the subject in the traditional world. By eliminating negative publicity while maximizing positive media outputs in opinion-forming Internet media, and the displacement of neutral or negative search results to irrelevant positions presented by the second to n-th side of Google search results." Instagram can be understood as mostly positive media output that is forming customers´ preferences and it also comparable to the Google search principle as people are searching things on Instagram through the hashtags mostly.

Above mentioned crucial facts improve that influencer marketing and the Instagram platform are very popular and also it is one of the most important online marketing tools for building and managing the online reputation of the destination or any service in the travel industry mainly due to creating and sharing e-WOM in an organic and inorganic way.

2 Theoretical background

The word "influence" is in general defined as the force of influence on a person, thing, or event (Brown & Hayes, 2008). With a huge number of social interactions that occur daily, companies realize that customers express their opinions online and they have an ability do change opinions of others (Pang & Lee, 2008). Carter (2016) describes influencer marketing as "a rapidly growing industry that attempts to promote products or increase brand awareness through content spread by social media users who are considered to be influential". Influencer marketing in tourism is a relatively new method, but it is already an established part of brand marketing strategies around the world. Tourism is currently the eighth largest influencer marketing producer in the world (Peltier, 2018). Influencer marketing is an inseparable part of online WOM (word of mouth) marketing. eWOM can be defined in several ways. Perhaps the most accurate and the most common is the wording "any positive or negative claim of potential, current or former customers about the product or company that is made available to many people and institutions via the Internet ". eWOM is based primarily on convincing customer experiences (Ismagilova et al., 2017). The WOMMA (English Word of Mouth Marketing Association) has established the so-called 5 "T" WOM marketing, ie 5 basic steps that are characteristic of WOM marketing campaigns. These steps are defined in the following table 1.

Table 1 Five T of WOM marketing; Source: own elaboration

Step	Simple form	Advanced form
1. Talkers	volunteers, customers, bloggers	influencers, enthusiasts, brand ambassadors
2.Topics	special offer, new product, interesting service	viral campain, buzz marketing, new functionality
3.Tools	the form „say to your friend." email offer, SMS	discussion forums, communities, blogs
4.Taking part	participation in discussion, writing diares	special teams, PR campaigns, customer service
5.Tracking	blog search tools	advanced programs for measuring and analyzing trends

At the beginning of the WOM campaign, it is appropriate to use the so-called co-creators, i.e. volunteers who are motivated by the managers of the chosen brand to disseminate positive information about the brand/company/destination. Business practice applies several activities related to WOM marketing in addition to the already mentioned influencer marketing also buzz, viral marketing, evangelist marketing or product seeding (Přikrylová & Jahodová, 2010).

Table 2 Influencer types; Source: (Santora, 2020; Geyser, 2017)

Nano influencer	Micro influencer	Makro influencer	Celebrity
>1000 followers	>10 000 followers	>100 00 followers	>1000 000 followers
high degree of involvement	close relationship with audience	diverse audience	huge audience and great reach
authentic recommendations and comments	covering a wider range audience	wide range	high professionalism
close relationships with audience	higher rate of engagement and conversion	stable position in his / her community	marketing potential
they take the time to interact with the audience	cheaper than influenceri with higher number of followers	work experience with markers	they help to increase brand awareness and place the product

E-WOM and Influencer marketing is the significant part of the digital branding as it has a strong impact on two of tree brand attributes: identity, visibility, and credibility among customers who discover, connect with and collaborate on digital platforms (DeLane, 2020). Moreover, current surveys show that visitors to tourism consider e-WOM to be a more credible source of information than other sources of information. Reviews, blogs, brief statuses, or videos available online significantly influence potential customers' decisions, especially when making product purchases. The information available online is easy to monitor, more durable, and easier to distribute. At the same time, negative references, which have a stronger influence on decision-making, are spreading faster (Gajdošík et al., 2017). Positive reviews are very crucial. According to Soviar et al. (2019) "we include professional articles as well as amateur reviews because readers believe these articles more than ads. From a general point of view, this includes the company's social networking, media, internet advertising, banners, etc. This is information from relatively formal sources that the public finds when searching for

information about the brands in question (or specific products)". Online reputation based on positive reviews is the basic nowadays. It is company/subject/person making everything to reach the state of the perfection in all of field of its scope, it can ensure competitiveness v different fields and make a profit despite the possibility of the past failure (Zraková et al., 2017). Also due to the constantly increasing innovation potential and business digitization, it is necessary time, money and energy in online reputation not only in the real world but also in the virtual world. It impacts on customers, the public, and other stakeholders (Vodák et al., 2017). This is applicable in the long run to all business spheres across all sectors and especially in the case of tourism.

3 Material and methods

The sources for this analysis have been identified by aimed research. Authors have focused on the rankings and statistics of the top influencers in Slovakia with a focus on traveling abroad. Content analysis and observation and secondary data analysis have been applied as well. The content analysis consists of the data about the number of followers, profile overview, the activity of the influencer (number of posts, reels, and videos, cooperation), feedback of the followers – average e likes per cost.

The authors´aim was to find answers to the following questions:

1. *What type of the content is the most interesting to the travel enthusiast (followers)?*
2. *Do Slovak travel influencers cooperate with the commercial travel agencies (commercial and local organizations/clusters) in general?*
3. *Do Slovak travel influencers cooperate with the commercial travel agencies (commercial and local organizations/clusters) due to the pandemic?*
4. *Is there a correlation between number of followers and number of posts?*
5. *Who are the most favourite and powerful Slovak influencers and bloggers?*
6. *How influencer marketing can effect online reputation?*

The authors have searched for recent information and analysed secondary data available online. The first level of information was obtained from marketing and PR platforms following by statistics. The second level of information was gathered with the help of Google Search Engine and Instagram itself. The main searched keywords were directly related to the questions mentioned above.

3.1 The most famous Slovak influencers

The following comparison analysis has been built according to up-to-date statistics about the most visible Slovak influencers and their activity on Instagram. The activity is quantified on the number of posts, videos, and reels (15-seconds long video / multi-clip with audio, effects and some creative tools applied). (Instagram, online) The authors put the impact on the possibility of the content changes and the cooperation with the travel subjects due to pandemic. The data are summarised in the following table 3.

Table 3 Activity of the most famous Slovak influencers in the field of travel in 2021 with the focus on travelling abroad; Source: (Cebrová, 2016; Influencer Marketing Hub, 2021; StarGage, 2021)

Influencer name	**General information about the IG account**			**Activity on IG**				
	Instagram account	***Num. of followers***	***Profile overview***	***Posts***	***Videos (IGTV)***	***Reels***	***Change of content due to pandemic***	***Paid commercial with travel agency***
Peter Popluhár	@patopopular	152 000	Like comedy and Africa.	409	0	0	yes, mostly travelling on Slovakia	no
Mia Bella	@mia.bella.official	135 000	Mia Bella	1 793	0	0	yes, due to maternity	no
Andrea Zahurancová	@andreazahurancova	80 000	Going on places; founder of @eyrim.eyewear.sk; #forbes30under30	1 240	0	0	no	no
Šimon Snopek	@simonsnopek	76 800	Film ; photo; creative director	651	1	2	no	no, yes - local destinations: @visitbratislava; @kempinskipalace_portoroz; @wow_hungary
Patrik Paulíny	@patrikpaulinyi	69 400	Filmmaker / photographer from Slovakia	1 052	4	20	yes, more travelling in Slovakia, mostly hiking; photo shooting Slovak nature	no
Miroslav Bača	@thebacis	68 700	Filmmaker / traveler / dumb	329	2	10	no	no
X	@zaujimavysvet	68 600	travelling / people / interesting facts	2 550	1	0	no	no
Nina Skalikoá	@ninaskalikova	49 000	Artist; photo shooting, weddings, Photoshop courses	582	5	1	no	no
Milan Bardún	@milan_bezmapy	44 500	9 years full-time travel blogger	1 593	5	12	no	no, yes @slovaklines
Martin Hanzel	@tourdesvet	41 100	The biggest travelling group account in Slovakia.	2 235	1	0	no	no
Janka	@travelhacker	23 200	Travel blogger & blogger of the year	856	13	3	no	no

Martin Navrátil, Peter Hliniča n	@travelistan.sk	26 400	Travelling company	606	4	0	no	no; travel agency itself.
Denisa Leštano vá	@denisadenza	17 600	English teacher travelling the World on break	378	0	0	no	no
Jožo a Hanka	@cestujemespol u	13 300	hanka & jozo & kristof	826	11	8	no	no
Martina Magulo vá	@cestujemebez cestovky	11 300	Travelling, lifestyle, tips for trips and accomodation	361	3	1	no	no
Daniela	@polar.girl	7 200	personal blog	513	0	7	no	no
Norbert Borský	@noroborsky	5 400	Slovakia sk	419	0	0	no	no
Ivana Grešlík ová	@ivanagresliko va	3 300	local information / tourism	1 644	0	0	no	no

3.2 Feedback on the most famous influencers

The data available in the next table represents the feedback of the influencer´s community. Average likes per post have been calculated as follows: the last 20 posts like counted and divided by the number of posts. This number represents the estimated average number of likes. Forbes ranking methodology is calculated as follows: Power Index Score (abbreviation: PIS) evaluates not only the knowledge of the influencer and thus the potential intervention or its popularity or connection with the brand, but also the so-called influence funnel, which is a measure of how many followers or subscribers is the influencer able to approach. The survey was conducted on a sample of 12,000 respondents aged 15-40, thus creating a list of the top 200 Slovak influencers, from which the authors subsequently selected the top 20 most influential. The condition was to have at least 50,000 followers/subscribers on Instagram, Facebook, or YouTube (Gulisová et al., 2020).

Table 4 Feedback on the most famous Slovak influencers in the field of travel with the focus on travelling abroad; Source: (Gulisová et al., 2020; Heglasová et al., 2019)

Influencer name	**Instagram account**	**Num. of followers**	**Average likes per post**	**Forbes ranking 2019**	**Forbes ranking 2020**
Peter Popluhár	@patopopular	152 000	17 650	13th place; IPS 111	17th place; IPS 108
Mia Bella	@mia.bella.official	135 000	1 380	-	-
Andrea Zahurancová	@andreazahurancov a	80 000	4 760	8th place; IPIS 113	13th place; IPS 111
Šimon Snopek	@simonsnopek	76 800	2 300	-	-
Patrik Paulíny	@patrikpaulinyi	69 400	3 400	10th place; IPS 112	17th place; IPS 107
Miroslav Bača	@thebacis	68 700	5 100	-	-
X	@zaujimavysvet	68 600	2 800	-	-
Nina Skaliková	@ninaskalikova	49 000	2 400	-	3rd place; IPS 119

Milan Bardún	@milan_bezmapy	44 500	3 100	-	-
Martin Hanzel	@tourdesvet	41 100	220	-	-
Janka	@travelhacker	23 200	600	-	-
Martin Navrátil, Peter Hliničan	@travelistan.sk	26 400	960	-	-
Denisa Leštanová	@denisadenza	17 600	2 260	-	-
Jožo a Hanka	@cestujemespolu	13 300	430	-	-
Martina Magulová	@cestujemebezcestovky	11 300	140	-	-
Daniela	@polar.girl	7 200	330	-	-
Norbert Borský	@noroborsky	5 400	460	-	-
Ivana Grešlíková	@ivanagreslikova	3 300	120	-	-

4 Main conclusions

According to the comparison analysis described above, it is possible to draw main conclusions in two views. The first deals with influencers and their activity on Instagram even in the period of the pandemic and the second focuses on the feed and interaction they get from their followers and an independent evaluator.

4.1 The most famous Slovak influencers

Travel content is very popular and most of the influencers create it, however, there are only a few typical travel influencers/bloggers in Slovakia: @milan_bezmapy, @travelhacker, @cestujemespolu, @cestujemebezcestovky, @ivanagreslikova. Other even more popular influencers do not focus only on travel but also on other categories. @patopopular as the number one travel influencer in Slovakia according to the number of followers also focuses on entertainment. @simonsnopek and @patrikpaulinyi are great photographers and filmmakers, as well as the @thebacis. Some influencers with a great community of followers love traveling and do it more as a supporting activity: @andreazahurancova (the CEO of sunglasses brand eyerim) and @mia.bella.official. Other travel influencers are travel agencies that promo and sell their product through social media channels, such as @tourdesvet and @travelistan. The content in the form of quality and interesting photo and video is crucial and that is the reason why some great photographers can easily become travel influencers, for instance: @ninaskalikova, @polar.girl, @noroborsky.

Most of the analyzed influencers have not changed their content due to pandemics. They kept their focus on traveling, used some throwbacks (older photos and videos) to keep the community tuned and inspired. In some months of the year 2020, they could not travel abroad so they were traveling by Slovakia and discovered it. None of the analyzed influencers has cooperated with some Slovak or any other foreign travel agency. Some travel bloggers cooperated with the local destination brands in Slovakia and neighboring countries, for example @visitbratislava; @kempinskipalace_portoroz; @wow_hungary, @slovaklines. In general travel influencers cooperate with quite a lot of different brands, however, the focus is not on traveling. Mostly they promote cosmetics, food products, cars, and others. Travel destination becomes a great "background" on how to make creative promotion. This way influencers have a very strong impact on building brand awareness and its reputation in the online environment, however, it relates to product or service brands, not destination or travel brands. The travel influencers do not cooperate directly with travel agencies, even in the period of the pandemic. To sum it up, the influencers directly influence only local destination reputation and indirectly the online

reputation of all destinations they visit. They share their positive and also negative experiences mainly with the use of Stories on Instagram and Facebook.

Most of the Slovak travel influencers do not use all potential of the reels and IGTV. Some of them are just mastering it. Another reason should be time-consuming content, very overspread and other reason should be current limitations of traveling.

4.2 Feedback on the most famous influencers

The number of posts does not correlate with the number of followers. However, the number of followers correlates with the number of average likes per post in the case of organic followers. In the case of @mia.bella.official, the number of likes per post does not fit with the number of followers. The reasons why it is happening should be the following: her content is not enough interesting and attractive or her followers are not real. As the competition is high on Instagram, even in Slovakia, it is difficult to be in the top 20 in Slovakia. However, the results say that some influencers can keep their popularity and power in such a ranking. @patopopular, @andreazahurancova, @patrikpaulinyi gets great feedback from the followers and even from the professional marketing agency that annually does the research and evaluation for Slovak Forbes.

5 Discussion

The content and comparison analysis that has been made proves that there is a connection between the influencer marketing on Instagram and the online reputation of the given destination, however even the most popular and powerful influencers promo and influence destination's reputation indirectly as there is no obvious clear cooperation between any or at least very few business travel business brands. The content available on social media and mainly on Instagram, in general, inspires people to travel. Attractive and creative photos and videos of the real or popular people available online can influence the final decision and indirectly definitely influence the online image of the destination. The more influencers positively describe some destination the more popular it is becoming.

There is a space for further research in the form of the in-depth interviews with the selected macro/micro or nano Slovak travel influencers with the focus on traveling abroad for finding answers for the questions dealing with the motivation of cooperation with other brands (no connection with traveling), the possibility of the cooperation with business entities in traveling, etc.

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Benefits and theif Role in the Context of Individualization of Remuneration

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Abstract

Individualization of remuneration is a current trend, that allows employers to respect and satisfy the individual needs of their employees. In this context, benefits play an important role. They represent a tool, that extends the traditional possibilities of monetary remuneration with various, attractive forms of remuneration for employees. The contribution deals with the analysis of the situation and trends in the provision of this form of remuneration. It examines the use of benefits within the organizations operating in the Slovak Republic, through the results of several surveys evaluates its development in the last decade and compares it with developments in the international context. The subject of the analysis is the structure of benefits provided by organizations in Slovakia, the selectivity of their provision and their use as an integral part of the so-called total compensation of the employee.

Keywords: Human resources management; Remuneration System; Benefits; Total Compensation; Employee.

JEL Classification: M54, M12, E24

Article Classification: Research article

1 Introduction

Employee benefits are a category of remuneration, that usually isn't directly related to the employee's performance, but entitles to them because of affiliation with the organization. The current, above-mentioned comprehensive understanding of remuneration and the application of the concept of total compensation, including its various non-monetary and intangible forms, creates optimal conditions in which this form becomes a lucrative component of total compensation (Stachová et al., 2015). Non-monetary rewards effectively can respond to the individual needs of employees, regarding

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the need for their recognition, appreciation, creating a motivating work environment, quality of life, space for individual development and career management, or reconciling work and private life (Joniaková et al., 2016). Therefore, they become a significant cost item in the total compensation structure, accounting for about 30% of corporate labor costs on average and requiring adequate attention (Armstrong, 2009). They are part of the organization's social policy.

Armstrong (2009) states, that employee benefits are essential actions, that increase employee well-being. although they are extremely popular today, they are nothing new or a modern achievement. They have their roots in the period of individualization, their origin stemmed essentially from social necessity and they were a manifestation of patriarchal duty of care for employees. Originally, they focused mainly on providing care in case of illness, old age insurance, or insurance in case of inability to work. Gradually, issues of cost-effectiveness began to be discussed in connection with the topic of employee benefits. As early as 1906, Abbe drew attention to the fact, that their implementation is profitable for organizations and the costs incurred in this way will be reimbursed (Grawert, 2005). Subsequently, ethical and humane goals came to the fore, as well as topics such as support for engagement and motivation began to be associated with employee benefits in the second half of the last century (Corby, 2006). Nowadays, the social policy of organizations is no longer an expression of charitable thinking, which does not exclude altruistic motives, but becomes "an integral part of remuneration management with all the positive and negative consequences for employee behavior, productivity and profitability" (Grawert, 2005). Its main objective is to contribute to competitiveness, taking into account the cost-benefit ratio on the part of the organization and the employee, as well as all other components of remuneration (Olsen, 2015).

According to the QUIPPE study (Quinter Studia zum Praxis der Personalpolitik in Europa), conducted in European countries in the 1990s, the most important goal of social policy of the organization was to improve their own position in the labor market, followed by employee satisfaction and their connection to the organization (Beckes et al., 1994). The increase in performance played only a secondary role, which is confirmed by the experience, that employee benefits as the only component of remuneration are not used to support performance, on the contrary, they are exempt from the principle of performance. If their introduction into the remuneration system contributes to the increase in performance, it is mostly indirectly, e. g. by improving working conditions.

However, the results of a research study on the flexibility of remuneration in large organizations carried out in Germany in 2003 showed, that following a partial easing of the labor market situation, organizations began to prioritize employment benefits in the field of employee benefits, contrary to previous findings. In second place, within the importance of social policy goals, the connection of employees to the organization was placed, and only subsequently did employers expect employee benefits to strengthen their own attractiveness in the labor market (Wagner, 2015). The diversity of the results of the various studies points to the diversity of the objectives of corporate social systems and also to their development in the context of a changing situation (Peluso et al., 2017). The performance principle is likely to apply to them more and more. The current discourse in this area results the need to integrate social policy effectively, transparently and clearly into a performance-oriented remuneration system. It is believed, that this could increase its stimulating effect. The prerequisite for this is the continuing individualization in the provision of employee benefits, which aims to ensure the optimization of personal preferences of employees and, at the same time, the connection to the overall performance-oriented remuneration system (Tae-Yeol, 2018; Olsen, 2015). Employee benefits should no longer be a separate component, separate from the monetary

components of remuneration, which is currently still a practice (Alhmoud & Rjoub, 2017). This is also visible in the organizational solution of remuneration, where social policy in organizations is usually administered by departments other than monetary remuneration.

Alternative remuneration options compared to direct money are attractive to their recipients only if they have the opportunity to increase their net income or to meet individual intangible needs in this way. An increase in net income can be achieved through a tax advantage compared to obtaining the same service outside the organization, directly on the market. However, this presupposes legislation, that favors the provision of social benefits and services to employees. Slovak legislation provides organizations with a relatively small space in this regard, because it is based on the assumption of equality of all types of income in terms of taxation. Only allowances for meals, transport to work, use of recreational, medical, educational, pre-school, physical education or sports facilities provided by the employer to employees and their family members, owned or contracted by the organization, are exempt from income tax cost advantage compared to the market price of the service, resp. performance resulting from e.g. the quantity rebates, that organization is able to obtain when procuring a larger volume of goods and services or from their own production. Satisfaction of intangible needs can be achieved by increasing the status of the employee, which can be confirmed by a certain level of services and benefits provided, e.g. by car, increasing the availability of services and benefits, that otherwise would be more complicated to obtain, a sense of self-determination and self-actualization of the employee, which provides him employee benefits (Gravert, 2015).

The evaluation of individual aspects is conditioned by the individual situation of employees and their preferences (Medcof et al., 2007).

The efficiency of the employee benefits system can also be increased by introducing optionality, where employees are allowed to individually select the benefits drawn in accordance with their own preferences and current needs. The so-called Cafeteria systems make possible to increase the effect of provided employee benefits at constant costs. Passive reception of information changes to active, because employee must get acquainted with the offered benefits and evaluate each offered item based on personal preferences before making his own choice. With this way providing transparency and sufficient information is ensured.

2 Material and methods

The aim of the contribution is to examine the use of benefits in the remuneration of employees within organizations operating in the Slovak Republic and its development in the last decade. The starting point for research and analysis was the results of several researches carried out at the Department of Management. In 2006 and 2019, a comprehensive survey was conducted on remuneration in organizations using a similar research tool (questionnaire), which allowed a comparison of the results obtained and evaluation of the development of the monitored issues. The results were supplemented by data, obtained within the framework of the international survey of human resources management in 2013 in the member countries of the CRANET network, which stable members represent teachers and lecturers of the Department of Management. Obtaining data from member countries made it possible to compare the situation in the international context.

The survey from the year 2006, specialized in remuneration, was conducted on a sample of 110 organizations (Table 1).

Table 1 Structure of the survey sample from 2006 research by industry; Source: own elaboration

Industry	Percentage share of organizations in the sample
Agriculture	2,5
Energy	3,1
Chemical industry	3,7
Metalworking and engineering Industry	17,3
Other manufacturing industry	14,2
Construction	11,1
Retail, hospitality and catering services	7,4
Transportation	8
Banking and insurance	11,1
Health and social services	3,1
Other services	4,3
Public administration	5,0
Information technologies	1,8

In terms of legal form, 34.4% of joint-stock companies and an absolute majority (52.5%) of limited liability companies are included in the monitored group. Only 13.1% of the companies consists of other legal forms. Such a sample structure meets the needs of the analysis, as it mainly involves business entities for which the remuneration of employees is fully liberalized under the current legislation and the companies themselves are responsible for its design. Regarding size structure of the organizations included in the survey, all size groups are represented in it (Table 2).

Table 2 Structure of the survey sample from 2006 research by the size of the organizations; Source: own elaboration

Number of employees	Percentage share of organizations in the sample
to 50	11,0
51 - 100	23,6
101 - 300	27,2
301 - 500	9,9
501 - 1000	16,7
over 1001	11,6

The survey from the year 2013, was conducted as part of a broader human resources management survey within the CRANET research network. The research sample contains data from 262 organizations in the Slovak Republic (Table 3).

Table 3 Structure of the survey sample from 2013 research by industry; Source: own elaboration

Industry	**Proportion of organizations in the sample**
Agriculture	4,1
Energy	4,2
Chemical industry	1,8
Metalworking and engineering Industry	13,1
Other manufacturing industry	18,9
Construction	5,4
Retail, hospitality and catering services	12,2
Transportation	9,0
Banking and insurance	10,4
Health and social services	2,6
Other services	6,8
Public administration	3,2
Information technologies	14,1

Based on sector, in which organizations operate, the monitored group are classified: 88.7% of private sector organizations, primarily created for the purpose of generating profit and 9.5% of organizations operating in the public services sector or in the non-profit sector. Such a structure of sample meets the needs of remuneration analysis in the human resources management system, as it mainly includes business entities for which the remuneration of employees is fully liberalized under the current legislation and the organizations themselves are responsible for its design. Regarding the size structure of the organizations included in the survey, all size groups are represented in it (see Table 4).

Table 4 Structure of the survey sample from 2013 research by the size of the organizations; Source: own elaboration

Number of employees	**Percentage share of organizations in the sample**
to 50	3,1
51 - 100	24,6
101 - 300	32,6
301 - 500	8,9
501 - 1000	11,6
over 1001	19,2

The survey from the year 2019, specialized in the field of remuneration, was carried out by the author of the paper using a similar research tool as in 2006. The sample includes 148 organizations (see Table 5).

Table 5 Structure of the survey sample from 2019 research by industry; Source: own elaboration

Industry	Percentage share of organizations in the sample
Agriculture	2,0
Energy	0,7
Chemical industry	1,4
Metalworking and engineering industry	20,1
Other manufacturing industry	9,5
Construction	8,1
Retail, hospitality and catering services	10,1
Transportation	3,4
Banking and insurance	25,7
Health and social services	2,7
Other services	4,1
Public administration	4,7
Information technologies	7,5

3 Results and discussion

Employee benefits have become an integral part of remuneration systems and in the context of overall remuneration currently play an important role. Therefore, the subject of our interest represented the analysis of changes in the use of this tool within organizations in Slovakia. Employee benefits represent an indirect form of employee remuneration and create extension of their salary remuneration. Nowadays, they have become a natural part of the remuneration systems of those organizations, that want to be competitive in the labor market. This is also documented by the results of the survey, on the basis of which their use is constantly growing. More than half of the organizations (52%) in 2019 stated, that in the last three years they had increased the share of employee benefits in the total compensation of employees, 48% did not make adjustments in this direction and no organization declared a decrease in their representation in the total compensation. Organizations also showed an increase in the share of benefits in 2006, but their current dynamics is even higher. These findings also indicate a current increase in the importance of benefits.

Table 6 Changes within the share of benefits in total compensation; Source: own elaboration

	Increase in the share of benefits	Without a change	Decrease in the share of benefits
2006	41%	58%	1%
2019	52%	48%	0%

The provided structure of employee benefits is relatively stable, as evidenced by a comparison of data obtained from surveys between 1998 and 2019 (see Table 6). These include long-term stable benefits, which are a traditional part of the offer, such as over-statutory food vouchers, extra offer of holidays than standard one determined by law, use of car and mobile phone for private purposes and much more. The change, new trend represents a significantly increased interest in educational activities on the part of both employees and employers. While in previous periods this type of benefits did not dominated at all in surveys, currently up to 70% of organizations report, that they offer training (especially language) as a benefit to employees. The international comparison showed a high variability of approaches to the inclusion of education in the range of

benefits. The results range from 25% to 94% of organizations. From this point of view, Slovakia is placed between one of the progressive countries.

Except of employee benefits, which create a stable part of remuneration systems, organizations also come up with their new forms of trying to reach, engage employees and make their own remuneration systems more attractive. This form of remuneration gives space for individualization of remuneration and current management of human resources respecting the life and career stages of the employee. Its implementation can significantly strengthen the employer's name as a brand in the labor market as well as in the perception of its own employees.

Table 7 Development of employee benefits structure; Source: own elaboration

Employee benefits	**1998**	**2001**	**2003**	**2006**	**2019**
Education	-	-	-	-	70%
Social and sports events	56%	61%	73%	85%	67%
Use of mobile phone	x	79%	79%	80%	56%
Use of car for private purposes	67%	61%	66%	67%	44%
Gifts for anniversaries	62%	65%	65%	62%	49%
Supplementary pension insurance	-	-	-	52%	50%
13. salary	-	-	-	50%	49%
Christmas gifts	-	35%	53%	48%	15%
Promotion	45%	36%	56%	47%	51%
Food vouchers beyond the law	x	35%	35%	38%	56%
Purchase of discounted products and services	37%	29%	30%	30%	54%
Holidays beyond the law	-	20%	23%	28%	51%
Loans	-	-	-	22%	30%
Clothing vouchers	30%	22%	21%	16%	28%
14. salary	-	-	-	13%	20%
Accident and life insurance	-	-	-	13%	15%
Creche and kindergartens	5%	2%	1%	1%	2%

Table 8 Employee benefits within organizations in 2019 by enlargement; Source: own elaboration

	Share of organizations
Education, especially language	70%
Corporate events	67%
Drinking regime at the workplace	61%
Flexible working hours	57%
Food vouchers beyond the law	56%
Use of mobile phone	56%
Possibility for purchase discounted products	54%
Holidays beyond the law	51%
Gifts for anniversaries	49%
Use of car for private purposes	44%
Transport voucher / transport to the workplace	32%
Clothing vouchers	28%
Home office	18%
Christmas gifts	15%
Contribution to above-standard health care	9%
Corporate creche and kindergartens	2%

These include: various ways of promoting flexibility, various types of commercial insurance, the provision of legal, financial and other counseling, contributions to educational and leisure activities for employees' children, health management, work-life balance measures and various others (see Table 7 and 8).

By looking at the offers of selected financial benefits in terms of managerial and non-managerial positions, we can see how organizations are trying to maintain the principle, based on which this form of remuneration is tied to membership within the organization in order to stabilize employees. Larger differences can be seen in the payment of 13th and 14th salaries, which are more often received by managers, but for other benefit categories the results are comparable (see Table 9).

Table 9 Selected financial benefits by category of employees in 2019; Source: own elaboration

	Managers	**Other categories**
13. salary	57%	40%
14. salary	25%	18%
Employees' loans	27%	32%
Supplementary pension insurance	48%	52%
Accident and life insurance	16%	14%

The current concept of total compensation approaches the employee's remuneration holistically and includes not only monetary and tangible, but also various intangible components. into relational rewards, Armstrong includes e.g. workplace relations, organizational culture, management styles, talent support, etc. Our intention was to find out whether organizations operating in Slovakia also have same approach to remuneration and what importance have these tools for them, which although have been a part of human resources management for a long time, but have not traditionally been directly connected with remuneration. Organizations declare, that they make extensive use of these intangible instruments as part of remuneration and consider them meaningful. The use of intangible rewards is mainly in the competence of direct managers, chefs, who must be qualified in this sphere and trust in their effects. Managers make the greatest use of personal awards (92%) and also attach great importance to it (see Table 10).

Table 10 Intangible remuneration instruments within organizations in 2019; Source: own elaboration

	Share of organizations	**Significance (rated on a scale of 1 - 5)**
Personal recognition	92%	4,0
Public praise	86%	3,4
Spending time together	78%	3,6
Talent support	70%	3,7
Empowerment	71%	2,7

By looking at the structure of employee benefits, that appear in the international survey of the Cranet network and its comparison with the structure observed in the surveys in Slovakia, a significant difference is apparent (see Table 11). In our conditions traditional benefits are dominating (work aids, vouchers for food, transport, corporate events, educational programs, etc.), while in the international context the structure of employee benefits and services is changing. It focuses more on the employees' individual needs in accordance with the stated management focused on their life stages. The offer includes programs focused on the supporting stages of parenthood (maternity and

paternity leave, childcare at the workplace), career development (opportunities to interrupt career for various reasons: educational, personal or family), support for employees, who are ending their careers (pension programs, health management) etc. Individualization and respect for individual life, career stages and the related changing needs of employees are taken into account to greater extent.

Table 11 Comparison of selected benefits in the countries of the Cranet Network and in Slovakia; Source: own elaboration

	Member countries of the Cranet network	**Slovakia**
Child care at the workplace	9%	10%
Childcare vouchers	17%	7%
Career break programs	22%	6%
Maternity leave	61%	43%
Paternity leave	52%	26%
Parental leave	48%	38%
Pension saving programs	47%	39%
Career interruption due to education	52%	25%
Private health insurance programs	51%	27%

The individualized approach to human resources management can also be indicated, defined by the existence of various support programs focused on individual, specific categories of employees, such as people with disabilities, older employees, etc. In organizations in Slovakia, young employees are mostly supported, which corresponds to the trend "fight for the talents." when organizations seek to recruit and develop employees with high potential in the labor market. In the last period, the organization pays increased attention to employees after maternity leave. As a result of demographic development and the above-mentioned changes in the reproductive behavior of the population, women are more likely to go on maternity leave at an older age, during the time when they already have well developed career and their departure is a loss for the organization. Therefore, they try to create the conditions for their early return and to provide opportunities for balancing work and private life.

Table 12 Programs for specific categories of employees in organizations; Source: own elaboration

	Share of organizations with programs
Older employees	35%
Minority groups	19%
Employees with disabilities	28%
Women after maternity leave	44%
Young employees	49%

The principle of selectivity, also called the cafeteria system, is a tool, that will help organizations to streamline the management of employee benefits, make it more attractive to employees and support the individualization of remuneration. According to the results of the survey, this principle, system is used by 39% of organizations, which represents a significant increase compared to 14% in 2006 and 4% in 2001. In the past, a low proportion of organizations, which decided to implement a cafeteria system persisted in our conditions for a long time, but now this problem seems to be overcome. However, a closer look shows, that even though organizations declare the use of the cafeteria system, they do not make it widely available to all categories of employees. In the

category of workers, it is used by only 15% of organizations, which is still extremely low. From specific forms of implementation the principle of selectivity for employee benefits, in 2006 two-thirds of organizations (67%) used an alternative menu system, i. e. offered employees a choice of several packets of benefits, which is a partially limited form of eligibility and organizations choose it as a kind of " intermediate step" for easier administration and lower costs. Nowadays, only one-third of organizations (33%) use such an approach, while the remaining two-thirds allow employees the freedom to choose through the buffet or core system.

Table 13 Comparison of benefit systems in selected countries in 2014/2015; Source: own elaboration

	Cafeteria system	**Non - monetary forms of remuneration**
Austria	45%	58%
Belgium	46%	56%
China	87%	80%
Croatia	13%	86%
Cyprus	17%	33%
Finland	19%	43%
France	18%	36%
Germany	55%	52%
Hungary	44%	55%
Italy	32%	42%
Norway	38%	19%
Romania	51%	36%
Mask	29%	83%
Slovakia	40%	55%
Spain	68%	38%
Sweden	31%	36%
UK	37%	58%
USA	52%	52%
European countries	37%	50%
Non-European countries	37%	52%
average	37%	52%
max.	87%	86%
min.	13%	19%

Based on international comparison, organizations in Slovakia are in the average band in terms of use flexible systems for employee benefits, as well as inclusion of non-monetary forms of remuneration in them (see Table 13). The variability is just as great, the use of elements of eligibility in benefit systems is not yet broadly spread, despite the long-term awareness of organizations about this possibility and its numerous benefits. In Croatia, the cafeteria still uses the systems of only 13% of organizations, in contrast to China, where this solution is almost standard (87% of organizations have it in place). Equally significant differences are visible in the use of non-monetary forms of remuneration, which only 19% of Norwegian companies include in their schemes, in contrast to 86% of organizations in Croatia. Large differences in approaches to remuneration through benefits are related to the setting of legislation in the researched individual countries. In some of them, relatively strong social protection and guarantee of various types of benefits is provided by law, and organizations then do not have to take over this function. In other countries, on the other hand, a large part of social services is provided to employees through corporate social policy and not from the state.

Decision-making on benefits in organizations is largely determined by the legal regulation of the creation of a social fund, but at the same time it is based on corporate and personnel strategy, which means that organizations try to reconcile the benefits provided with their own intentions and goals. This fact can be assessed positively, as it also confirms the fact, that individual remuneration tools are selected and deployed in the context of the overall situation in the organization and are not just an isolated tool for human resource management. Compared to the previous period, the importance of benefits as a tool to support the competitiveness of the remuneration system has increased. Organizations more often compare their employee benefit systems with the competition (increase from 15% to 36% of organizations). At the same time, organizations' interest in cost side of employee benefits started to increase, which is related to their expansion and importance in the remuneration system. Such approach is a prerequisite for their functionality (Table 14).

Table 14 Factors influencing the provision of benefits; Source: own elaboration

	2006	**2019**
Legal creation of a social fund	42%	57%
Tax deductibility	31%	30%
Parental company policy	24%	32%
Competitive pressure	13%	36%
Cost aspect	40%	55%
Collective negotiation	11%	30%
Business and personnel strategy	38%	39%

4 Conclusion

The conclusions from the use of employee benefit systems in organizations in Slovakia found on the basis of surveys can be summarized as follows:

- the share of employee benefits in total compensation has been growing for a long time with significant dynamics,
- organizations create systems of employee benefits in accordance with their own goals, while monitoring the competitiveness of benefits and their cost-effectiveness,
- the structure of offered employee benefits is relatively stable, focused primarily on traditional forms of benefits,
- education has become increasingly important in terms of benefits,
- the space for individualization of remuneration through benefits remains slightly used in our conditions, use of the principle of selectivity is growing, but not for all categories of employees.

The tendency to use not only monetary but also various tangible and intangible instruments as a form of remuneration is growing. The category of employee benefits has become a stable part of remuneration systems, almost all organizations involved in the survey in 2019 stated, that they use some form of benefits, their share in total employee remuneration is growing and organizations continue to declare interest in increasing this share. Various intangible instruments are also steadily used in remuneration (for example, up to 85% of organizations use work with praise and awards in remuneration today). The interconnection of remuneration system with systems of professional education, development and career growth of employees is becoming as a standard. The use of these human resources management tools in the practice of organizations is nothing new, but their connection with the function of remuneration and utilization in the form of

remuneration for employees is evidence for the use of the principle of total compensation. This is evidenced not only by the fact, that training and development programs are integrated into benefit systems, but subsequently employees are also rewarded for raising qualifications. There has been a significant shift in this direction, as in 2006 only 2% of organizations were bound by the increase in remuneration for raising their qualifications, while in 2019 there were as many as 52%, which represents an enormous increase. The concept of total compensation is currently a widespread way in which organizations try to increase the effectiveness of their own remuneration systems, its positives are widely discussed and described in the introductory part of the work.

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Changes and Trends in Employees Recruitment during 2010-2019

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Abstract

Every single organization tends to provide a suitable work potential due to the fact the work potential that organization disposes, determines the success of each organization as it is the basic prerequisite to meet current, as well as the future tasks of organization within market economy. The work potential not only means the number of employees, but much more their knowledge, abilities, skills, intelligence, talent and all personal characteristics required for meeting the set goals and enterprise mission, thus acquiring of such employees is one of the most important and permanent activities of human resource management. The paper captures the positive trend in organization focus operating in the area of Slovak Republic in recruiting employees from their own internal sources where on average and in all categories (management, specialists, administration and workers) the numbers increased by 10% to 15%. The significant changes appeared in individual methods and their utilization for recruiting employees. Advertisements in newspapers and employment offices was the most preferable method used during 2010 – 2012, since 2014 appeared significant changes influencing the ratio, and during the last monitored year 2019 the organizations started marking other methods in larger extent: references, social networks and employment agencies.

Keywords: Management; Human resources; Employees recruitment; Changes.

JEL Classification: M54, M12, E24

Article Classification: Research article

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1 Introduction

The concept of employees recruitment (or search, hiring) means that it is not just recruitment of necessary employees from external sources, but also an effort to recruit the employees who are seen as a greater benefit for organizations, namely the organization interests and goals, with the effort to get competent and motivated employees, whose individual goals are the same, or they are in compliance with the organization system of values and culture, thus those can be also their own, regular employees who have proven their work qualities (Kachaňáková, 2011). Current research shows that organizations often have to cope with difficulties in filling the vacancies. According to CIPD study of 2017, up to one tenth of organizations have difficulties to cover more than 50% of vacancies (Chartered Institute of Personnel and Development 2017).

The issue to use own internal resources reachees very positive evaluation from employees, where such acting of organization has a motivating effect. The vacancies are of particular interest to internal employees, mainy for those who are not placed in their original job positions (for various reasons - technological, organizational, new methods of work, etc.), and who have a need for the career growth, or have personal reasons to move to another position within the enterprise. Advertising the vacancies and positions at own intranet seats, notice boards, magazines, entrance halls, elevators and other frequently visited places enables the fast and effective spread of information and at the sae time savings the cost for searching, selection, adaptation, training and development of the employees. A disadvantage may become the fact of increased rivalry between colleagues, non-acceptance of authority, as well as nepotism, which prefers the recruitment of family members and known employees. In Asia and the Middle East is nepotism a cultural norm, even some American companies like Ford and the Rockefeller Foundation were built on the nepotism principles , which was an ideal tool for passing on the working knowledge and skills from generation to generation (Bajzíková et al., 2019). If the vacancy is not coverred from internal sources, then external sources become the main source to search for candidates, then the companies address the potential employees via advertisments (daily, weekly, professional, radio, television), websites and social networks, external search and intermediary agencies, etc.

The very specific task for recruiting staff is to ensure that the vacancy in the organization attracts a sufficient number of adequate candidates, at reasonable costs and in a timely manner, and also to obtain adequate information on candidates needed for the reliable selection of the most suitable one, where the optimization of recruitment costs are desirable, while the costs are significantly affected by the method purposefully chosedn by the organization. There exist a number of traditional and modern ways to start the contact with a target group, but the decision, which one to use, is one of the key decisions in the process of acquisition (Bajzíková et al., 2019). Important is the proper choice between formal and informal methods, which not only affects the costs incurred, but as the surveys show, also the satisfaction of both, the recruited employee and the organization itself. Formal methods of recruitment can be mentioned when an organization informs about the vacancy through selected media e.g. use of selected print media (newspapers, professional magazines, etc.), television, radio, placement of an advertisement in a corporate website, use of professional web portals, advertisement with dissemination through paid advertisement on the Internet, the use of professional social networks, etc.. Informal recruitment methods means when candidates learns about a vacancy informally, e.g. from the current employee or another person, find the address through informal social networks, or the candidates can apply for a job without any prior call or activity by the organization, etc. (Crowley, 2013). According to research, the

informally recruited candidates are in higher volume those, who tend to stay in the organization longer after being hired initially (Crowley, 2013), and perform better (Barber, 1998) compared with the candidates recruited via formal recruitment methods. One possible explanation is that these candidates are proactive in seeking a vacancy, as they are genuinely interested in working in a vacancy or within the organization. One of the assumptions is, that they have more realistic expectations about the job as well as the organization, and they had the opportunity to talk about the position with the person, who informally mediated the job offer, or they were actively interested in the organization itself (Bajzíková et al., 2019). On the other hand, the only use of informal recruitment methods, an organization may be deprived of the opportunity to recruit a diverse types of workforce, as informally addressed candidates usually come from the same background, have similar work experience as current employees in the organization (Snell & Bohlander, 2010).

What shold be taken into account is that not only one method can be accepted as the right one, each of them has its own positives and negatives, thus it is necessary for organizations to choose the method properly and individually, always in accordance with the current needs of candidates.

2 Material and methods

The paper presents the surveys results realized from 2010 to 2019, always conducted in the period from February to May, where the surveys respondents were top representatives of companies operating in the area of Slovakia. The survey was carried out in the form of a personally delivered questionnaires and the number of adresses managers oscillated around 570 every year, while the comprehensively and correctly completed questionnaires ranged at the level of 60% to 65%.

The research sample consisted of managers operating in companies throughout Slovakia, but in order to determine a sufficient research sample, the authors set two stratification criteria as follows: the first criterion was the operation region of the company according to the NUTS (Slovakia is divided based on the NUTS 2 category), and the structural system of samples we came out of the data provided by the Statistical Office of the Slovak Republic (Statistical Office of the Slovak Republic). For the second stratification criterion (chosen by the authors), was the minimum number of employees (50) in the surveyed companies, thus micro and small enterprises were excluded from the research sample, but by this criterion were on the other hand selected enterprises where the managerial skills could be demonstrated realistically.

During the observed period based on data ginen by the Statistical Office of the Slovak Republic can be stated, that the number of enterprises with 50 or more employees, based on individual regions, fluctuated around the same values; the proper structure of companies over 50 in the searched period is given in the Table 1.

Table 1 Regional structure of enterprises over 50 employees; Source: (ŠÚ SR)

Region - NUTS II.	**Bratislava region**	**West Slovakia**	**Central Slovakia**	**East Slovakia**
region	**BA**	**TT, TN, NR**	**BB, ZA**	**KE, PO**
Number of enterprises 2010	1,056	888	631	602
Number of enterprises 2011	1,064	892	638	607
Number of enterprises 2012	1,082	899	634	605
Number of enterprises 2013	1,074	895	639	603
Number of enterprises 2014	1,098	904	644	612
Number of enterprises 2015	1,105	916	651	613
Number of enterprises 2016	1,114	923	649	621
Number of enterprises 2017	1,123	926	654	623
Number of enterprises 2018	1,125	930	659	626
Number of enterprises 2019	1,137	935	661	627

To determine the optimal research sample from the mentioned basic set of companies, the authors stated 95% as the percentage of research reliability and the confidence interval of the results (H = +/- 0.10). Based on the above mentioned criteria, a sufficient, respectively relevant research sample for individual regions of Slovakia, in the analyzed years, are given in Table 2.

Table 2 Stating of research sample for individual regions of Slovakia; Source: own elaboration

Region - NUTS II.	**Bratislava region**	**West Slovakia**	**Central Slovakia**	**East Slovakia**
region	BA	TT, TN, NR	BB, ZA	KE, PO
size of research sample	88	87	84	83

3 Results

As a part of analysis in the changing trends of recruitment during the period from 2010 to 2019, the primary focus was to find out which sources of recruitment are preferred by organizations, mainly taking into account the fact that the recruitment task is not only to address the optimal number of candidates who meet the requirements for the position, but within the internal sources for acquisition, the offer of a promotion to an internal employee is perceived as a significant motivator.

Table 3 Utilozation of internal sources in gaining the employees; Source: own elaboration

Internal sources	**Categories of employees**			**Average use of sources for all categories v %**
	M %	**S %**	**A/W%**	
2010	62	55	47	54
2011	60	51	46	52
2012	59	43	50	51
2013	63	52	57	56
2014	65	60	63	61
2015	73	69	68	70
2016	70	64	65	68
2017	69	63	60	64
2018	70	62	60	62
2019	71	64	61	63

Notes: M – management, S – specialists, A - administrative workers, R – workers

The surveys showed that for management and specialist positions the organizations into a greater extent use internal resources, while for common work positions they mainly focus on attracting the employees from external sources (Table 3).

The quality and efficiency in recruiting employees from external sources is largely dependent on selected method, respectively on the combination of selected methods. The choice of method strongly depends on the position to be occupied, but the organization must also take into account own financial capabilities because, as with other human resource management functions, it is necessary to monitor the effectiveness of resources spent on acquisition, namely the economy and effectiveness. Taking into account the fact that there are many methods that cannot be used permanently for each job position, we searched for the methods preferred by organizations and various job positions. The gained results were summarized according to the individual occupied positions, and individual methods were ranked from the most frequently used ones (the order was determined on the basis of individual methods and arithmetic average in the monitored year).

The analysis of the utilized methods to acquire managers shows that over time the preferences to implement individual methods changes significantly. While at the beginning of the monitored years, organizations for this purpose used mostly advertising both in the media and on their own as well as agency websites, in 2019, organizations almost doubled the use of references as well as the advertisements on their own websites (Table 4).

Table 4 Methods of employees resourcing for management positions; Source: own elaboration

Methods used for gaining management positions	**Share in enterprises %**									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Advertising	32	31	30	27	25	22	20	19	20	19
Based on references	26	18	21	27	36	49	51	53	52	53
Personal agencies	37	31	20	24	26	29	31	33	34	33
Via enterprise website	33	26	24	27	34	42	42	43	42	41
Via recruitment agency	23	21	15	20	24	29	32	36	36	37
Random job seekers	11	12	14	18	20	25	23	22	24	23
From Labour office	4	5	6	10	12	23	22	22	24	24
From educational institutions	5	4	2	3	4	8	10	12	13	14
Social networks (LinkedIn)	x	x	x	6	6	7	13	16	15	17

Note: Scale and methods of gaining the employees was widened after 2013

Table 5 Methods of employees resourcing for the positions: specialist and technician; Source: own elaboration

Methods used for gaining the specialists and technicians	**Share in enterprises %**									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Advertising	66	47	37	32	27	23	23	23	24	23
Based on references	36	32	29	33	41	56	55	57	58	57
Personal agency	37	28	18	27	28	27	28	29	28	27
Via enterprise website	30	34	27	35	41	43	45	46	46	45
Via recruitment agency	37	23	22	28	34	38	39	39	40	41
Random job seekers	30	29	27	30	29	27	29	30	31	30
From Labour Office	13	11	11	14	17	23	25	28	27	25
From educational institutions	10	11	7	12	14	13	15	17	15	16
Social networks (LinkedIn)	x	x	x	8	7	7	15	16	14	15

Note: Scale and methods of gaining the employees was widened after 2013

When recruiting employees for the positions of specialists and technicians, the use of individual recruitment methods resulted in a similar change as for managerial

positions. While in the first years of the research the organizations preferred advertising, in the years 2015-2019 the share and use of references increased significantly, in average of 20% over the observed period of ten years (Table 5).

When filling administrative positions and workers, the most significant change in the use of methods during ten monitored years occurred in the use of advertising, which fell almost by 30%, as well as the use of employment offices, where there was a decrease of almost 20%. A significant decrease of more than 20% also occurred in the use of random job seekers. On the contrary, there was a significant increase in the search for employees via social networks by 15% and through recruitment agencies by approximately 15%, and also increased the form of using the organization's own website (Table 6).

Table 6 Methods of employees resourcing: administration and workers; Source: own elaboration

Methods used for gaining employees in administration and workers	**Share in enterprises %**									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Advertising	60	56	44	39	36	31	33	34	33	34
Based on references	47	45	44	46	50	55	54	54	55	56
Personal agencies	23	15	15	16	17	18	21	28	29	30
Via enterprise website	37	30	27	30	35	45	50	52	50	51
Via recruitment agencies	28	19	16	25	36	41	40	42	42	41
Random job seekers	61	58	47	40	38	36	36	38	37	38
From Labour offices	65	52	57	48	41	36	43	49	48	47
Rom educational institutions	10	7	5	7	9	11	11	12	11	10
Social networks (LinkedIn)	x	x	x	8	10	11	18	20	22	23

Note: Scale and methods of gaining the employees was widened after 2013

4 Discussion

While analyzing the current state of recruitment, we were primarily interested in the fact whether organizations prefer internal or external sources. The responses of the respondents confirmed (see Table 3), that organizations are primarily considering the candidates from internal resources when filling the positions, although from the practice is known that due to the implementation of equal opportunities policy, many companies insist that candidates applying for vacancies from internal sources had the same starting conditions as the applicants from external sources (Joniaková et al. 2016). The year-on-year analysis of the sources used in individual categories showed that organizations are becoming less and less different when recruiting employees. While in the years 2010 - 2013 they preferred internal employees for more professional and higher positions, it means the internal sources, which were stated as the preferred ones in managerial positions up to 60% and in the cases of specialists and administration employees it was approximately 50%, in working positions was this percentage significantly lower, only less than 30%. Since 2014, there has been a significant change in acting of organizations, (and it is at almost constant level) where recruitment of internal employees are preferable in all job positions. This may be related to the declining number of vacancies in the labour market (permanent decline in the percentage of unemployed, see Table 7), which has led organizations to value their own employees more.

Table 7 Development of percentage unemployment rate in Slovakia during 2010 – 2019; Source: (Eurostat, 2021)

Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Slovakia	14.5	13.7	14.0	14.2	13.2	11.5	9.7	8.1	6.5	5.8

Except for that, when using the employees from internal sources, organizations significantly reduce their costs needed for recruiting employees from external sources, and the costs are directly proportional to the weight and the significance of the occupied positions. When acquiring an employee from internal sources, the significant positive is the fact that the employee knows the organization and is already familiar with the values, attitudes and norms preferred in the organization. Several studies have been conducted during the recent years, (Alniacik et al., 2013; Christensen & Wright, 2011; SAAPM 2020), which have shown that if an employee really "fits in the organization." it has a positive effect on his work performance, satisfaction, or loyalty, and therefore these issues must be considerred (Bajzíková et al., 2019).

The analysis of the most preferred methods of recruiting employees after the results averaging showed that, while the most preferred method during 2010-2012 was advertising in newspapers and employment offices, since 2014 this ratio began to change significantly and in the last monitored year 2019 organizations in higher extent showed significance of references, social networks and intermediary agencies like more important methods. This can be attributed to increasing computer literacy of applicants for all job positions, and also the simplification in sharing and the access to information, preferably at online platforms. In a negligable sense it is also the effect of reduced unemployment rate, as a result of which there were less available qualified job seekers, both at the employment offices as well as the engaged single applicants for work in organizations.

From the results of Cranet international survey (similar to the survey conducted in 2015-2017 by CRANET in 31 countries worldwide), was found out that the company's internal sources are the most preferred source of recruited candidates for management positions: France (95%), Belgium (90%), Finland (85%), Sweden (83%), Austria (75%), Slovakia (67%). In addition, the websites of organizations or specialized career portals are heavily used in Sweden (86%), Finland and Austria (69%). Relatively frequently used are personal references, in France (83%), Belgium (68%) and Slovakia (50%). Social media is a frequently used method of recruiting managers in Belgium (63%), France (60%), the Netherlands (40%), while in Slovakia only 14% of organizations uses this way. Very different situation is when looking for candidates for specialist positions, where the research proved more significant diversification and at the same time more intensive use of individual methods, as well as the use and significant growth of social media potential. The most often used are internal resources, specialized career portals, applications, websites of organizations and to a significant extent the services of recruitment agencies. The most countries uses social networks at the extent of over 20%, Belgium (69%), the Netherlands (61%), Denmark (52%), Austria (29%) (Blštáková, 2018).

5 Conclusion

The presented survey aimed at trends and changes in recruitment during 2010-2019 showed the positive trend in prioritizing and recruitment from internal sources and the use of informal recruitment methods, and in the larger scope the methods of references. Taking into account current situation, when both recruitment as well as the complex functioning of human resources management have been affected by the situation

caused by the Covid 19 pandemic, it is possible to anticipate further changes in the prioritization, both in resources as well as in recruitment methods in organizations operating in Slovakia but also beyond. Connected with the above mentioned situation, the team of authors of the presented paper plans to continue in a similar analysis of organizations operating in Slovakia in capturing the changes in the behavior of organizations.

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Employer branding - challenge in Human Resources Management

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Abstract

The issue of employer branding has been recently addressed by several companies as it is increasingly difficult to recruit a quality employee, but also it is difficult to keep him. From traditional internal communication is therefore necessary to move to a broader concept of Employer branding, which includes several areas of company management, from public relations through human resources up to marketing, respectively to the department that deals with the company branding both in internal as well as in the external environment.

Key words: Human resources; Brand; Employer branding; Communication; LinkedIn; PR; Employee.

JEL Classification: M54, M12, E24

Article Classification: Research article

1 Introduction

Not only the COVID 19 pandemic has had an impact on the communication market, but many other changes have appeared in recent years, including the field of public relations, and the individual enterprises are becoming aware that important is to fight for their customers as well as for their quality employees. The discipline of internal communication has been expanding as well as moving further to Employer branding. The fight for an employee is becoming a permanent task but also the involvement of several departments is requested, namely the department of public relations, department of human resources and marketing department, respectively the brand management division.

The mentioned situation is also proved by the words of Soňa Lexman, the President of the Association of PR Agencies of the Slovak Republic: "Public relations has no longer been about media relations as it used to be, on the contrary, today, the agency is becoming a creative advisor, consultant, strategic planner, implementer of events, digital campaigns and communication on social networks, and furthermore,

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recently has been huge emphasis placed on the brand image building, Employer branding and internal communication, and elsewhere where PR finds its application. It means that today we can no longer clearly define PR as a work with the media, but rather as the work on building the client's image both externally and internally in the enterprise" (Lexmanová, 2019).

When having a look at the activities of Slovak PR agencies in 2020, Employer branding, internal communication and personnel PR reached high shares.

Table 1 Types and shares of services provided by PR agencies for clients in 2020 (based on the professional profiles of selected agencies); Source: Ročenka PR&Communication agencies 2021 (Yearly)

PR	**39%**
Communication strategies	
Media Relations	
Personal PR	
Crisis communication	
Community relations	
CSR and Sponsorship	
Internal communication	
Employer Branding	
Public Affairs	**11%**
Public Affairs	
Governmental Affairs	
Digital PR	**27%**
Social media communication	
Online marketing	
Influencer marketing	
Research	**6%**
Media Research	
Media buying	**7%**
Events	**10%**
Online events	
Offline events	

2 Trends in PR

Not only the current pandemic situation depicts necessary changes in the communication of companies within different sectors, moreover the increasing emphasis is put on the management of reputation as one of the main attributes of a company philosophy.

In communication market can be seen several trends as follows:

- companies emphasize the building of their reputation,
- consumers in their decision making pay more attention to recommendations of influencers than to the communication of the brand itself,
- brands express themselves on political and social issues,
- Employer branding and internal communication are becoming the main topics in companies,
- social networks are no longer just a communication tool but much more they serve as a customer service tool,

- in the case of relations with the media, no longer we have been just talking about journalists, the target group has been expanding to product and corporate communication,
- the dominance of digital communication reveals a large number of questions connected with ethical issues.

3 Employer branding

The Employer Brand or Brand represents a set of characteristics and qualities that encourage positive associations on the enterprise acting in the eyes of the target group, thus it can be clearly distinguished from other employers. Unlike the so-called personal marketing (HR marketing) which is aimed at attracting the target group of potential candidates by created single effective marketing campaigns, building of an Employer brand has not been a short-term activity with an immediate effect (Nejedlý, 2018). It is a long-term targeted process of changes in an organization to become the best possible partner of employees, where all parts of the organization are invo

The consulting company AON that conducts one of the largest worldwide surveys on employee engagement and job satisfaction called „Best Employers" states that based on the survey the organizations ranked among the best employees have had almost a doubled number of job applications compared to organizations that are not placed in the survey ranking (AON, 2009).

The results of the CIPD study of 2017 shows that for attracting and captivating quality candidate's companies consider the following three elements of Employer brand as the most important ones: values of organization, career growth opportunities, set up system of rewards and employee benefits. Further were in the results placed organizational goals, strategies and practices, perception of organization in the market and in the society, work environment, management of people and other factors (CIPD, 2017).

The term Employer brand has been defined in a number of different ways, the most definitions fall into three categories:

1. Defining the Employer brand as a promise. For example, The UK´s Chartered Institute of Personnel and Development (CIPD) defines Employer brand as a set of attributes and qualities – often intangible – that makes an organisation distinctive, promises a particular kind of employment experience, and appeals to those people who will thrive and perform best in its culture.
2. Defining the Employer brand in terms of your desired image and reputation. For example, Brett Minchington, who has published a number of books on the subject, defines an employer brand as the image of your organisation as a great place to work. From my perspective, both of these definitions describe strong employer brands, but unfortunately there are many Employer brands that could not be described in these terms. The final category of definition is more inclusive, and from my perspective more realistic and more useful.
3. Defining the Employer brand in terms of the full spectrum of thoughts and feelings that people associate with an employer, both positive and negative, both true and untrue, both clear and impressionistic, whether based on direct experience, intentional communication, unintentional communication or hearsay. From this perspective, every employer has an Employer brand, whether they have defined the attributes and image they would like to be associated with or not. In other words, brands like reputations, are ultimately defined by people´s perceptions. In this respect, I defer to the very first definition of the term Employer brand, as

described by Simon Barrow, founder and former chairman of People in Business, and Tim Ambler, Senior Fellow of London Business School, in the Journal of Brand Management in December 1996 as: the package of functional, economic and psychological benefits provided by employment, and identified with the employing company.

Defining and Employer brand in terms of perception and associations is more useful because it provides you with a more realistic measure of your employer brand´s true status and value. It helps you to recognize that your brand is ultimately shaped by what people hear about you, and how they experience you, and not simply by your intended brand messages, however powerfully they may be conceived and executed. It keeps you honest (Mosley, 2014).

The importance of Employer branding has been growing for several reasons:

- As the employees are important for the company in the period of crisis (they are also the source for media), they are also important for the company future;
- When the employees feel good in the company, it supports the company positive reputation;
- Simultaneously, each employee through his acting directly affects the reputation of the company (predominantly when in direct contact with customers);
- It is not sufficient to motivate the employees financially, they are much more interested in the company values as well as the overall benefits for the whole society.

Further we would like to mention five most important communication issues that are the most effective in increasing the employers´ credibility:

- Social impact – contribution of the company to improve the society;
- Company values;
- Company visions for future;
- Company Mission;
- Operational decisions, including those that may affect the work of an individual (Edelman Trust Barometer, 2019).

The positive Employer brand coupled with good reputation is becoming a prerequisite for an organization to be able and attract the best candidates (Knox & Freeman, 2006).

A quality Employer Brand can reduce recruitment costs (Ritson, 2002) increase the number and the quality of job seekers, reduce fluctuation at high performing employees and increase the overall labour productivity (Sullivan, 2004). It also has a positive impact on employees´ retention (Miles, Mangold, 2004), impact on increased job satisfaction (Miles, 2004) or internalization of organizational values (The conference board, 2001).

Towers Watson have recently developed a new definition of „sustainable" employee engagement ant it incorporates three core elements:

1. Discretionary effort and commitment to achieving work goals (being engaged):
   - Belief in company goals and objectives;
   - Emotional connection (pride and employer advocacy);
   - Willingness to give extra effort to support success.
2. An environment that supports productivity in multiple ways (being enabled):
   - Freedom from obstacles to success at work;
   - Availability of resources to perform well;

- Ability to meet work challenges effectively.

3. A work experience that promotes wellbeing (feeling energized):
   - Ability to maintain energy at work;
   - Supportive social environment;
   - Feelings of enthusiasm and accomplishment at work (Mosley, 2014).

4 Increased share of online tools in recruiting employees

During the period from 2010 to 2019 our research team carried out the survey aimed at the issue of Human Resources Management. For the purpose of the survey was used the questionnaire in the Google Forms platform, where were on yearly basis gathered 350 completed questionnaires. It was a randomized selected sample, where the common attribute of individual samples of respondents was the region of company operation, respectively the company seat. The share of Bratislava region was 26 %, Western Slovakia region (Trnava, Nitra, Trenčín) created 25 %, Central Slovakia region (Banská Bystrica, Žilina) was also 25 % and Eastern Slovakia region (Košice, Poprad) formed 24 %, where for the purpose of this paper were taken the results considering the recruitment method for gaining the employees.

Table 2 Methods used for recruitment of employees; Source: own elaboration

Methods used for recruiting the employees in administration and workers	**Share in organization in %**									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Advertising	60	56	44	39	36	31	33	34	33	34
Based on references	47	45	44	46	50	55	54	54	55	56
Personel agencies	23	15	15	16	17	18	21	28	29	30
Via company website	37	30	27	30	35	45	50	52	50	51
Via recruitment agencies	28	19	16	25	36	41	40	42	42	41
Random job seekers	61	58	47	40	38	36	36	38	37	38
From Labour Offices	65	52	57	48	41	36	43	49	48	47
From educational institutions	10	7	5	7	9	11	11	12	11	10
Social networks (LinkedIn)	x	x	x	8	10	11	18	20	22	23

Notes: The scale for employee recruitment was widened after 2010

As we are comparing the period from 2010 to 2019, the survey results show the visible the growth of online tools, namely the company websites that are today becoming one of the primary tools where many jobseekers have been looking for vacancies especially in the case they know the company brand, they are attracted by it and they would like to work for it. This is just the result of Employer branding, within which all three components of the company listed above the internal public relations department, human resources department and the department responsible for the Brand building should work properly together within both to internal as well as the external environment.

However, the task of Employer branding is often transferred only to the public relations department within the internal communication, but it has a specific position that does not include a wide range of disciplines in Employer branding.

The internal PR is the company mission to communicate with its employees about further development in the company and how they can participate in changes implementation. Proper internal PR should motivate and train the employees to act outside the company in the synergy with the company identity as well as to act in uniformed way with the external public. The employees should feel comfortable enough with prepared marketing activities or different events as to be willing and motivated to accept them but also to participate in them. The key factors are becoming dialogues of managers and employees, and also among the employees themselves. Managers should present and clarify the organizational changes, strategic orientation of the company and the implementation to employees (Pelsmacker, Guenes, Bergh, 2003). Intranet belongs to the basic tools of internal communication (in some companies, mainly in the production ones, they are replaced by notice boards), website, boxes for ideas and comments, internal events and company journal.

Above mentioned survey results clearly show that in the area of employee's recruitment, social networks come to the front, namely LinkedIn, that will be later described in the paper.

5 LinkedIn (not only) as a tool of Employer branding

LinkedIn is a professionally focused social network, which is mainly used by people in marketing, business, IT, human resources, as well as in various other business areas. LinkedIn has more than 620 000 users in Slovakia (year-on-year increase of about 10%) and in the Czech Republic it even reaches up to 1.8 million (data 2021). LinkedIn, as a network in our region has been still growing, and Austria, which has had slightly higher population compared with Slovakia, is the proof of that as it has 1.6 million users. Globally, more than 740 million people are registered in LinkedIn. The evidence on this social network potential is the fact that more than 45% of users in higher positions (manager, director) regularly monitor the posts on LinkedIn (Sasko, 2021).

LinkedIn gives the companies opportunities to profile themselves as an expert in the field in which it operates, and to share the views on events and trends related to the profession, including the experts from other fields as well as potential employees. It is primarily a tool for B2B communication and Employer branding, and no longer it is just a platform for online biographies as it used to be.

According to the survey published in study #FENOMENLINKEDIN:

- 55% of respondents declare that someone told them to see their activity on LinkedIn,
- 55% have moved professionally through LinkedIn information,
- 52% were found by their employer and the employer offered them a job,
- 40% discovered a business opportunity.

(FenomenLinkedIn 2020 survey, CZ / SK, 1002 respondents)

Table 3 Reasons to create a LinkedIn account; Source: (FenomenLinkedIn, 2020)

Networking	40%
Search for job opportunities	29%
Personal presentation, professional profile	20%
Gaining information, career development	16%
Electronic CV	10%
Ccuriosity	7%
Professional reasons, work in HR	5%
Recommendations, invitation	4%
Contact with former colleagues	3%
Necessity – new trend	3%
Employer request	2%
Within study	2%
Social network	1%
Fast and simple communication	1%
Other	2%
No idea, without any answer	2%

The Czech PR club realized the webinar on February 3, 2021 of where Ladislav Jelen from Coca-Cola and Petra Nuličková from Alza presented their communication via LinkedIn together with the impact on Employer branding, as they both work in the HR area.

The presentation of Ladislav Jelen pointed out what the communication on LinkedIn brought them, respectively what they have learnt from it:

- Authenticity is the key! People want to understand the corporate culture;
- Regularity is the key to success - an efficient platform can save time;
- An employee on LinkedIn is not the one who wants to run to another company (as some managers thought at the beginning), but the ambassador.

(Social network webinar at the time of Covid I. Webinár Sociální sítě v době covidu I., 3.2:2021)

Petra Nuličková stated what can be seen as brand building and she presented several numbers in terms of Alza CZ communication on LinkedIn in 2020:

- 400 posts during the last 12 months;
- 1,500 unique visitors every month;
- 100,000 visual displays per month;
- 8,000+ candidates in the system;
- 0 budget.

(Social network webinar at the time of covid I., 3.2:2021)

6 Conclusion

Employer branding can be accepted as a new trend in communication where in the contact with employees no longer is possible to rely only on traditional tools of internal communication, but on the contrary, important is to look for new ways, because current as well as future employees want to know the company values and how are they applied in practice, what is the company attitude to social issues, whether it can use the brand power to support the unpopular topics, as it was made by Dedoles company in June 2021, which publicly communicated its support to the LGBT + community and created a

special Pride collection. At the same time, the brand communication has been moving into the online environment where is important the grasp the available tools properly. One of them is LinkedIn, where the reach of company profiles has been decreasing, but on the contrary, the reach of employee profiles, especially managerial profiles, have been increasing, namely in the way that people in the company share their ideas on various public topics.

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Leadership and Motivation as a necessary part of a Manager´s Competence

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Abstract

The most important prerequisites for the managerial profession include not only professional knowledge but also knowledge and skills for working with people. Managers are responsible not only for achieving the goals of the organization but also have competencies in the field of Human Resource Management which include leading people and motivating them to work. The requirements of professional management differ in individual functional areas but most tasks of Human Resources Management should concern managers in the same way, perhaps their scope differs. Managing them depends on the skills and experience of managers and their co-workers. In the article the authors focused on a survey of the application of people's leadership style and motivational tools in a selected business company. They also examined employee satisfaction with leadership and motivation, predetermined hypotheses were verified and statistically evaluated by the Chi square test.

Keywords: Leadership; Motivation of employees; Competence; Organizational culture.

JEL Classification: M10, M12, M14

Article Classification: Research article

1 Introduction

Most often in academic circles but also in managerial practice we encounter the statement that the mission of management is to meet the goals of the organization by efficient use of resources. For several decades the scientific and professional literature has been devoted to explaining basic management activities and functions, finding and recommending ways and methods of their application in practice from different angles and in different aspects. One of the common features of managerial theories is the

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understanding of man as a subject and object of management, man is a creator of values either as a manager or as an employee. The most important prerequisites for the managerial profession include not only professional knowledge, but also knowledge and skills for work with people. Managers are responsible not only for achieving the goals of the organization or part of it but also have competencies in the field of human resource management which include leading people and motivating them to work.

The requirements of professional management differ in individual functional areas but the tasks of human resources management should apply to managers in the same way, perhaps their scope differs. Managing them depends on the skills and experience of managers and their co-workers. Successfully managing people is not just about giving them tasks and monitoring their performance. In particular, it requires the ability to be able to choose the right people to fill a job, to explain their roles, tasks and their importance to them, to make sure that they understand the procedure and what results are expected of them. In addition, the manager must provide material and intangible conditions for the work of all employees, making sure that there are no obstacles in their work (Urban, 2013). That is why, in addition to professional knowledge and organizational skills, social skills and appropriate competencies are essential for the work of managers.

Today we do not find clearly defined leadership, management theories offer a number of definitions, models and concepts of effective leadership (Antošová, 2008). Different definitions highlight different priorities, situations, and contexts but all provide answers to management questions, such as: Who? (manager) What is he doing? (leads) How? (in what style) Who? (people, co-workers) Why? (in order to meet the goal, achieve the result).

Armstrong and Stephens (2008) as well as other authors comment on the differences between management and leadership in the sense that managers must be leaders but leaders are not always managers. They explain management as achieving results through the effective acquisition, distribution, use and control of all necessary resources, i. e. material, financial, human and information. Leadership focuses on influencing the behaviour of one and the most important of these resources, i.e. to motivate people and gain their commitment and involvement. It is not enough to be a good resource manager; the manager must also be a good leader for people.

Managerial competencies are perceived as an intellectual potential through which managers perform their functions and roles (Zivcicova & Gullerova, 2017). According to Bennis and Nanus (1985), managers do things right and leaders do right things. Some authors (e. g. Zaleznik, 2004; Kotter, 1991; etc.) focused in their research on determining the differences between the roles of managers and leaders, others deal with managerial competence (e.g. Plamínek & Fišer, 2005; Hudakova & Mišun, 2012; Porvaznik & Mišun, 2013; Raisiene, 2014; Lorincova & Tomkova, 2018). Chreptaviciene (2009) analysed models of managerial skills and stated their peculiarities. Based on empirical research he presented a model of coherence of managerial competencies and motivation of employees.

The strongest factors influencing motivation include the quality of managers' influence, the creative content of management and their approach which they use in influencing work behaviour and employee performance (Blašková & Tršková, 2017). Some research documents the links between the leadership style of managers and the motivation of their subordinates but little is known about what leads to the formation of leadership skills. Kanat-Maymon and Elimelech (2020) examined the relationship between work motivation and people's leadership style.

Leadership and employee motivation are also expressed as part of the organizational culture. Managers are involved in building and promoting culture in the organization, adapting human resource management tools, their skills and abilities in leading people and motivating employees to increase the likelihood of achieving the goals of the organization and its culture. Horváthová et al. (2016) talk about the need to root the values of organizational culture to increase its impact on people's behaviour. Typical manifestations that express the recognized values of the organization include the manager's approach to co-workers, delegation of tasks in the work team, teamwork but also other elements of quality of working life. Antošová (2010) illustrates the relationship between human resources management and corporate culture in some processes of human resources management and organizational behaviour. Even when selecting employees for vacancies it is necessary to pay attention to the fact that the values and behaviour of candidates correspond to the values of the organization, managers should be able to estimate what is the assumption that a new employee will be willing to accept the values of existing organizational culture. If the applicant is e. g. a very conservative personality, it is difficult to identify with the innovative and progressive direction of the organization's activities. Čihovská et al. (2014) add that corporate culture also contains a set of corporate imperatives that must be followed. These include e.g. formal rules, regulations, orders and standards that show or prohibit certain activities. Corporate culture is a system of values and standards, it inspires defined opinions, beliefs and attitudes, guides them, recommends them or sometimes mandatorily enforces them., and in all areas, including leadership and employee motivation.

2 Material and methods

The aim of this paper is to examine and re-evaluate the impact of people's leadership style on employee motivation in a selected business company that has been operating in Slovakia for more than 20 years. The survey was carried out on the basis of pre-formulated hypotheses, a structured questionnaire was chosen to collect information. 80 respondents were contacted, the return rate of the questionnaires was 71% (57 employees, of which 39 were women and 18 men).

The survey focused on three areas of topics, namely the applied style of leadership, the motivation of employees at work and the impact of leadership on building organizational culture. On this basis we formulated hypotheses that were verified, tested and evaluated by statistical methods. We used a PivotTable and a Chi square test.

Pivot Tables - allow you to organize, group, and summarize data. It is a clear summary of the mutual relations between two statistical features using the MS Excel program.

Chi square test - determines whether the two categorical fields are independent. If the two fields are not independent they are linked. Using a test, we found out whether there is a relationship between two variables. We determined the null hypothesis H0 and the alternative hypothesis H1. The null hypothesis does not assume a dependence between the examined features, the alternative hypothesis does.

We created PivotTables listing empirical, real abundances (Ei), from which we calculated theoretical abundances (Ti), using the following formula:

$$x^2 = \frac{R_i * C_j}{n} \quad (1)$$

where applies: Ri – sum of the relevant line,

Cj – sum of the relevant column,
n – total sum.

When testing hypotheses, we calculated the test characteristic (TCH) using MS Excel and the CHISQ.TEST function. The value (TH) is a critical value, we entered through a table based on the level of significance (alpha = 0.05) and degrees of freedom. Subsequently, we defined the decision to accept or reject the hypotheses.

3 Results

We present the results of our survey aimed at re-evaluating the influence of people's leadership style on employee motivation in a selected business company based on the implemented Chi-square test and PivotTables, according to selected three areas of topics and formulated hypotheses.

3.1 Testing the relationship between employee satisfaction with the way people are managed and the length of time worked

Hypotheses:

- *H0: Employee satisfaction with the way people are managed does not depend on the length of his experience in the organization.*
- *H1: Employee satisfaction with the way people are managed depends on the length of his experience in the organization.*

Table 1 Empirical abundances TEST 1; Source: own elaboration

Satisfaction with the way people are managed	**Length of employee experience**				
	less than 3 months	**3 months to 1 year**	**1 to 5 years**	**more than 5 years**	**Total**
Yes	1	4	4	7	16
Rather yes	2	4	6	14	26
Rather no	1	4	5	2	12
No	0	0	2	1	3
Total	4	12	17	24	57

Table 2 Theoretical abundances TEST 1; Source: own elaboration

Satisfaction with the way people are managed	**Length of employee experience**				
	less than 3 months	**3 months to 1 year**	**1 to 5 years**	**more than 5 years**	**Total**
Yes	1.122807018	3.368421053	4.771929825	6.736842105	16
Rather yes	1.824561404	5.473684211	7.754385965	10.94736842	26
Rather no	0.842105263	2.526315789	3.578947368	5.052631579	12
No	0.210526316	0.631578947	0.894736842	1,263157895	3
Total	4	12	17	24	57

Calculation x^2 TEST 1: TCH = 0,5863
TH = 16,92

At a significance level of 0.05 we calculated that x^2 TEST 1 has a final value of 0.5863. According to the determination of the degrees of freedom the critical value is 16.92. Since the test result is lower than the specified critical value we state that we do not have sufficient evidence to reject H0. We therefore argue that employee satisfaction with the way people are managed does not depend on the length of time (experience) of the employee.

Based on the information obtained we state a positive finding for the organization when 74% of respondents are satisfied with the way people are managed in the workplace while the dependence on the length of employees' experience has not been confirmed. This finding leads to the assumption that managers approach leadership correctly and employees have a positive attitude towards managers regardless of the period worked in the organization.

3.2 Testing the relationship between employee motivation to work and satisfaction with benefits in the organization

Hypotheses:

- *H0: Employee motivation to work and satisfaction with benefits in the organization is not affected by their age.*
- *H1: Employee motivation to work and satisfaction with benefits in the organization is influenced by their age.*

Table 3 Empirical abundances TEST 2; Source: own elaboration

Motivation and satisfaction with benefits	**Age of the employee**					
	up to 20 years	**21 to 30 years**	**31 to 40 years**	**41 to 50 years**	**over 50 years**	**Total**
Yes	0	1	2	1	0	4
Rather yes	0	4	4	2	1	11
Rather no	1	5	8	5	3	22
No	2	6	5	4	3	20
Total	3	16	19	12	7	57

Table 4 Theoretical abundances TEST 2; Source: own elaboration

Motivation and satisfaction with benefits	**Age of the employee**					
	up to 20 years	**21 to 30 years**	**31 to 40 years**	**41 to 50 years**	**over 50 years**	**Total**
Yes	0.210526316	1.122807018	1.333333333	0.842105263	0.491228070	4
Rather yes	0.578947368	3.087718298	3.666666667	2.315789474	1.350877193	11
Rather no	1.157894737	6.175438596	7.333333333	4.631578947	2.701754386	22
No	1.052631579	5.614035088	6.666666667	4.210526316	2.456140351	20
Total	3	16	19	12	7	57

Calculation x^2 TEST 2: TCH = 0,9854
TH = 21,03

At a significance level of 0.05 we calculated that x^2 TEST 2 has a final value of 0.9854. According to the determination of the degrees of freedom the critical value is 21.03. Since the test result is lower than the specified critical value we conclude that we do not have sufficient evidence to reject H0. We therefore claim that the motivation of employees and satisfaction with the benefits provided does not affect their age.

In contrast to the first positive finding when determining the motivation to work the answers of the respondents showed that up to 74% of respondents are not satisfied with the benefits in the organization which negatively affects their motivation to work.

3.3 Testing the relationship between building organizational culture and leadership style applied by managers

Hypotheses:

- *H0: Building organizational culture does not depend on the leadership style applied by managers.*
- *H1: Building organizational culture depends on the leadership style applied by managers.*

Table 5 Empirical abundances TEST 3; Source: own elaboration

Building organizational culture	**Leadership style**				
	Authoritative	**Democratic**	**Liberal**	**I do not know**	**Total**
Yes	1	2	0	3	6
Rather yes	2	6	0	4	12
Rather no	8	13	3	1	25
No	5	8	0	1	13
Total	16	29	3	9	57

Table 6 Theoretical abundances TEST 3; Source: own elaboration

Building organizational culture	**Leadership style**				
	Authoritative	**Democratic**	**Liberal**	**I do not know**	**Total**
Yes	1.714285714	3.107142857	0.321428571	0.857142857	6
Rather yes	3.428571429	6.214285714	0.642857143	1.714285714	12
Rather no	7.142857143	12.94642857	1.339285714	3.571428571	25
No	3.714285714	6.732142857	0.696428571	1.857142857	13
Total	16	29	3	9	57

Calculation x^2 TEST 3: TCH = 0,0362
TH = 16,92

At a significance level of 0.05 we calculated that x^2 TEST 3 has a final value of 0.0362. According to the determination of the degrees of freedom the critical value is 16.92. Since the test result is lower than the specified critical value we conclude that we do not have sufficient evidence to reject H0. We therefore claim that building an organizational culture does not depend on the management style applied by managers in the workplace.

By evaluating the information about corporate culture obtained by questionnaires we can state that the selected organization has built a strong organizational culture and still uses all the elements to purposefully maintain it. Employees present their employer with uniform clothing with a logo, the behaviour of employees towards each other also in relation to customers as well as a vision as an idea of the organization's position in the future.

4 Discussion and conclusion

Research and empirical experience emphasize that today organizations cannot do without a new approach to the work of a manager. The manager should be prepared for the fact that he must also be a leader who is able to motivate his co-workers. Researchers argue that these efforts require the manager to have managerial skills and competencies based on a high emotional and social intellect.

The outputs of scientific research offer different models of leaders, their values, attitudes, competencies, abilities and professional characteristics required in the current organization. E. g. Raisiene (2014) states that the values, competencies, abilities and professional characteristics of leaders are interrelated variables and only the coherence of all these variables can lead to the success of management in the organization. In his research he defines the most important characteristics of a leader in the current organization. These characteristics are: activity, determination, caring for the needs of employees, responsibility, dedication to work, sincerity, emotional balance, practicality, attention and ability to listen and flexibility. For a company to be successful a modern leader also needs five general skills and competencies: the ability to communicate, the ability to make decisions in a team, the ability to work together, the ability to help employees achieve results, and the ability to overcome various contradictions.

The development of effective leaders and leadership behaviours should be a major concern in organizations of all types. Managers should not only manage resources, formulate a vision, set goals and insist on their fulfilment, managers should be leaders. E. g. top managers are expected to formulate a vision and determine the direction of the organization but in addition, all other managers know how to explain the vision and especially should share it with their co-workers, trying to get them to meet the goals. Such an approach can increase employees' motivation to work thus achieving better performance of individuals and work group, in the interest of long-term sustainability for the benefit of the entire organization.

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CRM system implementation in IT company

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Abstract

The contribution deals with the issue of CRM system implementation in an IT company and its impact on building a relationship with the customers. It also focuses on the achievment of the company's goals through the CRM system and the essence of its benefits. The theoretical backround describes the bases of the purpose by the CRM system, and the choice of suitable CRM solution itself. The research part is focused on the analysis of the current situation at NESS and identification of key problems in the implementation of the CRM system. It describes and analysis the CRM system implementation in the company and the analysis of the state after its implementation across the company through qualitative analysis and deduction methods that evaluate the digitization of the selected IT solution t the company and its direct and indirect impact on customer's relations, processes at the company and the company management.

Keywords: CRM – Customer Relationship Management; Relationship with customer; IT Solution.

JEL Classification: D18, M15, M31

Article Classification: Research article

1 Introduction

Customer Relationship Management (CRM) is a complex of technologies (application and basic software, technical means), business processes and human resources designed to manage and continuously ensure relationships with customers of the company in the areas of business support such as sales, marketing and customer support and customer service (Buttle, 2004; Kotler, 2004). To maintain a relationship, industry marketers need to develop important and often confidential knowledge of

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customer operations and contribute unique value to customer trading. Relationship marketing deals with all marketing activities aimed at establishing, building and maintaining successful exchanges with customers and customers (Morgan & Hunt, 1994). There is no generally accepted definition of CRM, but from the available literature and the views of recognized authorities in the field, we can define CRM according to Storback (2002) as follows: Customer Relationship Management is an interactive process aimed at achieving an optimal balance between corporate investment and customer satisfaction. The equilibrium optimum is determined by the maximum gain of both sides. The biggest benefit of CRM systems is the ability to plan and manage campaigns, segment customers and ideally manage the time and efficient workload of people in the company. The basic areas of CRM systems are as follows:

- Operational CRM - responsible for sales, marketing and customer service support;
- Analytical CRM - consists of a detailed analysis of data on customer behavior, marketing campaigns, finding sales opportunities, but also the prediction of customer behavior;
- Collaborative CRM - thanks to this CRM, companies gain a significantly better overview of customer activities, as it includes communication with them, as well as partners or employees using various communication channels across organizations and creating new collaborative relationships, optimizing this communication and sharing customer information internally.

Significant amounts of money are invested in a comprehensive CRM solution. According to a report by Deloitte Consulting, the total global investment in CRM (and related services) approached $ 125 billion by the beginning of 2005 alone (Lehtinen & Jarmo, 2007). From the point of view of information technologies, the CRM system is created by integrating applications for sales, marketing, sales and together with applications of e-commerce, customer service, service and direct contact with the customer (call center, e-mail) creates a comprehensive portfolio for customer relationship management. The basic four types of CRM systems, differing in the degree of use of computer technology, the degree of automation of activities, the suitability of use for different types and sizes of organizations, or the scope and complexity include:

1. Paper database system. This is the oldest way to keep track of all activities related to individual customers. It has two major advantages - it does not depend on the use of computer technology and allows easy storage of documents that exist only in paper non-electronic form. It is a system in the pure form of individual processes. The biggest drawback is the zero degree of automation of activities - endless description of data, annual search in the database, manual production of statistics, etc.
2. Solution based on the Microsoft Office package. This system allows for partial automation of some processes and activities. After creating an electronic database of contacts, you can easily automate the filling in of templates, forms and tables, or set up automatic notifications for important dates. However, the system no longer offers the user document management, analytical and statistical processes, or automating the creation of reports for colleagues and superiors. It is up to each user to create a system for storing documents or to perform statistical calculations and analyzes using a spreadsheet editor. The most commonly used are e.g. Outlook, Excel, Word, Access. The basic advantage is the low purchase price (programs are installed in most computers today) and the automation of the most frequently recurring procedures such as filling in data.

3. Contact management and time management programs. These applications were pioneers among truly electronic CRM systems. Even for users who are not 100% masters of their computer, they create comfort in managing contacts, related documents and schedules. Contact and time management systems are, above all, a well-developed database with a link to the surrounding software world and thus a unifying element that connects individual "Office" applications into a functional unit. Although these systems are not the technological cutting edge in the field of CRM, they are characterized by simplicity of operation and maintenance. For small and medium-sized organizations, they are currently the optimal solution for managing customer care activities.
4. Comprehensive CRM e-systems. The current technological peak in the field of CRM consists of extensive electronic systems including 4 basic CRM modules:

   - Automation of sales activities;
   - Automation of marketing activities;
   - Automation of service activities and customer support;
   - Electronic commerce.

   These systems are mainly used in large and multinational organizations. While the previous type of contact management and time management programs can be considered a good sales automation module, large-scale systems offer far more options. The interconnection of individual modules is very important, which enables effective communication and cooperation both in the horizontal direction and in the vertical direction. They allow you to analyze the customer's propensity to buy. From the point of view of CRM, it is primarily a matter of finding patterns and trends in customer behavior. Another valued analytical tool is the monitoring of customer value and its management - it is a matter of obtaining the profitability rate of individual customers from available information and estimating their future potential. The main disadvantages are the high purchase price, the need to ensure well-trained users and permanent maintenance of the system.

Artificial intelligence integrated with CRM systems has revolutionized organizations' means of analyzing their huge volumes of customer data (Chatterjee et al., 2021). Abu Ghazaleh and Zabadi (2020) explored the role of IoT and BD and their impact on CRM investments in modern customer service to develop an analytic hierarchy planning framework to establish criteria weights and to develop a general self-assessment model for determining the most important factors influencing the IoT and BD investment in CRM. Awasthi and Sangle (2012) reviewed state-of-art literature on adoption of CRM technology, categorized selected articles under four main themes based on the channel CRM, multichannel CRM, eCRM, mCRM. Akkanen et al. (2007) discussed experiences in extending an open source CRM application to develop a new server-based mobile business application. Combining the application code reuse with incremental development process allowed successful development of a pilot application in a tight schedul, enabling a quick start for customer-driven development, diminished risks related to the baseline application itself, and provided the flexibility needed in experimental pilot development. Companies could have problems in their digital endeavor have obtained very basic levels of return on their investments. Radzi et al. (2021) examined the effects of governance on digital transformation by scrutinizing the implementation of e-CRM system at a Malaysian petrochemicals company. The use of a Customer Relationship Management system to manage relationships with customers, is used also in area of wine production (Guerola-Navarro et al., 2021; Belias et al., 2018). CRM implementation in IT company helps to use possibilities to visually support the collaborative design process

of business application systems (Meier et al., 2020). According to the mentioned literature review there is space to deal with CRM implementation according to the sectors of the company. The aim of the contribution is to investigate CRM implementation and investment in IT company.

2 Material and methods

The analyzed company is the IT company NESS KE, s.r.o. (hereinafter NESS KDC), its operation and status of CRM use. NESS KDC is a product and technology development and innovation center providing services to foreign clients in areas such as the automotive industry, transportation, financial sector, media and marketing, energy and big data. The services offered by the company are the following:

- Managed Software product engineering services;
- Extended development centers for world-wide clients;
- Research & Development, Innovations;
- Software development, Testing, Deployment;
- Solutions implementation and Support;
- User Experience Design;
- Mobile applications development;
- Product Re –engineering;
- Customer support (T1, T2 & T3) Technologies;
- Managed Software product engineering services;
- Extended development centers for world-wide clients;
- Research & Development, Innovations;
- Software development, Testing, Deployment;
- Solutions implementation and Support;
- User Experience Design;
- Mobile applications development;
- Product Re-engineering;
- Customer support (T1, T2 & T3) Clients: Perform Group - digital platforms - media, Solar Turbines - Internet of Things, Clients in the field of banking and finance, Intelligent solutions - transport, Digital maps for navigation - motoring, Telematics and fleet management, Big data - banking, Kinetic Worldwide - top advertising and media campaigns.

The company's marketing strategy is to ensure an active supply of new employees by building a good name for the company, and then ensuring customer satisfaction. The company NESS KDC started building its marketing department in Košice about 5 years ago. Until then, marketing activities were largely managed by the US corporate marketing department. Given the location of the sales department in foreign branches of NESS and the marketing department in KE, it is noticeable that these departments do not use 100% potential and synergies, the removal of which can ensure even greater attractiveness of NESS KDC in the local market, and thus greater interest in positions. is key to the company's growth. The marketing department communicates only minimally with end customers, as it does not have all the necessary information at a given time, which is partially recorded in the CRM system, where this department does not have access and does not use it at all. The company mainly uses advertising through digital tools to make itself visible. The biggest and most importantly guaranteed advertising are mainly references, a satisfied customer, and also an employee. Presented is given by Figure 1.

Facebook	Own profile of the company, Facebook group NESS KDC Crew
Web	Web side of the company
Public relations	Various types of sponsoring, IT partner of the city, IT partner HC Košice, etc.
Advertisement	Prospects of the company through web and all digital tools
Sales promotion	Advertisement subjects for the clients, business partners and employees

Figure 1 Tools of the marketing communication; Source: own elaboration

At present, the company NESS KDC has created databases of customers and potential customers in the already implemented CRM system from Microsoft. The company has a database of suppliers in the SAP system. The systems are not interconnected. Sales departments are located in the UK, Germany and the USA. All merchants maintain their databases of customers and potential customers with whom contact has been established. In this database, the sales department tries to maintain a list of inquiries and sent offers. It records the identification data of the potential customer, the contact person with whom the employee communicated, the number of the price offer made to him, also records each communication with the contact person and the date of the next contact and the date of sending prospectuses. However, the operation and management of individual databases is not observed in detail, monitored and recorded by all sales staff in sufficient granularity and fairness. In addition, the implemented CRM system is not connected to any other internal system, which prevents the sharing of information about customers, the company does not respond synchronously and in a timely manner to their requests, resulting in lower customer satisfaction and lower sales on the company side. The database contains mainly customer identification data, order duration, contract volume in EUR, required technologies, chronological list of invoices, data on handover, resp. failure to submit work / orders. This database is maintained by the economic department and is regularly updated. For business reporting purposes, the company uses a programmed MS Excel with the title Project Plan Report, which includes the following data:

- Number of employees on projects whose work is reimbursed by customers;
- Full-time workers;
- Discount provided per number of people to customers;
- Total number of staff working on projects;
- Reserve for the number of employees;
- Allocation of staff on projects;
- Sales;
- Invoiced costs;
- Labor costs;
- Direct overheads;
- Contractors;
- Total direct costs related to the project;
- Gross (final) margin;
- % of gross margin;
- Average invoiced price per person;
- Average wage costs per person.

The file takes into account data by months, quarters and year-round for each project separately, and subsequently for the entire company. Individual values are processed in other xls files from the input data of individual departments and projects. The automation of the formulas largely eliminated manual inputs, but there is still a noticeable version of the automation of the connection between the individual files and no connection with the used CRM system. The company uses several SAP modules, such as FI – Financial, CO – Controlling and MM - Material.

The modules are interconnected. The company also uses a "superstructure over the SAP system" for internal reporting purposes. The whole platform works in MS Excel. However, a significant disadvantage is that none of the SAP modules, nor its "superstructure, are connected to CRM. The company currently uses CRM Microsoft Dynamics 365. Due to its not 100% usability, a lot of information is kept in Excel, e-mails, resp. they are not caught anywhere, which results in insufficient information sharing between the departments for normal operation, also for the purposes of the crowd in the absence of the trader, inefficient operation and communication between customers and the supplier. Likewise, the company loses not only the possibility of growth, but small, does not use its potential to build and increase its market share, does not have enough candidates for open positions and does not work enough with its customers to deepen relationships, which could increase its sales. The communication is given by communication channels, illustrated by Figure 2.

Personal meeting	Business meetings from which records should be made and recorded in CRM. However, the recordings are not uploaded
Telephone	In case personal meeting is not necessary. It serves mainly for operative solution of risen situation and continuous monitoring.
E-mail	One of the most effective channels.
Post	It is using the least.

Figure 2 Communication channels; Source: own elaboration

2.1 Disadvantages of the situation before the implementation change

The information can be found in various IS One of the main disadvantages is that the necessary information is found in separate non-contiguous and unconnected databases. This causes errors in searching for customer information, outdated information, and consequently slowing down the solution of requirements or problems. Manipulation and editing of information by multiple users, since most of the information is entered and transmitted to the systems directly by users and thus traders, it is possible to manipulate it directly. There is no tool to verify, check and compare the accuracy of the data. Thus, company managers and other team members participating in specific processes have rather distorted information available instead of real information, often in a form that is satisfactory, but not always real and in real time describing reality and state. Impossibility of creating management reports by automated data collection. The most fundamental problem that the company encounters is the inability to prepare reports from data that would be uniformly processed and automatically interconnected in the individual databases in which they are located. It can be said that the requirement for optimization, resp. The new implementation change is based directly on this problem, in order to ensure clear, accurate and uniform data on the state and health of the company in real time. Managerial reports are an excellent means of monitoring and controlling the activities of not only the entire company, but also projects, specific managers and

salespeople, down to the level of not only their customers and their sales, but also the time spent with individual tasks and work procedures within their scope of work.

Necessary manual intervention of employees of individual departments in common tasks. A complex information system, such as CRM, performs most operations, in which any information from individual databases is transferred automatically and separately. The currently implemented CRM system and other subsystems do not currently have this functionality. It is therefore necessary for manual input of employees of various departments, who often transfer data by manual entry into individual databases of another information system. This brings another degree of error and no, resp. very small% of back control. The above disadvantages are the most fundamental problems that need to be addressed. In addition to the problems already mentioned, it brings other problems to the company:

- Time-consuming and knowledge-intensive search and retrieval of information about the sales department, customers and projects;
- The impossibility of retrospectively checking the veracity of the information obtained;
- Distorted data in reports on the fulfillment of business objectives, the composition of customer portfolios and the services provided;
- On the basis of inaccurate data on the fulfillment of plans, the following plans and forecasts / estimates and forecasts are determined again inaccurately, not reflecting reality;
- Customers often learn about mistakes through inaccurate communication from the company, from projects and people's daily work on projects;
- All the above problems contributed to the company's financial loss and increased costs.

With the need to implement a change in the CRM system, respectively new information system in the form of e.g. Saleforce, and thus unify, interconnect and replace existing applications, also raises the need to introduce new and revise existing business processes. To improve the management of business processes, it is necessary to redefine the business processes of obtaining information about customers and the sales department and incorporate them into the requirements for new, respectively. improved information system. This must be done in the preparation phase for the implementation change of the existing CRM, resp. implementation of the new CRM, and at the same time consult them with users in the form of test versions of individual parts of the information system, the so-called Sandbox (from the English term sandbox - trial operation). Specifically in the company NESS KE it is necessary to focus attention, change and create the following business processes: - define the procedure for entering new customers and potential customers - define the procedure for entering the status of “work in progress” and relationship with it - define how to verify data accuracy - define allocation process individual questions and requirements to specific departments - to define managers' requirements for managerial reports and to link them with both source input data, but also reports to each other - this has not been possible so far and was implemented mostly through Excel documents and were not verified by any information system. It follows that this is the most important task for a change in information management through a functional CRM. Even before the actual implementation of CRM, the company used a fairly large number of processes during the use of current CRM, which were also defined but not up-to-date and did not support interconnection of individual databases, ie accuracy, accuracy and efficiency of data to ensure their credibility, elimination, error rates and the smooth flow of information across the organization.

3 Results

The presented research gives results from the view of training and preparation of employees and users, problems resulting from the change of IS Greater burden on salespeople and sales department staff, changes in existing information systems, their malfunction and incompatibility with the new IS, cecessary measures for the smooth course of IS implementation and the advantages after the implementation.

3.1 Training and preparation of employees and users

In the initial phase during the implementation of CRM, respectively changes to the CRM system, it is very important to prepare users and all interested employees of the company for new business processes and work with new, resp. modified information system. In the first phase, changes are generally received rather negatively, without enthusiasm, motivation and determination to participate in them. As already mentioned, the advantages of the state before implementation, they benefit mainly from users, but not in a beneficial and most advantageous way for the company. Therefore, it is absolutely necessary from the beginning, during the implementation of the information system, in the phase of analysis of existing processes, to train employees and set them up in a new way of communication and cooperation. At the NESS company, trainings were carried out from the very beginning of the implementation, which will be affected by the upcoming change. However, they were not provided to all interested parties, which of course also had negative effects. The trainings that were implemented are as follows:

- Introduction to the CRM system (implemented by trained employees of the company in charge of implementation);
- New work procedures and changes in internal processes (implemented by their internal groups of experts who were also part of the implementation teams and their main the task was to present new working procedures, processes, and at the same time consult these changes directly with the sales department).

Simultaneously with the implementation of these trainings, three employees from the team of the sales department were assigned to test the developed information system, the so-called already mentioned Sandbox. This team / employees created fictitious actions with customers and generated requirements, questions and problems that may and do arise in real work with customers. As for other departments such as finance, human resources, recruitment, purchasing, technical and other "support" departments, they were almost unfamiliar with this system until the real launch of the sharp version of the new CRM.

Table 1 Time saving of the activities with applications (in time unit); Source: (Voříšek, 2010)

Activity	SAP	Operation system	MS Office	Accounting system	Sum
Installing	0	55	60	37	152
Support and	27	110	45	62	244
Administration	145	117	47	67	376
Net	487	517	47	377	1428
Help desk	86	92	8	125	311
Data storage	200	0	5	91	296

From which it can be stated that the preparation phase of these essential users has been largely omitted. It follows from the above that the company did not adopt a conceptual model of CRM implementation, including its preparatory phase, and did not

place much emphasis on employee readiness, which will be reflected in the post-CRM phase. In connection to the training of employees and users of the application, we resulted from the time savings of the activities with applications, as presented in Table 1.

3.2 Problems resulting from the change of IS Greater burden on salespeople and sales department staff

The three employees who were assigned to test the implemented IS automatically lose enough space for their primary job, which is trading, caring for existing customers, finding and acquiring new ones, and making acquisitions. This, of course, was reflected in their reduced, in some cases almost zero, fulfillment of the plan, and consequently their bonuses, which is a huge cost item for both NESS and most companies and related to the costs of implementing the information system.

Significant amounts of money are invested in a comprehensive CRM solution. According to a report by Deloitte Consulting, the total amount of global investment in CRM (and related services) approached $ 125 billion by the beginning of 2005 alone. Investments structure, as resulted from the Gartner Group research was: 28 % to programs, 23 % to technology, 38 % to services and 11 % to communication (Lehtinen & Jarmo, 2007).

3.3 Changes in existing information systems, their malfunction and incompatibility with the new IS

During the implementation, it was not intended that the CRM system be a comprehensive IS that would serve not only the sales department. The functionalities, needs and possibilities on both sides were not sufficiently consulted. In the opinion of the author of the work, this was an incorrect managerial decision. Based on this, a unilaterally usable IS was created, the potential of which will be used only minimally and will not help streamline processes across the company, which may again result in errors, delays in processing customer requirements, duplicate activities, which reflected the customer relationship, total sales, which could grow with better care with customers and communication with them due to the increase in the number of open positions in NESS KE. Consequently, of course, it has an impact on the company's cash flow. Some functionalities of the existing IS, e.g. SAP FI system did not immediately offer a new information system.

This was, for example, the impossibility of automatically generating the status of invoices and paying invoices, and subsequently preparing documents for the payment of business commissions / bonuses. These commissions were delayed, often inaccurate, due to which the company again lost stability in the cash flow indicator. These problems were often solved by manual calculation in Excel files, which created duplication of data, which subsequently revealed differences between the way of working with this data, in the old and new information system, as well as errors in the calculation. Users were not informed in a timely and systematic manner about what was happening, what sequence of steps had to be followed, resp. what process is valid at that time and should be followed. The information was often disseminated by e-mail to various groups of recipients, which had the fatal effect of informing users and distributing sensitive data that only a certain group of people should have at their disposal.

3.4 Necessary measures for the smooth course of IS implementation

Based on the problems that arose during the implementation phase and that were described in the previous subchapter, essentially no systematic measures were taken to lead to their elimination and avoidance. The only measure that, of course, cannot be understood as a measure would be if the new IS were not implemented, resp. implemented later. At the same time, the implementation and individual parts of the information system were divided into several phases:

1. The first phase was the launch of the basic CRM functionality, namely the registration and cataloging of customers and the main core services of the company.
2. The second phase was the connection of the CRM system with the technical department and individual projects and direct incorporation of all functionalities needed to perform the work of these departments (for example the functionality of the previous IS Univerzum - records of all projects, current numbers, additional orders from customers, etc.).
3. The third phase of implementation was the incorporation of the remaining tasks performed by the sales department staff. This was, for example, the automatic generation of contracts into PDF files. After the second phase, the possibility to generate managerial and other various reports became available, which was the main reason for changing the IS, although due to non-connection to other departments (financial, personnel, etc.) and other databases, the reports did not contain all the necessary data for their full functionality. Although the division of the implementation into individual IS functionalities led to a smoother implementation process, it also delayed the complete handover of the system to live operation by almost 10 months, after which the system is still insufficient. During this time, other inconsistencies, questions to the implementation team and problems that arose during the sharp operation of the individual modules were continuously and often at the expense of customer satisfaction. As a measure of customer dissatisfaction, excuse e-mail communications were sent to customers as they found and resolved issues, conference calls were made, and their salespeople were visited, again adding additional work and costs and strengthening neither company nor customer relationship.

Table 2 TCO calculation for IS implementation; Source: (Voříšek, 2010)

Year	**1**	**2**	**3**	**4**	
Discount factor	**1,00**	**0,93**	**0,81**	**0,71**	**Total (€)**
Direct costs					449 680,85
HW purchase	60 000,00				60 000,00
SW purchase	120 000,00				120 000,00
Trainings	40 000,00				40 000,00
Upgrade SW		60 000,00	60 000,00	25 000,00	122 231,50
Additional training		15 500,00	15 500,00	14 500,00	37 246,65
Maintenance and operation of the system		25 000,00	30 000,00	32 000,00	70 202,70
Indirect costs					71 650,53
Help desk	16 000,00	14 900,00	14 250,00	14 500,00	35 673,53
Technical support	14 500,00	14 250,00	14 850,00	15 100,00	35 977,00
Total costs	250 500,00	129 650,00	134 600,00	101 100,00	521 331,38

Smooth course of IS implementation is influenced by total costs for the IS implementation, as given in Table 2.

3.5 The advantages after the implementation

Despite the relatively demanding phase of the implementation of Microsoft Dynamic CRM in NESS, the result in the form of new functionalities and benefits of the new CRM was at least partially delivered:

- Comprehensive system of entering and registering customers in one place;
- Comprehensive system for entering requirements when working with the customer;
- Possibility of greater control by management and shareholders;
- Adherence to business processes, inability to manipulate information;
- Accelerate business processes.

4 Discussion

Weaknesses and unresolved issues related to implementation in the company are limited ability to monitor the binding nature of individual customer contracts and the awareness of traders about the terms arising from the contracts Impossibility to limit the allocation of customers to sales departments whose competence is not to take care of this customer Inability to communicate across departments.

New problems and shortcomings after implementation are untransferred functionalities and weaknesses and errors in implementation.

The evaluation of benefits and the proposal of optimization of the processes of implementation of the Microsoft Dynamic CRM system in the company NESS can be realized in several ways. Since the client and investor of the CRM system implementation was the parent company NESS Technologies, not the company NESS KE, it does not have any financial data and indicators from its parent company, so in this part of the work will be proposed a method of measuring the benefits of business informatics in NESS KE, without specific calculations. . The reason is the non-involvement of NESS KE and the implementation team by the parent company in the issue of audit and analysis of the return on investment in the new CRM system. This phase of implementation was carried out by the parent company under its own direction before the presentation of this plan to NESS KE. Subsequent evaluation of benefits and proposal of process optimization will be performed by comparing the state of business informatics in the company NESS KE before and after the implementation of CRM Microsoft Dynamic system. Optimization of processes before and during the implementation will also be developed and proposed, the aim of which will be to prevent and eliminate errors and problems in the implementation in the future. The basic benefits from a practical point of view are the following:

- A unified, comprehensive system for entering and registering customers in one place;
- S unified and comprehensive system for entering requirements when working with each customer on each project;
- The possibility of greater control by management and shareholders;
- Speeding up and streamlining business processes;
- Compliance with business processes, inability to manipulate information.

Conclusion

Synergistic effects and the use of CRM are certainly ways that will help companies not only maximize the value of all information and data that the company has in the CRM system, but above all all this data will increase sales and profitability of the company. The aim of the paper was to analyze the current state and needs for the information CRM system in the company NESS.

By analyzing the current situation in the company NESS and under the conditions of current use of CRM, we identified key problems that occurred and avoiding the implementation of the CRM system, but especially its subsequent correct setting across the company and processes would bring the desired effect and contribute significantly to compliance goals of a company for which growth in the market is key by increasing the number of customers working on projects for them. Thus, the satisfaction of customers, who will subsequently require more projects and more development workers, can be greatly supported by the successfully implemented CRM system. Qualitative analysis and subsequent method of deduction describes the benefits of the currently used information system and what needed to be done so that the CRM system has added value for the company in the form of interconnection and automation of departments and processes across departments to the customer.

Despite the undeniable benefits of CRM itself in the company from various perspectives (business, financial, procedural), several relatively significant problems arose during the implementation process, but also after it, which resulted in an increase in implementation costs. By analysis and the method of deduction, we can state that the company was not sufficiently prepared for implementation. By preparing well for implementation, it not only gains a competitive advantage, but also saves time, money and, of course, human resources. From the acquired knowledge, I state that this phase is underestimated in several companies in Slovakia. Properly implemented IS, including a well-managed preparation phase, brings the company more efficient business, high functionality of internal processes that are shorter and use synergies with each other, more effective cooperation with customers and their management, thus supporting return on investment and increasing sales and ultimately profitability. The contribution of the contribution to the development of practice is a proposal for the optimization of implementation processes and its preparation in order to prevent potential further problems before, during, and after the implementation of a CRM system in another, similar company.

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Relationships between principles of CSR and real activities of organizations

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Abstract

In the academic environment, social responsibility comes to the forefront of social and economic topics. It is a concept that has undergone significant development since the middle of the last century. Still, its permanent pillar is the realization that individuals and groups (e.g., companies) are part of a more comprehensive system, and their behavior impacts this system. Research in social responsibility is becoming one of the main ways of defining systemic concepts, which can then be applied in practice. Despite the growing interest in topics related to social responsibility, comprehensive research covering several aspects of social responsibility at once - especially principles and real activities of organizations - is still very rare. Instead, researchers focus on empirically oriented in-depth analyzes covering one or two key aspects of social responsibility at the expense of complexity. This article aims to examine the links between organizations' attitudes towards CSR principles and between real activities that directly or indirectly affect CSR.

Keywords: Corporate social responsibility; Principles; Activities; Decisions.

JEL Classification: M14

Article Classification: Research article

1 Introduction

Several publications and various strategic documents show a constant interest in topics related to social responsibility. The historical context and the development of the

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concept of CSR play a key role in understanding it. In the past, several historical currents focused on individual aspects of social responsibility.

In the 1950s, the concept of CSR appeared somewhat under the acronym SR, which represented Social Responsibility. The turning point came in Howard R. Bowen's work entitled "Social Responsibility of the Businessman" (Bowen, 1953). Several authors consider this work to be the basis of the modern concept of social responsibility (Carrol, 1999). It defines the social responsibility of the entrepreneur as follows: "the obligation of the entrepreneur to conduct such policies and to make such decisions or such activities as are required with regard to the aims and values of society" (Bowen, 1953).

In the 1960s, there was a significant increase in attempts to formalize and more precisely define CSR. One of the most important representatives of this period was Keith Davis, who later wrote about social responsibility both scientifically and practically and conceptually. He perceived social responsibility as "decisions and activities of the entrepreneur that were implemented with regard to at least partially exceeding the economic or technical interest of the enterprise" (Davis, 1960). In 1966, Davis and his colleague Blomstrom published the first edition of "Business and its Environment." He defined social responsibility as follows: "Social responsibility means the duty of man to consider the consequences of his decisions and actions on the entire social system. An entrepreneur acts socially responsibly when he considers the needs and interests of others who may be affected by his activities" (Davis, 1966).

The 1970s saw a significant increase in interest in the CSR concept. In 1970, Morell Heald published "The Social Responsibilities of Business: Company and Community, 1900-1960" (Heald, 1970). Although Heald did not give a brief definition of CSR in this publication, it is relatively clear that his perception of the term corresponds to the currents of the opinion of the 1960s. At the same time, in his foreword to his book, he states that the importance of social responsibility for entrepreneurs must be perceived in the light of the current policies to which they relate. He sought links with social responsibility in historical sources covering the early 20th century to the 1960s. This review led him to conclude that entrepreneurs were significantly involved in corporate philanthropy and community relations during this period. A study by the Committee on Economic Development, entitled "Social Responsibilities of Business Corporations." was also published in 1971. It contains the survey results in which two-thirds of respondents agreed that the entrepreneur has a moral obligation to help other institutions achieve social progress, even at the expense of profitability. The findings of this survey led the authors of this study to create a circular concept of social responsibility - it was an onion-shaped model consisting of three circles. In 1972, a major academic debate took place on the importance of CSR between two professors of economics - Henry G. Mann and Henry C. Wallich. This debate was summarized in The Modern Corporation and Social Responsibility (Manne, 1972). In this debate, Manne stated that any valid definition of CSR must include three elements: be purely voluntary and (3) it must be the expenditure of the whole enterprise and not of the individual" (Manne, 1972).

The next decade was characterized by less attention being paid to defining CSR. It has moved from theoretical concepts to practice-oriented research focused on implementation and the effects of social responsibility. At the same time, several authors focused on alternative topics related to CSR, such as corporate social responsibility, corporate social performance, public policy, business ethics. corporate ethics, stakeholder theory. In 1980, Thomas Jones introduced an interesting perspective on CSR. First, CSR was defined as follows: "CSR means that organizations have obligations to essential groups of society in addition to shareholders and beyond the law. Two aspects are key in this definition - these responsibilities must be voluntarily accepted by businesses and must

involve multiple stakeholders such as customers, employees, suppliers and communities" (Jones, 1980). Based on this definition, Jones stated that CSR should be seen as a process and explained how the company should implement this process.

In the next decade, attempts to define CSR accounted for only a fraction of all publications devoted to this topic. Topics that focused on the integration of CSR into other and broader system units appeared much more frequently. Thus, CSR became a building block or starting point for other concepts that were directly or indirectly related to social responsibility. These included, for example, CSP (Corporate Social Performance), Stakeholder Theory, Business Ethics Theory, and Corporate Citizenship. In the following text, we will focus on CSR's most important conceptual concepts in the 1990s. The redefinition of the four-component view of CSR occurred in 1991, when its author (Archie Carroll) again slightly modified the fourth component of CSR. The first three components remained unchanged (economic, legal, ethical), but the fourth component - discretionary, which was later reformulated to be voluntary and philanthropic - was again changed to "corporate citizenship". In the study, Carroll states the following: "In order for CSR to be accepted by entrepreneurs, it must be framed in such a way as to cover the full range of social responsibility. It must be said that four types of social responsibility are CSR: economic, legal, ethical, and philanthropic. In addition, these four categories or components of CSR can be represented as a pyramid. For the sake of accuracy, all these types of responsibilities have always existed to some extent, but in recent years the ethical and philanthropic aspects of social responsibility have grown significantly" (Carroll, 1991).

The zero years of this century were characterized in CSR by deeper and broader integration with other related topics. In the literature from this period, the authors dealt with sustainable development, corporate sustainability, social contract theory, and legitimacy theory. The topic of corporate citizenship is also growing, as Carroll had anticipated in 1994.

Around the year 2000, it was possible to perceive relatively strong shifts in the field of sustainable development in the academic world. This concept has been evolving since the middle of the 20th century and, from the beginning, took the form of discussions about the environment and society's impact on it. Later, the topics of sustainability were extended to other areas in order to align with the concept of CSR around the year 2000.

In 2011, the American authors Michael Porter and Mark Kramer introduced the concept of creating shared values, which the authors perceived as a natural evolutionary step in business. Creation of Shared Values (CSV) has been characterized as "a policy and practice that increases a company's competitiveness while contributing to the improvement of economic and social conditions in the communities in which the company operates. CSV focuses on identifying and developing the relationship between social and economic development" (Porter, 2011). Its authors perceived the concept of CSV as an extension of a narrow view of business strategy, which usually does not take into account the factors causing long-term success. According to the authors, the position of CSR is an outdated/limited concept and they call for its replacement by their own CSV concept, the purpose of which is perceived as "companies must be redefined to create shared values" (Porter, 2011). According to the authors, in order to achieve this, companies should focus on three areas:

1. Reassessing products and markets,
2. Redefining productivity in the value chain and
3. Creating supportive industrial clusters where the company operates.

The above streams are only partial examples, pointing to a relatively broad scientific and practical interest in CSR issues. The main historical milestones were summarized in a publication by Latapí Agudelo, who presented them in the form of a clear timeline - Figure 1.

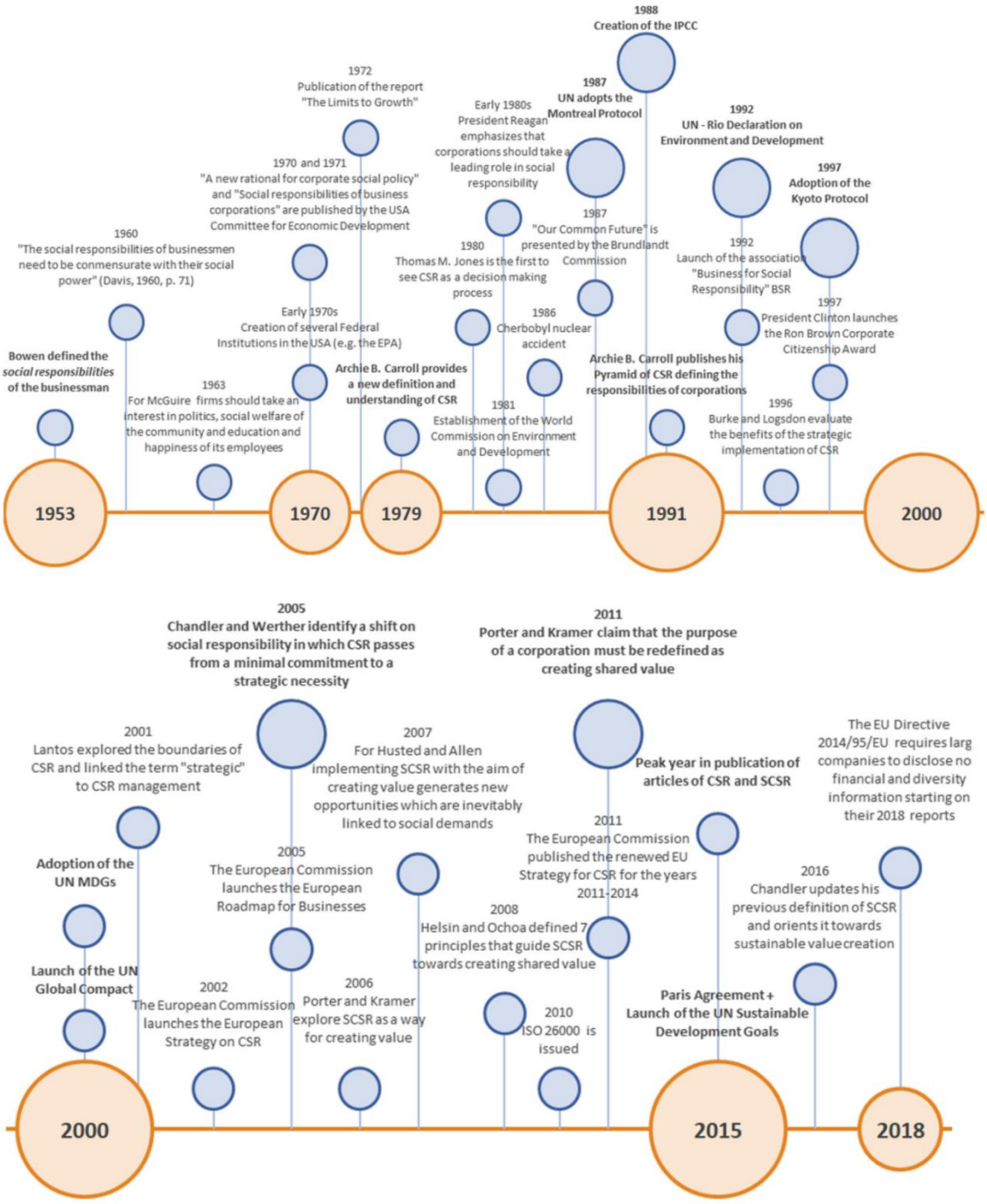

Figure 1 Review of main CSR milestones until 2000 (top) and after 2000 (bottom);
Source: (Latapí Agudelo, 2019)

As can be seen from the literature review, the content and scope of research focused on CSR has changed over time in the relatively high atomization of CSR topics. This results in a relatively narrow focus of research, which focuses on a partial part of CSR and tries to answer questions to which neither practice nor science has yet offered

us answers. The presented article is focused on the examination of the ideological and implementation setting of CSR. As part of the research, we accepted the thesis that knowledge of CSR principles should help organizations apply these principles (Antošová, 2015) (Csikósová, 2020). This article aims to examine the links between organizations' attitudes towards CSR principles and between real activities that directly or indirectly affect CSR.

2 Materials and methods

We used a questionnaire to verify the relationship between the principles and the real activities of organizations. The questionnaire was designed to cover the most important elements of CSR, be sufficiently understandable for respondents, and ensure that its data structure is sufficient for the implementation of statistical procedures. For this reason, we have used the ISO 26000 standard, which is a globally recognized conceptual framework containing the most important aspects of CSR.

The questionnaire contained 21 questions. The first seven questions concerned the attitude of organizations towards the principles of CSR. The second seven questions concerned the real application of the principles in organizations. The third seven questions concerned organizations' real actions and decisions and directly or indirectly concern CSR. The variables that were subsequently analyzed from these questions are as follows (ISO 26000):

- Principle nr. 1: Accountability [Pr-1 resp. Pr-8]
- Principle nr. 2: Transparency [Pr-2 resp. Pr-9]
- Principle nr. 3: Ethical behaviour [Pr-3 resp. Pr-10]
- Principle nr. 4: Respect for stakeholders interest [Pr-4 resp. Pr-11]
- Principle nr. 5: Respect for the rule of the law [Pr-5 resp. Pr-12]
- Principle nr. 6: Respect for int. norms of behaviour [Pr-6 resp. Pr-13]
- Principle nr. 7: Respect for human rights [Pr-7 resp. Pr-14]
- Activity nr. 1: Elimination of neg. impact on stakeh. [Ro-1]
- Activity nr. 2: Approach to priority determination [Ro-2]
- Activity nr. 3: Discussion of serious decisions [Ro-3]
- Activity nr. 4: Decision-making based on facts [Ro-4]
- Activity nr. 5: Transparent decision-making [Ro-5]
- Activity nr. 6: Analysis of the impact of decisions [Ro-6]
- Activity nr. 7: Promoting volunteering [Ro-7]

A 7-point scale was used and the results were processed in SPSS Statistics software. Descriptive statistics and test statistics procedures were used in the analysis. Contingency tables were used to test the interrelationships. The examination of internal correlations was performed through factor analysis. The results of data processing can be found in the following chapter.

3 Results

The survey ran from May 4 to June 26, 2020. In total, more than 77,000 electronic invitations to participate in the survey were sent. Email contacts obtained from public databases were no longer functional in some cases. The number of such contacts was below 10%. We did not record the exact number, as notifications of undelivered messages came continuously and often aggregated multiple email addresses. Nevertheless, the number of organizations contacted was relatively high. 2647 subjects responded to the

participation in the survey, but the vast majority of them in the survey filled in only a negligible part of the questions resp. did not fill in any questions. From this number of answers, incomplete and incorrectly completed questionnaires (e. g. the same answers to all questions) were gradually removed. After this adjustment, the resulting number of entities involved was 563 companies. From a statistical point of view, this number represents a relatively reliable sample on the basis of which conclusions can be drawn and findings generalized.

3.1 Perception and application of CSR principles

The analysis of CSR principles took place on two levels. The perception of principles formed the first level - variables Pr-1 to Pr-7. The second level was the application of the principles - variables Pr-8 to Pr-14. Consistently worded questions were used to assess the perception of the principles. For example, the principle of "Ethical Behavior" was reworded in the questionnaire to the question "Organization must behave ethically." to which the respondent had the opportunity to comment on a scale from 1 (strongly disagree) to 7 (strongly agree). Because the scale was used, the results could be displayed in several ways. Figure 2 shows the average results of the perception of CSR principles.

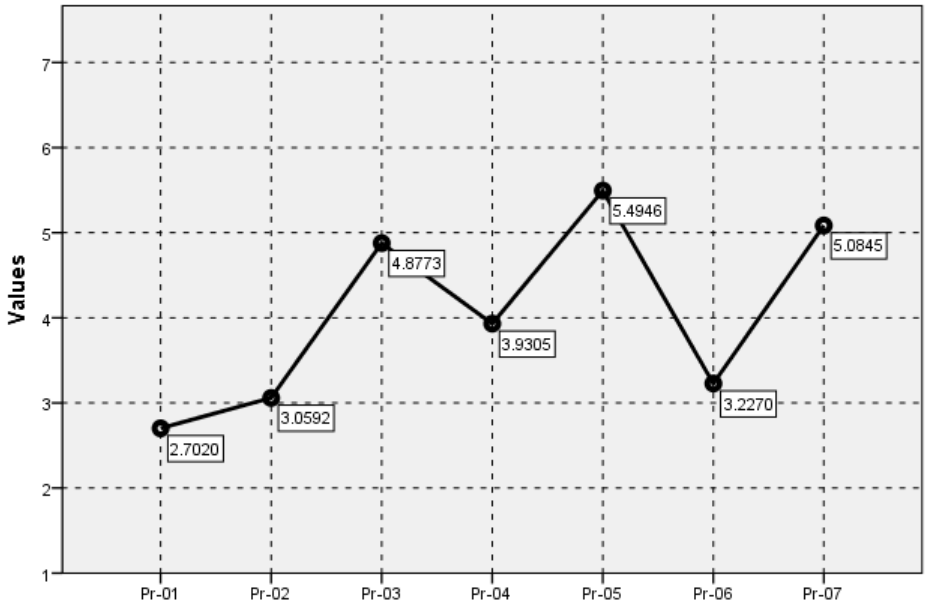

Figure 2 Perception of CSR principles; Source: own elaboration

In analyzing the perception of the principles of social responsibility, we also examined the results in terms of the characteristics of the entities involved. We, therefore, looked at how companies perceived these principles concerning sector, industry, size and region of operation. This showed several differences, which, however, for reasons of scope, we will not interpret in more detail:

- With one exception, the level of perception of the importance of the principles of social responsibility was higher for companies operating in the public sector (the exception was the principle of transparency);

- The area of trade did not attach great importance to respect for international standards of conduct, on the contrary, in the field of health and education, the principle of respect for the rule of law was considered highly important;
- The perception of the principles did not differ significantly with regard to the size of the company;
- The principles of social responsibility were of the highest importance in the Prešov Region and the lowest in the Bratislava Region.

The second group of questions contained 7 questions concerning the application of the principles of social responsibility. Each question related to one principle (similar to previous analyzes). The procedure of assessing the importance of an element in relation to the application of the same element is often used in research. The main reason is that by comparing the perception and realization of a certain element (in our case, the element is a specific principle of social responsibility) it is possible to distinguish entities that consider the element important and thus act from entities that act differently. The following table provides an overview of the main characteristics of the implementation of the principles of social responsibility.

Table 1 Application of CSR principles; Source: own elaboration

Principle	Mean	Std. Error of Mean	N	Std. Deviation	Kurtosis	Skewness
Pr-08	2.73	.074	552	1.742	-.642	.652
Pr-09	3.39	.063	561	1.484	-.499	.254
Pr-10	4.14	.050	563	1.195	-.289	-.181
Pr-11	4.51	.076	561	1.793	-.818	-.287
Pr-12	5.23	.066	556	1.548	.127	-.805
Pr-13	3.54	.064	560	1.522	-.811	.114
Pr-14	4.94	.076	551	1.791	-.607	-.563

Combining the results between the perception and application of CSR principles made it possible to create groups of organizations according to their relationship to social responsibility. Figure 3 shows the results of such categorization, with color-coded organizations by region.

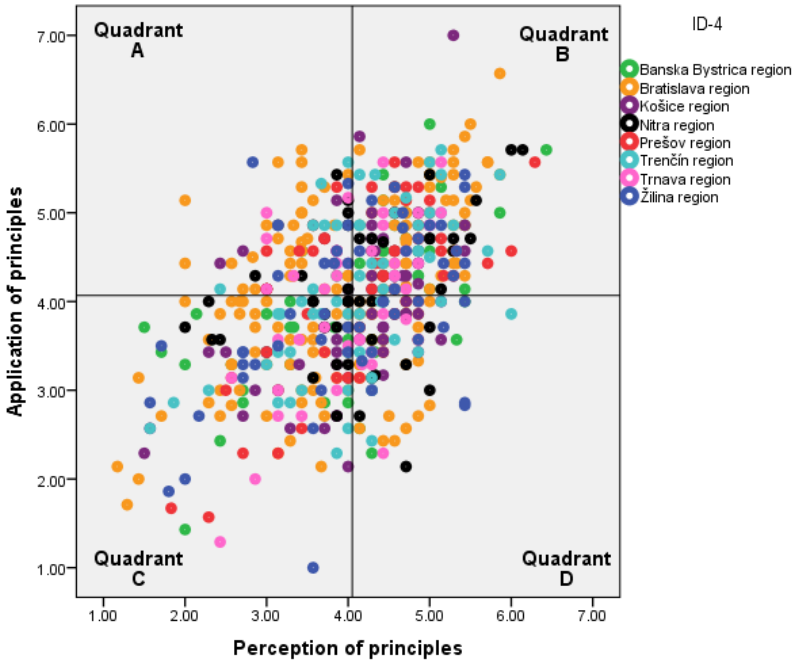

Figure 3 Attitude to CSR principles – creating categories; Source: own elaboration

The horizontal and vertical lines divided the graph into four zones - quadrants. Each quadrant has its characteristics and contains several companies. We named the quadrants in letters, and in the following list, we also name them verbally, as we will use this information in later analyzes. The quadrants were as follows:

- *Quadrant A "Pragmatically responsible"*. It is a group of companies that do not attach high importance to the principles of social responsibility but nevertheless apply them. Although we do not know the reasons for this application, we can assume that these will mostly be rational and pragmatic reasons focused on the functioning and economic or non-economic benefits that the company derives from the application of the principles of social responsibility;
- *Quadrant B "Apparently responsible"*. It is a group of companies that attach high importance to the principles and at the same time adhere to these principles. Although it is not possible to accurately assess their motives, we can assume that the set of their moral attitudes is consistent with their behavior;
- *Quadrant C "Obvious unresponsible"*. This group consists of companies that have given low importance to the principles of social responsibility and at the same time have given low ratings when asked about their application. These are, of course, those who, in their own words, have clearly not mastered the idea of responsibility;
- *Quadrant D "False responsible"*. Although the group of companies declared that the principles of social responsibility are important to them, it answered questions at low levels when it came to their application. Even in this case, it is difficult to determine the reasons for this apparent contradiction clearly, but from the nature of this group it is possible to perceive a certain disproportion between (declared) attitudes and real behavior.

3.2 Activities related to CSR

Within this subchapter, we will focus on the analysis of decision-making, which we will supplement with the results from the previous three monitored aspects of social responsibility. In the questionnaire, we looked at seven types of decision-making that are directly or indirectly related to social responsibility.

As in previous cases, we used a 7-point agreement scale for these questions in the questionnaire. The higher the number of respondents to the question or. attributed to the given statement, the more they declared the degree of identification with the question resp. given claim. We will display the results by a combination of graphic and tabular forms, which a textual interpretation part will supplement. Table 2 provides an overview of the basic indicators describing the different types of decisions related to social responsibility.

Table 2 Results of the analysis of activities related to CSR; Source: own elaboration

Activity	Mean	Std. Error of Mean	N	Std. Deviation	Kurtosis	Skewness
Ro_01	4,34	,039	563	,931	,094	-,245
Ro_02	4,12	,044	563	1,064	-,114	-,001
Ro_03	4,60	,040	563	,968	-,373	-,220
Ro_04	4,55	,039	563	,940	-,092	-,135
Ro_05	5,36	,040	563	,964	-,138	-,376
Ro_06	4,65	,039	563	,942	-,184	-,211
Ro_07	4,41	,042	563	1,004	-,017	-,318

The participating companies stated that they focus the most attention on transparent decision-making (Ro-05 = 5.36). This type of decision-making showed higher average values than the following types, which remained just above the level of 4, which represented the middle of the seven-point scale used. It was not found that below-average values assessed any decision-making and therefore, it cannot be stated that an area was given disproportionately little attention. If we look at the magnitudes of the standard deviations for each type of decision, we see that the values are around level 1. This means that no type of activity showed too many extremely positive or extremely negative responses, which supports the reliability of the results. It can also be seen from other indicators that the data have a relatively normal structure and are suitable for further analysis. The kurtosis and skewness indicators are around 0, which represents the normal distribution.

In analyzing the principles, we found that companies can be classified into four categories according to their attitude to social responsibility. We can compare these categories with the actions and decisions that organizations implement. We displayed the results in the form of a radar graph together with the source data - Figure 5.

Group	Ro-01	Ro-02	Ro-03	Ro-04	Ro-05	Ro-06	Ro-07
A - Pragmatically responsible	4,33	4,38	4,28	4,43	5,17	4,52	3,98
B - Apparently responsible	4,48	4,43	4,90	4,76	5,59	5,00	4,67
C - Obvious unresponsible	4,24	3,88	4,30	4,37	5,09	4,33	4,21
D - False responsible	4,28	3,71	4,82	4,59	5,56	4,66	4,65
Mean	**4,34**	**4,12**	**4,60**	**4,56**	**5,36**	**4,66**	**4,41**

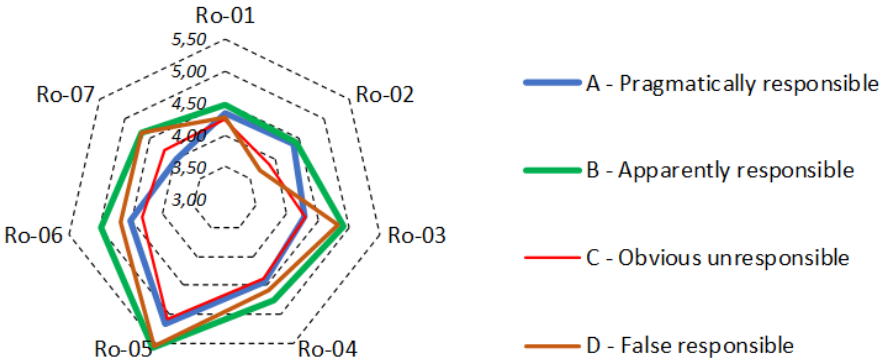

Figure 5 Comparison of individual categories of companies according to the average degree of taking responsibility into account in different types of activities; Source: own elaboration

It can be seen from the results that all types of companies pay relatively high attention to the transparency of decision-making (Ro-05). The lowest level of socially responsible decision-making showed two groups: C - clearly irresponsible and D - false responsible. The nature of these groups is not a very surprising finding and only confirms the correctness of this categorization of companies.

4 Discussion

Part of the discussion is focused on summarizing the main results and implications arising from them. Since we have worked with empirical data, we must pay at least partial attention to research limitations, which we will also briefly describe.

4.1 Originality and value

Social responsibility is one of the topics where interest is growing, both from an academic and a practical point of view. Empirical research can only contribute to the development of social responsibility. In the following bullets, we list some of the benefits that are important from our point of view in terms of the overall impact of the research:

- *Originality*. Our research was based on an internationally accepted set of information materialized in the ISO 26000 standard;
- *Complexity*. The research covered the most important aspects of social responsibility - principles, actions and decisions;
- *Relationship analysis*. In several parts of the research, we tried to link the various aspects of social responsibility;
- *Contribution to practical activities*. In this work, we based our research on an empirical approach. We collected data from companies, and therefore the results reflect their perception and evaluation of individual aspects of social responsibility.

4.2 Research limitations

Empirical research carries with it certain limitations with regard to several of its characteristics. We must state such limitations and define certain limits within which our results can be interpreted for methodological accuracy. The basis of our research was built on the processing of the results of the electronic survey. Sociological surveys carry several risks that need to be considered when choosing a methodology and interpreting the results. These are mainly the following limitations:

- *Questionnaire structure and wording of questions*. When formulating the questions, we based our questionnaire on a review of the ISO 26000 standard. We tried to formulate the questions in such a way that they capture the wording of this standard, but at the same time that the respondents well understand them. Nevertheless, it can be assumed that our sample included respondents who were unclear about some of the questions;
- *Choice of scale used*. The type of responses can significantly affect the quantification of results. We used a 7-point agreement scale. We tried to ensure uniformity and comparability of results;
- *Sample size*. A total of 563 companies participated in our survey, whose answers were structured enough to be included in the survey. From the point of view of statistical power, this is a medium-sized sample;
- *Geographical limitation of research*. Our research was focused on companies operating in Slovakia. The results we have reached are valid for the conditions of Slovakia. It can be assumed that similar results could be achieved in countries with similar essential features to our country - especially economic maturity, the economy's structure, and the cultural aspects of society. The same research could lead to partially different results in countries significantly different from Slovakia in the above-mentioned features.

In designing our research, we have tried to take these limitations into account and adapt our actions so that their negative impact is as low as possible. We are aware that it has not always been possible to achieve this completely. Therefore, our results must be seen within these limitations and taken as one of the individual initiatives to understand the concept of social responsibility better. Despite our awareness of these limitations, we believe that our research may partially shift knowledge in this area of interest.

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Employee evaluation as a support tool for strengthening the knowledge organizational culture

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Abstract

When building knowledge management, one of the essential elements is building a knowledge-based organizational culture. The knowledge of organizational culture thus becomes an integral part of modern management of organizations and many managers are beginning to understand it as an important factor influencing the competitiveness of the organization. The aim of the article is to point out one of the activities of human resources management - employee evaluation - as a personnel activity that could support the sharing of knowledge in the organization. Research is carried out in an environment of public administration, because it resonates in society need to increase its effectiveness, better targeted support for innovation at lower levels of public sector management, etc. Primary (questionnaire research) and secondary (literature review) sources were used in the research. Statistical testing of the hypothesis examined the differences in the use of individual evaluation methods and individual organizational cultures supporting knowledge sharing. The benefit is the summarization of knowledge in the field of support for knowledge organizational culture through the evaluation of employees in public administration organizations.

Keywords: Culture; Employee; Employee evaluation; Knowledge; Organizations; Public administration; Human Resource Management.

JEL Classification: D83, M10, M14, L30

Article Classification: Research article

1 Introduction

Knowledge is becoming an important driving force and a key factor in creating value. Greater emphasis needs to be placed on expanding the organizational and

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knowledge base, either through learning from others or by creating new knowledge through innovation. Both processes help ensure a lasting competitive advantage. The basic premise for the effective and judicious application of knowledge in the organization is the knowledge management. The result of applying new knowledge in the organization is innovation. It is in the interest of organizations to create innovations of the highest possible order, which are the basis of the degree of added value. Only the products of knowledge organizations, whether in the form of products or services, with their relatively high added value create space for real wage growth and the achieved profit rates also stimulate knowledge organizations to further development. The specifics of knowledge management lie in the fact that it does not compete with any existing direction. It is a natural transition from one source of wealth to another (from land ownership, capital to a specific source - "knowledge"). Arian Ward (2006) very aptly captures the essence of knowledge management, emphasizing in its definition that it is not about creating an encyclopedia containing everything anyone has ever known, but about following those who know and developing an organizational culture and technology that they make them talk.

To build a knowledge-based organizational culture, in which it is usual among colleagues to ask for help, or. help to offer is therefore one of the important factors for achieving knowledge management (Collison, 2006). If we want to achieve this, we need to encourage employees to offer and reward help with their recognition, which Collison (2006) identifies as the strongest motivation and emphasizes that we are willing to lend material things to someone we know and trust, and even with knowledge.

When defining a knowledge organizational culture, it is possible to proceed from the definitions of organizational culture, because knowledge culture forms a "higher level" of organizational culture, however, it is necessary to emphasize its orientation to support knowledge sharing in the organization. According to Kulkarni (2007), knowledge organizational culture affects the creation, sharing and use of knowledge at all levels, namely language (symbol level), creativity, problem solving, cooperation with others (social and behavioral standards) and perception (basic idea and starting points). Knowledge-based organizational culture is characterized above all by a willingness to share one's experience and knowledge, as well as trust, mutual respect, acceptance of mistakes, physical encounters, teamwork, live dialogues, common language, willingness to take risks and appreciation of knowledge sharing (Goodman, 2001).

Lukášová and Nový (2004) list the factors that significantly influence "the success of the formation of a new organizational culture:

- the existence of a clear and comprehensible strategy,
- decisiveness in the range of continuity and discontinuity,
- concretization of expectations and requirements for employees,
- interconnection of the new organizational culture with personnel activities,
- participation of a professional and power promoter,
- coherence with other soft and especially hard management factors,
- consistency of organizational and national culture,
- identification of managers with the necessary culture,
- orientation towards long-term goals,
- the new culture is not permanent, it is conditioned by a specific strategy and the current situation in the organization.

In the article, we focus on the connection of the new, ie knowledge organizational culture with personnel activities, specifically the evaluation of employees. The evaluation of human resources is one of the most important, most complex and most sensitive

personnel activities. Often, human resource evaluation is considered the Achilles' heel of human resource management. According to Boudrou (2007) the evaluation of complex performance represents a continuous process of obtaining and using information about the achieved work performance to create conditions for higher motivation and more efficient functioning of employees and the organization in the future. In practice, performance evaluation according to Koubek (2008) means:

- finding out how the employee performs his work, performs work tasks, his relationships with colleagues as well as work behavior,
- providing feedback in the sense of passing on the results to individual employees and subsequent discussion,
- entering measures to improve the identified deficiencies and finding ways to improve the employee's work performance.

Evaluation integrates all human resource management activities and for this reason is one of the most important human resource management activities. It enables a deeper understanding of employee behavior from a work and social point of view. The output of the evaluation can serve various organizational and individual needs and at the same time provides a lot of information about the work performance of individuals, working groups as well as the entire organization. A properly planned, implemented and developed evaluation system brings benefits in the short, medium and long term.

The most significant benefits of a clear and effective evaluation process include (Armstrong, 2008):

- improving internal communication,
- increasing the identification of employees with goals set within the organization, building the so-called ownership of individuals,
- increase employee loyalty,
- motivation for greater work performance (regular giving of feedback influencing the behavior and performance of employees),
- building an organizational culture based on a fair and transparent way,
- the possibility of differentiation to evaluate performance (remuneration tied to the achievement of goals),
- career planning and succession planning,
- increasing the credibility and attractiveness of the organization as an employer on the labor market, the so-called employer of choice,
- getting the best people on the market.

Modern approaches, understanding the organization as a dynamic whole, consider a systemic approach to be a prerequisite for a successful evaluation system in the organization. However, opinions on the creation of an employee evaluation system differ from author to author. Porvazník (2007) draws attention to the need to establish and consistently apply appropriate evaluation criteria. Juríčková draws particular attention to setting the goal of evaluation, ie clarifying what we want, what we want to achieve and then focusing on the set goal during evaluation (Hitka, 2010). Javorský and Kališ recommend analyzing the central values of organizational culture, basic strategic goals, audit human resources management and the current state of organizational culture, analyze management's views on key variables of employee success in the organization and then assess previous evaluation systems or experience with evaluation in organizations (Hitka, 2010). Robbins (2013) states that it is necessary to answer 6 basic questions: Why? Who? What? Who? How? When? The answers to these questions form the basic elements of an employee appraisal system.

Human potential significantly affects the process of providing public services. The issue of the functioning of public administration in connection with the relevant organizational and managerial problems belongs to the fundamental theoretical and practical issues of the present. The position of public administration management in the current system of social management is irreplaceable in public and civil relations in the current system of mixed economy. There are still creating new activities, new public interest, new quality and citizens' initiatives that stabilize the importance of public administration management in public relations and growing demands on the quality of action and decision-making.

The transition to a knowledge economy requires a change in public administration. The ever-changing environment brings a number of new challenges for organizations in this area as well. Reliance on ad hoc or traditional ways of managing human resources cannot be created for the creation of a knowledge economy, because increasing their contribution is still an urgent and demanding task, the solution of which lies in adequate modern human resources management reflecting the requirements of the external environment. People need to belong somewhere and therefore strive to integrate people with the same interests into the community. The use of this human need in management presupposes the interconnectedness of personal and corporate values. It is the evaluation of the performance of human resources that is one of the most important activities of personnel work, to the extent that in organizations that attach human resources management, their knowledge of importance, becomes its integrating element.

It is therefore important to address the issue of human resources evaluation and support of knowledge organizational culture in order to increase the efficiency and continuous operation of activities in the commercial sphere as well as in public administration and society as a whole. Although the public sector is dependent on state and municipal funds, it is also an organization that enters into various relationships, whether with the public or with other institutions and organizations.

2 Material and methods

The main goal of the article is to emphasize the need to support the knowledge of organizational culture in public administration organizations and through the evaluation of employees as one of the activities of human resource management. As mentioned above, employee appraisal is a complex process consisting of many consecutive activities. In the research presented in this article, we focus on only one part of the evaluation - evaluation methods. Employee evaluation methods are tools that record and measure the quality of their performance. There are a large number of methods that can be used in practice and when choosing them, it is necessary to assess their material complexity, financial complexity, explanatory power, etc., always with regard to the specific conditions of the organization. The presented research wants to point out the differences of the used evaluation methods and the support of knowledge sharing, ie the creation of a knowledge organizational culture in the conditions of public administration organizations.

Information on the researched area was obtained mainly from secondary sources. It is mainly a study of foreign and domestic authors working in the field of human resources management, organizational culture and knowledge management. In addition to scientific and professional publications, information was also drawn from the European Institute of Public Administration (EIPA) and European models of comprehensive quality management (EFQM, CAF) and the ProQuest database.

2.1 The methodical procedure of research

From primary sources, the research is based on the technique of an electronic questionnaire. We used two questionnaires. The first questionnaire (questionnaire A) was divided into two parts. The first part examined the process of employee evaluation and questions were created on the basis of theoretical knowledge obtained from authors dealing with human resource management, especially employee evaluation. The second part was focused on the presence of knowledge management elements and was compiled on the basis of the CAF manual. The second questionnaire (questionnaire B) is a modification of the OCAI (Organizational Culture Assessment Instrument) questionnaire (Quinn and Cameron's methodology used in the questionnaire to define current organizational culture). The OCAI questionnaire is the most frequently used tool in connection with examining the overall profile of organizational culture and by examining six key aspects of organizational culture (dominant characteristics, way of leading the organization, management of employees, organizational putty or cohesion of the organization, emphasis on strategy and criteria of success) allows to determine the dominant type of organizational culture. The evaluation of questionnaire B consisted of placing all answers a) in one column (as well as answers b), c) and d)), adding them up and then calculating the arithmetic mean for each questionnaire separately. Based on this, it was possible to label organizations and thus divide them according to the dominant types of organizational cultures (1 - clans, 2 - adhocratic, 3 - market, 4 - hierarchical).

To fulfil the goal of the presented research, we defined the hypothesis, which we wanted to verify whether it is possible to record significant differences in the methods used within individual organizational cultures supporting knowledge sharing. We set the following hypothesis:

- *H1: There is a statistically significant difference between individual organizational cultures supporting knowledge sharing in public administration organizations and the methods used to evaluate employees.*

By conducting a questionnaire survey, we obtained data to verify the validity of the defined hypothesis. We first processed the results of the survey in Excel. The processing consisted of clearing the so-called raw data from the Google.docs environment and adjusting them to values of 1 - 10, or to values 0 - 100, which represented the percentage of each option in multiple-choice questions (ie if the respondent could indicate more than one option, the results were transformed to 0 - 100, which expressed the percentage of agreement with each option: 1 option represented 10 %, ie if someone marked 2 options reached 20 %, if the respondent marked all 10 options he got 100 %). Statistical procedures for testing hypotheses were selected with respect to the types of variables and SPSS software from IBM and Minitab were used to process them.

3 Results

The research sample consists of public administration organizations operating in the Slovak Republic. As follows from Table 1 all types of public administration organizations were represented in the sample, i. e. managers from state administration, self-government, public institutions and advisory bodies participated in the survey. We recorded the highest frequency in self-government organizations (47 %) and the lowest in organizations of advisory bodies (8.7%), while the above results correspond to the frequency of individual types of organizations in the basic set.

Table 1 Evaluation of the identification question; Source: own elaboration

You are manager in organization		Frequency	Percent	Valid %	Cumulative %
Valid	state administration	115	31.3	31.3	31.3
	self-government	173	47.0	47.0	78.3
	public institution	48	13.0	13.0	91.3
	advisory body	32	8.7	8.7	100.0
	Total	368	100.0	100.0	

The research using questionnaire A (part 2) and questionnaire B examined the links between the support of knowledge sharing in the organization of public administration and the type of organizational culture. We found that each type of organizational culture defined by Cameron and Quinn has a positive effect on promoting knowledge sharing, but not to the same extent, ie none of the defined types of organizational culture can be ruled out as completely unsuitable for promoting knowledge sharing, but it is possible to define this type of organizational culture, which dominates in the support of key values for strengthening the knowledge of organizational culture in public administration organizations in Slovakia. Clan culture was identified as a culture characterized by higher support of knowledge management processes, followed by adhocratic culture, market culture and hierarchical culture.

Questionnaire question no. 11 (from part A, which examines the evaluation system in the organization) was used to test hypothesis H1. In question no. 11, the respondent could indicate more than one option, and therefore we transformed the results into values 0 - 100. Using the K-S test, the distribution of data was determined (Table 2).

Table 2 Test of Normality; Source: own elaboration

	H1	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
Q.OC	.20	.277	280	.058
	.40	.287	67	.120
	.60	.267	86	.067

a Lilliefors Significance Correction

Since the normal distribution of the data was confirmed (K - S test, $p > 0.05$), we tested hypothesis H1 by one - sided analysis of variance (ANOVA). From the results shown in Table 3 generated in IBM SPSS Stastistics 22, we can read that the significance level $p < 0.05$, i.e. the statistical significance of the differences is confirmed.

Table 3 ANOVA – hypothesis testing; Source: own elaboration

Q-11	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	59.753	3	19.918	12.883	.001
Within Groups	562.744	364	1.546		
Total	622.497	367			

Based on the above, it can be stated that hypothesis H1. There is a statistically significant difference between individual organizational cultures supporting knowledge sharing in public administration organizations and the methods used to evaluate employees. is accepted.

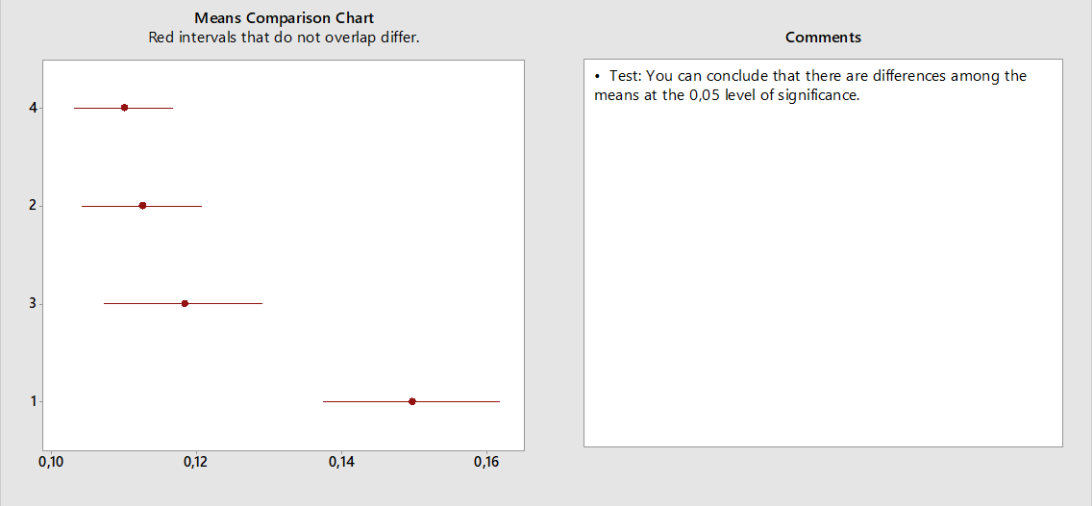

Figure 1 Comparison of average values of variables; Source: own elaboration

For a more comprehensive view, we created a graph in the Minitab program (Figure 1) comparing average values between individual variables (designations: 1 - clan, 2 - adhocratic, 3 - market, 4 - hierarchical organizational culture). Specifically, we can see that again the Clan organizational culture shows different results from all other cultures. The results of other cultures do not show such significant differences.

The most frequently used method in all cultures is the questionnaire (Table 4). The questionnaire is also the most common method of evaluation in general due to the ease of processing and minimal preparation of evaluators and standardization, and therefore the result is not surprising. In the surveyed organizations, there are no evaluation methods based on compliance with standards, the method of critical cases, evaluation administration, comparison with other employees, or the assessment center.

The non-use of some methods can be considered understandable in these types of organizations (e. g. assessment based on compliance with standards is used primarily by workers, assessment center - more costly), but some methods can be effectively applied with regard to their material, financial demands and explanatory power. also in public administration organizations (e. g. comparisons with other employees). It can be positively assessed that the method of self-evaluation has appeared in all types of cultures. It is self-assessment that contributes to greater employee involvement and creates a more open climate in the organization. However, self-assessment should be combined with another type of assessment method. In clan and hierarchical culture, there is also a method of evaluation according to set goals and evaluation scales, which can provide a quality picture of employee performance when selecting appropriate criteria.

Based on the results, we can state that the most significant differences were noted in the clan organizational culture, which most supports an environment suitable for creating, sharing and using knowledge, and therefore it seems appropriate to use also the self-assessment questionnaire and in case of suitability for the organization as well as the method of evaluation scales or evaluation according to set goals.

Table 4 Evaluation of questionnaire question 11; Source: own elaboration

	Organizational culture			
	Clan	**Adhocratic**	**Market**	**Hierarchical**
Questionnaire	109	56	44	114
According to set goals	29	0	0	23
Evaluation scales	7	0	0	7
Self-evaluation	30	7	8	22

As part of determining the methods used, we were also interested in the respondents' opinion on the effectiveness of these methods, which we found out with questionnaire question no. 12. Of all the listed methods, the respondent could identify one method that he considers the most effective.Again, the questionnaire method of employee evaluation dominated in all cultures (Table 5). However, not all respondents who use it indicated it as the most effective form. A different situation occurred with evaluation scales, where all respondents who use them consider them to be the most effective form of employee evaluation. The method of evaluation according to the set goals was marked by 22 respondents, while it is used by 52 respondents, ie the majority did not evaluate it as the most effective method.The complexity of this evaluation from the point of view of managers as a result of the correct setting of goals could also contribute to the result, as well as the assumption of continuous monitoring and providing feedback on the achieved performance, as well as solving potential problems, as the undeniable advantages of this method include the possibility for the employee to participate in defining goals. Another advantage is the ability of the employee to monitor their results and the resulting motivation to achieve them.

Table 5 Crosstabulation – question no. 12; Source: own elaboration

			Organizational culture (OC)				
Q_12: Effectiveness of used methods			**Clan**	**Adhocratic**	**Market**	**Hierarchical**	**Total**
	Evaluation scales	Count	7	0	0	7	14
		% within Q_12	50,0%	0,0%	0,0%	50,0%	100,0%
		% within Q_OC	6,0%	0,0%	0,0%	4,9%	3,9%
	Questionnaire	Count	88	49	44	107	288
		% within Q_12	30,6%	17,0%	15,3%	37,2%	100,0%
		% within Q_OC	75,2%	87,5%	100,0%	74,3%	79,8%
	According to set goals	Count	7	0	0	15	22
		% within Q_12	31,8%	0,0%	0,0%	68,2%	100,0%
		% within Q_OC	6,0%	0,0%	0,0%	10,4%	6,1%
	Self-evaluation	Count	15	7	0	15	37
		% within Q_12	40,5%	18,9%	0,0%	40,5%	100,0%
		% within Q_OC	12,8%	12,5%	0,0%	10,4%	10,2%
Total		Count	117	56	44	144	361
		% within Q_12	32,4%	15,5%	12,2%	39,9%	100,0%
		% within Q_OC	100,0%	100,0%	100,0%	100,0%	100,0%

4 Discussion

The issue of the functioning of public administration in connection with the relevant organizational and managerial problems belongs to the fundamental theoretical and practical issues of the present. Abroad, attention has been paid to the issue of increasing the quality of public services for decades, but in Slovakia, the relevant interest began to be addressed only upon accession to the EU.

The process of providing public services is significantly influenced by human resources., and it is the view of human resources that has differed diametrically in recent decades. The concept of a knowledge worker came to the fore, within which the employee is understood in a broader context, specifically as an employee with knowledge that is generally known, but also that which no one in the organization has. The knowledge worker thus creates his own standards, work procedures, he chooses reactions to unexpected problems. Recruiting, shaping and managing such employees is a great challenge for managers. In organizations that attach human resources to the importance of their knowledge, it becomes an integrative element the employee evaluation.

Employee evaluation is one of the most important activities of personnel work, because it becomes a process that connects all its activities. In addition, research shows that the added value of choosing an appropriate evaluation method can not only contribute to an effective evaluation system, but also create space for a fair perception and appreciation of each individual's contribution to the benefit of the organization as a whole., and it is the encouragement of a suitable organizational culture that is one of the important conditions for supporting the creation, acquisition, sharing and storage of knowledge in both commercial organizations and public administration organizations. Without the change of organizational culture to knowledge, it is not possible to expect positive results of the implementation of knowledge management even in public administration organizations.

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Management of risk in IT

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Abstract

Every organization and company should think about how to make streamline decision-making and enable their employees and teams to work more effectively by knowing and using proper project management tools and methods. Risk is one of the main performance parameters of any project, especially in the field of information technology. Organizations often ignore or do little about risks involved in their activities. In the event of a security incident, organizations continue to perceive risks in a different context if they come at a loss. The aim of this paper is to get acquainted with the framework management of risk (M_o_R) and its tools from Axelos. It focuses on the implementtion of this tool set and discusses the most common Slovak IT security incidents in 2020.

Keywords: Information technology; Management of risk; M_o_R; PRINCE2; Project management; Risk; Security incidents.

JEL Classification: M15, D81, G32

Article Classification: Case study

1 Introduction

According to Axelos and Gov.UK statistics, PRINCE2 is a project management method widely adopted around the world but mainly in Europe. The reason is the binding of the PRINCE2 methodology in the regulations of the European Union and the regulations of individual EU states. Also in Slovakia, PRINCE2 is the most used project management methodology thanks to Decree 85/2020 C. l. on project management From 2020, it is necessary to manage all state projects according to Decree 85, which was created on the basis of the PRINCE2 methodology. PRINCE2 stands for PRojects IN Controlled Environments and provides a step-by-step procedure to deliver projects. It can be tailored to meet the specific requirements of each organization. The PRINCE2 methodology comprises 4 integrated elements: 7 principles, 7 themes, 7 processes and

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the project environment shown in. Principles are the guiding requirements and good practices which determine whether the project is genuinely being managed using PRINCE2. There are seven principles and unless all of them are applied, it is not a PRINCE2 project.

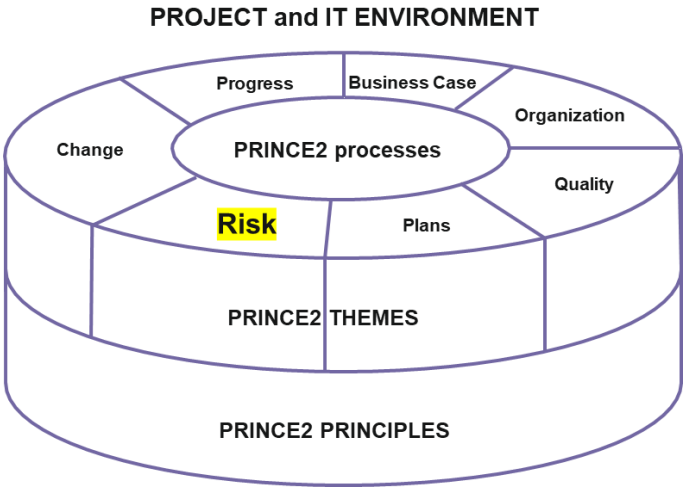

Figure 3 Structure of the PRINCE2 methodology; Source: modified by Axelos PRINCE2

The seven principles of PRINCE2, which also represent best practices:

1. *Continued business justification*: there must be a justifiable reason to be running and managing the project. If not, the project should be closed.
2. *Learn from experience:* PRINCE2 project teams should continually seek and draw on lessons learned from previous work.
3. *Defined roles and responsibilities:* the PRINCE2 project team should have a clear organizational structure and involve the right people in the right tasks.
4. *Manage by stages:* PRINCE2 projects should be planned, monitored and controlled on a stage-by-stage basis.
5. *Manage by exception:* people working within the project should be given the right amount of authority to effectively work within the environment.
6. *Focus on products:* PRINCE2 projects focus on the product definition, delivery and quality requirements.
7. *Tailor to suit the project environment:* PRINCE2 must be tailored to suit the project's environment, size, complexity, importance, capability and risk.

Themes describe aspects of project management that must be addressed in parallel throughout the project. The seven themes explain the specific treatment required by PRINCE2 for various project management disciplines and why they are necessary. PRINCE2 helps organizations apply the themes by stating the minimum requirement needed for each theme and gives specific guidance on how to tailor to certain environments (Axelos, 2017).

The seven PRINCE2 themes:

1. *Business case:* create and maintain a record of the business justification for the project.
2. *Organization:* define the individual roles and responsibilities of the project team.
3. *Quality*: what the quality requirements and measures are and how the project will deliver them.

4. *Plans:* the steps required to develop the plans and the PRINCE2 techniques that should be used.
5. *Risk:* effectively identify risks and opportunities that could impact the project.
6. *Change:* how the project manager will assess and act on changes to the project.
7. *Progress:* the ongoing viability and performance of the plans and how and whether the project should proceed (Axelos, 2017).

According to PRINCE2, a project is a temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case (Axelos, 2017). Projects are how we introduce change. As the definition of a project states, projects are temporary in nature. When the desired change has been implemented, business as usual resumes (in its new form) and the need for the project is removed. Projects should have a defined start and a defined end. Every project is unique. An organization may undertake many similar projects, and establish a familiar, proven pattern of project activity, but each one will be unique in some way: a different team, a different customer, a different location, a different time. For IT projects, it's not uncommon to utilize a combination of traditional and agile project management methodologies, e.g. PRINCE2 and Scrum (Miklosik, 2015). The characteristics already listed will introduce threats and opportunities over and above those we typically encounter in the course of business as usual. Projects are inherently riskier.

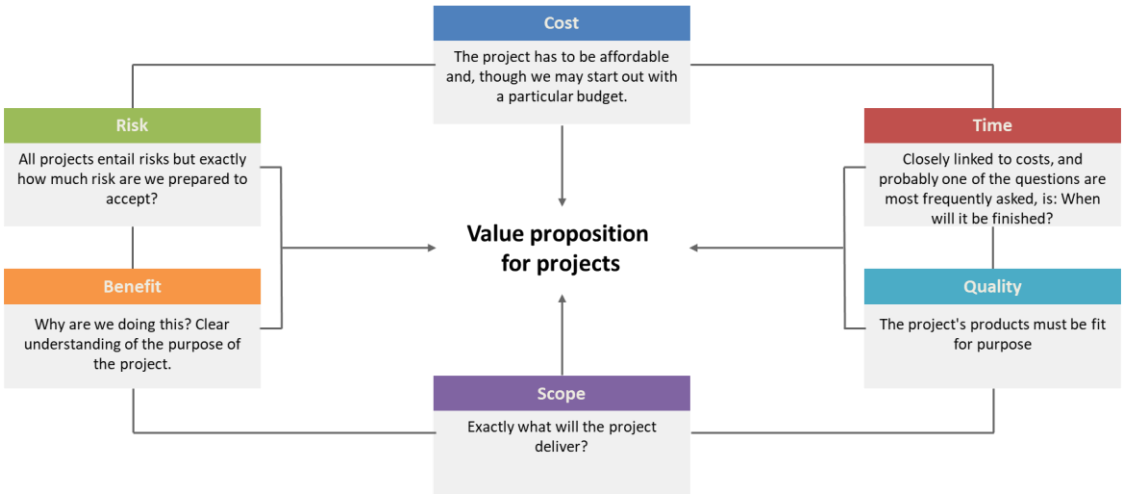

Figure 4 Project performance parameters; Source: own procesing

There are 6 variables involved in any project, and therefore six aspects of project performance to be managed in Figure 4 (Axelos, 2017).

1. *Costs:* The project has to be affordable and, though we may start out with a particular budget in mind, there will be many factors which can lead to overspending and, perhaps, some opportunities to cut costs.
2. *Time:* Closely linked to costs, and probably one of the questions project managers are most frequently asked, is: When will it be finished?
3. *Quality:* Finishing on time and within budget is not much consolation if the result of the project is subpar. In PRINCE2 terms, the project's products must be fit for purpose.
4. *Scope:* There must be agreement on the project's scope and the project manager needs to have a sufficient understanding of what is and what is not within the scope.

5. *Benefits:* The project manager has to have a clear understanding of the purpose of the project as an investment and make sure that what the project delivers is consistent with achieving the desired return.
6. *Risk:* All projects entail risks but it needs to considered, exactly how much risk are we prepared to accept?

2 Methods and methodology

The authors used a combination of research methods. Secondary data has been used as the basis for critical analysis of the M_o_R framework and generating the comparison for most common types of IT security incidents in 2020 in Slovakia and the world. Primary research using the qualitative method of a case study was performed to demonstrate use the best practices of M_o_R in the digital transformation of an enterprise (Reiter & Miklosik, 2020) as well as annual cybersecurity reports from IBM and Verizon. Qualitative data has been collected from official materials from Axelos (Axelos, PRINCE2, 2017). These research questions were defined:

1. *What project management methodology is most used in Slovakia and Europe?*
2. *What framework for working with risks is most popular in Slovakia and Europe?*
3. *What are the best practices in the field of risk in management?*
4. *What are the most common types of IT security incidents in 2020 in Slovakia and the world?*
5. *What are the most vulnerable sectors to IT security incidents?*

Effective risk management can bring far-reaching benefits to all organizations, whether large or small, in the public or private sector, as well as individuals managing projects or programmes (Webb 2017). It can improve performance against objectives by contributing to:

- Fewer sudden shocks and unwelcome surprises;
- More efficient use of resources and improved innovation;
- Reduced waste and fraud;
- Better service delivery;
- Better management of contingent and maintenance activities;
- Lower cost of capital.

3 Results

Cybercrime is one of the biggest challenges facing todays companies. A simple miscalculation, answering an official looking email on a hectic day, downloading software from a seemingly secure website or simply being unlucky and being chosen as a target for an attack by hackers may cause great damage in lost revenue, trust and sensitive information. It is estimated that in 2021 the total damages of cybercrime are going to cost the world economy 6 trillion USD. This number is expected to grow annualy by 15% for the next five years (Morgan, 2020). In this chapter we are going to list and analyze the most common cybersecurity threats globally and in the Slovak republic as well as M_o_R and how to implement it.

3.1 Comparison of IT security incidents in Slovakia and in the world

We analyzed the data of security incidents for the year 2020 CSIRT (Computer Security Incident Response Team) in Slovakia. Security incidents are classified into 11 categories. We have compiled an overview of the incidents for the period from 1.1.2020 to 31.12.2020 in the form of a table in Table 1 and a graph in Figure 5.

Table 1 Overview of the security incidents for 2020 in Slovakia; Source: (CSIRT, 2020)

Incident	% of Incident
Botnet	0,8 %
Unavailability (DoS, DDoS)	1,3 %
Unauthorized access and leakage of information	2,5 %
Unwanted content (defacement, spam)	1,0 %
Fraud	1,3 %
An attempt to penetrate	6,6 %
Penetration into the system	1,6 %
Malicious code	3,1 %
Information retrieval (phishing, social engineering)	42,3 %
Vulnerability	5,3 %
Others	34,2 %

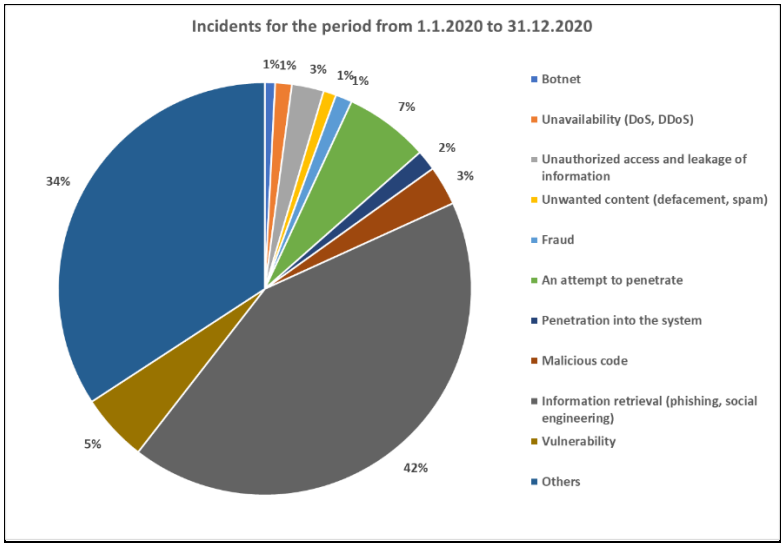

Figure 5 Overview of the incidents for 2020 in Slovakia; Source: (csirt.gov.sk)

The most common security incident in 2020 is Information retrieval (phishing, social engineering) in up to 42.3% of all cases. Information retrieval consisted of social engineering, phishing, scanning, and eavesdropping. Scanning also known as Scan and Exploit means sending requests to a system to reveal its weaknesses to exploit them during an attack. This includes some testing processes to find information about devices, services and accounts, e. g. fingerd, DNS requests, ICMP, SMTP (EXPN, RCPT, ...) etc. Eavesdropping involves monitoring and recording network traffic for this purpose. Social engineering means obtaining information from people in a non-technical way (lies, tricks, threats). The second largest group Others contained other incidents unsuitable for any type of selected 11 categories. The third largest group was the attempt to penetrate organizational systems. An intrusion attempt consists of exploiting a known vulnerability, repeated logon attempts, and attacks with unknown characters. An attempt to compromise

a system or disrupt a service by exploiting a vulnerability with a standardized identifier (e. g. CVE), such as memory overflow, back door, XSS (cross site scripting) etc. This includes repeated unsuccessful attempts to log in (guessing, brute force attack), as well as attempts to penetrate in a hitherto unknown way.

Then we analyzed the security incident data for 2020 itgovernance.co.uk worldwide (Irwin, 2021). Security incidents are classified into 13 categories. We compiled an overview of incidents for the period from 1.1.2020 to 31.12.2020 in the form of a table in Table 2 and a graph in figure 4.

Table 2 Overview of the security incidents for 2020 in world; Source: (itgovernance.co.uk)

Incident	% of Incident
Cyber-attack (Botnet)	7,201 %
Internal Error	77,372 %
Unauthorized access and leakage of information	0,008 %
Malware	0,000 %
Data breach	0,129 %
Password breach	0,006 %
Penetration into the system	7,201 %
Malicious insider	0,462 %
Information retrieval (phishing, social engineering)	0,002 %
Physical theft/loss	0,003 %
Vulnerability	7,535 %
Ransomware attacks	0,034 %
Unknown	0,045 %

Based on data provided by IT Governance, on a global scale, the most common security incident is an internal error in up to 77.37% of all cases.

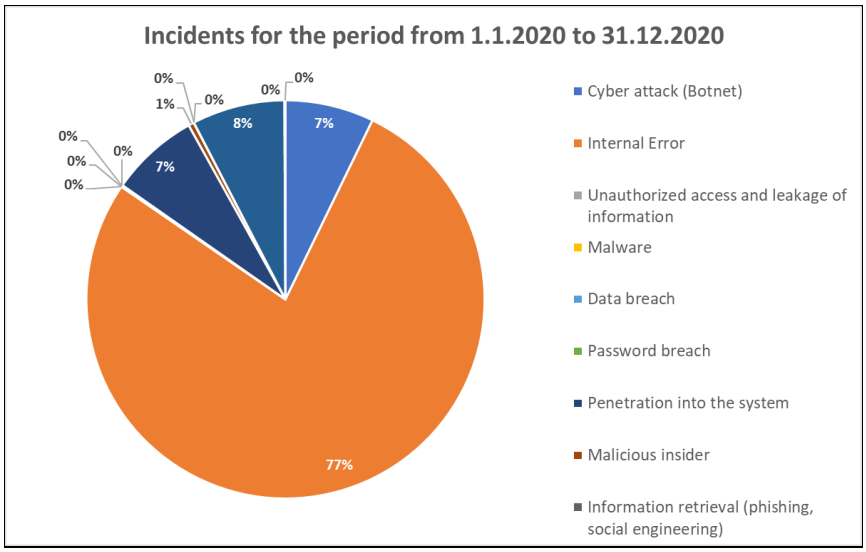

Figure 6 Overview of the incidents for 2020 in world; Source: (itgovernance.co.uk)

Although based on data published by Verizon the top threat actions in incidents was DoS (hacking) with almost 60% (Verizon, 2020), in breaches with more than 20% it was phishing and based on data from IBM it was mainly ransomware used in 23% of attacks (IBM, 2020).

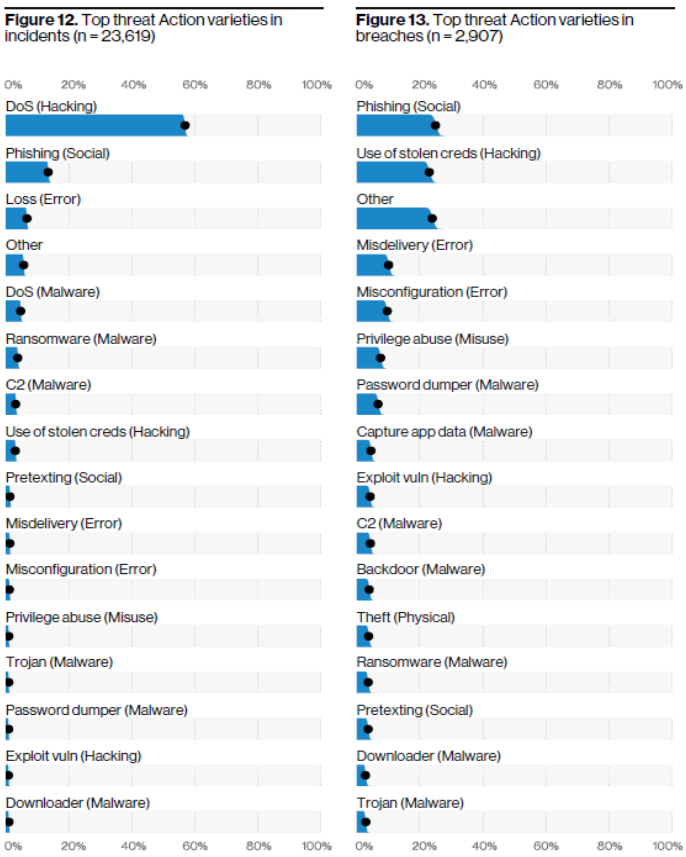

Figure 7 Overview of threat action varieties in incidents and breaches in 2020; Source: (Verizon,2020)

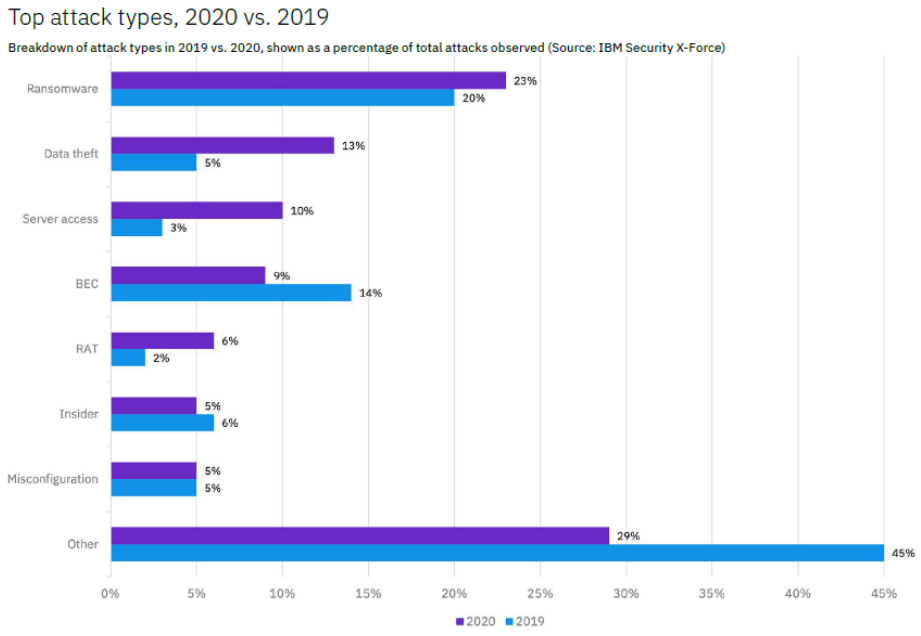

Figure 8 Overview of attack types in 2019 and 2020; Source: (IBM, 2020)

3.2 M_o_R framework

M_o_R stands for Management of Risk and is a route map for risk management, bringing together principles, an approach, a set of interrelated processes, as well as pointers to more detailed sources of advice on risk management techniques and specialisms. It provides advice on how the principles, approach and processes should be embedded, reviewed and applied depending on the nature of the objectives at risk. M_o_R consist of the 3 core concepts in Figure 9 (Axelos, 2012):

1. **M_o_R Principles**: these are essential for the development of good risk management practice. They are all derived from corporate governance principles in the recognition that risk management is a subset of an organization's internal controls.
2. **M_o_R Approach**: the principles need to be adapted and adopted to suit each individual organization. Accordingly, a company's approach to the principles needs to be agreed and defined within a risk management policy, process guide and strategies, and supported by the use of risk registers and issue logs.
3. **M_o_R Processes**: there are 4 main process steps, which describe the inputs, outputs and activities involved in ensuring that risks are identified, assessed and controlled. Embedding and reviewing M_o_R - having put in place the principles, approach and processes - an organization needs to ensure they are consistently applied and that their application undergoes continual improvement in order for them to be effective.

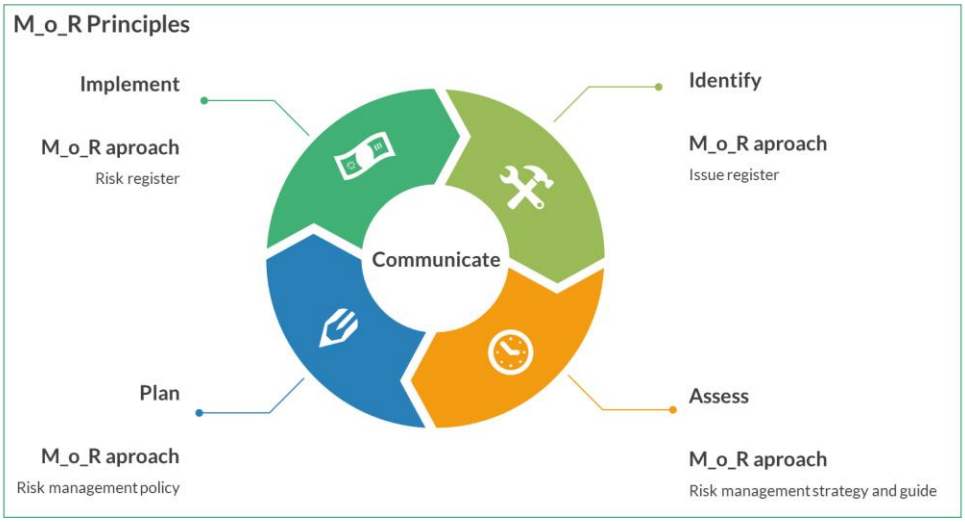

Figure 9 M_o_R framework; Source: modified by (Axelos M_o_R)

3.3 Risk and incident analysis

The Cambridge dictionary defines risk very broadly as “the possibility of something bad happening” (Cambridge Dictionary, 2021). While the Gartner IT glossary would define it in IT as “the potential for an unplanned, negative business outcome involving the failure or misuse of IT” (Gartner, 2021). While this would represent a general understanding of risk, in M_o_R risk is understood as something that can both become an issue or even an oportunity. This underlines the full impact that a risk can have as it offers for example an opportunity to learn, grow or inovate and in the long-term be positive (Axelos, 2016).

An incident is defined by Cambridge "an event that is either unpleasant or unusual" (Cambridge Dictionary, 2021) and by Verizon in IT as "A security event that compromises the integrity, confidentiality or availability of an information asset" as oposed to a breach, which is "An incident that results in the confirmed disclosure—not just potential exposure—of data to an unauthorized party" (Verizon, 2020).

While probably all human activities entail some form of risk, it is important for management to both minimize it to a tolerable level and to minimize the damage caused if a risk becomes a reality. For both goals to be fulfilled in an acceptable manner and with limited resources they need to be subject to analysis. Such an analysis helps to identify possible risks, what systems are threatened, how, by what and what the consequences would be if a risk is realized. Even a simple analysis answering these questions would naturaly lead to the creation of plans for such events, apointing a contact person, creating redundancies and increasing security requirements in vulnerable and critical systems. These findings should then be formalized and written down for example in risk and incident registers.

3.3.1 Risk register

A risk register is a document which contains all identified risks, their current status and history. It is therefore a useful tool to maintain past and current information on threats and opportunities that stem from those risks.

A risk register should contain these categories:

- *Risk identifier*: Is a unique assigned ID of the risk in a numeric or alpha-numeric value. This helps to quickly reference the risk and access any relevant information about it.
- *Risk author*: This is a specific person that has raised awareness of the risk.
- *Date registered:* The date when the risk was identified.
- *Risk category:* Specifies the type of risk in relation to the business activity. For example it may cause issues with the end quality of a product, cause loss of trust or loss of revenue.
- *Risk description:* This entails a more through description of the cause, the threat and oportunities and the effect the risk will have on business activities.
- *Probability, impact and expected value:* Here the estimates are written down for the inherent values (pre-response action) and residual values (post-response action). These should be recorded in accordance with the project's chosen scales.
- *Proximity:* This is a time estimate of when a risk event may happen in relation to a business activity. This could be imminent, within stage, within project, beyond project.
- *Risk response categories:* Defines how a response will be made in relation to a business activity. For example for threats avoid, reduce, fallback, transfer, accept, share or for opportunities enhance, exploit, reject, share.
- *Risk response:* Lists all activities that have to, should or may be taken in response to a risk.
- *Risk status:* Typically described in terms of whether the risk is active or closed
- *Risk owner:* Lists a specific person who is responsible for managing the risk.
- *Risk actionee:* Lists the persons that will take the actions described in risk response (Axelos, 2016).

Project	VITA (Virtual IT Academy)			
Date:	1.1.2021		**Release:**	**Draft**/Final
Author:	Miroslav Reiter			
Owner:	Ondrej Cupka			
Client:	IT Academy s.r.o.			
Document	2			

Risk Register

Risk ID	Author	Date Registered	Risk Category	Description			Impact		Probability		Expected Value		Proximity	Risk Response Categories	Risk Status	Risk Owner	Risk Actionee
				Cause	Event	Effect	Inherent	Residual	Inherent	Residual	Inherent	Residual					
1	Reiter	4.3.2021	Quality	QCE	SW security bug	Eff1	2000	50	30%	10%	600	5	Within stage	Accept	Closed	Sangala	Stone
2	Cupka	7.4.2021	Legal	GDPR	Missing subpage	Eff2	1300	250	15%	5%	195	12,5	Beyond project	Transfer	Active	Smith	Smith
3	Reiter	10.5.2021	Schedule	Bad planning	Time Exception	Eff3	500	40	65%	15%	325	6	Imminent	Reduce	Active	Sangala	Stone

Figure 10 Example of a template for a risk register; Source: modified by (Axelos PRINCE2)

3.3.2 Incident register

An incident register, also known as issue register, is similar to the risk register with the difference that incidents are security events that are actively managed. Or better said, a risk register contains information on the possibilities of a bad event, but the incident register records events that have happened either closed and archived or actively worked on. These registers should contain:

- *Incident identifier:* A unique assigned identifier of the risk in a numeric or alpha-numeric value. This helps to quickly reference the risk and access any relevant information about it;
- *Incident type:* Defines the type of issue being recorded, such as request for change, off-specification, problem/concern;
- *Date raised:* The date and time when the issue was reported;
- *Raised by:* The specific name of the person who reported the incident;
- *Incident report author:* The name of the person that created the incident record;
- *Incident description:* A more thorough description of the event, its cause and impact on the user or business activity;
- *Priority:* Assigns the priority of an incident based on pre-defined conditions. For example an incident impacting a minor business activity or a single user should be handeled with a different priority than a company wide problem. The priority may be changed based on problem analysis;
- *Severity:* Similarly to priority, it is assigned based on pre-defined conditions. Severity indicates the level of management that is required to make a decision on the incident;
- *Status:* The current status of the incident and the date of the last update;
- *Closure date:* The date the issue was closed (Axelos, 2016).

3.4 Implementation of M_o_R in the context of security incidents

Implementation of security strategies in a business often prooves to be a rather unpopular topic. The reason is obvious as implementation and maintanence of such strategies takes limited resources for in many cases creating no direct value for products and services. It becomes all the more clearer in light of the global climate crisis when highly possible future disasters are considered by many as less important that current savings or profits. Similarly the implementation of security strategies such as M_o_R run against agruments of short-term economic benefits. But in fact, not being able to deal

with risk and focusing on the short tearm is often times more costly, which is further proven by the rise in damages caused by the rising global damages of cybercrime.

Focusing on the short term issues leads to self-preservation, lack of learning from experience and a fragmented approach across an organization, all of which adds up to increased costs (Thomson, 2014).

In general strategies are implemented successfully when completing these actions:

1. *Set Clear Goals and Define Key Variables:* Setting goals should follow the SMART principles and be specific, measurable, attainable, relevant and time-based. Apart from goals, managers should also plan for variables that may hinder fulfiling those goals and make sufficient preparation for such events.
2. *Determine Roles, Responsibilities, and Relationships:* Each strategy requires roles that need to be assigned. It should always be clear who does what, who is responsible and what the relationships are between the roles.
3. *Delegate the Work:* Once roles, responsibilities and relationships are defined the tasks that are connected with them are next to be assigned. One of the aspect of management is that work is often done not by managers, but by employees managed by them. This action is therefore the core of management.
4. *Execute the Plan, Monitor Progress and Performance, and Provide Continued Support:* In this phase the focus of the manager should be to support their team, answer questions, carefuly listen to feedback and monitor progress. This is best done with daily, weekly and monthly meetings.
5. *Take Corrective Action:* A saying in military says that no plan survives contact with the enemy. Similarly in business plans need to be adjusted and revised based on changing circumstances.
6. *Get Closure on the Project, and Agreement on the Output:* Each project, such as strategy implementation, needs some closure to be able to evaluate its success, motivate employees and shift focus to new projects. This requires to consider if the project completed its goals set in the beginning, get agreement from those involved and grant support in completing the final tasks.
7. *Conduct a Retrospective or Review of How the Process Went:* As mentioned in the last point, evaluation is a key component after a project has finished. As business does not have an end and a company should behave as if it would never shut down, it makes it all the more important to continually learn from past mistakes and successes (Miller, 2020).

The above mentioned steps do also apply to implementation of M_o_R althouth with a few differences. M_o_R should be continuous and integrated into daily activities and decision making. This approach is also specific in that it needs to start from the very top of the organization with the CEO always having security on his agenda. To create an integrated risk management process it should be ensured that:

- Risk Management is part of the regular Governance cycle;
- Is at the start of a Governance agenda not the end;
- Review the existing risk information available and lessons learned;
- Identify operational risks and link them to strategic risks;
- Put a risk management process in place to start building and maintaining integrated risk plans;
- Categorize risks in order to control them for the whole enterprise;
- Choose a common tool to capture risks, e.g. a risk register which includes probability, impact and proximity;

- Represent overall programme risks in the form of Risk Bowties - useful with stakeholders;
- Get senior management buy-in and from this have nominated risk champions responsible for plans being integrated across locations – this ensures joined-up thinking, common mitigation actions and the ability to control mitigation costs (Thomson, 2014).

4 Discussion and conclussion

The most used project management methodology in Europe and Slovakia is PRINCE2 (RQ1). The most used framework for working with risks in Slovakia and Europe is M_o_R (RQ2). M_o_R is from the same vendor as PRINCE2, the British company Axelos. The PRINCE2 methodology together with the M_o_R framework is incorporated into European legislation with regulation in project management. Best practices in the field of project management and risk management are e. g. management by exception, continuous business justification of projects, learning from experience, working with risk and establishing a register of risks and incidents. The key elements in risk management are the use of proven principles, approaches and processes in the M_o_R (RQ3) framework. According to CSIRT.GOV.SK statistics, the most common security incident in 2020 is the Information retrieval (phishing, social engineering) in up to 42.3% of all cases (RQ4). On a global scale, the most common security incident is an internal error in up to 77.37% of all cases (RQ5). The most vulnerable sectors in year 2020 was the healthcare and health sciences sector. It recorded 240 incidents, which accounted for 1.2 billion breached records. The technology and media sector was the second most vulnerable sector, with 158 incidents and 3.3 billion breached records. The education sector followed, with 157 incidents and 884 million breached records (RQ5).

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Influencer marketing in brand building

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Abstract

Today, the business plans and marketing strategies of companies are increasingly adapted to the Internet. The development of the Internet is one of the most significant changes in recent years because it significantly changes and affects the way of doing business. The use of traditional marketing tools gradually replaces the use of online tools, and thus the transition to digital marketing, respectively. Online marketing is becoming a necessity for businesses and entrepreneurs. One of the most effective online marketing tools is influencer marketing. Merchants and businesses invest in selected influencers to create and promote their products and branded content to their followers. Influencer marketing can be considered a marketing strategy that uses social media and influencers to achieve the goals and business needs of the company. The presented paper aims to point out the influence of influencers in building a brand of selected subjects and to show the model of functioning of a successful influencer in a selected segment

Keywords: e-commerce; Digital marketing; Branding; Influencer marketing.

JEL Classification: M31, M37

Article Classification: Research article

1 Introduction

Marketing is a key component of any successful business. It does not represent established rules and standards but expresses an ever-changing process that adapts to the dynamics of information technology development and globalization. Traditional marketing brings only average results, so it is necessary to constantly monitor new trends. The dynamism of the present brings with its constant changes and development in every sphere. One of the most significant changes in the development of information technologies, which is why business entities are gradually adapting to the age of the Internet, which has a significant impact on the way we do business. The attention of

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businesses and consumers is shifting to the online environment. Digital marketing is part of marketing, which uses the Internet and digital technologies to promote products and services. Buying, selling, promoting, or branding a business takes place in an e-commerce environment, which can be defined as a business model that allows businesses and individuals to buy and sell products and services over the Internet. Traditional marketing tools are gradually complementing, in some cases replacing new types and methods of promotion and advertising, companies are more often focusing on online marketing tools. With the use of online marketing, companies and brands have found a whole new way of presenting products and services, and the style of communication is also changing - an individual approach to consumer needs (De Veirman et al., 2017).

For a company, to ensure its primary goal of maximizing profitability, it must pay attention to the individual theoretical aspects of marketing. The whole marketing process should consist of an integrated set of activities focused on consumer needs, the creation of an offer that satisfies the needs, the acquisition of quality information for continuous sales and the emphasis on the long-term nature of repeat customer purchases.

1.1 Digital marketing

The dynamic impact and development of modern information technology have replaced traditional marketing and marketing communication with online marketing. The effect of new trends causes constantly changing and increasing customer requirements. To ensure the fulfilment of the set goals, create and maintain market share and satisfy customer requirements, the company must orient its efforts and adapt them to the new nature of marketing - marketing in the online environment (Følstad, 2018).

The primary difference between offline and online marketing is that online marketing allows you to see results in real-time, e.g. businesses determine the number of views of their website, ads, or how many people discovered the e-shop by clicking on the ad. Based on the effective functions of digital marketing, the company can set priorities in time, set a marketing strategy, and thus save money and connect with potential customers (De Pelsmacker et al., (2018).

The use of online marketing and promotion brings benefits to sellers as well as consumers. Benefits of online marketing for buyers:

- *Convenience* - the buyer can order products twenty-four hours a day from any part of the world without the use of transport;
- *Information* - Customers can find a wealth of comparative information about products, companies and competitors without leaving their offices, homes or country;
- *Own decision* - the buyer does not get into direct communication with the seller, who tries to convince or influence the customer through emotions and appeals.

Benefits of online marketing for sellers:

- *Rapid adjustments to market conditions* - companies can expand their product portfolio and change prices according to market requirements;
- *Cost reduction* - allows sellers to avoid business maintenance costs, rental costs, insurance and other operational services, they can produce digital catalogues at a lower cost than the cost of printing and sending paper catalogues;
- *Relationship building* - online merchants can communicate with consumers and get feedback;

- *Auditorium size* - sellers can immediately see how many people have visited online sites and how many of them have stopped in certain places on the web, information can help marketers improve their offers and ads (Appel, 2019).

Online marketing activities are one of the most effective ways for businesses to expand their reach, find new customers and increase revenue. Today, most businesses have some kind of online presence that aims to reach as many users as possible while investing the least amount of financial resources and gaining the most benefits. Online advertising guarantees an effective way to achieve all this while allowing potential customers to get to know the business and gain interest. Unlike traditional advertising, Internet advertising is increasingly available for every type of business, allowing you to quickly, easily, efficiently and affordably reach the target group of the company (Bossetta, 2018).

Figure 1 Online ads typology; Source: own elaboration

1.2 Influencer marketing

Influencer marketing is focused on the use of influencers on social networks as a communication channel in the marketing mix. Influencers - influencers most often work on social networks Instagram (posting in the form of photos and images), Youtube (vloggers upload videos to their channel) and Facebook (posting and communication in the form of chat). Merchants and businesses invest in selected influencers to create and promote their products and branded content to their followers. Influencer marketing can be considered a marketing strategy that uses social media and influencers to achieve the goals and business needs of the company (Khamis, 2016).

The term influencer marketing comes from the English word influence, which in translation means influence. An influencer is a person using a social network who has sufficient power and ability to influence consumers to purchase products and services. Consumers do not make their own decisions when buying products and services, but their shopping behavior influences the opinion of influencers. Influencer marketing is therefore a process in which companies search for, identify and involve suitable opinion leaders of social media - influencers, who can purposefully and effectively disseminate information about a product or service and thus influence other consumers (Brown & Hayes, 2008).

Influencers are present on most social platforms, the best known being the social network and the Instagram application, which currently reaches more than one billion active users. Many influencers operate Instagram because of their ease of use and ability

to publish content quickly. Instagram is a visually appealing platform, allowing you to mark paid collaborations and brands directly on the photo, making it easier for the consumer to find a product or service (Hennessy, 2018).

Figure 2 Influencer marketing tools; Source: own elaboration

The division of influencers according to the type of content is divided into four groups:

- *Blogger* - can be the owner of a blog (website) on which he shares and updates his photos, posts, thoughts and hobbies. The blogger creates authentic and unique content, publishing it chronologically in the form of posts and articles on his blog and subsequently on the social network. Maintains contact and interaction with your audience;
- *Vlogger* - most often Youtuber, publishes videos with funny content, experiences, hobbies or answers questions from his fans;
- *Celebrity* - actor, singer, athlete, a participant in a reality show, who became an influencer thanks to the power of previous media. They have a lot of fans on social networks with whom they share life situations and privacy;
- *Instagrammer* - a person who publishes quality content - photos or videos that can attract and engage other Instagram users. It supplies the followers with several contributions, to which it immediately receives feedback. In Slovakia, Instagrammers are not very widespread and well-known, but in other countries, they help to build and spread the brand of various companies (Arora et al., 2019).

2 Material and methods

The paper aims to demonstrate a practical model for streamlining the marketing communication of a selected entity in the field of fashion and fitness using influenza services. The created model represents one of the possibilities by which a company and a brand can influence the shopping behaviour of consumers through the individual power of influencers in a given segment.

The data were obtained from a structured interview (obtaining essential information about influencers and companies), from an analysis of influencer profiles and websites of selected companies.

2.1 Analysis of selected influencers

A controlled structured interview was conducted to obtain important information about individual influencers. Relevant influencers were selected for the given research, whose job is to cooperate with the company, resp. brand, presentation of products or

services and influencing the shopping behavior of followers - consumers. 30 different influencers and influencers were contacted, but for compatibility between the company and influencer, e.g. in terms of field of action, four influencers were selected. Selected influencers belong to the group of micro-influencers. It is this group that has the largest representation on social networks, the most loyal fans, and can influence consumers' shopping behavior the most. The table shows basic information about selected influencers.

Table 1 Selected influrencers; Source: own elaboration

Influencer	Type	Followers	Segment	Er
ZUZ.RYGAROVA	Micro	11.2k	Fashion &lifestile	3 %
STYLEMON.BLOG	Micro	11.9k	Fashion	5 %
KATARINADARASOFFICIAL	Micro	22.6k	Fashion &lifestile	6 %
OOMARTINAMARKOVAOO	Micro	41.4k	Ftness	4 %

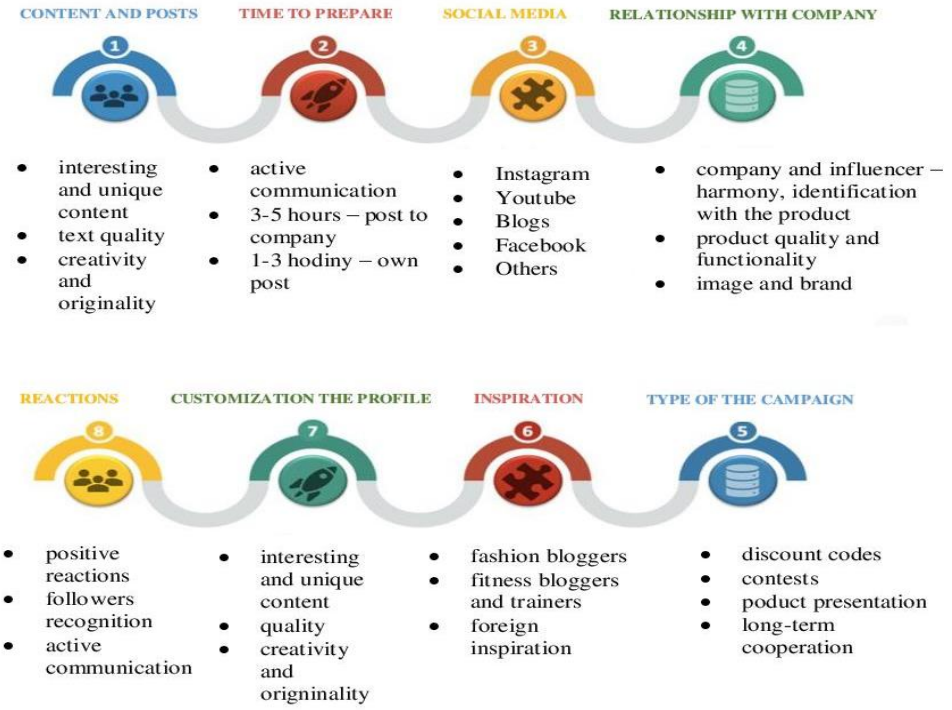

Figure 3 Summary of results from the analysis of influencers; Source: own elaboration

After the analysis of the obtained data, it is possible to state that in the selected branch the influencers on social networks implement the following activities:

- Influencer is an interesting, unique contribution that will interest its followers and thus increase their loyalty;
- The time devoted to creating contributions for the company is in the range between 3-5 hours, if it is a private post, the required time is lower;
- The most used social network is Instagram;
- There is a relationship between the company and the influencer, harmony, the influencer must identify with the products it promotes. In the selection of the company and the cooperation of the influencer, the quality of the products, the use and the image of the company itself are convincing;

- The most popular types of online advertising campaigns are discount codes, competitions and the presentation of the product and its features, influencers prefer long-term cooperation, not one-time;
- Foreign influencers are often the inspiration;
- The profile must be color-matched, photos and posts in high quality;
- Positive reactions of its fans are important in the influence of the influencer, active communication and willingness to advise help to achieve them.

3 Results

Through guided interviews with selected influencers, it is possible to describe the individual qualities and steps to be a successful and popular influencer in the selected segment. It is the knowledge of the qualities of influencers that guarantees the company that their brand and the overall image of the company is in the right hands.

Their typical features are:

- Pleasantness, passion, commitment, authenticity, authority - qualities that are essential when working with people and building trust;
- Sense of marketing - the right influencer should be an expert in their field, also know and communicate with their audience, should know current trends and publish interestingly the content they create, either in the private sphere or in cooperation with the company;
- Visibility - the size of the audience and fans, the right influencer knows how to be as visible as possible. The influencer knows how social networks work and "turns" time in its favor, e.g. it is important to know the best time of day to publish certain content so that the post has a high reach and response;
- Personal fit - influencer and company (brand) share the same values and have similar goals.

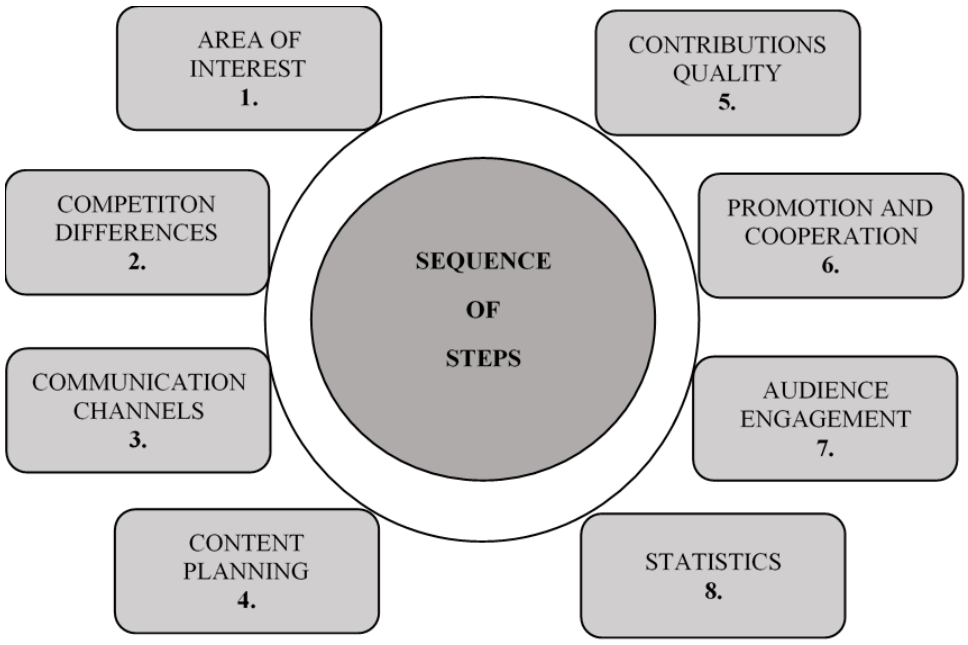

Figure 4 Model of a successful influrencer; Source: own elaboration

The following figure describes the sequence of steps to become a successful and trusted influencer.

1. *Area of interest* – it is important to find out what influencers enjoy, their interests. It doesn't have to be just classic areas like travel or fashion.
2. *Competition differences* – areas of interest are likely to be repeated, but each influencer should have a unique way of presenting and translating contributions.
3. *Communication channels* – the influencer cannot be successful on all social networks or communication channels. It is advisable to choose one communication channel, or two, where it is possible to be as online and active as possible for your fans.
4. *Content planning* – it is appropriate to plan your content, e.g. for 1 month so that the published contributions fit together. It is important to add posts at the same time on selected days.
5. *Contributions quality* – publish well-crafted contributions, whether it concerns the photograph itself or the text.
6. *Promotion and cooperation* – the advertised contribution can reach several times a larger audience, cooperation - the most effective way to get to know is to establish cooperation with an already successful influencer or, at best, with a company.
7. *Audience engagement* – it is important to answer every question and comment.
8. *Statistics* – monitoring statistics, where it is possible to find out which post was most interesting or attracted new followers.

4 Discussion

Businesses, most often in the areas of fashion, lifestyle and fitness, use influencer marketing, because in the home environment their target group of customers spend more time using social networks and are inactive in interaction with content creators - influencers. The conducted interviews with companies showed that customers are greatly influenced by the opinion of the popular influencer when buying goods and services, but its influence is also usable in many other areas, as the influencer is gradually becoming a model for consumers. In addition to working with companies, influencers are constantly coming up with new ideas and tips for their fans, so the influence of influencers can be positively used in four proposed categories (in connection with a pandemic). The COVID - 19 pandemics have shifted almost all of our attention to the digital environment, with online shopping and e-commerce coming to the fore. Businesses in almost all categories set up e-shops and are active online and on social networks. The pandemic accelerated the changes that were already underway, but have now become a necessity. Many consumers spend most of their time on the Internet and on social networks, whether at work, but especially with entertainment and for inspiration.

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Using neuromarketing to understand user experience with the website (UX) and interface (UI) of a selected company

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Abstract

E-commerce is an increasingly common term nowadays. Thanks to technology, many operations are becoming easier and easier, making it increasingly simple for a business to carry out its business activities. Websites, which form the fundamental basis of e-commerce, can perform not only a commercial, booking, but also an informational function. Just as the process of attracting visitors to a website is important, so is the process of ensuring that the site is clear so that customers do not leave it and the bounce rate does not increase. This is the area that User Experience (UX) and User Interface (UI) designers deal with. Their job is to design a solution that is attractive and interesting enough to be accessible on all devices and at the same time easy enough for the customer/visitor to get to their destination or get the information they need in a few clicks. The basis for changes in UX design can be obtained today not only through online analytical tools, but also through neuromarketing. The paper highlights new possibilities of testing the UX design of an information website using a stationary eye camera (Eye Tracking) and face reading (Facial coding).

Keywords: Visual Attention; Emotions; User Experience; Web Design.

JEL Classification: C80, M31, M37

Article Classification: Research article

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1 Introduction

In 2019, 3.5 million Slovaks aged between 12 and 79 were online, according to the IAB monitor. According to the IMAS survey, 6 out of 10 people who were internet users also participated in online shopping. There are now more than 12,000 officially registered online stores in Slovakia, and these stores recorded a 20% year-on-year growth in sales, resulting in a record €1.36 billion turnover in 2019, more than 60% of which was made via mobile phones. Thus, in the long term, it can be seen that online shopping is very popular among Slovaks, and currently also as a response to COVID-19 pandemic, as a result of which it is increasingly becoming a trend to extend e-shops to physical stores as well., and this is where customized UX solutions tailored to the client's specific requirements can play a key role.

1.1 E-commerce

Authors Chaffey and Ellis-Chadwick (2019) describe e-commerce as "all electronically mediated transactions between an organization and any third party with whom that organization deals". According to this definition, non-financial transactions, such as a customer requesting additional information, would also be considered part of e-commerce. Kalakota and Whinston (1997) refer to a number of different perspectives on e-commerce:

1. *Communication Perspective* - the providing of information, products/services, or payment by electronic means.
2. *Business process perspective* - application of technology to automate business transactions and workflows.
3. *Service perspective* - enables cost reduction at the same time as speed and quality of service delivery is increased.
4. *Online perspective* - buying and selling products and information online".

The online world and the e-commerce sector is constantly changing and developing, which is why it is extremely important to keep up to date with all the latest trends that affect the life of the consumer and retailer

1.2 Research in online

The online environment represents the environment of the Internet as a publicly accessible computer network around the world. As a valuable source of information, it has become a popular everyday tool for marketing activities. The online environment shows a global world of information where any person can quickly enter at any time via computer, tablet or mobile phone. It works not only as a transmission medium, but also as a system of interconnected websites.

Web analytics is the measurement, collection, analysis, and reporting of web data for the purpose of understanding and optimizing web usage (Clifron, 2009). According to Brunec (2017), "web analytics is not only a process for measuring web transmission, but can also be used as a tool for business and market research and to evaluate and improve the effectiveness of a website". Web analytics applications can also help businesses measure the results of traditional print, radio or television advertising campaigns. This analysis is done on the principle of the change in visitors to a website after a new advertising campaign has been launched. Web analytics provides information about the number of visitors to a website and the number of page views. It helps to

measure traffic and popularity trends which are useful for market research. According to Jansen (2009), most web analytics processes have four basic stages, which are:

- *Data collection* - this stage represents the collection of basic data. The aim of this phase is to collect all relevant data for further processing;
- *Processing of data into information* - the aim of this stage is to collect the data and adapt it to information, specifically metrics;
- *Determination of KPIs (key performance indicators)* - this phase focuses on the use of metrics and how they are met by business strategies, which are referred to as key performance indicators (KPIs). KPIs many times deal with aspects of conversion, but not all the time. It depends on the organization;
- *Formulating an online strategy* - this phase relates to the online goals and standards for the organisation or business. These strategies usually relate to making money, saving money or increasing market share;
- *Experiments and testing* - another essential stage that analysts have developed to optimize websites are experiments. A/B testing is a controlled experiment with two variations in online settings. The goal of A/B testing is to identify and suggest changes to a website that increase or maximize the effect of the statistically tested outcome of interest.

1.3 UX a UI design

Based on Kim and Cho (2016), User Experience (UX) attributes to the whole experience related to the perception when the user feels and thinks through the use of the system, product, content or service. While User Interface (UI) related to interfacing that through appearance, use commands or techniques to operate the system, input data and content usage (Joo, 2017). Von Saucken et al. (2013) stated that User Experience (UX) enhances the User Interface (UI) through blended of the emotional aspect. Some studies have been done to take a more systematic profound approach, and this has resulted in product designs that address the connection between design and emotion (e. g. Desmet & Dijkhui, 2003; Hekkert et al., 2003). Over the past years, significant interest in design and emotion has been imbued within design practice and design research.

1.4 Eye tracking and Face reading

Biometrics is a universal concept that involves measurements of physiological responses of the body – not directly the brain – to the external stimuli that are perceived through the senses (Pradeep, 2010).

Eye tracking: measuring eye movements and dilated pupils when viewing the subject, object, or scene has multiple uses in neuromarketing, both as a separate tool, but also as an important complement to other indicators. The speed and the sight direction change provide valuable indicators of attention, interest, and attraction. The device for measuring eye movement is called Eye tracker, and there are mobile and fixed versions of the device based on the nature of the conducted research. Eye tracking offers market researchers the possibility to collect specific data that can be statistically analysed and graphically rendered, thus increasing the quality of their research (Velásquez, 2013).

Facial expressions: a whole range of emotional states is recognizable on the human face. Changes in facial expressions can be classified on two levels: observable changes of expressions – microemotions (e. g. a smile or scowl) and unobservable changes of mimic muscles (e. g. muscle contraction associated with positive and negative

emotional response). Observing facial expressions appears to be an important indicator of positive or negative emotional reactions – valence. To detect observable changes in facial expressions a special software (Facereader) is used, which can very quickly detect emotions from the recorded face of the surveyed subject (Berčík & Rybanská, 2018).

2 Material and methods

The aim of this paper was to examine the user experience with a selected website of the retail company Kaufland. The aim of the subsite was to inform selected consumer segments about a new way of indicating the nutritional value of foods through the "Nutri-Score" indicator. Nutri-Score is a voluntary, supplementary system of nutrition labelling. It is located on the front of the packaging of products to complement the traditional detailed nutrition labelling on the back of the pack. The assignment for the 30 participants (50% men and 50% women interested in a healthy lifestyle aged 18-65 years) who took part in the testing was: "Imagine you want to eat healthy. Kaufland is now coming out with a new Nutri-Score product labelling. Please check out their website."

During the test, the respondents' visual attention was monitored using a static eye tracking camera Tobii X2-30, and at the same time, emotional response was captured using Face reading (FA) – Facereader 7. After the test, the respondents answered questions regarding the perception of the subsite, its structure and clarity at a conscious level.

The survey was conducted on 23, 24 and 27 November 2020 in the Laboratory of Consumer Studies, FEM SUA in Nitra.

Figure 1 The testing process of the UX design of the website subsite; Source: Authors' own photo documentation based on research 2020

3 Results and Discussion

Based on measurements via a mobile eye camera, the highest level of visual attention was identified through outputs in the form of heat maps and points of interest (POIs). In Figure 2 it can be seen that most attention (red) was focused on the text describing the nutritional indicator "What is the Nutri-Score?". At the same time, respondents first noticed the logo within the main banner after an average of 6.63 ms, and

the latest they noticed the Nutri-Score image, including its variants A-E (42.36 ms) within this section. They spent the longest time looking at the text "What is the Nutri-Score?" (mean 6.06 s).

An important finding is that the text under the main banner is the second place they spent the most time looking at (3.29 seconds on average). The longest initial look time was concentrated on the Nutri-Score image, including variants A-E (0.36 s). Repeated backward views were concentrated most often on the main banner at the top of the subsite.

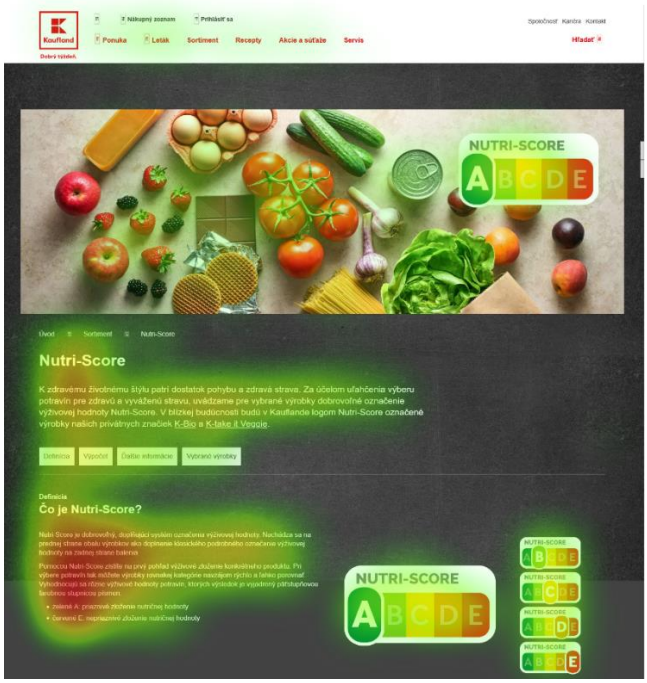

Figure 2 Visual Attention Heat Map – 1st part web subsite; Source: Output from Tobii Studio PRO program, 2020

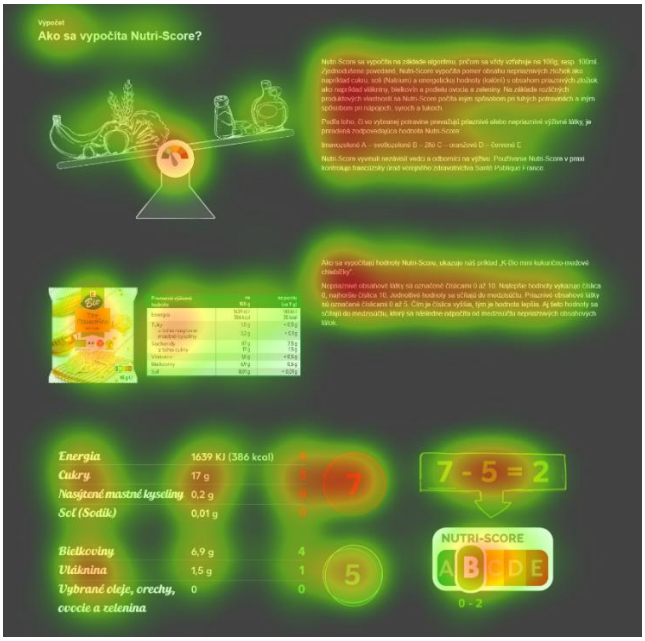

Figure 3 Visual Attention Heat Map – 2nd part web subsite; Source: Output from Tobii Studio PRO program, 2020

In the second part of the site (Figure 3), most of the focus was on the text describing the calculation of the Nutri-Score, but also an example of assigning favourable and unfavourable values. The first in order that respondents noticed in this section was the text "How is the Nutri-Score calculated?" (1.39 ms). They noticed the text explanation "Example calculation text" as 3rd in order (12.97 ms). Within the graphical explanation of the calculation, they first noticed "Nutri-Score Table 7" (77.92 ms) and last the formula "Nutri-Score Calculation"(87.06 ms). On average, respondents spent the longest time looking at the first text paragraph "Paragraph 1" (5.24 s), probably due to trying to understand the calculation quickly. The longest initial view was taken on the table of unfavourable values "Nutri-Score Table 7" (0,40 s). Repeated backward views were most frequent on the first text paragraph "Paragraph 1" (13) and on the text with the calculation example "Calculation example text" (13).

In terms of communicating the main message, it can be stated that the majority of respondents understood the informational relevance of the Nutri-Score subsite (17 correct statements, 5 partially correct). After opening the subsite, the terms such as "colourful." "healthy nutrition." "nice graphics" were the most frequently thought of by the respondents. The majority (18) had no complaints about the website, those who had complaints most often cited clarity (4) and font size (3) as negative aspects.

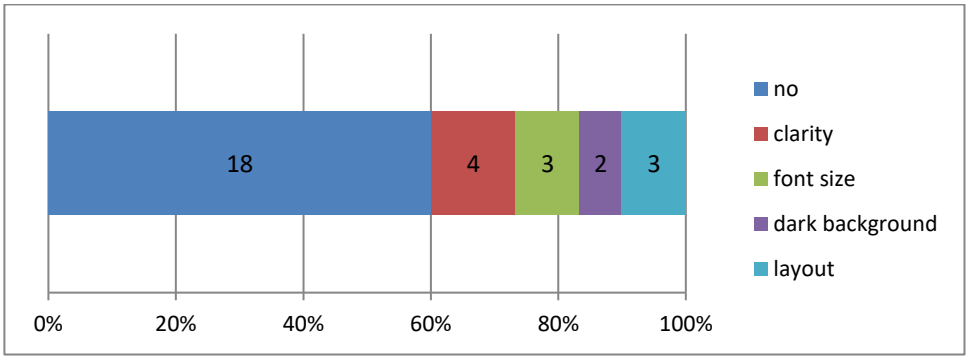

Figure 4 Question processing – Is there anything you didn't like about the website?; Source: Authors' own photo documentation based on research, 2020

In addition to visual attention, the respondents' emotions were also monitored through face reading. Based on the valence data (polarity of emotions), a heat map of negative feelings i.e., the places where respondents had the highest level of frustration based on the average values was created.

In the first part of the web subsite, the introductory text paragraph "Nutri-Score." which most respondents tried to read and quickly understand, was a source of increased frustration. The same was also the case for the definition of "What is Nutri-Score?." probably due to the length of the text and the relatively small letters, see Figure 5.

More negative feelings were noted at the title of the calculation "How is the Nutri-Score calculated?" (-0.13) and also when looking at the sample calculation (-0.16), as many respondents could not quickly understand the assigned score, especially for the unfavourable (red) components (Figure 6). The more negative response may also be due to the higher cognitive load in trying to understand the calculation, which was confirmed by some people in the interview, where they stated that they were confused by the calculation, they did not know exactly what the numbers 7 and 5 meant and would have liked a simpler form of explanation.

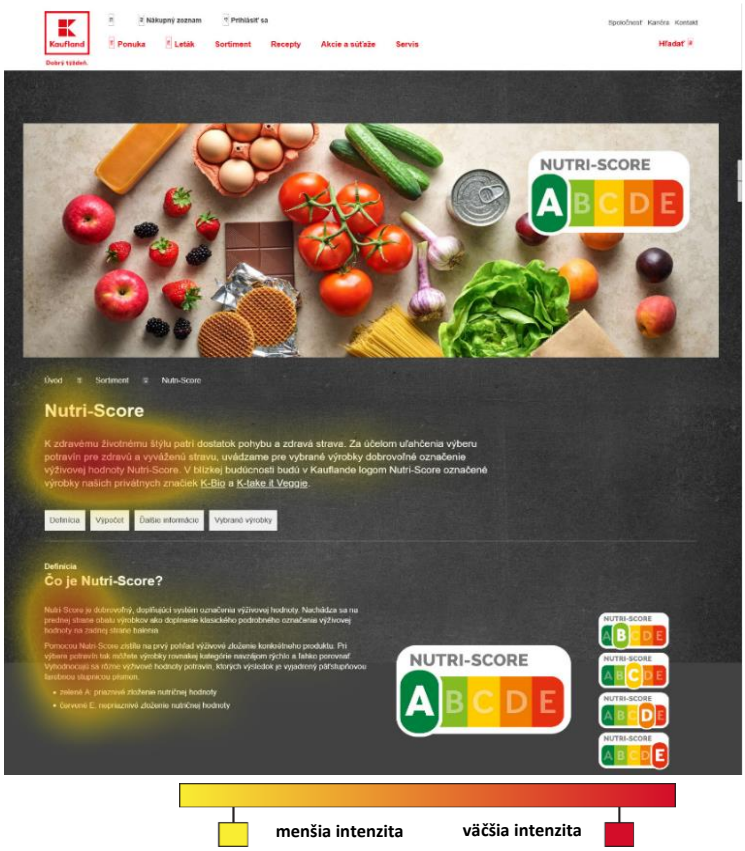

Figure 5 Frustration heat map – 1st part of the web subsite; source: Own processing based on research 2020 using Facereader 7 software

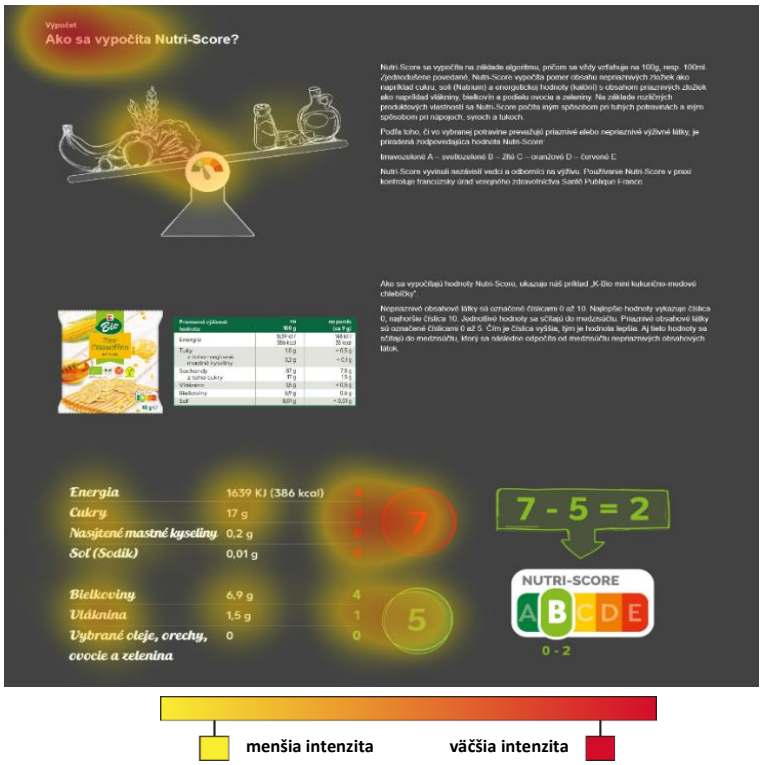

Figure 6 Frustration heat map – 2nd part of the web subsite; Source: own processing based on research 2020 using Facereader 7 software

4 Conclusion

Based on the conscious feedback, it can be concluded that the web subsite fulfilled its objective as the majority of respondents understood the meaning of the subsite (17 correct statements, 5 partially correct). The use of neuromarketing methods suggests that some improvements need to be made, as many respondents had difficulties in understanding at a quick view the actual calculation method (scoring of unfavourable substances within the calculation of the nutritional score), which was also reflected in an overall more negative emotional response within this section of the subsite (valence -0.075). Some aspects of the subsite in terms of UX (User Experience) and UI (User Interface) may also have accounted for the worse subsite rating, particularly for those who had complaints about the clarity (4) and font size (3), despite respondents generally liking the colour scheme and design of the subsite. From the above, it can be assumed that a modification of the explanation of the calculation, e.g. by reorganizing the individual elements or adding specific examples, could contribute to improving the comprehensibility of the web subsite, which will be associated with a reduction of the cognitive load and thus less frustrating moments. The results from the visual attention monitoring pointed to the fact that it is necessary to use a larger font for the texts and to make adjustments through copywriting, thus eliminating the number of texts, or to make a partial reorganization of them, or to replace some difficult texts with animations and infographics. These changes would mainly contribute to improving the user interface (UI) but also the experience (UX). The involvement of neuromarketing methods in the perception testing of the selected subsite revealed a lot of detailed information about consumer perception, which is further usable in the marketing management and communication process

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Session B

Economics and the entrepreneurship in the era of digitalization

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Cross-generational entrepreneurship in Slovakia in the era of digitalization: pragmatic approach

The Impact of COVID-19 on the Apple Brand and Customer Satisfaction

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Abstract

The aim of this article is to examine the consumer satisfaction and the impact of COVID-19 on the sales of Apple products. The theoretical part of the article is addressing the consumer behaviour. As a quantitative method, a questionnaire survey was used to conduct the research. A total of 440 filled in questionnaires were collected from the respondents using Apple products. Based on the research results, the customers are more conscious in purchasing decisions and the frequency of realizing a purchase. The customers interested in Apple products do not buy products as frequently as they did before the pandemic.

Keywords: Consumer behaviour; Consumer satisfaction; Brand loyalty; Apple; COVID-19.

JEL Classification: D10, D12, M10

Article Classification: Research article

1 Introduction

In marketing terms, the customer is a person who makes decision in order to satisfy his/her needs or the needs of his/her environment. The concept of consumer is usually identified with the concept of buyer. We can list all those individuals and households who are purchasing products to satisfy their needs (Bérczíné, 2006; Bakó et al., 2021).

Consumer behaviour refers to purchasing products and services in order to increase customer satisfaction. According to Solomon (2011), consumer behaviour

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expresses the consumer desire to satisfy needs and desires by purchasing products and services that make the customer happy by obtaining and using these products. Fodor et al. (2012) defined the consumer behaviour as the sum of activities oriented at purchasing, using, evaluating products, as well as including the process of consumer decision. It is a complex behaviour including the needs of the individual, defining elements of the individual's environment, information provided about the product, ability to evaluate the alternatives and the decision making mechanism which will later result in customer satisfaction or dissatisfaction. The consumer behaviour is examining the purchasing process, decision-making about purchasing the product or service in order to satisfy his /her needs (Mura & Lincényi, 2015; Sánta, 2019).

It is essential to know when, why and how the consumer decision is made, how the consumer is collecting information about the product or service, and what kind of experience obtains during the purchase. It is necessary to be aware of the factors having impact on the customer in order to influence the consumer behaviour. Sociological and psychological research of consumer behaviour has been a conscious process. However, the most typical form of the research is the consumer observation in different purchasing situations, evaluation and analysis of the customer reaction (Bérczíné, 2006; Benda-Prokeinová et al., 2017).

The factors and group of factors determining consumer behaviour are complex and vary. As components that often seem to be insignificant can be determining, we will list the factors influencing and determining consumer behaviour. The factors influencing consumer behaviour fall into 3 groups.

I. Wider socio-economic and political environment:

- *Economic*: national income per capita, pace of development, level of indebtedness, unemployment rate, financial security of citizens.
- *Political*: the citizens of countries with balanced development and political environment develop different attitude compared to citizens of those countries involved in war or face political imbalance.
- *Geographical*: those living close to the Equator will develop different consumer habits than those nations living on the north.
- *Prices, price levels, demand:* price has a significant influence on the customer purchasing product or service. Price decrease might have positive impact on demand.
- *Income*: different income conditions can be detected in Slovakia, e.g. the income of inhabitants in the western part of the country is higher than income of citiznes in the East.
- *Advertising, mass communication, trends:* the consumers show willingness to purchase products beyond their needs if they receive an offer with short-term benefits. Fashion can generate change in consumer behaviour, however it is valid for trendy clothes or products (Bérczíné, 2006; Mura & Lincényi, 2015).

II. Factors of the social environment

- *Culture, subculture*: the former tends to refer to differences between the societies, while the subculture refers to units within the society, which operate on the basis of different norms but all of them are linked to a particular culture. The attitude of the individual to other individuals, groups, behaviour as a consumer is strongly determined by these.
- *Social stratification*: is often manifested in form of social classes. The system of social classes has a hierarchical character.

- *Role*: a form of behaviour expected from the individual in a specific situation or a form of behavior determined by the needs of people in the environment of the individual.
- *Status*: position of the individual in the system of values in the society. Certain social status is associated with particular products or services. Individuals are choosing products and services that reflect their status in the society.
- *Reference group*: being a member of a group representing values and norms, which has an impact on the behaviour of direct or real members of the group.
- *Family*: the most important purchasing or consuming unit of the society having a significant impact on the purchase. Family members form the most influential reference group that determines the consumer behaviour (Bérczíné, 2006; Mura & Lincényi, 2015).

III. Factors determining the individuals, characteristics of individuals

- *Age*: The range of products and services people buy or use changes in different stages of their lives. Their opinion about products and services is changing with the age of people. Consumer habit of a twenty years old single person is different from the habits of a married 32 years old father with children.
- *Gender*: male and female customers purchase particular products with different frequency and different way. There are some products purchased only by female customers, while others are attracting men.
- *Qualification, income and type of profession* also determine the consumer habits.
- *Residence*: living in town, village or capital provides different opportunities and habits.
- *Personality*: different purchasing attitude is detected in the case of introvert and extrovert individuals (Bérczíné, 2006; Mura & Lincényi, 2015).

1.1 The impact of COVID-19 on consumption

The year 2020 brought unexpected changes having an impact on purchasing and consumption habits of the consumer. The outbreak of worldwide pandemic resulted in uncertainty, many people lost their jobs and income. The global uncertainty and the quarantine indfluenced not only the consumers but also had impact on the economy and marketing activities. The changes in society can be determined by examining the direct and indirect correlations. As a result of the pandemic, several solutions have emerged that decreased the personal contact of individuals. These solutions are not new (e. g. home office, e-learning), but the rapid spread of these new alternatives and their integration to everyday life is significant (Lennert, 2020). As a characteristic trend during the economic downturn, companies cut the marketing costs as a first step of cost reduction. As a further challenge, companies face the lack of human resources. As companies are reducing their advertising costs, so does the number of marketing experts is decreasing. Other aspect to be considered is the changing consumer habit. It is necessary to detect how consumers respond to the new situation. According to Korcsmáros et al. (2019), similar changes in consumer habits could be detected when Slovakia joined the EU. Later this change was visible during the economic crisis in 2008.

The journal of the American Harvard University with a focus on economic issues differentiates four categories of consumers in reflection to the economic recession in 2008.

- Low-income consumers are those mainly influenced by the crisis. This groupr of consumers will decrease their expenses as a result of uncertainty;

- Consumers affected by the crisis, but remain optimistic and will wait for things change to better. They are worried about maintaining their living standard and will decrease their expenses;
- Consumers maintaining their financial stability during the crisis – maintain their consumer habits on the level they had before the crisis, but will reschedule their spendings;
- "Live for the moment" group of consumers are made up of those young consumers living in cities who do not stress about their savings as they spend most of their income on pleasure and experience rahter than tangible goods. Consumer habits of this group can change when experience radical changes in their life (losing a job or property). As a result of this change, new marketing channels and strategies can be applied to reach this group of consumers. Marketing will play a key role in maintaining their income, but also highlights the possibility of development (Szesztai, 2020).

Many factors emerged during the outbreak of pandemic that could benefit several services. The marketing strategy had to be tailored to the existing functioning model. Social distancing resulted in teleworking and distance learning, which means that the focus has shifted to online platforms and other platforms supporting and ensuring online learning.

Since the work and learning remained a scheduled activity, there was not enough time to develop new platforms. The customers have already developed trust to service providers of Zoom and Microsoft Teams, which were already known and used online platforms. The pandemic has completely changed the consumer habits, online shopping started to prevail over brick-and-mortar facilities. The society benefited from the decreased social interaction of individuals. The pandemic has slowed as a result of the decreasing social interaction. Demand for delivery services have increased, which resulted in increasing number of couriers generating income for e-tailers. New ideas and well-developed marketing strategies showed that businesses can survive also during the pandemic.

The breakthrough of online grocery shopping was slow before the pandemic. The late breakthrough was explained by the fact that consumers do not trust in the quality of delivered products and did not show willingness to pay for delivery. The outbreak of pandemic has completely changed this consumer attitude. Although the grocery stores were not really affected by the restrictions, online shopping turned out the be the only safe solution for purchase. Amazon involved in providing delivery service has become the pandemic giant realizing 50 times higher number of orders than the previous year. Online grocery shopping has also accelerated in Slovakia, available delivery dates of online retailers became limited. However, not only the giant companies with developed logistics systems and supplier netwrok were able to cope with the change, but start-up companies also performed well both in bigger and rural settlements. The number of webshops started to show an increasing tendency. They have benefited from the pandemic situation as well as can provide quality customer service in terms of quality of products and services, quick delivery terms and adequate product portfolio (Osztovits et al., 2020).

The hospitality industry faced an unexpected decrease of turnover, but also underwent changes during the period of pandemic restrictions. The smaller and bigger restaurants have joined online platforms offering food delivery serivce. The food delivery has increased by 8,7% in the USA. The market forecasts show an increasing tendency of this trend in the next 5 years. This trend has already existied worldwide, the pandemic restrictions even accelerated the trend. The turnover statistics of Falatozz.hu portal (Hungary) show that the number of new customers has increased by 59% during the

pandemic. Covid-19 has significantly reshaped the demand and supply balance in the food industry. It means that customers have become more conscious, looking for different quality products than they had interest in before the pandemic. The demand for long shelf life foods has increased by 90%, as consumers have decreased the number of their purchases. Accumulation of certain types of long shelf life products e.g. flour has increased. Consumers started panic shopping, creating a shortage of goods. It is necessary to mention that these products could benefit short term as a result of imbalanced consumer trend. The customers realized that the food supply remains smooth without an accumulative consumer behaviour.

The supply of products remained smooth, which was ensured by delivery service companies. The activity of webshops and e-retailing has increased by 104%, ensuring parcel delivery services with continuous work. The Logistics Department of Magyar Posta reported that the daily revenues had increased by 20%, which was characteristic only for Christmas period before. The Express One Hungary Ltd and the GSL grew by 31% compared to previous year results. Not only the existing parcel delivery services expanded, but new players have already entered the market. Building and developing delivery networks in rural areas seemed to be an excellent opportunity. Bigger companies had low level of penetration in these areas.

The online education and conferencing platforms (Google Classroom, Teams, Zoom) have also benefited from the situation, as due to curfew restrictions most of the people had no other alternative than studying and working from home. The Zoom share value increased from 108$ to 162$ within a week in March 2020. Not only the number of users increased, but they have spent substantially more time on these online platforms. Platforms supporting online teamwork have also benefited. The daily number of Microsoft Teams users increased from 12 million to 44 million. Free and paid fitness classes started to appear on the Facebook, Instagram and Youtube, which means that after closing the fitness centres, also the sport activity moved to online platforms remaining the part of people's everyday life. The virus banned also the other forms of entertainment e. g. theatre, movie, concerts. Most of the artists found a way to reach their audience by uploading concerts and theatre performances to remain in contact with their audience. These paid services have also developed a business model, which are not completely developed, but integrated payment solutions might work on these sites in the future.

Most of the people had more free time than ever before. Not only the education and work, but also the enterteinment has moved to online platforms. As a result of this, new entertainment platforms have also entered the market e. g. Tiktok. This application has outperformed Zoom in the number of downloads as 12 million users downloaded the application within a month. This platform was designed to attract Generation Y and Generation Z, but became popular also with older generations.

Not only the Tiktok, but also the existing entertainment platforms e.g. Facebook, Youtube, Netflix could benefit from COVID-19. Thanks to the wide variety of programmes and launching new programmes, thez were able to attract their audience. The social contacts also needed to be maintained. This could be achieved by video games, where the popularity has increased by 75%, which has never been experienced before.

2020 was planned to be the year of the Olympic Games, but all the sport events were banned happening in front of the audience. There were some sport events organized without audience. However, thanks to modern technology, the sport could easily accommodate to the pandemic situation, which resulted in emergence of e-sport. Consumers could watch their favourites from their homes. This seemed to be an attractive solution mainly for the age group of 15-24 consumers. The ban of real life sport events

influenced the gambling sector as well, which has also shifted to online platforms as a result of the pandemic restrictions. The online casino games have increased by 225%.

The last sector emerging as a winner of the pandemic is the beauty industry. Despite of not leaving our home, the consumers still had interest in purchasing their products. The fashion giants launched their home office collections, accommodating to new trends and consumer needs. Many female magazines addressed this issue, emphasizing that fashion and style play an important role in our everyday life.

Almost everybody had a dream to try a new job, learn a new language before the pandemic, but had no opportunity because the lack of time. They were provided a chance to integrate these activities into their life or make changes. Video games and social networking platforms were not a form of entertainment for everybody, some people chose the way of self-realization. The importance of knowledge accelerated on the labour market, a lot of people chose online courses to develop themselves. Five times more people had interest in e-learning material in Hungary than earlier. Many people passed language exams during the pandemic, started their studies, so these sectors had also shown an increasing tendency. Flexibility remained the key feature of companies, so they developing new marketing strategies became an important issue in the changing environment. Only those market players will remain on the market, which have enough financial reserves. The financial reserves proved to be a benefit on the advertising market, since most of the companies could spend significantly less on marketing activities (Osztovits et al., 2020).

When companies are mentioned, we can look at how pandemic influenced the market leaeder Apple. Several hypothesis appeared whether the market leader company can go bankrupt or how will the company react to changes caused by COVID-19. They are the only electronic device company that launches several products on the market annually e.g. smart phones, smart watches, laptops, air pods and other devices. The company planned to launch a series of new smart phones on the market in 2020, but the launch date had been postponed. Elliot Lanaz, a specialist at Apple added that not only supply-related problems can emerge, but the demand is expected to decrease. In case of longer delay, the smart phones will be launched with further smart devices planned to be introduced. Elliot Lanz expressed that its not a favourable condition in terms of the company's profitability (Hvg, 2020; Bobenič Hintošová et al., 2021).

If everything returns back to normal, the production of Apple products can kickstart, but it does not mean a guarantee for launching new smart phones according to plans. Jeffrey Kvaal, the analyst of NomuraInstinet thinks, the return to normal will be earlier than expected in the Apple supply chain, so the restrictions will be short-term. Wamsi Mohan, the analyst of Bank of America forecasted that the launch of new models also depends on restarting production following the pandemic (Hvg, 2020).

According to the CEO of Apple, Tim Cook, the company appeared to be on a track to achieve record revenue, but the pandemic had negative impact both on demand and sales. The company made tremendeous efforts to mitigate the negative effects of the pandemic. The users of Apple prouducts were trying to find new ways to stay connected, work effectively and find the ways to access information. The employees of the company were not only motivated to satisfy new needs, but provided tens of millions of face masks and shields for the healthcare workers during these difficult times. Cook also confirmed that the production returned to normal level in March, and hundreds of thousands iPads were distributed to Canada, Scotland, Los Angeles and New York. In China, where the stores closed first, the sales have significantly decreased. The income in the USA remained at the same level as it was in 2019 (Mészáros, 2020).

Based on the news published, we would think that the company suffered a financial damage as a result of the pandemic, but the figures do not correspond with the news. The revenue of Apple in 2020 was 58,3 billion dollars, which means 1% increase compared to the previous year result. The surplus is presented in figures below in terms of product groups.

- IPhone: decreased from 30 billion to 28,9 billion; it means 7,5% decrease;
- IPad: decreased from 4,9 billion to 4,4 billion, which means 10% decrease;
- Mac: decreased from 5,5 billion to 5,35 billion, which is 3% decrease;
- Wearable assets: increase from 5,1 billion to 6,3 billion, which is 22% increase;
- Services: increase from11,5 billion to13,4 billion, which means17% increase.

The number of active Apple users has increased in each product category and each region (Mészáros, 2020).

As most of the companies, Apple has also made the necessary steps required in the pandemic situation. According to Reuters, the company restricted the number of iPhones that could be purchased online in many countries. This restriction came into effect when the Chinese shops closed. The countries and market players introduced these measures in order to slow down the spread of the virus (Portfolio, 2020).

Maximum of 2 pieces of devices could be bought from the official website of the Apple. Similar measures were taken by the company in 2007, whent the first iPhone was launched. The measures were taken to prevent the buyers to resell the product. The company had also been influenced by the pandemic, but did not suffer significant financial damage compared to other companies. This can be explained by the savings of the company, know-how and the effective problem solving ability.

2 Material and methods

This research has addressed the consumer habits of Apple users and the impact of COVID-19 on the performance of the company. In order to obtain transparent information, we conducted a questionnaire survey as a quantitative tool. The questionnaire consisted of 28 questions, 5 of them with demographic character. The questionnaire was accessible in a closed group of a popular social networking site. The group is formed by members using Apple products. We finally worked with 440 evaluable responses. We set several assumptions before evaluation of the questionnaire survey. These were the following:

- A1: Design, quality and user-friendliness are crucial factors for most of the Apple users;
- A2: Consumers classify Apple products as expensive;
- A3: Apple users are brand loyal;
- A4: COVID-19 had a significant effect on consumer habits;

The assumptions were set to obtain comprehensive results about the impact of COVID-19 on Apple.

3 Results

3.1 Characteristics of the sample

61% of the respondents were female and 39% were men. Most of our respondents (29%) belong to the age group of 18-21. The second biggest group of the respondents is formed by those over 40 years of age (23%). They are followed by the age group 22-25, which accounts for 22% of the respondents. They were followed by those between 31-40 years of age (16%), while the smallest group of the respondents was formed by those between 26-30 years of age (10%). Based on the answers, those respondents representing the age group 18-21 own the most Apple devices. It can be explained by the fact that they are more sensitive to fashion trends and brand awareness. The representatives of this age group form the majority of registered on the social networking sites.

Most of the respondents (30%) have already obtained university or college degree. About 50% of the respondents have a high school degree. 10% completed vocational training, while 10% received only a primary education. This ratio can be explained by the fact that most of the respondents have not completed their studies yet.

46% of the respondents work in employed status, while 33% of the respondents are students. They were followed by the entrepreneurs with 10%, and those in senior executive position with 8%. The smallest ratio of the respondents (3%) were unemployed.

3.2 Consumer habits of the respondents using Apple products

Apple is providing a wide product portfolio of electronic devices for its customers. We wanted to know which Apple devices our respondents are using. The most frequently purchased product by the respondents was the iPhone, as 94% of the respondents use it. Further favourite products proved to be the Ipad, smart watch and Airpods made by the company.

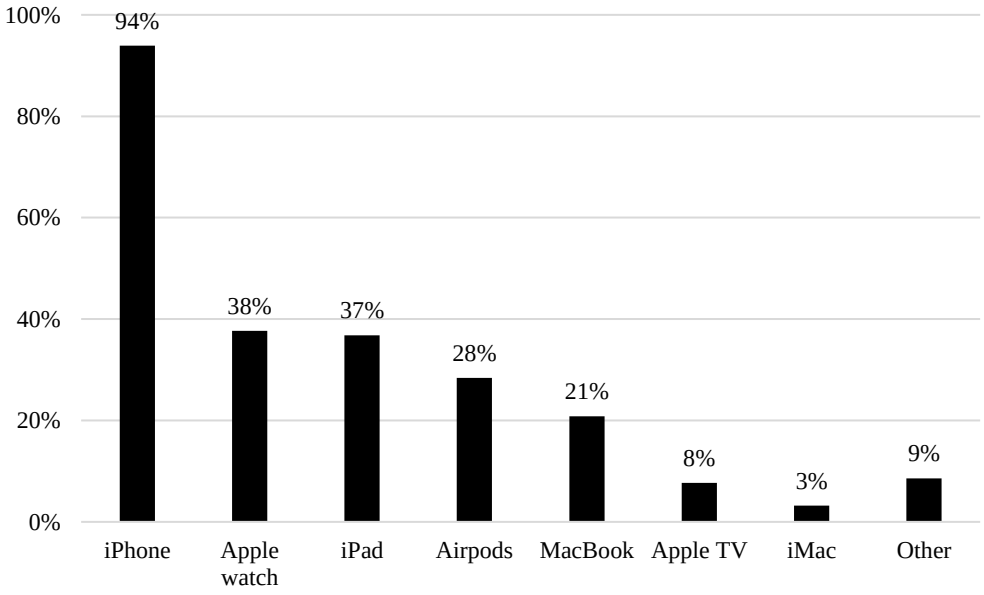

Figure 1 Apple products consumers buy; Source: own processing

The respondenst have been using Apple devices for several years and feel satisfied with the products of the company. The following figure shows, which product features the customers are the most satisfied with. Quality, design and user-friendly functions of the products are the most significant factors purchasing the product. The responses are not surprising as the company has emphasizes the unique design and high quality of products from the beginnings. In order to satisfy the needs of diverse customer groups, the company also paid attention to launch user-friendly products. Satisfaction related to service and compatibility is mixed, as 57% and 48% of the repsondents are absolutely satisfied with the above. Based on these results assumption 1 (A1) is approved.

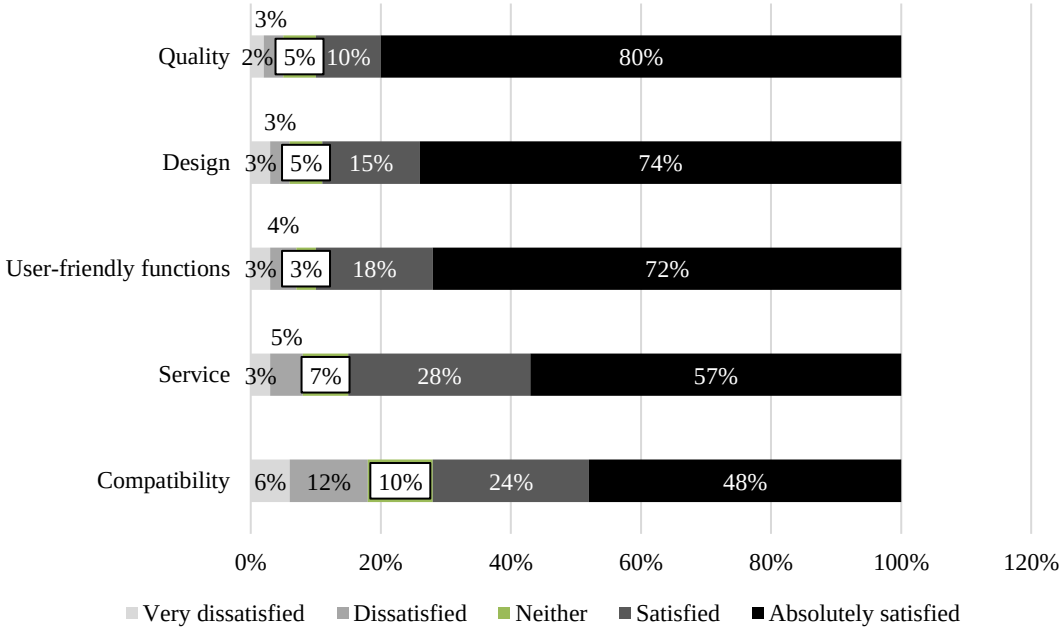

Figure 2 Satisfaction with products; Source: own processing

The responses show that the brand is not cheap, since 85% of the respondents expressed that the products of the company are expensive. If the customers find the products expensive, why do they purchase? Based on the respondents answer, the reliability and functions of the product resulted in brand loyalty. In additon to these, the ecosystem of products, design and trends also contribute to the popularity of the products. Assumption 2 (A2) is also approved.

The respondents were also asked whether they would like to switch to other brand. 81% of the respondents have no intention to switch to another brand, 13% were indecisive and 6% would switch to other than Apple brand. Assumptions 3 (A3) is also approved.

The next questions was focusing on how often the respondents buy new products. Most of the respondents buy new devices in 2 years time interval. The results are summarized in the following figure.

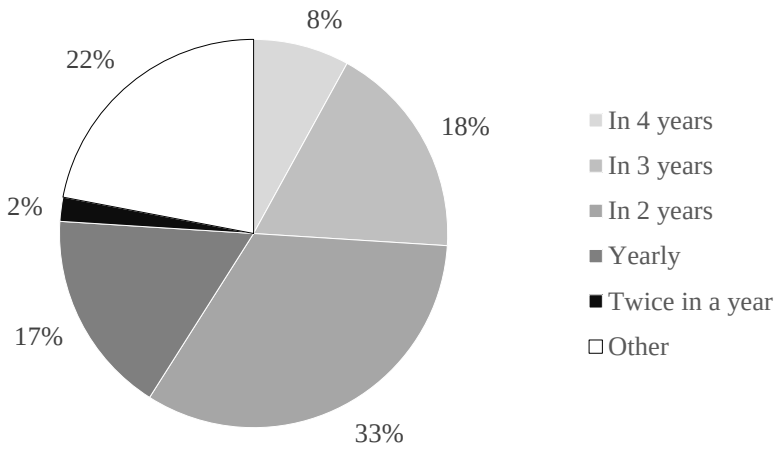

Figure 3 Frequency of purchase; Source: own processing

In case of new products, we wanted to know where the respondents are buying new devices. 57% of the respondents are realizing their purchase from their service operator, but the respondents showed willingness to buy devices from specialist retailers or use the official website of the company. It also happens that the customers buy a second hand product.

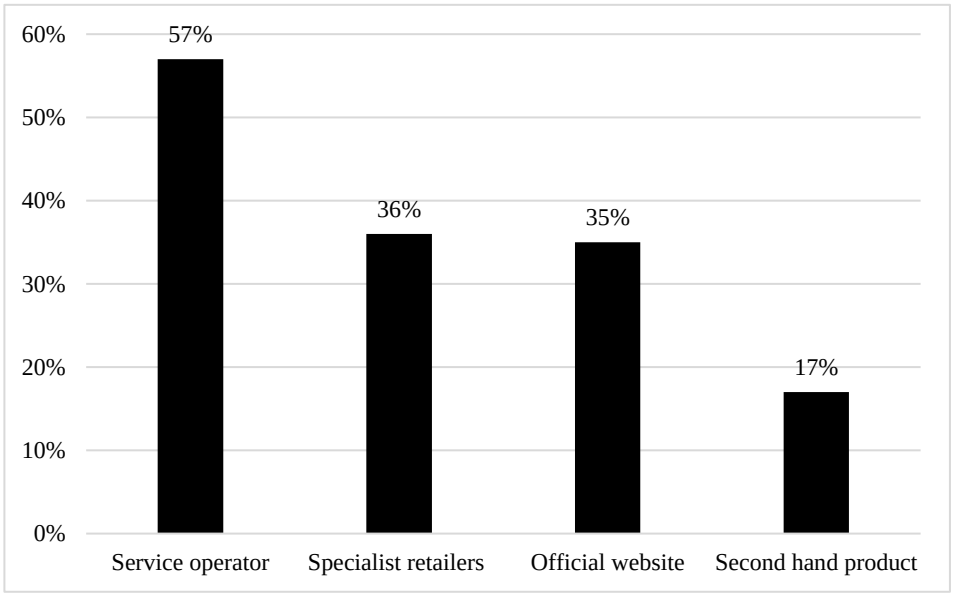

Figure 4 Frequency of purchases; source: own processing

3.2 The impact of COVID-19 on Apple consumer habits

2020 was a year no like other years before as the pandemic shut down the world. The main focus of our research is the impact of pandemic on the consumer habits. Spreading the virus resulted in spreading restrictions, most of the retailers and services had to close. The consumers started to purchase online, increasing the turnover of the e-tailing platforms. It seemed to be a safe form of shopping, as consumers realized a contacltess shopping slowing down the spread of the virus. The customers became more conscious and considered the frequency of their purchases.

Our questionnaire also addressed the issue how pandemic situation changed the purchasing habits of the customers. The responses were not surprising at all, 79% of the respondents reported that their purchasing habits have completely changed. Only 21% reported no change in their purchasing habits. It means that Assumption 4 (A4) was also approved.

According to obtained results, the customers do not purchase Apple products as frequently as they did before the pandemic. They have become more conscious. Luxury products are not a priority. Apple products can be classified as luxury, since customers cannot afford to buy these products frequently. 61% of the respondents reported that they do not purchase Apple products as often as they did before the pandemic.

The respondents expressed their opinion how COVID-19 affected the sales of the Apple products. According to 43% of the respondents, the pandemic did not affect the activities of the company. 42% of the respondents feel that the pandemic situation did not affect the company sales, while 35% said the opposite. The prices of the products were not influenced according to 35% of the respondents as well as the quality of the products was not influneced by the pandemic (75%).

4 Discussion

The aim of our research was to examine the consumer satisfaction of Apple users, as well as we examined the impact of COVID-19 on the company activity. The theoretical part of the work introduced the consumer behaviour. As a quantitative method, a questionnaire survey was applied. 440 responses were obtained from the consumers using Apple products.

Based on the responses, the consumers are mainly satisfied with the quality, design and user-friendliness of the products. According to our respondents, Apple is a high-price category brand, assumption 2 (A2) was also approved. Most of the respondents are brand loyal and would not switch to other brands. Most of the respondents feel that the pandemic has significantly changed their purchasing habits. As the research results show, consumers have become more conscious what they buy and how frequently they purchase those products. Consumers do not purchase Apple products as often as they did before the pandemic. It would be worth to continue this research and examine the changes in consumer behaviour and habits with a slowing tendency of the pandemic.

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The Slovak Foreign Trade with agro-food commodities

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Abstract

The article is concerned with the term competitiveness at the branch level (agriculture and food). The ability to compete on international and domestic markets depends on comparative advantages. Therefore, we employ trade data to contribute to a better understanding of the evolution in the comparative advantage by employing trade based measures of competitiveness for the agro-food sector of Slovakia. Data used in this article are from Statistical Office of the European Communities - Eurostat. The objective of the work is to identify changes in the foreign trade with agricultural and food commodities of the Slovak Republic that occurred within the past sixteen years; and, with the utilization of the chosen indicators: RCA and GLI. Summarizing the development of the agricultural trade after the accession of the Slovak Republic to the EU, a positive and also negative trends can be seen. The value of Agricultural export increased almost fourfold- from 844.21 million Euro in 2004 to more than 3 138.15 million Euro in 2020; imports also grew significantly from 1 267.57 million Euro to more than 4 896.47 million Euro in the same period. The commodity structure of the Slovak agricultural trade has been developing very dynamically in recent years. The Slovak Republic mostly in period years export following groups of commodities: HS10, HS21, HS04, HS18, HS12, HS22, HS17, HS19 and HS01. On other side Slovakia imports following commodities: HS02, HS04, HS22, HS21, HS08, HS19, HS18, and HS07. By the indicator RCA comparative advantages are achieved in case of aggregations, which have positive value of RCA: HS01 (Live animals), HS04 (Dairy produce; birds' eggs; natural honey), HS10 (Cereals), HS11 (Products of the milling industry; malt; starches; inulin; wheat gluten), HS12 (Oil seeds and oleaginous fruits), HS17 (Sugars and sugar confectionery) and HS18 (Cocoa and cocoa preparations) .

Key words: Foreign trade; Agricultural products; Export; Import; Comparative advantage.

JEL Classification: D18, K22, M31

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1 Introduction

Global trends and movements in the world are great challenges and at the same time significant opportunities for agriculture not only on a global scale, but also in the European Union. The global agri-food market has started the historically highest and unrepeatable growth dynamics. Therefore, the Slovak agricultural sector not only registers this phenomenon, but within the framework of the Common Agricultural Policy of the EU it must effectively use the positives of globalization and eliminate the negatives. A significant problem of globalization is the agricultural sector in particular, as part of the economies of nation states, which are to fulfill primarily a socio-economic function. Agriculture in the complex is also the strongest economic sector and also the largest employer (Baco, 2007).

The article deals with agricultural foreign trade of the Slovak Republic in the period of 2004 – 2020. The aim of this paper is to analyze development of trade and competitiveness of agricultural commodities groups. Agricultural trade represents in the functional and highly competitive contemporary econo-mies a viable tool in the process of valuing the national agricultural potential from a larger perspective of extending business development in the field (Andrei et al., 2020). During the time, under the influence of new economic developments, Slovakian agriculture has developed a major component of the trade flows managing to design an efficient framework of business chains, becoming a generator of wealth in the economy and an outlet for valuing domestic economic potentials.

The last 20 years affected agricultural sector in many European countries including the members of the Visegrad Group. The volume of their agricultural production was significantly reduced, but the volume and value of their trade activities had been constantly growing (Bielik et al., 2010).

Following the enlargement of the European Union (EU) in 2004, the foreign trade of agricultural products has substantially changed. Besides the impact of the common internal market, the measurements implemented earlier by the newly accessed member states on their protected – basically from each other, too - and subsidized markets were also eliminated. The formerly applied disproportionate national subsidies which could ensure relative competitive advantages in regards to some markets were also cancelled. Thus the accession had a great impact on the product trade of new member states among each other and it has been fundamentally rearranged after the integration. Substantial value and volume growth could be observed during this process (Vásáry et al., 2012).

In the case of Slovakia, the most significant trade partners are: Czech Republic, Austria, Germany, Hungary, Italy and Poland (these countries participate in the agricultural export and import with a share from 85% to 60% respectively). The leader of the agricultural market of the V4 countries is undoubtedly the Czech Republic, which realized a share of over 30%. Of total agricultural trade within the V4 countries. Second place is held by Slovakia – which, by way of intensive trade between it and the Czech Republic, had a share of approximately 28%. Poland attained a share of approximately 24% and Hungary had approximately 16%. In relation to the market of the V4 countries, only the agricultural trade of Poland has comparative advantages as awhole, and in some years, also Hungarian agricultural trade. Agricultural trade of the Czech Republic and Slovakia as a whole does not have comparative advantages even in within the market of the V4 countries (Smutka & Svatoš, 2014).

The Slovak foreign agri-food trade has had an unsuitable development during the last years. The decreasing negative balance is presenting a threat in connection with the competitive commodities, which we can produce in the domestic agrarian market (Récky & Hambálková, 2014).

The article is concerned with the term competitiveness at the branch level (agriculture and food). The ability to compete on international and domestic markets depends on comparative advantages. Therefore, we employ trade data to contribute to a better understanding of the evolution in the comparative advantage by employing trade based measures of competitiveness for the agro-food sector of Slovakia.

2 Material and methods

The Slovak agrarian trade does not have a comparative advantage both in the EU market and world market. Nevertheless, individual segments of Slovak agrarian trade are able to get comparative advantage in relation to individual commodities. The processed paper analyses the comparative advantage of Slovak agrarian and food export in relation to selected commodities. The own analysis in concentrated especially on comparative advantage development during period 2004 – 2020. The main accent is on the period after accession to the EU. Primarily such changes are identified, that occurred in relation to the EU-Member States and to third countries.

Data used in this article are from Statistical Office of the European Communities - Eurostat. The objective of the work is to identify changes in the foreign trade with agricultural and food commodities of the Slovak Republic that occurred within the past sixteen years; and, with the utilization of the chosen indicators, to illustrate for the entire structure of agricultural and food trade (24 commodity chapters – for details see Table 1).

Table 1 Commodity structure of the Slovak trade with agricultural and food commodities; Source: (Eurostat, 2021)

HS	Commodity
01	Live animals
02	Meat and edible meat offal
03	Fish and crustaceans, molluscs and other aquatic invertebrates.
04	Dairy produce; birds' eggs; natural honey
05	Products of animal origin, not elsewhere specified or included
06	Live trees and other plants
07	Edible vegetables and certain roots and tubers
08	Edible fruit and nuts
09	Coffee, tea, maté and spices
10	Cereals
11	Products of the milling industry; malt; starches; inulin; wheat gluten
12	Oil seeds and oleaginous fruits
13	Lac; gums, resins and other vegetable saps and extracts
14	Vegetable plaiting materials
15	Animal or vegetable fats and oils and their cleavage products
16	Preparations of meat, of fish or of crustaceans and others.
17	Sugars and sugar confectionery
18	Cocoa and cocoa preparations
19	Preparations of cereals
20	Preparations of vegetables and fruit
21	Miscellaneous edible preparations
22	Beverages, spirits and vinegar
23	Residues and waste from the food industries, animal fodder
24	Tobacco and manufactured tobacco substitutes

To analyse an average growth rate within individual time series, the geometric mean of individual chain indices is used to sum the development trend for the whole

surveyed period. Based on their averaging through the geometric mean, we can get the average growth/decline in export or import value for the whole surveyed period. An advantage of the geometric mean is the fact that it considers both positive and negative increments. The calculation of the geometrical mean (%):

$$G = \sqrt[n]{X_1 X_2 \cdots X_n} \quad (1)$$

A country's ability to compete in intra-EU and extraEU markets depends on its comparative advantages. According to Balassa (1965), the nature of revealed comparative advantages for the dairy group of products according to the level of milk processing is investigated by using the methodological approach, which is widely used in empirical trade literature to identify a country's weak and strong export sectors. The revealed comparative advantage (RCA) index, as introduced by Balassa (1965), is defined as follows:

$$RCA = ln\ ((Xij / Xit) / (Xnj / Xnt)) \quad (2)$$

where X represents exports, i is a country, j is a commodity (or industry), t is a set of commodities (or industries) and n is a set of countries. RCA measures a country's exports of a commodity (or industry) relative to its total exports and to the corresponding exports of a set of countries.

A comparative advantage is "revealed." if RCA>0. If RCA is less than unity, the country is said to have a comparative disadvantage in the commodity / industry.

An alternative RCA index is computed in order to make reference to the "own" country trade performance only. This type of measurement of a country's RCA recognizes the possibility of simultaneous exports and imports within a particular commodity / industry.

The Grubel–Lloyd Index measures intra-industry trade of a particular product. It was introduced by Herb Grubel and Peter Lloyd in 1971. Intra-industry trade flows are conventionally defined as the two-way exchange of goods within standard industrial classifications. The extent of intra-industry trade is commonly measured by Grubel-Lloyd indexes based on commodity group transactions. Thus, for any particular product class i, an index of the extent of intraindustry trade in the product class i between countries A and B is given by the following ratio:

$$GLI = ((Xij + Mij) - |Xij-Mij|\ ) / (Xij + Mij) \quad (3)$$

Values are from 0 to 1. This index takes the minimum value of zero when there are no products in the same class that are both imported and exported, and the maximum value of 100 when all trade is intra-industry (in this case Xij is equal to Mij). Bilateral indices of intra-industry trade in the product class i between country A and all its trading partners are obtained as a weighted average of the bilateral indices for each partner country B, using as weights the share of total trade of A accounted for by trade with B. Bilateral indices of intra-industry trade between country A and country B for total manufacturing are the weighted average of the indexes in for all product classes i, with weights given by the share of total trade of i over total manufacturing trade.

3 Results

Summarizing the development of the agricultural trade after the accession of the Slovak Republic to the EU, a positive and also negative trends can be seen. The value of Agricultural export increased almost fourfold- from 844.21 million Euro in 2004 to more than 3138.15 million Euro in 2020; imports also grew significantly from 1267.57 million Euro to more than 4896.47 million Euro in the same period. From the table 1 we can see, that the total turnover increased from the value 2111.78 Euro in 2004 to the value 8034.62 Euro in 2020 what is increase 5922.84 million Euro. Although the value of the Slovak agricultural trade grows very fast, it is worth noting that agricultural trade represents only a marginal share of the total trade of the Slovak Republic.

Table 2 Development of the main indicators of Slovak foreign trade with agricultural and food commodities in the period 2004-2020 (in million Euro); Source: (Eurostat, 2021)

	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Import	1267,57	1756,26	1928,59	2464,95	2852,78	2839,45	3289,04	3780,42	4016,50
Export	844,21	1214,66	1497,96	1800,43	1970,94	1945,07	2257,89	2935,30	3607,03
Trade balance	-423,36	-541,60	-430,64	-664,52	-881,84	-894,38	-1031,15	-845,12	-409,48
Trade Turnover	2111,78	2970,92	3426,55	4265,37	4823,72	4784,51	5546,92	6715,73	7623,53

	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Index 2020/ 2004**
Import	3946,37	3835,89	3895,79	4154,34	4292,81	4551,57	4837,26	4896,47	3,86
Export	3219,89	2738,47	2805,16	2830,44	2850,77	2856,74	2988,59	3138,15	3,72
Trade balance	-726,48	-1097,43	-1090,63	-1323,90	-1442,04	-1694,84	-1848,67	-1758,32	4,15
Trade Turnover	7166,26	6574,36	6700,96	6984,78	7143,59	7408,31	7825,85	8034,62	3,80

Higher dynamics in agricultural trade is mainly due to higher growth in prices of agricultural and food products, and by changing structure of the Slovak agricultural export with a higher proportion of semi-processed and finalized products. Negative trend is seen in the development of trade balance. From the figure 1 we can see that in all analysed years (2004-2020) the Slovak republic reached negative value of trade balance. The development of the trade balance is represented in the figure 1. The value of the turnover is increasing every year (except the year 2015) and it increased by index 3.80. The average annual growth rate of agricultural exports reached the level about 1.10 while the average annual growth rate of agricultural imports stood at 1.09.

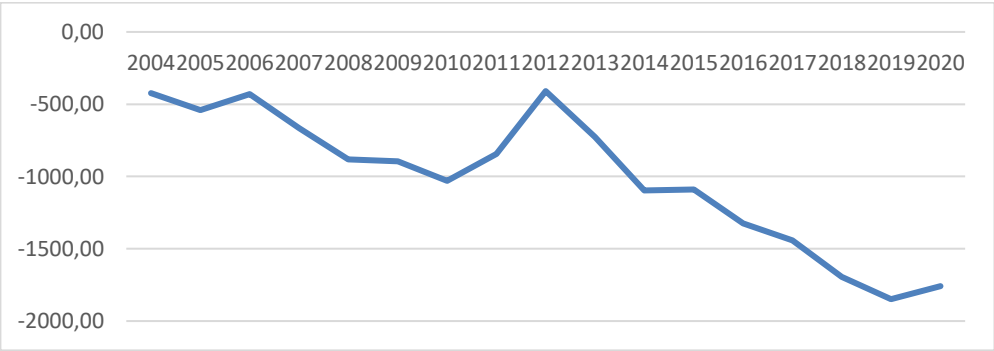

Figure 1 Development of the trade balance in the period 2004-2020 (in million Euro); Source: (Eurostat, 2021)

3.1 Trends in commodity structure of the Slovak agricultural foreign trade

The commodity structure of the Slovak agricultural trade has been developing very dynamically in recent years.

The Slovak Republic mostly in period years export following groups of commodities: HS10, HS21, HS04, HS18, HS12, HS22, HS17, HS19 and HS01. On other side Slovakia imports following commodities: HS02, HS04, HS22, HS21, HS08, HS19, HS18, and HS07.

Table 3 Commodity structure of the Slovak exports with agricultural and food commodities in the period 2004-20120 (in million Euro); Source: (Eurostat, 2021)

	Export					
Year	**2004**	**2008**	**2012**	**2016**	**2020**	**Average annual growth**
HS01	45,42	93,13	205,33	192,35	163,59	1,10
HS02	41,46	85,35	170,25	110,61	93,06	1,12
HS03	3,86	4,97	4,15	5,14	6,92	1,31
HS04	117,07	296,86	271,20	254,85	270,23	1,07
HS05	4,67	12,00	10,25	11,89	15,74	1,14
HS06	5,56	5,36	11,35	13,94	19,28	1,10
HS07	17,62	46,88	41,92	35,88	49,72	1,10
HS08	37,26	75,52	67,14	78,61	83,24	1,07
HS09	3,87	69,51	193,94	185,95	128,18	1,36
HS10	40,07	161,65	305,06	350,29	410,44	1,21
HS11	55,68	137,40	146,19	121,65	133,21	1,07
HS12	59,39	156,37	519,80	182,98	219,83	1,14
HS13	0,25	0,84	0,92	0,88	2,05	1,23
HS14	0,06	0,24	0,35	0,01	0,25	2,33
HS15	48,93	47,29	330,00	122,33	104,90	1,15
HS16	4,04	43,57	59,79	96,30	113,09	1,43
HS17	81,78	161,22	542,49	200,40	200,77	1,10
HS18	87,70	134,64	156,62	253,32	249,24	1,08
HS19	47,83	84,94	97,52	118,98	163,62	1,08
HS20	13,63	42,27	52,88	61,04	53,01	1,11
HS21	40,27	108,06	124,10	178,77	339,49	1,16
HS22	47,32	150,07	191,49	154,24	202,43	1,13
HS23	20,86	51,21	99,65	94,62	104,00	1,12
HS24	19,59	1,59	4,63	5,41	11,87	1,58
Total	844,21	1970,94	3607,01	2830,44	3138,15	1,10

The Slovak Republic has a positive trade balance in relation to commodity aggregations HS01. HS10, HS11, HS12 and HS17. Other commodity aggregations reached negative value of trade balance.

Exports were dominated by products with lower added value, in contrast to imports, where products with higher added value predominated.

Table 4 Commodity structure of the Slovak import with agricultural and food commodities in the period 2005-2017 (in million Euro; Source: (Eurostat, 2021)

	Import					
Year	**2004**	**2008**	**2012**	**2016**	**2020**	**Average annual growth**
HS01	25,89	58,46	119,27	69,44	90,57	1,11
HS02	88,82	263,16	401,01	424,84	485,96	1,14
HS03	20,18	28,29	38,05	52,95	53,74	1,09
HS04	62,97	217,20	279,33	320,21	392,59	1,15
HS05	9,09	18,95	25,30	22,61	29,51	1,08
HS06	23,58	37,14	60,39	64,16	67,30	1,09
HS07	56,21	148,16	172,70	231,99	228,23	1,12
HS08	128,71	225,20	231,12	320,71	311,97	1,07
HS09	25,89	98,01	198,18	214,25	161,59	1,14
HS10	25,91	139,87	133,33	77,38	85,83	1,14
HS11	6,12	33,44	43,23	39,03	48,14	1,18
HS12	32,81	47,76	165,26	89,69	96,53	1,13
HS13	4,93	7,02	8,77	16,31	16,71	1,10
HS14	0,70	1,01	0,53	0,88	0,96	1,10
HS15	62,05	164,80	371,27	192,97	159,61	1,09
HS16	35,59	117,33	156,61	208,75	217,12	1,15
HS17	47,15	123,28	278,38	97,44	99,25	1,08
HS18	85,98	141,79	183,48	314,09	286,63	1,09
HS19	85,11	173,23	226,89	278,38	272,99	1,10
HS20	63,73	126,47	143,31	159,20	165,00	1,08
HS21	102,76	192,69	229,54	288,70	306,13	1,09
HS22	91,16	270,68	266,26	354,93	370,20	1,11
HS23	102,73	148,57	170,39	181,27	187,81	1,05
HS24	79,50	70,28	114,11	134,18	158,44	1,18
Total	1267,57	2852,78	4016,73	4154,34	4292,81	1,09

3.2 Trends in competitiveness of the Slovak agricultural foreign trade

Competitiveness of the Slovak agricultural export has been developed in long-term horizon. We used following indicators for the competitiveness evaluation: RCA and, GLI indexes. By the indicator RCA comparative advantages are achieved in case of aggregations, which have positive value of RCA: HS01 (Live animals), HS04 (Dairy produce; birds' eggs; natural honey), HS10 (Cereals), HS11 (Products of the milling industry; malt; starches; inulin; wheat gluten), HS12 (Oil seeds and oleaginous fruits), HS17 (Sugars and sugar confectionery) and HS18 (Cocoa and cocoa preparations) (Table 5).

We can see same trend like before that the product with lower added value have comparative advantage and product with higher value added have comparative disadvantage.

Table 5 Competitiveness of the Slovak agro-food foreign trade (development of RCA index from 2004 to 2020); Source: (Eurostat, 2018)

Year	2004	2008	2012	2016	2020	Average annual growth
HS01	0,9684	0,8355	0,6508	1,4026	1,1531	1,1155
HS02	-0,3555	-0,7563	-0,7492	-0,9619	-1,3688	-0,8154
HS03	-1,2467	-1,3685	-2,1073	-1,9492	-1,6922	-1,4570
HS04	1,0266	0,6822	0,0780	0,1554	-0,0022	0,3260
HS05	-0,2590	-0,0873	-0,7962	-0,2588	0,0124	-0,1574
HS06	-1,0384	-1,5654	-1,5640	-1,1430	-1,0804	-1,3153
HS07	-0,7537	-0,7810	-1,3082	-1,4829	-1,2997	-1,1482
HS08	-0,8330	-0,7228	-1,1285	-1,0224	-1,0159	-0,8664
HS09	-1,4929	0,0262	0,0859	0,2421	0,4034	-0,1380
HS10	0,8424	0,5145	0,9352	1,8938	1,8618	1,2897
HS11	2,6144	1,7830	1,3259	1,5205	1,3232	1,6690
HS12	1,0000	1,5558	1,2546	1,0967	1,1365	1,2350
HS13	-2,5883	-1,7529	-2,1485	-2,5302	-1,7025	-2,0004
HS14	-1,9922	-1,0697	-0,3173	-4,4553	-0,8831	-1,6168
HS15	0,1689	-0,8787	-0,0103	-0,0721	-0,0086	-0,2420
HS16	-1,7684	-0,6209	-0,8554	-0,3899	-0,4294	-0,6437
HS17	0,9571	0,6381	0,7747	1,1049	1,1563	0,9623
HS18	0,4262	0,3181	-0,0508	0,1687	0,2848	0,2551
HS19	-0,1697	-0,3428	-0,7368	-0,4663	-0,3197	-0,4197
HS20	-1,1359	-0,7261	-0,8895	-0,5749	-0,8568	-0,7707
HS21	-0,5303	-0,2086	-0,5073	-0,0956	0,3202	-0,1786
HS22	-0,2492	-0,2201	-0,2222	-0,4497	-0,3019	-0,3781
HS23	-1,1877	-0,6953	-0,4289	-0,2664	-0,2954	-0,5271
HS24	-0,9942	-3,4176	-3,0979	-2,8269	-2,3145	-2,7643

Index of intra-industry trade (GLI) with agro-food commodities reached in 2020 level from 0,1191 in HS24 (Tobacco and manufactured tobacco substitutes) to 0,9792 in HS09 (Coffee, tea, maté and spices) (Table 6).

Compared to other small open economies, the Slovak Republic has a low level of food self-sufficiency, which continues to decline relatively quickly. The level of food security is equally low. Slovakia is not unsatisfactory in offering vegetables, potatoes, sugar, eggs, fruit, milk, poultry, beef and pork meat.

The Slovak Republic is food self-sufficient in commodities such as rape, sunflower, wheat, rye, sheepmeat and goatmeat. Even the Slovak Republic produces sixteen times more sunflowers than it needs to satisfy its consumption.

The main importers to the Slovak Republic are Germany, the Czech Republic, Italy, Austria, Poland, Hungary and France. All importers from the European Union account for up to 89% of food imports and the above importers up to 69%. Foods where the Slovak Republic has the largest negative trade balance in monetary terms are meat, fruit, vegetables, cereal preparations, milk preparations and milk itself.

Our food self-sufficiency in monetary terms of all foods is 53% and in quantity for basic foods 74.57%. We are in the sixth worst place overall in the EU in terms of food self-sufficiency.

Table 6 Index of intra-industry trade (GLI) with agro-food commodities (development of GLI index from 2004 to 2020); Source: own elaboration

Year	2004	2008	2012	2016	2020	Increase/Decrease
HS01	0,7262	0,7713	0,7349	0,5305	0,6600	decrease
HS02	0,6364	0,4898	0,5960	0,4132	0,2804	decrease
HS03	0,3214	0,2991	0,1969	0,1769	0,2111	decrease
HS04	0,6995	0,8450	0,9852	0,8863	0,7801	increase
HS05	0,6790	0,7754	0,5766	0,6893	0,7871	increase
HS06	0,3816	0,2524	0,3164	0,3569	0,3574	decrease
HS07	0,4773	0,4807	0,3907	0,2679	0,2975	decrease
HS08	0,4490	0,5022	0,4502	0,3937	0,3767	increase
HS09	0,2604	0,8299	0,9892	0,9293	0,9792	increase
HS10	0,7854	0,9278	0,6083	0,3618	0,3903	decrease
HS11	0,1981	0,3915	0,4564	0,4858	0,5871	increase
HS12	0,7117	0,4680	0,4821	0,6579	0,6673	decrease
HS13	0,0953	0,2138	0,1897	0,1029	0,2091	increase
HS14	0,1665	0,3833	0,7907	0,0157	0,4190	increase
HS15	0,8818	0,4459	0,9412	0,7759	0,7771	decrease
HS16	0,2041	0,5416	0,5526	0,6314	0,5887	increase
HS17	0,7314	0,8667	0,6783	0,6543	0,6586	decrease
HS18	0,9901	0,9742	0,9210	0,8929	0,9201	decrease
HS19	0,7196	0,6580	0,6012	0,5989	0,6353	decrease
HS20	0,3524	0,5010	0,5390	0,5543	0,4278	increase
HS21	0,5631	0,7186	0,7019	0,7648	0,9378	increase
HS22	0,6834	0,7133	0,8366	0,6059	0,6430	decrease
HS23	0,3376	0,5127	0,7380	0,6859	0,6459	increase
HS24	0,3954	0,0443	0,0779	0,0775	0,1191	decrease

4 Discussion

Summarizing the development of the agricultural trade after the accession of the Slovak Republic to the EU, a positive and also negative trends can be seen. The value of Agricultural export increased almost fourfold- from 844.21 million Euro in 2004 to more than 3138.15 million Euro in 2020; imports also grew significantly from 1267.57 million Euro to more than 4896.47 million Euro in the same period. The total turnover increased from the value 2111.78 Euro in 2004 to the value 8034.62 Euro in 2020 what is increase 5922.84 million Euro.

The Slovak Republic mostly in period years export following groups of commodities: HS10, HS21, HS04, HS18, HS12, HS22, HS17, HS19 and HS01. On other side Slovakia imports following commodities: HS02, HS04, HS22, HS21, HS08, HS19, HS18, and HS07.

Competitiveness of the Slovak agricultural export has been developed in long-term horizon. We used following indicators for the competitiveness evaluation: RCA and, GLI indexes. By the indicator RCA comparative advantages are achieved in case of aggregations, which have positive value of RCA: HS01 (Live animals), HS04 (Dairy produce; birds' eggs; natural honey), HS10 (Cereals), HS11 (Products of the milling industry; malt; starches; inulin; wheat gluten), HS12 (Oil seeds and oleaginous fruits), HS17 (Sugars and sugar confectionery) and HS18 (Cocoa and cocoa preparations).

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Current Innovative Trends in Business Management in Slovakia cand Hungary

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Abstract

The purpose of the research is to explore what innovative trends have been applied in businesses according to the employees' answers as a result of the COVID-19. As the pandemic affected Hungary and Slovakia in different measures, it was set as an aim to map the difference in degrees of digitalisation in the mentioned countries. The data were collected among Slovak and Hungarian citizens through surveys as a quantitative method. To analyze the formulated 2 hypotheses, non-parametric Fisher's Exact test and Mann-Whitney U tests were performed. For the latter, it was requisite to perform a test of normality. Regarding the obtained results, it can be stated that there are significant differences neither in the introduction of digital tools in businesses in the examined countries nor in the introduction of smart working. The theme of this research paper can be considered as original as it gives an international comparison for both countries. As many companies had to face various problems implementing digital tools, the government should provide financial support to solve this problem.

Keywords: Innovation; Digitalisation; Pandemic; Smart-working.

JEL Classification: O14, O30, J81

Article Classification: Research article

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1 Introduction

The ability to adapt to current trends through the tools businesses use can be defined as a key competitive benefit for them in recent years. Due to the pandemic, digitalisation plays an extremely important role, as it has enabled many businesses to operate and survive safely. It is particularly important, both economically and socially, to maintain employment. The companies whose type enabled the digital transition introduced the home office, smart working, and further training in the online space. Employment maintenance is first and foremost for both the economic and social sides. The companies whose type enabled the digital transition introduced the home office, and smart working opportunity, and further virtual training. It has become apparent that companies that have already used digital devices or were flexible in working from home have faced fewer problems in the past year, in many cases with lower sales than companies that have started to use new tools because of the pandemic.

The evolution of organisational and environmental history has a major impact on the process of digital innovation and the results of the transformation (Ramdani et al., 2021). Even before the coronavirus epidemic, businesses were already reminded of the importance of improving themselves in the field of digitalisation to cope with the dynamic environment and the intense competition in the market, which are the results of globalisation (Turulja & Bajgoric, 2018). More efficient use of information and communication technologies will help to create and implement innovative ideas (Dirgová & Lysá, 2017). There are three things to highlight when it comes to the transition to digitalisation for companies: Firstly, in the context of digital transformation, it is important how businesses can compete with their competitors, as they can reduce costs in many ways. Secondly, an important factor is a degree to which digital knowledge and skills related to the business are developed. Not every business needs a website some of them only need to promote their business through the right channels. Thirdly, the use of the digital wallet service within the business, which facilitates the payment process for customers while keeping their data safe (Winarsih et al., 2021). Digital transformation requires employers to pay close attention to workers, as flexibility and adaptability in the workplace have a significant impact on the company's results (Trenerry et al., 2021). The best technology, well-managed processes and strategies, well-chosen partners, and opportunities cannot add value on their own if the company does not have adequate human resources to support these factors. Based on these, it can be said that while digitization offers many opportunities for companies, it does not guarantee success (Antonizzi & Smuts, 2020).

The results of Nagel's (2020) research have shown that the pandemic has not only increased the number of people working from home, but they believe that the digital forms of work will play a more significant role in the future. Moreover, their research also revealed that workers who had previously worked from home occasionally were much abler to adapt to the new situation. Based on the research by Wong, Cheung and Chen (2021), it can be said, that in general, women prefer to work in the home office over men. Palumbo (2020), in his research, found out that working from home has a significant negative impact on work-life balance. From the results, he concluded that teleworkers at home were more likely to bring stress from work to their private lives and vice versa. In contrast, Errichiello and Pianese (2019), in their research reported according to their respondents, that those employees who are smart working are less afraid of being isolated from colleagues because they meet occasionally at work and can easily communicate thanks to the technological tools. Teleworking can provide a better environment for certain types of work if the home offers a quieter space, allowing the employee to focus better on their tasks and save time for those who have to commute to their workplace.

Thanks to these factors, they can do their job much more efficiently, which is also beneficial for the company (Anderson & Kelliher, 2020).

The smart working approach involves new leadership styles, skills, attitudes, and behaviours that need to be in line with digital working (Torre & Sarti, 2019). As a result of these, the organisational culture changes, as the individual is given a greater role in order to be able to carry out their work without being disturbed and more efficiently. Another inherent part of telecommuting is that employees are more independent in their work, although they can receive instructions, still it can be said that they do their work without direct control (Bajzikova et al., 2016).

Dingel and Neiman (2020) found out that there is a positive correlation between the country's income level and the number of jobs that can be done from home. One of the main macroeconomic advantages of home office working is that it helps to reduce the employment gap between regions. It is important to mention that it helps disabled people to find work and makes it easier for parents to work, and it is also environmentally friendly, as it also reduces people's carbon footprint by not having to go to work (Kis, 2020). Banking units were the least prepared companies for teleworking, as employees handle highly sensitive information, so confidentiality was also an important pullback factor. Meanwhile, other companies have been using smart-working, so they have worked from home several times a week and from the workplace on specific days (Belzunegui-Eraso & Erro-Garcés, 2020).

As a result of the COVID-19 epidemic, different video call applications like Zoom were used in many areas of business and enterprise (Mahr et al., 2021). In addition to video conferences, the use of webinars was very common during the pandemic, many of which were available free of charge to users to encourage them to participate in later webinars. Many companies used webinars to maintain their schooling for employees. Sharma et al. (2021) drew attention to the fact that less is sometimes more and that the focus should be on quality rather than on the frequency of webinars as a result of rapid spread. For successful management, there are many useful applications for employees and managers too, such as Serene and Toggl. The former was created for Mac operating systems with free access. As a first step, daily targets should be set and sub-targets tied to a set time to increase productivity. This software blocks websites and social media sites, as well as apps that can easily distract from the task at work. The latter is compatible with all operating systems, but it is not for free. The essence of the app is to show how much time the user has spent on a given task, and it provides the employer or freelancer with information about the real value of the project and work based on the number of hours invested (Brooks, 2020). It is now clear that the emergence of new technologies has a significant impact on the labour market and also on the career paths of workers (Volejníková & Kučerová, 2019).

2 Material and methods

The aim of this study is to seek information on what innovative trends can be observed in businesses due to the pandemic and what changes companies have applied in order to prevent infection, protect employees, and for being effective despite the lack of physical presence in many cases. Through international literature, we map the new trends in applications that help employees to be effective as they increase their productivity and to leaders to manage the employees from a distance.

In our research, we have formulated a questionnaire survey for Slovak and Hungarian citizens. The cross-sectional method was chosen as a research method as we took a single sample of the elements of the examined population only once. During the

questionnaire period, we have collected 862 answers, of which 40.37% were received from the Hungarian and 59.63% from the Slovak citizens. The proportion of respondents is the following: 54.03% of the Hungarian respondents were women, and 45.97% were men, whereas 50.77% of the Slovak respondents were women and 49.23% men. The questionnaire period took place from January 2021 to March 2021. The formulated survey was built up from 24 mainly closed questions, from which 6 questions were used to examine the aims of the research paper. The answer collection was realised through an online and paper-based form of survey.

Based on Wiley (1999), with the help of sample size calculation we need to ascertain the optimum sample size to evaluate the population prevalence with a great precision. To calculate it, we used the following formula:

$$n = \frac{Z^2 \, \mathrm{P}(1-\mathrm{P})}{d^2} \qquad (1)$$

Where n = sample size = 15190136 according to ŠÚSR (2020) and KSH (2021), critical value at 95% confidence level, Z = 1.96, P = expected prevalence or proportion = 40% =0.4, and d = precision = 5% = 0.05. Therefore, a size of 369 respondents could be appropriate for deriving meaningful inference in our research. Regarding the obtained sample size value, we can say that our research sample is representative.

During the research we formulated two hypotheses.

- H0: *There is no significant difference between Slovakia and Hungary in the introduction of digital tools in the companies during COVID-19.*
- H1: *There is a significant difference between Slovakia and Hungary in the introduction of digital tools in companies during COVID-19.*

In the case of the 2x2 cross-tabulation, a Fisher-exact test was performed in the SPSS statistical program, thanks to which we examined the significant difference between the variables. The dependent variable of cross-tabulation was the introduction of digital tools, and the two countries as an independent variable. Since we examined the difference between two countries, we took into account the value of the 2-sided test. Therefore, we worked with a significance level of 2.5% per side.

Our second hypothesis is the following:

- H0: *Hungary is not more willing to introduce the smart-working opportunity as a result of the COVID-19 pandemic than Slovakia.*
- H2: *Hungary is more willing to introduce the smart-working opportunity as a result of the COVID-19 pandemic than Slovakia.*

In the case of the second hypothesis, to successfully carry out the Mann-Whitney U test, it is essential to perform a normality test to see if the examined dependent variable follows a normal distribution or not. Based on Aslam (2019), the Kolmogorov-Smirnov test can be used to fulfill this purpose. According to Artaya (2019), when interpreting the results, we can state a non-normal distribution when the value of asymptotic sig is less than 0.05, whereas when the value is greater than 0.05, we can state that the dependent variable follows a normal distribution. After performing the mentioned Kolmogorov-Smirnov test, it can be declared that our dependent variable follows a non-normal distribution. According to Refugio and Delmo (2018), in the case of a non-normal distribution, we can perform the Mann-Whitney U test to see whether there is a significant difference between the ordinal dependent variable and a dichotomous independent variable. Before performing the test, we must meet some requirements, such as the samples and respondents must be independent, and the dependent variable should be

measured at least on an ordinal measurement level. We can state that we meet all the mentioned assumptions, thus we are allowed to carry out the test.

3 Results

The following table (see Table 1) indicates that in both country's respondents (52.86%- HUN and 60.93% - SVK) do not use new tools, whereas either the type of work does not allow it, or it is costly, time-consuming, or not considered necessary. On the other hand, 8.21% of Hungarian and 16,67% of Slovak respondents pointed out that Home Office work was used at their workplace. Finally, 21.43% of Hungarian and 16.39% of Slovak respondents said that smart working has been introduced at their workplace.

Table 1 The use of digital tools at work; Source: own elaboration

	HUN (%)	**SVK (%)**
We do not apply as the type of work does not allow	23.21%	24.32%
Home office working type was introduced at work	8.21%	16.67%
We do not use digital tools as it is costly	4.29%	14.75%
We do not use as it is time-consuming to learn the new methods	6.79%	5.19%
We do not use as we do not consider it necessary	10.71%	9.84%
We do not use new tools, as we have used them before	7.86%	6.86%
Different work and business meetings are hold online	7.86%	3.28%
Further trainings take place online	9.64%	2.73%
Smart working has been introduced	21.43%	16.39%

In the next part of the research we examined the formulated hypotheses.

Table 2 Fisher's Exact test; Source: own elaboration

	Value	**df**	**Asymptotic Significance (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	4.684	1	0.030		
Continuity Correction	4.338	1	0.037		
Likelihood Ratio	4.679	1	0.031		
Fisher's Exact Test				0.035	0.019
Linear-by-Linear Association	4.676	1	0.031		
N of Valid Cases	633				

When performing the Fisher Exact test, the one-sided (Exact Sig 1-sided) and two-sided (Exact Sig 2-sided) tests are also completed automatically. In this case, the value of the two-sided test is important for us, which is p= 0.035. Based on the obtained results, it can be said that there is no significant difference between Slovakia and Hungary in the introduction of digital devices in companies during COVID-19.

In the following part, we examined the second hypothesis that we have formulated

Table 3 Kolmogorov Smirnov test of normality; Source: own elaboration

	Statistic	**df**	**Sig.**
Smart Working (Hungary)	0.236	280	0.000
Smart Working (Slovakia)	0.235	360	0.000

After performing the Kolmogorov-Smirnov test, it can be assumed that the dependent variable follows a non-normal distribution.

Table 4 Ranks; Source: own elaboration

	Country	N	Mean Rank	Sum of Ranks
Smart Working	Slovakia	360	318.01	114483.00
	Hungary	280	323.70	90637.00
	Total	640		

The Table 4 indicates that the Hungarian group had a little higher value of Mean Rank. For this reason, it is worth examining if the Hungarian respondents' willingness is significantly greater than Slovak respondents or not.

Table 5 Statistic tests; Source: own elaboration

	Smart Working
Mann-Whitney U	49503.000
Wilcoxon W	114483.000
Z	-0.403
Asymp. Sig. (2-tailed)	0.687

The Mann-Whitney test indicated that Hungarian respondents (Mdn = 4) willingness to introduce smart-working opportunity as a result of COVID-19 was not significantly greater than Slovak respondents (Mdn = 4), U = 49503.000 Z = -0.403 p = 0.344 (1-tailed) as we devided the 2-tailed value by 2 because we assumed the greater willingness for one group.

4 Discussion

According to the obtained results, we can conclude that there are no significant differences either in the introduction of digital devices in companies in the two countries or the introduction of smart working. These results can be explained by the widespread of digitalisation even though employees were vulnerable as the pandemic highly affected them. Furthermore, smart-working is questionable for health reasons, as it does not address the potential spread of coronavirus disease, as it carries the chance of getting infected due to the job mobility and occasional presence at work.

Nevertheless, it is worth mentioning that one of the pulling factors in the implementation of home office is the mistrust of employers towards employees (Kazai Ónodi & Holló, 2020) Regarding the greater proportion of introduction of home office in Slovakia, we assume that this was the result of earlier introduction of restrictions.

One of the major problems appeared in the digitalisation of various organisations. While in many cases companies have also been particularly strong in their digitalisation, many companies have had difficulties in using and introducing basic digitalisation tools. The introduction of these methods involves additional costs and it can also be time-consuming to learn new methods, but it is important to point out that many types of work do not allow the use of digitalisation tools, such as smart working and home office. In cases where the introduction and use of the new methods are costly and time-consuming,

we see a solution in the development of a state-funded digitalisation action plan which can facilitate the use of new working methods.

In those cases where various digital tools and home office have been introduced, it would be worth examining which tools and applications they have used. Moreover, it is foremost to analyse their effectiveness in order to use in the future only well-tried tools and softwares. Regarding the limitations of this research paper, these gaps could form the basis for further research.

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Application of competitive benchmarking for the creation of national and regional creative index

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Abstract

According to the modified models of the marketing mix, countries and regions are also products. They can be attractive for life, study, business, employment and tourism. One of the benchmarks is creative potential. Creativity is difficult to measure and subjective feature. It does not exist only in the psychological context, but also in the business (innovation ability) and regional (concept of creative economy). Measuring the creative potential of countries and regions is based on the Florida 3T Index (Technology, Talent, Tolerance). This index has many modifications for European, national and regional conditions. The aim of the paper is to create a national (Slovak) creative index and modify the regional index (PSK) using competitive benchmarking. These indices are composed of 6 sub-indices (Openness and Diversity, Human Capital, Cultural Environment, Technologies, Institutional Environment, Creative Outputs), 36 indicators (SCI) and 38 indicators (PCI). The following methods are used in the paper: analysis, synthesis, induction, deduction, comparative method, desk research, mathematical-statistical methods. The contribution of the paper lies mainly in the new use of competitive benchmarking, which is traditionally used when comparing products, services, processes, in a spatial (regional) context. Benchmarking the creative potential of countries and regions has many advantages, e.g. municipalities and regional development organizations can see the structure of weaknesses and their quantitative expression, not just the final result. Then they can implement preventive and corrective activities.

Keywords: Creativity; Creativity measurement; Competitive benchmarking; Regional development; Slovak Creative Index; Prešov Creative Index.

JEL Classification: M13, O31, O32, R11

Article Classification: Research paper

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1 Introduction

In the 1970s Richard A. Easterlin described the paradox that from a certain economic level measured by the size of a pension, the sense of satisfaction of the population stagnated. This is a deviation from material consumption towards other values such as health, safety, justice and experiences linked to increased demand for tourism, arts and culture services. The growth of the generations Y and Z on the labour market and among consumers contributes to this, too. These are generations that prefer flexibility and are technologically skilled (Kotler & Keller, 2007; Kloudová et al., 2010; Wheelan, 2012; Madzík et al., 2015). With the development of services, high demands are placed on human capital, within which, even in the time of the development of artificial intelligence, creativity is an inimitable feature. In today's economy, creativity plays an important role not only at the micro level, but also at the macro level in the form of regional development and increasing the attractiveness of a region or country for business, study, employment, tourism and housing (Kotler & Keller, 2007; Štefko & Krajňák, 2013).

The division of regions into developed and problematic regions is the main subject of the analysis of regional disparities (inequalities), the foundations of which were created by the French economist Perroux (1954). Perroux was a student of the father of Schumpeter's theory of innovation, and thus created the terms “geographical space.” which is characterized by geographical coordinates, and “economic space.” which is characterized by relations between economic variables. He is known for his theory of force fields. According to this theory, growth does not appear everywhere at once, but manifests itself in points, respectively poles of growth, with different intensity and driving impulses for the emergence of these poles can be an innovative company, industry or group of companies.

This unit is constantly increasing its inputs and outputs, thus increasing the number of inputs and outputs of other units located in this region (Perroux, 1954; Lisý et al., 2005; Horeháj & Šuplata, 2016; Přívara & Přívarová, 2018). According to Gúčik (2010), tourism can also be the pole of the region's development, as long as the region has a sufficiently attractive natural and anthropogenic potential. Thus, there is a multiplier effect of tourism.

Research on creativity in the social sciences (especially in psychology) is one of the most recent areas of research, because in the past creativity was a mystical phenomenon and was mainly concerned with spiritual sciences and theology, as evidenced by the well-known statement from Greek mythology “I was insired by the muse”. Torrance and Shaughnessy (1998) define creativity as “the process of forming ideas or their hypotheses, their verification and transmission of results, as well as the process of gaps and deficiencies in knowledge, sensitivity to elements that are lacking in knowledge, on the one hand, to disharmonies, to the discovery and search for new, original solutions and, finally, to the communication of the results obtained. “

At the corporate level, creativity becomes evident mainly in the form of innovation. Howkins (2001) sees creativity as an internal and subjective manifestation, while innovation as an external and objective manifestation, according to him, creativity is able to drive innovation, but innovation can never drive creativity.

According to Schumpeter (1912/2006), creativity and innovation contribute to economic development and are the cause of economic cycles. Denning et al. (2014) also support Schumpeter's idea, arguing that all successful firms that have the potential to create new markets are temporarily monopolies. In addition to Schumpeter, Adam Smith, the father of economics, had a similar view. In Wealth of Nations, he states that the creativity of labour force is the greatest wealth of nations, and he sees the value of the nation primarily in work, not in natural resources, as was the case with physiocrats, nor

in the mining of precious metals, as was the case with mercantilists. The creativity of the entrepreneur is a part of his self-realization (or egoism) so-called "the invisible hand of the market". Every individual who pursues his own interests, strives to increase his wealth, at the same time fulfilling the interests of the country and thus increasing his overall wealth (Horeháj & Šuplata, 2016). The importance of creativity precisely due to the impact on the national economy penetrates into the theory of regional development. This creates the concept of creative economy.

The author of the concept of creative economy is Howkins (2001). Veselá and Klimová (2014) and Florida (2002) believe that the creative economy is the next trend after the knowledge economy based on information and know-how and that creativity fulfills the function of input and output. Purnomo and Kristiansen (2018) take a different view, arguing that the creative economy (either rational or intuitive) is not compatible with neoclassical economic theory based on preference for rationality, profit maximization, and equal access to information. The benefit for the customer and the interest in the service in this case is based not only on economic values, but also on aesthetic, spiritual, social, symbolic ones and authenticity, which in turn affects demand.

Other concepts associated with the creative economy include the creative class, the creative industry, and the creative cluster. Florida (2002) divides the creative class (creative workforce) into 2 groups, namely: the super creative core (scientists, engineers, university professors, poets, writers, architects ...) and creative professionals (employees with intensive knowledge of the field of high-tech, healthcare, financial services, management ...). The theory is not unified within the models of creative industries.

The European Commission considers Throsby's model (2001) of 4 concentric circles to be the most effective one: core creative arts - literature, music, acting, visual arts, other core cultural industries - libraries, museums, film, wider cultural industries - video games, computer games, television and radio, traditional services, publishing, sound recording and related industries - advertising industry, architecture, fashion, design. The concept of "creative cluster " refers to" the geographical concentration of the creative industries (including, for example, crafts, film, music, publishing, interactive software, design, etc.), which gathers all the resources to optimize the creation, production, dissemination and exploitation of creative work "(Ali Taha & Tej, 2015).

The development of the creative economy is associated with certain preconditions that must be met. It is about achieving a certain degree of maturity of the economic, social, technological and cultural environment, which creates conditions for the growth of the creative sector (Kloudová, 2009). The best-known method of measuring the creative economy, whose author is Florida (2002), is the 3T index consisting of the talent index, the technology index, and the tolerance index. Modified 3T index for European conditions, so-called The Euro-Creativity Index (ECI) was developed by Florida and Tinagli in 2004. A comparison of the indices is shown in Table 1.

In the case of the Slovak Republic, it is the Slovak Creative Index (SCI) based on the ECI and composed of 6 evaluation criteria, which are presented by a study by Neulogy (2013) and Hudec and Klasová (2016). In both studies, statistical data from the Statistical Office of the Slovak Republic, ministries, the Industrial Property Office and the results of the European Social Survey (2004) were used to determine these 6 criteria (subindexes).

In the sub-index Openness and Diversity, for example the attitude of the population towards various minorities, the share of foreigners in cultural activities (exhibitions, performances) or the share of foreigners in employment were rated. In the sub-index Human capital for example the share of art educational institutions, the number of doctoral students and the number of workers with an artistic profession were evaluated.

In the subindex Cultural environment for example household expenditure on culture and the number of different cultural institutions (e.g. theaters, cinemas, libraries, galleries) were rated. In the Technology sub-index, households with an Internet connection and expenditure on research and development were evaluated. In the subindex Institutional environment, for example financial support of culture by the state and parameters of intellectual property protection were rated. In the sub-index Creative outputs, for example economic effects of creativity (share of creative industry in GDP, book, music and film outputs), publications and designs were judged.

Table 1 3T index vs. ECI; Source: (Florida, 2002; Florida & Tinagli, 2004)

Talent Index		**Euro-Talent Index**	
Human capital index	% of population with university degree	Human capital index	% of population aged 25 - 64 years with university education
Creative employment rate	Creative class concentration	Creative class index	
		Scientific talent index	Number of researchers and engineers per 1,000 workers
Technology index		**Euro-Technology Index**	
Innovation index	Number of patents per person	Innovation index	Number of patents per 1 mil. population
High-tech index	% of high-tech industry output in total output	High-tech index	Number of patents in the field of high-tech per 1 mil. population
		R&D index	The share of R&D expenditure in GDP
Tolerance index		**Euro-Tolerance Index**	
Minority index	Number of members of various minorities in the region in the total population of the region	Attitude index	% of tolerant people towards
Bohemian index	Population with artistic focus in the region	Index of values	Reflection of traditions in the values of the population
Immigration index	% of immigrants in the region	Index of self-expression attitude to individual rights and expression	Attitude to individual rights and expression

With the aim to evaluate 8 self-governing regions (NUTS 3) a study by Neulogy (2013) used Z-score standardization and a more recent study by Hudec and Klas (2016) used the analysis of major components (PCA). Both studies with the help of these calculations have the ability to divide regions into above-average creative (SCI> 0) and

below-average creative (SCI <0), it is also possible to proceed in the evaluation of subindexes and identify which region in which sub-index is above-average and in which it is evaluated below average. In the case of both studies, BSK was in 1st place, PSK in the last place (Neulogy, 2013) and 6th (Hudec & Klasová, 2016).

2 Material and methods

The aim of the paper is to create national (Slovak) creativity index and to modify regional index in a chosen region (Prešov region) by competitive benchmarking. These indices are composed of 6 sub-indices (Openess and diversity, Human capital, Cultural environment, Technology, Institutional environment, Creative outputs). Material for this research is pair comparison questionnaire and secondary data, which are further modified (desk research). The methodical procedure consists of 4 steps:

1. Application of competitive benchmarking methodology (Kovaľová, Nogová, 2016), which is based on pair comparison of criteria and the best value method:

   The benchmarking process consists of the following steps:
   - Selection of criteria for evaluating the creative potential of the Slovak Republic (6 SCI / PCI sub-indices composed of available partial indicators);
   - Determination of the weights of the criteria (6 subindexes) by means of a pairwise comparison carried out by means of a questionnaire survey, while the real significance (w), or the weights of the criteria are determined as follows:
     - average significance: ∅ vi = 100 / number of criteria;
     - significance coefficient: ki = frequency of occurrence (based on pairwise comparison);
     - average significance coefficient: ∅ki = Σki / number of criteria;
     - calculation by deviation: PPO = (ki-∅ki) * o;
     - deviation: o = Σvi / Σki;
     - real significance (or weight of 6 subindexes): w = ∅ vi + PPO;
     - n: number of sub-indicators within one criterion (sub-index);
     - weight of the indicator: VU = w / n.
   - The final stage of benchmarking is the best value method, which is based on knowledge of the real values of the criteria for comparing regions and real significance (w), which is the result of previous benchmarking steps. The tendency (t) of the criterion can be increasing or decreasing depending on whether we want to maximize or minimize the numerical value of the criterion, to identify the global benchmark we proceed as follows:
     - based on the available primary and secondary data, we determine the actual values of indicators (x) - in some cases for the years 2017, 2018 or 2019, in some the average value for the last 3 years (2017–2019);
     - transformed values of criteria (a): if the trend of the criterion is increasing: a = actual value / highest value; if the trend of the criterion is decreasing: a = lowest value / actual value;
     - point values for individual criteria (b): b = a * VU;
     - final number of points for the given region (B): B = Σb;
     - normalization of point values using the Z-score method: z = (x-μ) / σ, where x - original value, μ - mean value, σ - standard deviation, where the average value is transformed to 0 and standard deviation to +1 and - 1;

- identification of regions that have above-average and below-average Z-scores (within sub-indices and within the resulting score);
- determination of the final position of PSK (Prešov self-governing region) within the Slovak Republic is the basis for primary questionnaire research and formulation of hypotheses.

2. Application of competitive benchmarking for expression of Slovak creative index (SCI) composed of 6 sub-indices and 36 indicators;
3. Application of competitive benchmarking for expression of Prešov creative index (PCI) composed of 6 sub-indices and 38 indicators;
4. Final evaluation of regions (in SCI) and districts (in PCI).

3 Results

The research results are focused on the specification of the Slovak Creativity Index (SCI) and its regional modification Prešov Creativity Index (PCI) with the indication of all indicators on the basis of which they were compiled.

3.1 Modifiction of the Slovak Creativity Index (SCI)

The Slovak Creativity Index (SCI), which is a modification of the European Creativity Index (ECI), consists of 6 subindexes, namely: Openness and Diversity, Human Capital, Cultural Environment, Technologies, Institutional Environment and Creative Outputs. The mentioned 6 subindexes consist of indicators, the numerical values of which are drawn from the available secondary data, i.e. it is a method of "desk research". In the case of openness and diversity in 1a) ─ 1e), we also use primary data, as the European Social Survey took place in 2004 and since then the attitudes and tolerances of the population may have changed. In the following sections, we analyze the individual sub-indices and our selected indicators, which are inspired by previous research, taking into account the current availability of data.

Within the sub-index *Openness and Diversity*, we examine 9 sub-indicators. One of the features of a creative personality is tolerance for ambiguity and seeing the problem from multiple perspectives. This property can also affect the higher tolerance of minorities. The first 5 indicators concern the mentioned tolerance towards minorities (marriage with a foreigner, tolerance of other cultures in the city / municipality, understanding of other cultures, understanding of different lifestyles and attitude to accept other races and cultures). The other 4 indicators are drawn from secondary sources. The migration balance (immigration - emigration) expresses the attractiveness of the region for business, employment and life. If the number of immigrants exceeds the number of emigrants, the region is also more attractive to the creative class. Related to this are indicators indicating the share of living and employed foreigners. The last examined indicator is the share of women entrepreneurs. This indicator testifies to equal opportunities in the region, which is one of the main elements of a tolerant society. An overview of sub-index indicators and data sources are given in Table 2.

Human capital is also an important factor in the development of the creative economy. The subindex consists of 6 indicators selected by us. If the regional unemployment rate in % is high, it has a demotivating effect on the creative class. If the economic burden index is high, it means that people of working age are leaving the region and the population may be aging. Human capital develops in terms of knowledge and creativity if not only Slovak but also foreign graduates are willing to stay in the region and if applicants for university studies have a wide range of faculties to choose from.

There can also be cooperation between the faculties, e.g. in scientific or artistic activity. The last indicator is the number of schools (elementary schools, high schools, universities) that offer art education. These schools are involved in educating the creative workforce. An overview of sub-index indicators and data sources are given in Table 3.

Table 2 Openess and diversity; Source: own elaboration

Indicator	Source
1a) Proportion of answers CERTAINLY + YES + PREFERABLY YES to the question: "Is marriage with a foreigner conceivable for you?"	primary research, 2020
1b) Proportion of answers CERTAINLY YES + YES + PREFERABLY YES to the question: „Would it be good if more other cultures lived in your city / village?"	primary research, 2020
1c) Proportion of answers CERTAINLY YES + YES + PREFERABLY YES to the question: „Do I understand the customs and traditions of other cultures?"	primary research, 2020
1d) Proportion of answers CERTAINLY YES + YES + PREFERABLY YES to the question: „Should people with different lifestyles (eg cultural, religious and national minorities, subcultures) have the right to live according to their ideas?"	primary research, 2020
1e) To what extent (in%) should Slovakia accept people of other races and cultures than the majority?	primary research, 2020, average% for individual regions
1f) Migration balance (immigration-emigration) per 1,000 inhabitants	SO SR, average 2017 ─ 2019
1g) Proportion of non - Slovak nationality	SO SR, 2018
1h) Number of employed foreigners per 1,000 inhabitants.	The Ministry of Labour, Social Affairs and Family of the Slovak Republic, average 2017 ─ 2019
1i) Share of women's entrepreneurship in SMEs	SBA, average 017 ─ 2019

Table 3 Human capital diversity; Source: own elaboration

Indicator	Source
2a) Regional unemployment rate in%	The Ministry of Labour, Social Affairs and Family of the Slovak Republic, average 2017 ─ 2019
2b) Economic burden index - share of population aged 0 ─19 years and 65+ to 20 ─ 64 years	The Ministry of Labour, Social Affairs and Family of the Slovak Republic, 2018
2c) Number of Slovak university graduates per 1,000 inhabitants.	SO SR, average 2017 ─ 2019
2d) Number of foreign university graduates per ,1000 inhabitants.	SO SR, average 2017 ─ 2019
2e) Number of faculties at universities per 1,000 inhabitants.	SO SR, average 2017 ─ 2019
2f) The total number of primary, secondary and higher education schools with n artistic focus on 1,000 inhabitants.	The Ministry of Labour, Social Affairs and Family of the Slovak Republic, 2019

Within the *Cultural Environment* sub-index, we examine 8 sub-indicators, namely: demand for culture (household expenditure and number of people participating in cultural events) and the number of individual cultural institutions (theaters, museums, cultural and educational organizations, libraries, galleries, cinemas). An overview of sub-index indicators and data sources are given in Table 4.

Table 4 Cultural environment; Source: own elaboration

Indicator	Source
3a) Average annual expenditure on culture per 1 household member in €	SO SR, 2019
3b) Number of people participating in theater, dance and music performances per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3c) Number of public or private theaters per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3d) Number of museums per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3e) Number of cultural and educational organizations per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3f) Number of libraries per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3g) Number of galleries per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3h) Number of cinemas per 1,000 inhabitants	SO SR, average 2017 ─ 2019

Technological creativity is also an important part of the region's creative potential. We have included 4 indicators in the *Technology* subindex. The first is the share of households using ICT, as digital literacy increases employment. Technological creativity should also be systematically supported by technological incubators and the creation of technology clusters, which are other indicators analyzed. When managing new innovative projects, it is also possible to use web crowdfuding platforms, through which the starting project can obtain funding for start-up. An overview of sub-index indicators and data sources are given in Table 5.

Table 5 Technology; Source: own elaboration

Indicator	Source
4a) Proportion of households using ICT	SO SR, 2017
4b) Number of technological incubators per 1,000 inhabitants	Piteková & Vrábliková, 2019;
4c) Number of technological clusters per 1,000 inhabitants	siea.sk, 2020
4d) Number of active start-up projects on web crowdfunding platforms per 1,000 inhabitants	Piteková & Vrábliková, 2019

In order to turn human creativity into concrete innovation, it is necessary for the region to have supporting *institutional environment*. Within this sub-index, we examine 4 selected indicators. These are government R&D expenditure and private non-R&D expenditure on innovation. As it is possible to support creativity and innovation at the regional level also at the level of self-government, it is important that the counties have a transparent management and that the region also has counseling services for start-ups (e.g. legal services) e. g. coworking. An overview of sub-index indicators and data sources are given in Table 6.

Table 6 Institutional environment; Source: own elaboration

Indicator	Source
5a) Expenditure on research and development per 1,000 inhabitants	SO SR, average 2017 ─ 2019
5b) Index of expenditure on innovations not related to research and development	RIS, average of 2017, 2019
5c) Transparency of individual counties in %	Transparency International, average of 2015, 2017, 2020
5d) Number of institutions providing counseling services to start-ups - e.g. coworking per 1, 000 inhabitants	Piteková & Vrábliková, 2019

The last subindex of the SCI is *creative outputs* with 5 researched indicators. As creativity is an inimitable human characteristic and creative industries belong mainly to the service sector, we examined the share of services within the sectoral structure of SMEs. Other indicators relate to the results of creativity, namely in the field of intellectual property (patents, trademarks, designs) and in the field of innovation (product and process, marketing and organizational). We express the economic effect of creativity in terms of sales revenues from products new to the market and the company. An overview of sub-index indicators and data sources are given in Table 7.

Table 7 Creative outputs; Source: own elaboration

Indicator	Source
6a) Share of services (including creative production) within the sectoral structure of SMEs	SBA, average 2017 ─ 2019
6b) Index of registered patents, trademarks and designs	RIS, average of 2017 and 2019
6c) Index of implemented product and process innovations	RIS, average of 2017 and 2019
6d) Index of implemented marketing and organizational innovations	RIS, average of 2017 and 2019
6e) Index of sales of products new to the market and the company	RIS, average of 2017 and 2019

The real significance of the criteria (6 subindexes) was determined using a pairwise comparison questionnaire (15 combinations), which was distributed in the preliminary research (year 2020) to 428 respondents and was filled in by 182 respondents (individuals) from all over Slovakia. As the company Neulogy (2013) and Hudec and Klasová (2016) drew the attitudes of the Openness and Diversity subindex from the European Social Survey (2004), we planned to update these answers, so 5 additional questions were added to the pairwise comparison questionnaire. The total number of combinations of pairwise comparison of 6 SCI subindexes is 2730 (15 possible preferences / combinations of subindexes in one questionnaire x 182 respondents). Using the recalculations on the above procedure, we found that the most important criterion with a weight of 24.10% is Creative Outputs (6), which have 5 sub-indicators. In second place was Cultural Environment (3) with a weight of 18.10%, which has 8 sub-indicators. It is followed by Human Capital (2) with a weight of 17.15% and 6 indicators. In fourth place is the Institutional Environment (5) with a weight of 16.19% and 4 indicators. The penultimate are Technologies (4) with a weight of 12.67% and 4 indicators. Openness and diversity (1) came in last, weighing 11.79% and 9 sub-indicators. The advantage of benchmarking based on the best value method is not only the knowledge of the differences between the compared subjects, but also the knowledge of the structure, or

weaknesses that we can improve. In the following tables we can see the point ratings, Z-scores and the order of individual regions in the sub-indices and within the SCI.

Within the sub-index Openness and Diversity, the regions of western Slovakia reach above-average values, namely: BSK and TTSK. PSK finished in last place. The tolerance of the population within the PSK can be influenced by e.g. lower living standards and higher regional unemployment rates. This causes lower mobility and lower demand for tourism products, thanks to which we can get to know new cultures better. However, this sub-index has the lowest weight and the highest number of indicators based on a pairwise comparison.

The regions of western Slovakia also achieve above-average values within the Human Capital, BSK and TTSK. PSK is also in the last place in this sub-index, which may be due to the high regional unemployment rate and high brain drain to more developed regions, not only when looking for a job, but also when choosing a university.

The above-average value of the Cultural Environment subindex is achieved by BSK, BBSK and ZSK mainly due to the high number of cultural institutions (e. g. museums, libraries, theaters). However, PSK took the 4th place, which may be due to the higher number of cultural and educational organizations, historical potential and folk culture of the region. The negative feature for PSK is the low demand of the population for cultural products, which is related to the standard of living, as these products are not vital.

BSK and KSK achieve above-average scores in Technologies. Košice is known for its advanced IT industry and a high number of clusters, innovative incubators and start-ups. PSK ended up in the penultimate place, which may be due to high brain drain, which has digital literacy and a high proportion of young people from marginalized groups who have poorer results in the use of ICT. PSK also has reserves in the use of web crowdfunding platforms focused on financing innovative projects.

Within the Institutional Environment, only BSK reaches an above-average value. KSK took 2nd place mainly due to investments and PSK took 3rd place mainly due to the relatively high transparency of the county. The downside to PSK is the low level of state support for R&D, which companies seek to replace with private investment in non-R&D innovations.

The last sub-index is creative outputs, which include services of the creative industry, various types of innovations and various forms of intellectual property (patents, trademarks, designs). However, according to the pairwise comparison, the subindex reaches the highest weight. Only BSK has an above-average value, KSK is in 2nd place mainly due to technological innovations, BBSK is in 3rd place, where the Industrial Property Office is located. PSK took 4th place. The state of innovations is satisfactory, but in the region there is a low share of knowledge-based and creative services within the sectoral structure of the economy.

BSK ranks 1st in all evaluated subindexes due to the fact that it is the capital of SR, which is the cultural and technological center of Slovakia. This region is also the only one which has a positive value of the resulting Z-score, respectively is the only one with an above-average SCI value. KSK took 2nd place in the overall evaluation mainly due to advanced technologies, BBSK 3rd place with a developed cultural environment, ZSK 4th place and TTSK 5th place. The PSK, which we examined, is in 6th place in the overall ranking. Although it reaches below-average values in each sub-index, it is relatively successful in the cultural environment, institutional environment and creative outputs.

NSK was placed in 7th place, where the resulting value of the Z-score is only 0.01 lower than in the case of PSK. TNSK came in last place mainly due to the low level of cultural production and high migration of the population to the neighboring Czech

Republic. The resulting ranking of regions differs little from the ranking in the research of Hudec and Klasova (2016). An overview of the final SCI score of self-governing regions can be found in Table 8.

Table 8 Final score SCI; Source: own elaboration

	BSK	**BBSK**	**KSK**	**NSK**	**PSK**	**TTSK**	**TNSK**	**ZSK**
Total SCI	91,534	51,450	51,979	42,708	42,866	46,460	39,984	49,625
Z- SCI score	2,386	-0,038	-0,006	-0,567	-0,557	-0,340	-0,731	-0,148
Final order	1	3	2	7	6	5	8	4

3.2 Modification of the Prešov Creativity Index (PCI)

The Creative Index of the Prešov Self-Governing Region (PCI) is a modification of the European Creativity Index (ECI) and the Slovak Creativity Index, it also consists of 6 subindexes, namely: Openness and Diversity, Human Capital, Cultural Environment, Technologies, Institutional Environment and Creative Outputs. These 6 sub-indices consist of indicators, the numerical values of which are drawn in most cases from the primary questionnaire survey compared to the SCI, as there are very few regional analyzes dealing with the LAU1 level. In the case of the subindex of openness and diversity, we use the evaluation of sociologically oriented items no. 24 - 28 from our questionnaire. In the following sections, we analyze the individual sub-indices and our selected indicators, which are inspired by previous research.

Table 9 Openess and diversity - region; Source: own elaboration

Indicator	**Source**
1a) Average mark for item no. 24 "Is marriage with a foreigner imaginable to you?"	primary research, 2021
1b) Average mark for item no. 25 "Would it be good if there were more cultures living in your town / village?"	primary research, 2021
1c) Average mark for item no. 26 "Do I understand the customs and traditions of other cultures?"	primary research, 2021
1d) Average mark for item no. 27 "Should people with different lifestyles (e.g. cultural, religious and national minorities, subcultures) have the right to live according to their ideas?"	primary research, 2021
1e) Average of responses for item no. 28: To what extent (in%) should Slovakia accept people of other races and cultures than the majority?	primary research, 2021
1f) Migration balance (immigration-emigration) per 1,000 inhabitants.	SO SR, average 2017 ─ 2019
1g) Proportion of non - Slovak nationality	SO SR , 2018
1h) Number of employed foreigners per 1,000 inhabitants	The Ministry of Labour, Social Affairs and Family of the Slovak Republic, average 2017 ─ 2019
1i) Average mark for perceiving the social benefits of the creative economy (item 10e - 10g)	primary research, 2021

Within the sub-index *Openness and Diversity*, we examine 9 sub-indicators. The first 5 sub-indicators were the same as for the SCI, but were obtained by primary research (items 24 - 28), the other 3 sub-indicators were obtained from secondary sources, but for

LAU1 level and the last indicator was obtained from primary research as the average social benefits of creative economy (increasing the quality of life of the majority population, minority population and elimination of brain drain). An overview of sub-index indicators and data sources are given in Table 9.

Within *human capital*, we examine 8 indicators. The first 2 indicators are, as in the case of the SCI, minimalist, namely the regional unemployment rate and the economic burden index, and are obtained from secondary sources. Other indicators influencing human capital have included the number of faculties or detached workplaces per 1,000 inhabitants of the district and the number of art-oriented primary and secondary schools.

Other indicators included the average grade for the use of creative methods (in human resource management, new product development and marketing communication), the average grade for the perception of socio-psychological barriers to the development of the creative economy (brain drain, insufficient use of creative methods in education, absence of thinking "out of the box"), the average mark for knowledge forms of motivation to participate in the creative cluster (gaining know-how and the best students from the university environment) and the percentage of answers "yes" to the first 3 questions in item no. 29 (recruitment of students during university studies, consultation of the student's final work, creativity as a key feature). An overview of sub-index indicators and data sources are given in Table 10.

Table 10 Human capital – region; Source: own elaboration

Indicator	**Source**
2a) Regional unemployment rate in%	The Ministry of Labour, Social Affairs and Family of the Slovak Republic, average 2017 ─ 2019
2b) Economic burden index - share of population aged 0 ─19 years and 65+ to 20 ─ 64 years	The Ministry of Labour, Social Affairs and Family of the Slovak Republic, 2018
2c) Total number of faculties and detached workplaces per 1,000 inhabitants.	SO SR, average 2017 ─ 2019
2d) Total number of primary and secondary schools of art specialization per 1,000 inhabitants.	SO SR, average 2017 ─ 2019
2e) Average mark for the use of creative methods (item no. 12)	primary research, 2021
2f) Average mark for the perception of social barriers to the development of the creative economy (item no. 11b-11d)	primary research, 2021
2g) Average mark for knowledge forms of motivation to participate in the creative cluster (item no. 20c-20d)	primary reseach, 2021
2h) % share of answers "yes" in the first 3 questions of item no. 29, which relate to human resource management	primary research, 2021

Within the *Cultural Environment* subindex, we examine 6 sub-indicators, namely: the number of individual cultural institutions in the districts (theaters, museums and galleries, cultural and educational organizations, libraries and cinemas) and the% share of answers "yes" to the question concerning sponsorship of cultural events from companies in PSK in item no. 29. An overview of sub-index indicators and data sources is given in Table 11.

Table 11 Cultural environment - region; Source: own elaboration

Indicator	Source
3a) Number of public or private theaters per ,1000 inhabitants	SO SR, average 2017 ─ 2019
3b) Number of museums and galleries per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3c) Number of cultural and educational organizations per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3d) Number of libraries per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3e) Number of cinemas per 1,000 inhabitants	SO SR, average 2017 ─ 2019
3f) % share of answers "yes" to the question aimed at sponsoring cultural events in item no. 29	primary research, 2021

We have included 4 indicators in the *Technology* subindex. The first is the number of industrial parks in individual districts per 1,000 inhabitants (sario.sk, 2016). Other indicators were obtained by primary research and were as follows: number of active start-up projects on web crowdfunding platforms per 1,000 inhabitants, % share of answers "yes" to the question concerning the use of standardized management systems (item no. 29), as these systems require precise processing of operations that lead from the customer's request to the final product / service. The last indicator was the % share of answers "yes" to the question concerning the use of IT and CRM in communication with the customer (item no. 29). An overview of sub-index indicators and data sources are given in Table 12.

Table 12 Technology - region; Source: own elaboration

Indicator	Source
4a) Number of industrial parks per 1000 inhabitants	sario.sk, 2016
4b) Number of active start-up projects on web crowdfunding platforms per 1,000 inhabitants	primary research, 2021
4c) % share of answers "yes" to the question focused on the use of standardized management systems in item no. 29	primary research, 2021
4d) % share of answers "yes" to the question focused on the use of IT and CRM in communication with the customer in item no.29	primary research, 2021

In order to turn human creativity into concrete innovation, it is necessary for the region to have a supportive *institutional environment*. Within this subindex, we examine 6 selected indicators. Their values were obtained by primary research. This is an average mark for the perception of economic barriers to the development of the creative economy (living standards of the population, insufficient cooperation of companies, insufficient investment in technology, insufficient support for science and research by the state). Another indicator is the average sign of interest in participating in the creative cluster (item no. 19), which is an important part of the institutional environment. In order for innovation to be put into practice, it is necessary to combine financial resources effectively.

Therefore, we have included among the indicators the average mark for the use of new forms of financing innovation (item 18d-18h). There is also a need to expand counseling for start-ups. Therefore, another indicator is the number of coworkings and innovation incubators per 1,000 inhabitants of the district. We drew the last 2 indicators from item 29, namely: % share of answers "yes" to the question concerning the experience of companies with innovation incubators and % share of answers "yes" to questions concerning the experience of subsidies from public administration and through Eurofunds. An overview of sub-index indicators and data sources are given in Table 13.

Table13 Institutional environment - region; Source: own elaboration

Indicator	Source
5a) Average mark for the perception of economic barriers to the development of the creative economy (item no. 11a, 11e-11g)	primary research, 2021
5b) Average mark for interest in participating in a creative cluster (item no. 19)	primary research, 2021
5c) Average mark for the use of new forms of financing innovation (item no. 18d-18h)	primary research, 2021
5d) Number of institutions providing counseling services to start-ups - e.g. coworking per 1,000 inhabitants	coworkings.sk, 2021
5e) % share of answers "yes" to the question concerning the experience of companies with innovation incubators (item no. 29)	primary research, 2021
5f) % share of answers "yes" to questions concerning the experience with subsidies from the public administration and through Eurofunds	primary research, 2021

The last subindex of the PCI is the creative outputs with 5 researched indicators. The first indicator is the % share of answers "yes" to questions concerning the intellectual property of PSK companies (patents, trademarks and designs) under item no. 29. In the framework of other proposed indicators, similarly to the creation of the SCI, we focused on the average mark for product and process innovations (item no. 16a-16b), which constitute higher-order innovations, and on the average mark for marketing and organizational innovations (item no. 16c-16d).

Another indicator is the mutual ratio of the preference of radical innovations to incremental ones (item no. 17). The last indicator that affects not only creative outputs, but also the overall competitiveness of the company is to obtain a significant award in the economic, social or environmental field (e. g. Innovative Act of the Year, Healthy Company, Green Company, etc.). Therefore, we determined the % share of answers "yes" to this question under item no. 29. An overview of sub-index indicators and sources of data extraction can be found in Table 14.

Table 14 Creative outputs - region; Source: own elaboration

Indicator	Source
6a) % share of answers "yes" to questions concerning intellectual property (item no. 29)	primary research, 2021
6b) Average mark for preferences of product and process innovations (item no. 16a-16b)	primary research, 2021
6c) Average mark for preferences of marketing and organizational innovations (item no. 16a-16b)	primary research, 2021
6d) Ratio of preferences of radical innovations to incremental ones (item no. 17)	primary research, 2021
6e) % share of answers "yes" to the question concerning the valuation of the company (item no. 29)	primary research, 2021

Since for some indicators we also use conversions per 1,000 inhabitants of the district, figure 34 shows the absolute and relative numbers of inhabitants of all districts (as of 31 December 2019, SO SR). As in the calculation of SCI, we will use the method of competitive benchmarking and the method of best value in the calculation of PCI based on the already mentioned methodology of Kovaľová and Nogová (2016) and finally apply Z-scores to divide the values into above-average and below-average.

The real significance of the criteria (6 subindexes) was determined using a pairwise comparison questionnaire (15 combinations) in item 23, which was mandatory only for 164 respondents from PSK - within this sample there was representation from all PSK districts, most of them from Poprad district (38 and 23.17%, respectively) and Prešov (33 and 20.12%, respectively) and at least from the districts of Humenné, Medzilaborce and Vranov nad Topľou (6 and 3.66%, respectively).

The total number of combinations of pairwise comparison of 6 PCI subindexes is 2,460 (15 possible preferences / combinations of subindexes in one questionnaire x 164 respondents). Using the recalculations on the above procedure, we found that the most important criterion with a weight of 25.33% is in the case of PSK Human Capital (2), which has 8 sub-indicators. In second place were Creative Outputs (6) with a weight of 19.35%, which have 5 sub-indicators. The following are Technologies (4) with a weight of 19.23% and 4 indicators. In fourth place is the Cultural Environment (3) with a weight of 13.01% and 6 indicators. The penultimate is the institutional environment (5) with a weight of 11.67% and 6 indicators. Openness and diversity (1) came in last, with a weight of 11.42% and 9 sub-indicators.

Even in the case of PSK, the advantage of benchmarking is the knowledge of the structure, resp. weaknesses that we can improve. In the following tables we can see the point ratings, Z-scores and the ranking of individual regions in the sub-indices and within the PCI.

Within the sub-index Openness and Diversity, the districts of Prešov (1st), Poprad (2nd), Kežmarok (3rd), Levoča (4th) and Bardejov (5th) reach above-average values. In the case of the first 2 districts, a higher number of jobs play an important role, which are suitable for the self-realization of the creative class, which is characterized by a higher tolerance. In the case of the other 3 above-average districts, the history of district cities, where there was a clash of different cultures and thus their tourist attractiveness, plays an important role. In the last place was the district of Medzilaborce, where significant factors of lower value of the index may be lower demand for tourism products in order to get to know new cultures and a more conservative worldview of the population.

Within human capital, the districts of Prešov (1st), Poprad (2nd), Levoča (3rd) and Kežmarok (4th) reach above-average values. Although the Kežmarok district has a high regional unemployment rate, in some cases voluntary, and a high index of economic burden, it excels in the use of creative methods in various areas of management and in the demands on the creative potential of university graduates. The districts from the eastern part of the PSK reached below-average values, where the brain drain to more developed cities and abroad is even higher. This in turn causes lower demands on the creative potential of university graduates, weaker use of creative methods and less innovative activities.

The above-average value of the Cultural Environment subindex is reached by up to 8 districts, namely: Svidník (1st), Prešov (2nd), Bardejov (3rd), Kežmarok (4th), Levoča (5th), Stropkov (6th), Stará Ľubovňa (7th) and Sabinov (8th). Due to its population, the Svidník district has many museums, galleries and libraries. The district of Prešov is the center of PSK. Other above-average rated cities are connected by their historical potential, e.g. Kežmarok (EĽRO festival, lyceum as the largest library in Central Europe), Bardejov (fair), Levoča (pilgrimage town) and Stará Ľubovňa (castle, open-air museum). Although the city of Poprad (10th) is one of the most technologically advanced cities of PSK and in other sub-indices this district is located above average, it is also one of the youngest cities where history is lacking and therefore there is a tendency to lower number of museums, galleries and other cultural institutions per 1,000 inhabitants.

The districts Levoča (1st), Poprad (2nd), Medzilaborce (3rd), Prešov (4th), Sabinov (5th) and Snina (6th) achieve above-average scores in Technologies. The existence of an industrial park in the district town, the use of IT and CRM in communication between managers and customers, and the introduction of standardized management systems that help improve business processes have played an important role in the excellent evaluation of some less developed districts. The Technology subindex consists of only 4 indicators, but based on pairwise comparison, it is the second most important.

Within the Institutional Environment, the districts of Prešov (1st), Poprad (2nd), Bardejov (3rd), Kežmarok (4th), Levoča (5th) and Svidník (6th) achieve above-average values. As in other indicators, better values have been achieved by cities where start-ups have the opportunity to provide advice, e.g. in the form of coworking or innovation incubators, which can help a start-up entrepreneur to develop a project and thus obtain funding through a grant from the public administration, Eurofunds, or use some of the new forms of financing innovation. Also in these cities, there is a high willingness on the part of managers to participate in a creative cluster, in case of its creation.

The last sub-index is creative outputs, which include services of the creative industry, various types of innovation, various forms of intellectual property (patents, trademarks, designs) and business excellence in the form of awards for economic, social or environmental benefits. 8 districts reach above-average value, namely: Prešov (1st), Poprad (2nd), Kežmarok (3rd), Sabinov (4th), Stará Ľubovňa (5th), Vranov nad Topľou (6th), Levoča (7^{th}) and Humenné (8th). The first 3 districts excel in a number of different forms of intellectual property and innovation potential. In industrially more advanced districts such as Poprad and Prešov, higher-order innovations (product and process) dominate, and in districts with a predominance of cultural creativity such as Kežmarok and Levoča, marketing and organizational districts dominate.

Within the overall PCI evaluation, 5 districts were ranked above average. In the first place was the district of Prešov, which is the center of PSK, there is the lowest regional unemployment rate, the lowest brain drain, the highest number of faculties, detached workplaces and institutions that provide advice to start-up entrepreneurs. In second place was the district of Poprad, which is weaker in the field of cultural environment, but is technologically advanced, has a coworking center and 2 detached workplaces of universities with an economic focus. It is also attractive for tourists because it is the gateway to the High Tatras. The districts of Levoča and Kežmarok took 3rd and 4th place, where openness and diversity, cultural environment and creative outputs had an impact on the final evaluation.

These are district cities with a rich history and the penetration of cultures (former royal cities), which is a potential for cultural tourism. The last above-average district is Sabinov, which is a neighboring district to the district of Prešov. The Sabi dairy a.s. is located here, which is an important source of innovation and employment in the region. Based on the resulting score, we can see that the above-average districts are geographically located in the west of the PSK. As in the case of the Slovak Republic, the creative potential is shifting from east to west in the case of PSK, which causes these regional disparities. An overview of the final PCI score of self-governing regions can be found in Table 15.

Table 1 Final Score – PCI; own elaboration

	BJ	**HE**	**KK**	**LE**	**ML**	**PP**	**PO**	**SB**	**SV**	**SP**	**SK**	**SL**	**VT**
Total PCI	57,5	55,4	64,1	68,9	49,9	71,4	78,2	61,1	52,2	48,4	57,8	57,7	55,1
Z – PCI score	-	-	0,48	1,04	-	1,32	2,10	0,14	-	-	-	-	-
Final order	8	9	4	3	12	2	1	5	11	13	6	7	10

4 Discussion

The application of competitive benchmarking also in lower level regions (LAU1, districts) allows to quantify weaknesses in the development of creative potential of regions and answers the question of which area of creative potential (individual subindexes) should be improved by which district and which area should be dominant in development plans of a particular district. For example, PSK districts with a rich history and cultural tourism excel in the Cultural Environment sub-index (KK, LE, BJ) and districts with the dominance of technological creativity (PP, SB) in the Technology sub-index. The use of competitive benchmarking at the regional level is based on the perception of the region as a product (in terms of marketing mix). Today, in a market economy almost 200 years after the abolition of slavery, the region as well as the product can be freely chosen, whether it is a place to live, study, work, do business and tourism. In this case, the "consumer" compares countries and regions on the basis of personal preferences. However, benchmarking moves comparisons to a quantitative level and no longer answers the question of whether we are a better or worse region for the self-realization of the creative workforce, but also by how much and in what criteria. In our paper we see the contribution to further research and the methodology can be used in other Slovak and foreign regions. Of course, taking into account national and regional specifics.

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Evaluation of financial performance of Slovak cluster organization

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Abstract

The article deals with the creation of cluster organizations based on cluster initiatives in the Slovak Republic and their financial performance. The paper is divided into three parts. The first part defines the basic concepts - cluster, cluster initiative, cluster organization - and describes the development of the cluster concept in the Slovak Republic. The second part presents the research methodology. A database of 54 cluster organizations that have been founded in the Slovak Republic since 2004 was created within the research. Out of 52 existing organizations, there are 28 active ones. The research also included obtaining information about the membership of cluster organizations. The financial analysis was performed on a case study of the Automotive Cluster - West Slovakia, which is in the maturity phase. The results of the research show that the financial performance of the business entities decreased by approximately 20% year-on-year in the period 2013–2017. This decline was driven by both negative technological changes and a decline in internal technical efficiency.

Keywords: Cluster; Cluster organization; Automotive Cluster - West Slovakia; Financial performance; Malmquist index.

JEL Classification: L52, O31, R12

Article Classification: Research article

1 Introduction

Nowadays, the term cluster is quite well known, especially thanks to successful IT companies based in Silicon Valley. However, few people know that even in Slovakia there are dozens of cluster organizations in various sectors. Linking universities, companies and the third sector, concentration of experts and cooperation between competitors can significantly boost innovation and productivity.

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Cluster organizations are groups of industry-related companies and associated organizations operating within one or more regions. The aim of cluster organizations is to strengthen the competitiveness of their member entities. A cluster organization is based on systemic relationships between companies, where members support each other, but at the same time compete with each other. Support is mainly based on shared technologies, skills and joint research. Cluster organizations enhance performance and competitiveness through the externalities produced and through links between member and non-member companies.

An important element of cluster organizations is the accumulation of investments. The attractiveness of a cluster organization for investment is based on the fact that clusters concentrate know-how, science and research in a given field. Cluster organizations thus become the center of a specialized area and naturally attract investors (Zaušková, 2010).

The presented paper is focused on the mapping and analysis of cluster organizations in Slovakia. Slovakia first started with one-off support activity of technology clusters in 2012, yet the spontaneous emergence of different types of clusters had already occurred in Slovakia before 2012.

Important actors in the formation of clusters were higher territorial units, which significantly supported the establishment and became donors of their initial start-up. The main initiators and founders are mainly private companies, universities and municipalities. The first cluster organization in Slovakia was established in 2004, it was the Technological Cluster for the Efficient Use of Earth Resources. However, this cluster organisation does not show activity as of 1 January 2019. The second cluster organisation established in the same year was the BITERAP cluster.

The Ministry of Education, Science, Research and Sport of the Slovak Republic and the Ministry of Economy of the Slovak Republic are the main institutions focused on supporting clusters. In 2010, the Union of Clusters of Slovakia was founded, it is the only organization representing clusters in Slovakia. The aim of the Union of Clusters of Slovakia is to promote the economic development and competitiveness of all its regions through clustering (ÚKS, 2019).

In addition to the support of existing and new cluster organizations in Slovakia, cooperation with neighboring countries has a great potential for innovation. State support for clusters is needed not only to promote regional clustering, but also to exploit the full potential of existing cluster organizations and the creation of new ones. The existence of cluster organizations and their contribution to the Slovak economy are thus significantly influenced by the overall quality of the Slovak innovative ecosystem (Rusiňáková, 2018).

2 Literary overview

In the literature dealing with cluster organizations, the concepts of cooperation and collaboration are most often encountered. One way to merge businesses is a cluster that has gained considerable popularity. This is a relatively young economic concept. Similarly, as with other terms, clusters do not have an established and uniform definition. Therefore, this section of the paper will define this concept.

OECD (2002) provides a definition of clusters, which states that clusters are networks of interdependent firms. According to Porter (1990), clusters are geographically close groups of cooperating companies, specialized suppliers, service providers of related institutions in a particular industry, and firms in subsidiary industries that compete with each other.

The term cluster is used in practice as a natural territorial agglomeration, but also as a name for a cluster initiative and a cluster organization. The actual meaning is

determined by the context. Here in this paper the term cluster will refer to managed and consciously cooperating and similarly oriented enterprises, i.e. cluster organizations. Although it may seem that a cluster initiative and a cluster organization are synonymous with a cluster, this is not the case. The definition of a cluster initiative is given in the Green Book on Cluster Initiatives. According to this book, a cluster initiative is an organized effort aimed at increasing the growth of a cluster and improving its competitiveness in a given region in the presence of cluster companies, the research community, or the government (Sölvell at al., 2003).

A cluster organization is the bringing of a cluster initiative into the form of an independent organization. According to Rydvalová and Žižka (2018), a cluster organization (institutionalized cluster) is a voluntary grouping of entities grouped under one organization that has its own identification number.

3 Material and methods

The main sources of data were publicly available information on the official websites of cluster organisations, the portal of the Slovak Innovation and Energy Agency (hereinafter SIEA), the FinStat database, the Register of Interest Associations of Legal Persons and the Register of Civil Associations operated by the Ministry of the Interior of the Slovak Republic.

In the first step, all organisations containing the word "cluster" in their name were searched in the Register of Interest Associations of Legal Persons and the Register of Civic Associations. The SIEA portal was also used as a supplementary source, which, among other things, provides a clear list of cluster organisations in Slovakia. Subsequently, all the necessary data on the cluster organizations were identified using the above sources.

In the next step, a list of member entities of existing cluster organisations was compiled. The data was searched on the official websites of cluster organizations, in the FinStat database or on the official websites of the member. In addition, financial data was obtained from the financial statements, in particular the balance sheet and the profit and loss account for the years 2013–2017. The obstacle to this step is that not all companies comply with the obligation to publish selected data in the collection of documents.

The economic value added indicator (further EVA) was subsequently calculated for all business entities. The EVA ratio was calculated using the EVA equity method (see formula 1). The CAPM model was used to estimate the cost of equity (r_e) (see formula 2). Where r_f is the risk-free rate of return; β_n is the quantity used to measure the systematic risk of the asset; r_m is the expected rate of return in the market (Damodaran, 2019).

$$EVA = (ROE - r_e) * E \quad (1)$$

$$r_e = r_f + \beta_n * (r_m - r_f) \quad (2)$$

The DEA method and Malmquist index were chosen to evaluate the financial performance of the Slovak cluster organization. The number of employees and long-term capital were chosen as inputs. Long-term capital is the sum of the following balance sheet items: equity, long-term bonds issued and long-term bank loans. The output is EVA.

In the next step the technical efficiency values were determined and the Malmquist index were calculated (Caves, Christensen and Diewert 1982) – for each enterprise within the set, the MaxDEA 7 Ultra software was used to calculate an efficiency score D_q under variable returns to scale, and the values for distance functions

and each component of the Malmquist index were determined using formulas (3) and (4). Finally, the value of the Malmquist index was calculated using formula (5).

$$EFFCH_q = \frac{D_q^{t+1}(x^{t+1}, y^{t+1})}{D_q^t(x^t, y^t)} \tag{3}$$

$$TECH_q = \sqrt{\frac{D_q^t(x^{t+1}, y^{t+1}) D_q^t(x^t, y^t)}{D_q^{t+1}(x^{t+1}, y^{t+1}) D_q^{t+1}(x^t, y^t)}} \tag{4}$$

$$MI_q = EFFCH_q TECH_q \tag{5}$$

4 Results

In the first part, the results of the mapping of cluster organizations (further COs) in the Slovak Republic are presented in terms of the year of foundation, region of activity and industry. The second part of the paper focuses on the evaluation of the financial performance of a selected Slovak cluster organization.

4.1 Analysis of cluster organizations in the Slovak Republic

Based on the carried out mapping, 54 COs (as of 1 January 2019), both active and inactive, were identified in Slovakia. The first CO in Slovakia was established in 2004, it was the Technological Cluster for the Efficient Use of Earth Resources. The second CO established in the same year was the BITERAP cluster. The survey shows that since 2004, an average of 3.6 COs per year have been established in Slovakia. The most COs were established in 2014 (12 in total), see figure 1. The years 2008 and 2010 (7 organizations) ranked second in the number of COs established followed by 2012 (5 organizations).

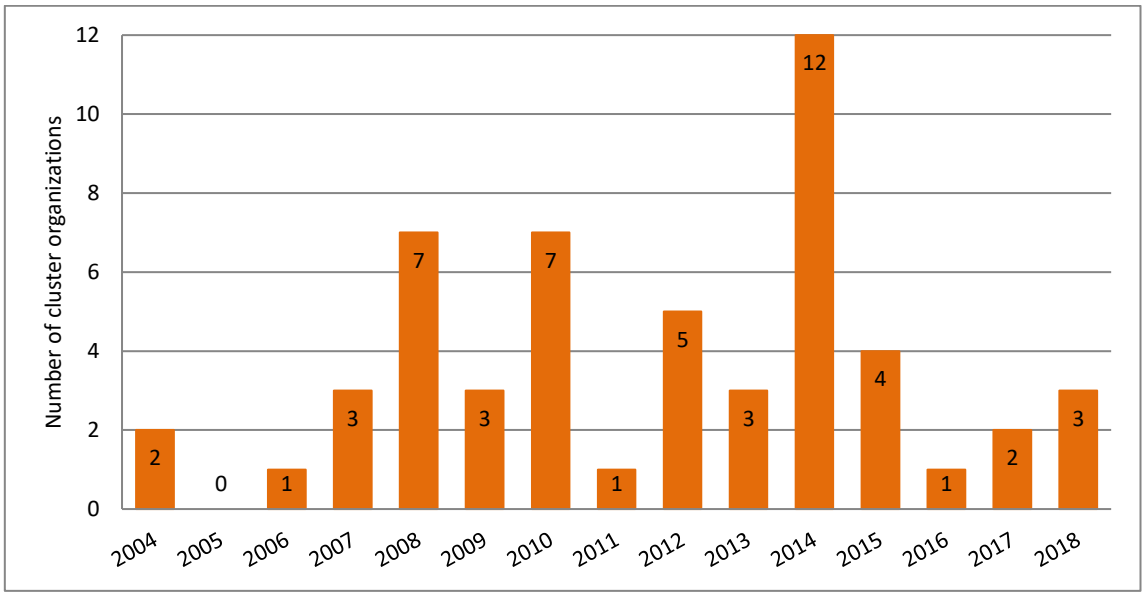

Figure 1 Number of cluster organizations by foundation year; Source: own processing

It should also be noted that after the analysis of the obtained information, for the purposes of further research, 2 COs registered as extinct as of 1 January 2019 were

excluded from the original file. These were ABC - Academic Business Cluster and Centrope Energy Cluster. The remaining 52 COs is therefore hereinafter referred to as "existing" COs. The data on existing CO allows the analyses below.

The survey shows that in the Slovak Republic, COs were established in all regions (see figure 2). The largest number of COs is in the Trnava Region (10), který je followed by the Bánská Bystrica, Košice and Žilina Regions with 8 clusters. The least, only two COs operates in the Trenčín Region. The number of COs in individual regions is given in figure 2.

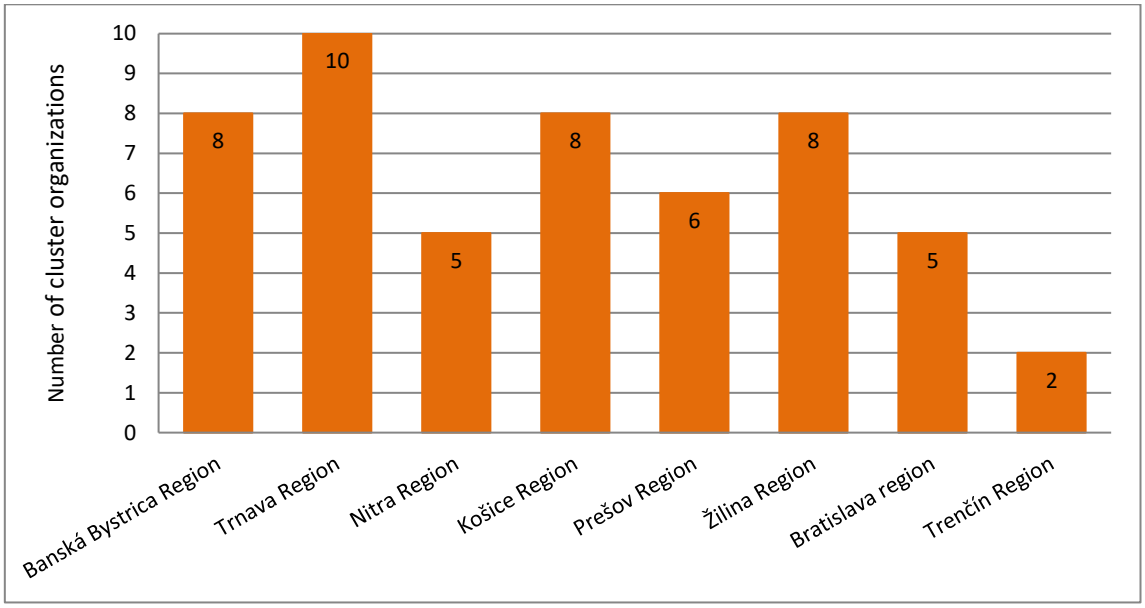

Figure 2 Number of cluster organizations in the Slovak regions; Source: own processing

In terms of legal form, most COs act as the interest association of legal entities. The survey shows that more than 88% of the existing COs were established with the legal form of the interest association of legal entities, i.e. 46 COs (see figure 3). Further 6 COs with the legal form of association.

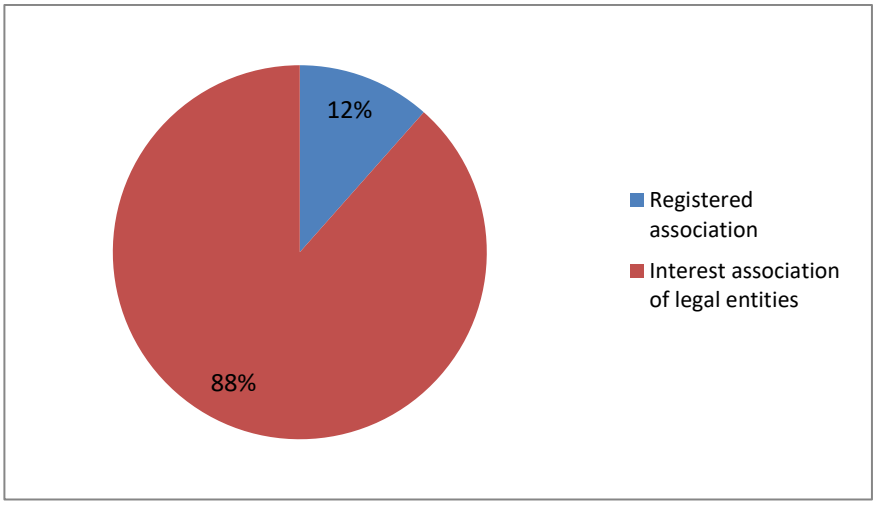

Figure 3 Number of cluster organizations by legal form; Source: own processing

In Slovakia, basically cluster organizations are divided into two groups - technology clusters and tourism clusters. The survey shows that 34 of the existing COs are technological COs (see figure 4). There are also 18 tourism COs.

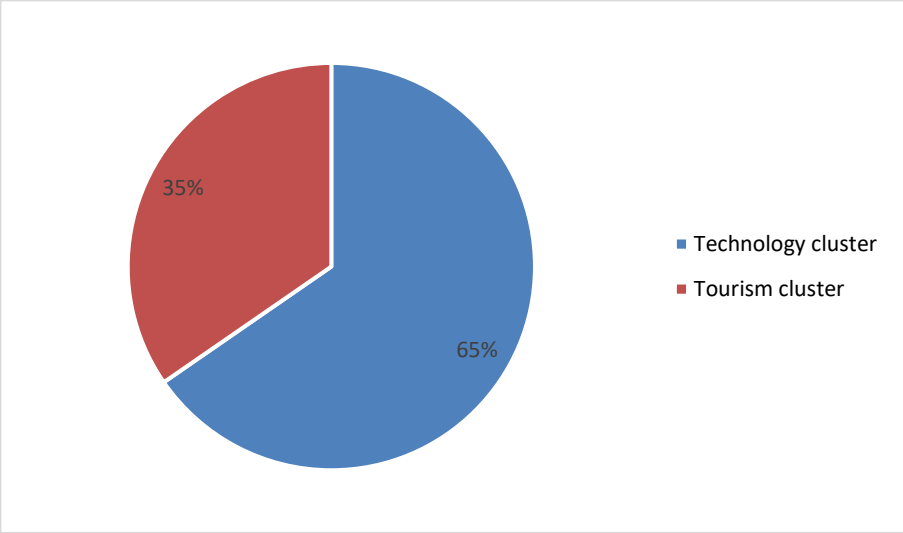

Figure 4 Number of cluster organizations by predominant industry; Source: own processing

For technological COs, it is possible to perform a detailed breakdown (see figure 5). The survey shows that the IT, energy and technology industries are the most represented.

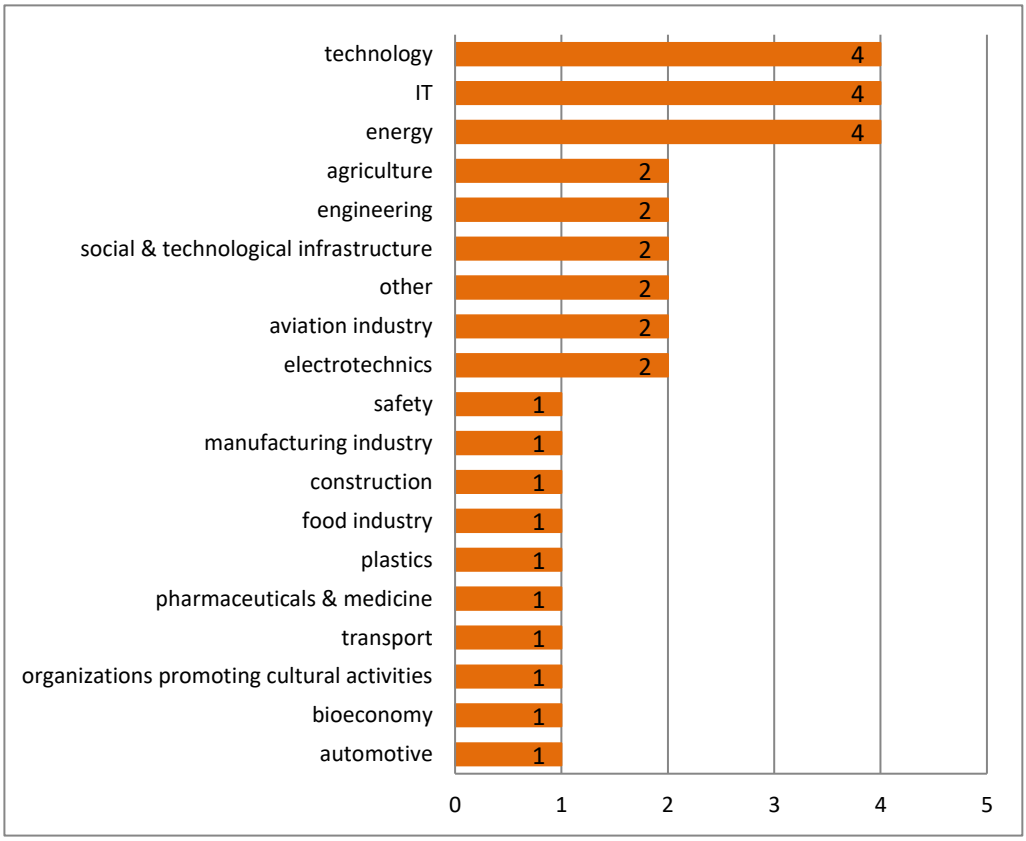

Figure 5 Number of technology cluster organizations by predominant industry; Source: own processing

When searching for data on individual members of the CO, it was found that out of 52 existing COs in Slovakia, data on member entities could not be found for 24 COs. Therefore, these COs were excluded from further research (they were inactive COs). Since these KOs have shown almost no activity in recent years, it cannot be considered beneficial and relevant to include them in further research. The data on 28 active COs in Slovakia, for which it was possible to obtain a list of members, allows the following analyses.

The average number of members in a Slovak CO is 15. The median value is 12.5 members. Modus is 5 members. The average number of members of the technology CO is also 15. The Košice IT Valley cluster has the highest number of members (55 members in total); the second largest CO is the Slovak Plastics Cluster (38 members); the smallest COs are the Slovak AeroSpace Cluster and the Electrotechnical Cluster - West Slovakia (three members in total). The average number of members of the tourism CO is 16. The largest tourism CO is the ORAVA Tourism Cluster (26 members in total); the second largest tourism CO is the Slanské vrchy Tourism Cluster (25 members); the smallest tourism CO is the Triskel Tourism Cluster (6 members).

In terms of the structure of members of the tourism CO (see figure 6), the area of public administration authorities predominates, i.e. regions, cities, municipalities, associations of towns and municipalities (47% in total). This is followed by companies (43% in total). In third place with 8% are interest groups and associations. Educational and research institutions (1%) and foundations and other non-profit organizations (1%) are represented in a minority.

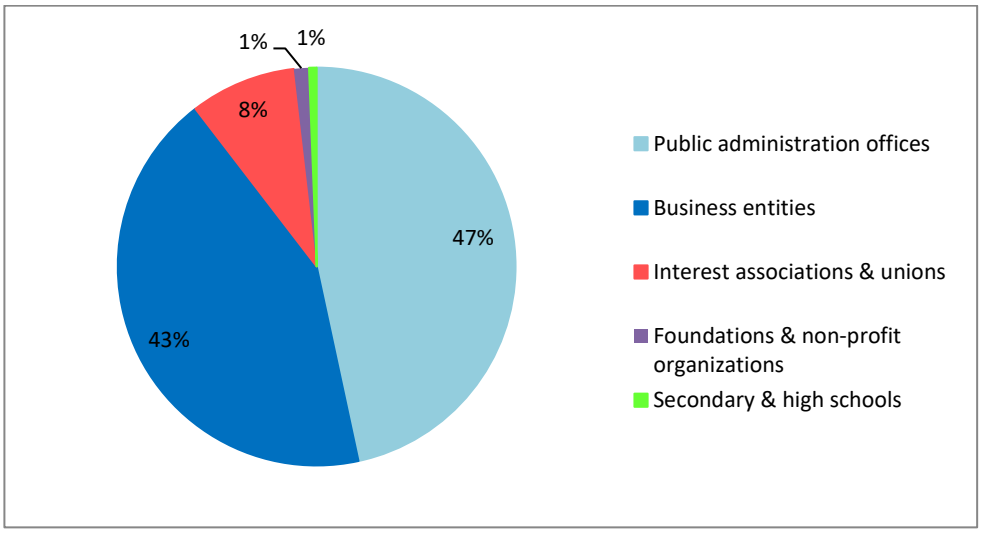

Figure 6 Structure of member subjects of tourism COs; Source: own processing

In terms of the structure of members of the technology COs (see figure 7), business entities predominate (62%), followed by educational and research institutions (12%) and universities and colleges (10%). In fourth place is the area of public administration offices, i.e. regions, cities, municipalities, associations of cities and municipalities (6% in total). This is followed by interest associations and unions (4%). Foundations and other non-profit organizations (2%) and state institutions (2%) are represented in a minority. Cooperatives and banks are in last place with one percent.

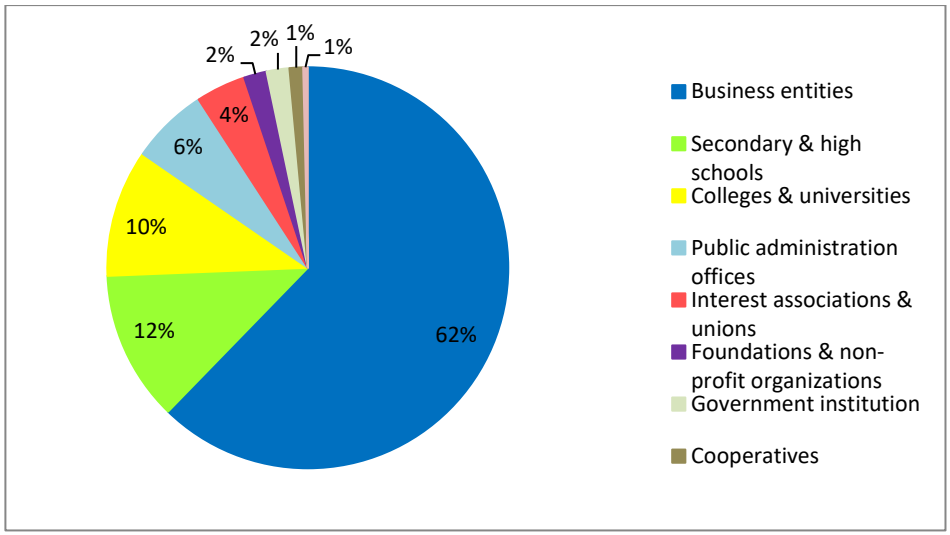

Figure 7 Structure of member subjects of technological COs; Source: own processing

Approximately 22% of micro-enterprises were represented among member business entities. Small enterprises were represented by 35%, medium-sized enterprises 17% and large enterprises 14%. For the remaining 12% of businesses, the number of employees could not be found.

4.2 Evaluation of the financial performance of the Automotive Cluster - West Slovakia

For this case study, the Automotive Cluster - West Slovakia was selected due to the availability of data. The cluster is based in Trnava and its main mission since 2007 is to assist in the development of subcontractors in the automotive industry and to help ensure their continued competitiveness at home and abroad. A total of 16 member businesses were analyzed.

The cluster's average efficiency score (D) for each years is shown in Table 1 (the arithmetic mean was used for the calculation). For the entire period under investigation, the average technical efficiency score for companies within the Automotive Cluster - West Slovakia was not high (0.3298). Out of a total of 16 business entities, 3 to 5 companies were at the efficiency frontier each year. The highest number of companies identified as efficient was in 2015 (5 companies in total). Three companies were identified as efficient throughout the period under review.

Table 1 Malmquist index summary of annual means in the Automotive Cluster - West Slovakia; Source: own processing

D	Period	MI	EFFCH	TECH	GDP	IPI
0.3475	2014/2013	0.8569	0.9697	0.8836	1.026	0.9889
0.2615	2015/2014	1.6078	1.4052	1.1441	1.046	1.0228
0.4126	2016/2015	0.6937	0.8680	0.7992	1.016	0.9901
0.3424	2017/2016	0.4340	0.6208	0.6990	1.043	0.9825
0.2848	**Geomean**	**0.8025**	**0.9257**	**0.8669**	**1.0327**	**0.9960**

Table 1 provides an overview of trends in the average values for MI and its components for the cluster organization in the period from 2013 to 2017. Given that the MI is constructed as a multiplicative model, the geometric mean was used to calculate

these average values. Table 1 shows that the MI values rather fluctuated in the different years. Table 1 shows that the MI was less than one in most of the periods studied. The sample of the cluster's member companies shows a decline in financial performance in 2013–2014 (may be attributable to the recession). The financial performance of member companies decreased by 14%. The decrease in performance resulted from a decrease in both components of the MI. This was followed by a relatively robust growth in financial performance in 2014–2015. Surprisingly, financial performance then declined again in 2015–2017. Within the entire period under review, the biggest year-on-year increase in the MI value (an increase of 61%) took place in 2014–2015. The index decomposition then shows that, in the same period, the technical efficiency of cluster members increased by 40.5% on average, while there also was a 14% technical progress.

The reasons underlying the fluctuation in the MI and its components are not entirely clear. The Slovak Republic's economic situation (see GDP column) may have contributed to changes in financial performance.

The last row of table 1 below indicates the total MI value, which shows the overall change in the member companies' financial performance. Overall performance has decreased by an average of approximately 20% per year. This decrease also corresponds to the average industrial production index (see IPI column) in in the automotive industry. Table 1 also shows that the financial performance of companies was affected both by technological decline and by deterioration in the internal efficiency of member companies. The deterioration in the cluster members' technical efficiency contributed (7% per year) while the technological change accounted for about 13% per year.

5 Discussion and conclusions

In the first part of the paper an analysis and mapping of cluster organizations in Slovakia was carried out. Based on the carried out mapping, 54 cluster organizations (as of 1 January 2019), both active and inactive, were identified in Slovakia. The survey shows that in the Slovak Republic, cluster organizations were established in all regions. Almost half of the total number of cluster organizations in Slovakia is inactive. A large number of cluster organizations are active in the tourism sector. Tourism clusters are becoming an important regional development element. This type of clusters is based on the regional natural specifics that determine the attractiveness of the region in terms of tourism.

In addition to COs, there are natural clusters in the Slovak Republic that did not need to formalize their functioning in the form of cluster organizations. Their mapping is much more difficult because they do not use the "trademark" cluster externally, nor are they represented by an umbrella organization of the association type.

The next part of the paper dealt with the evaluation of the trends in the financial performance of 16 members of the Automotive Cluster - West Slovakia in the 2013–2017 reference period. The paper used DEA analysis expanded to include the Malmquist index, as a tool to compare the trends in efficiency over time. The number of employees and the amount of long-term capital were selected as inputs.

It can be concluded that the financial performance of the companies within the Automotive Cluster - West Slovakia decreased over the 2013–2017 period under review. Technical efficiency – i.e. the ability to efficiently transform inputs into outputs – decreased by 7% year-on-year. In addition, there was also a technological regression (13%). This does not support the claim that business entities' membership in a cluster organization translates into their improved financial performance in a time series.

It can be concluded that the impact of a cluster organization varies across industries and the impact of the different components of the MI also varies. While the reference period for this study ends in 2017, the author of the paper will continue the research in subsequent years and will expand it to include additional sectors.

Akcknowledgements

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SEPA Instant Payments in the Slovak Republic

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Abstract

The latest pan-European payment scheme, the SEPA Instant Credit Transfer Scheme, which responds to the current trend towards digitalisation and the introduction of new technologies, was launched in November 2017. It is based on round-the-clock availability of payments with virtually instant settlement within seconds. The aim is to achieve a decisive level of uptake of this payment instrument in the European payment market. In December 2019, the Banking Council of the National Bank of Slovakia approved the National Plan for the introduction of instant payments in Slovakia. Instant payments are both a challenge and an opportunity for Slovak banks. Instant payments will bring with them a number of benefits for clients, businesses and the public sector. The introduction of instant payments requires real-time processing, which necessitates significant adjustments to banking systems.

Key words: Instant payments; Payment system; SEPA, Digitalisation.

JEL Classification: E42, E58, F02

Article Classification: Research article

1 Introduction

Digitalisation has resulted in higher speed in all areas of life, not excluding payment systems, which are an integral part of a functioning market economy. For the optimal operation of interbank payments, it is essential that an efficient payment system is implemented in the economy for the settlement processes of transactions between economic entities. With the development of digital technologies, cash payments are gradually taking a back seat and cashless payment transactions are increasingly being

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used. Within the Eurosystem, a new service has been developed for the settlement of spot payments.

Instant payments are electronic retail payments that are processed in real time, 24 hours a day, 365 days a year, where the funds are made available immediately for use by the recipient.

In December 2014 the Euro Retail Payments Board (ERPB) proposed that at least one pan-European solution for instant payments in euro should be available to all payment service providers in the European Union (European Central Bank, 2017).

The prevalence of instant payments in the European payment services market depends in particular on the technical capabilities of payment service providers to make such payments and the availability of systems to settle them, including their interoperability.

In 2018, payment card payments accounted for 51%, SEPA payments 46% and SEPA direct debits 3% of all non-cash payments made by SR clients. The number of SEPA payments as well as payments by payment cards is increasing every year. Payment card payments are growing at the expense of cash due to their ease of use enabled by contactless chip technology and the expanding network of merchant acceptance points, including E-commerce merchants. New innovative solutions for closed-loop payments and merchant platform payments, operated by technology giants, are already enabling payments to be made with payments being credited to the payee within seconds. A possible way for Payment Service Providers (PSPs) to achieve the desired speed of payments is to move from SEPA payments to SEPA instant payments, which will speed up the payment processing process and pave the way for new innovative solutions for person-to-person payments (PersonToPerson), person-to-business and merchant-to-business payments for goods and services in bricks-and-mortar shops and also on the internet (PersonToBusiness, BusinessToPerson), business-to-business payments (BusinessToBusiness) and government payments (European central bank, 2018).

Instant payments will increase the speed at which euro payments are processed in European Union countries. Today, when a SEPA payment is made, the funds are credited to the recipient's account the next business day. Instant payments are made 24 hours a day, 7 days a week, 365 days a year, i.e. the funds are available in the beneficiary's account within a few seconds.

Payment service providers are invited to make instant payment solutions in euro available on a pan-European level from November 2017. Although PSPs are not obliged to implement them, a large number of them are expected to do so.

This article discusses the evolution of the payment system in the European Union so far, shows that instant payments are becoming the new normal in the euro area. According to the National Plan for the introduction of instant payments in Slovakia, the Slovak Republic is also introducing digital payment systems through which cashless payment transactions take place. The article also deals with the introduction of SEPA instant payments in the Slovak Republic.

2 Material and methods

Modern economies now rely on the secure and efficient flow of transactions. As a result of constant digitalization in all sectors, but also in everyday life, people expect speed practically everywhere already, and this development trend has not escaped the banking sector either. This is especially true for financial payments. This expert article deals with this very issue. This means non-cash payments, electronic payment systems,

systems for settling these transactions, their development within the European Union and the transition to the most modern payment infrastructure in the Slovak Republic as a country belonging to the SEPA area, which is instant payments.

An instant payment is a payment that is available to the bank's customer every day of the year, including weekends, holidays, and is credited to the payee's account within 10 seconds of the initiation of the payment by the payer's bank.

Consumer demand, technological advances, central banks and private organisations are driving instant payments around the world. Today, instant payments are a reality in 46 countries with instant payment schemes and another 12 are in the planning phase (InstaPay, 2020).

The global real-time payments market is projected to reach approximately $26 billion by 2023 (Marketsandmarkets, 2020).

Instant payments are not new in Europe. In November 2016, the European Payments Council published the first version of the "SEPA Credit Transfer Inst rulebook." which set out the first standards for an instant payments scheme to prevent fragmentation of the EU payments market.

The TARGET instant payments settlement service (TIPS), which was introduced in November 2018, provides an incentive for payment service providers to introduce instant payments as it will make it easier and cheaper for them to access customers of other providers across Europe. As a result, instant payments should soon become mainstream across Europe (European central bank, 2018).

The Czech Republic already has instant payments, but the situation there is different in that the country is not part of the eurozone and has its own domestic currency. The instant payment scheme is voluntary. The uptake depends on the technical capacity of banks to make such payments and, in particular, the availability of systems to settle them. Some countries approach this agenda locally, at the level of the national currency, by using a national payment settlement system.

According to experts, Slovakia lacks the willingness to cooperate in the introduction of fast payments. P2P (Person to Person) payments are payments between individuals, the provision of which is a commercial decision for the payment service provider as it is a commercial product.

3 Results

Payment transactions may be made through banks or through other financial banking and non-banking institutions, which we generally refer to as payment service providers. A payment transaction is primarily a matter between the payer and the payee, with the bank, as a payment service provider, entering into this relationship as an intermediary. On the basis of the foregoing, we may also interpret the concept of payment transaction as a relationship between payer and payee, which takes certain forms either directly between them, i.e. the payer and the payee, or through a monetary institution. Another definition interprets the payment relationship as 'a set of different ways of paying and settling funds between the payer and the payee (Jílek, 2004).

A payment transaction is interpreted as "a set of different methods of payment and settlement of funds between a payer and a payee (Kotlebová & Sobek, 2007).

The technology of the international payment system is the set of actions that are necessary to ensure a particular payment process. This includes various transfer orders, opening of letters of credit, direct debits, etc. (Sipko, 2000).

Banking today is characterised by the integration of financial markets, the rapid growth of capital flows and, more generally, the process of globalisation. For these processes to develop smoothly, the existence of efficient payment systems is necessary.

In his publication, Juraj Sipko states that: 'A payment system can be defined as a set of rules, institutions and technical mechanisms that serve to transfer money (Sipko, 2000).

Above all, payment systems should be characterised by efficiency, speed, timeliness and reliability. They are an integral and natural part of the financial infrastructure of any market economy.

According to Kotleba, a country's payment system is made up of payment instruments, banking operations and interbank payment systems that ensure the transfer of money (Kotlebová & Sobek, 2007).

As stated by Torma, the main developments in industrialized countries in the area of payment systems can be summarized in the following points:

- the adoption of measures by national central banks to ensure that each payment cycle is closed in full, i.e. that payment obligations from one payment cycle or day are not carried forward but are paid on time;
- the introduction of real-time gross settlement (RTGS) systems managed by national central banks;
- the use of central bank credit policy limits and guarantees in the operation of RTGS systems;
- initiatives in the European Union to develop minimum common characteristics for payment systems in the Member States, which were essential for the operationalization of payment systems in the context of the emergence of the European Monetary Union;
- the intensification of cooperation between industrialised countries, under the supervision of the Bank for International Settlements, to improve the coordination of their payment systems policies (Torma, 2000).

In the European context, technology driven transformations in the payment system are also supported by regulatory interventions that increase competition and innovation. In 2007, the Payment Service Directive (PSD) introduced a new category of payment service providers, the “Payment Institution”. The new directive (PSD2), which takes effect from 2018, paves a stable path towards further innovation by regulating the activity of “third parties providers” (TPP) (Banca d'Italia, 2017).

3.1 European Union payment system

P TARGET is the core payment system used and operated by the European Union since January 1999, i.e. since the creation of monetary union. Its name is derived from the English a meaning: TransEuropean Automated Eeal-Time Gross Settlement Express Transfer, which translates as: Trans-European Automated Real-Time Gross Settlement Express Transfer. This payment system is based on communication between different national real-time gross settlement systems - the RTGS technique. It is operated by the European Central Bank and consists of the RTGS systems in each euro area country that belong to that national central bank.

TARGET was created to ensure the efficient settlement of payments related to the implementation of the European Central Bank's single monetary policy measures and other large-value payments, thereby extending and deepening the integration of national money markets. TARGET has also made it possible to execute interbank transactions in

large volumes within the Eurosystem at very short notice. It is a very reliable, fast, high-capacity and low-risk cross-border clearing system that operates as a real-time gross settlement system. It entered into force in 1992 with the European Central Bank as the clearing bank. Each European country automatically became an active participant in TARGET upon joining the European Union. The RTGS systems of these Member States use the euro as their currency. This means that all transactions through TARGET are carried out in euro only. TARGET is primarily used for the settlement of central bank operations, large interbank transfers in euro and other payments in euro. It processes interbank and customer payments.

TARGET2 was launched on 19 November 2007 as an enhanced successor to TARGET. Slovakia joined TARGET2 on 1 January 2009, the date of adoption of the euro.

The TARGET instant payments settlement service (TIPS), which was introduced in November 2018, provides an incentive for payment service providers to introduce instant payments as it will make it easier and cheaper for them to access customers of other providers across Europe. As a result, instant payments should become common across Europe (European central bank, 2018).

TARGET Instant Payment Settlement enables payment service providers to offer their customers real-time, round-the-clock settlement of instant payments, 24 hours a day, every day of the year. This means that, thanks to TIPS, individuals and businesses can send payments to each other within seconds, regardless of the opening hours of any bank. The TIPS service is technically designed to provide instant payment processing within ten seconds, handle large transaction volumes, be available around the clock without the need for maintenance downtime, and enable the process of deploying newer versions of the service without interrupting its operation.

Currently, 2272 PSPs from 22 European countries are registered in the SEPA Instant Payment Scheme, representing 56 % of all PSPs participating in the SEPA Payments Scheme (Touchit, 2021).

In terms of geographical coverage, the scheme is available in 36 SEPA countries (28 EU countries, plus Iceland, Norway, Liechtenstein, Switzerland, Monaco, San Marino, Andorra and Vatican City). This allows PSPs to offer instant payment services to end-customers on a pan-European basis. In order to join the SCT Inst scheme, PSPs must, as a minimum, be able to accept an instant payment from any scheme participant in the EU. In order to be able to provide instant payments to their clients, PSPs must be able to both accept and initiate them.

The maximum immediate payment amount is reviewed every 2 years. With effect from 1.7.2020 it is EUR 100.000 (National bank of Slovakia, 2019).

3.2 Immediate payments in the Slovak Republic

The provision of payment services in the Slovak Republic is governed by Act No.492/2009 on Payment Services. Instant SEPA payments are based on SEPA credit transfers, which were introduced on the basis of Regulation No 260/2012, which set deadlines for the substitution of domestic transfers in euro by SEPA credit transfers.

The Banking Council of the National Bank of Slovakia approved the National Plan for the introduction of instant payments in Slovakia, i.e. their real-time processing. An instant payment is available to the bank's client every day of the year, regardless of holidays or weekends, and is credited to the recipient's account within ten seconds. They should be launched from the first of February 2022. The National Instant Payment Plan in Slovakia was developed in cooperation between the National Bank of Slovakia, the

Slovak Banking Association, the State Treasury and the Ministry of Finance of the Slovak Republic. The introduction of instant payments requires cooperation between banks as well as adjustments on the part of banking systems. The National Plan therefore foresees a deadline for the introduction of instant payments as well as the fulfilment of the technological prerequisites. The aim is to introduce instant payments in the Slovak Republic within the agreed deadlines and with the set national conditions.

PSPs may choose one of the payment infrastructures providing these services within the SEPA area to ensure the clearing and settlement of immediate payments. The Eurosystem offers TIPS - Target Instant Payment Settlement, which is part of the other TARGET2 services, to ensure the processing of instant payments. Currently, Slovak banks use the SIPS payment system operated by the NBS, which is an associated system to TARGET2, TARGET2 directly operated by the Eurosystem and also STEP2 operated by EBA Clearing for processing SEPA payments. The objective of the PSPs in terms of efficiency in the processing of immediate payments is to use only one payment infrastructure for the processing of immediate payments. PSPs in the Slovak Republic prefer to use TIPS services for the processing of immediate payments and to benefit from their current membership in TARGET2 and in the future from consolidation projects over the services provided in TARGET.

The content of the National Plan is not legally binding. Therefore, accession to the National Plan is voluntary for Payment Service Providers, hereinafter referred to as "PSPs" in the Slovak Republic. PSPs accede to the National Plan by means of a written declaration signed by the PSPs' statutory bodies and delivered to the NBS. The National Plan does not address the level of client fees or the business strategy of PSPs for the provision of instant payments, nor does it address the procedures for resolving instant payment complaints in the SR.

The decision to join the National Plan is therefore up to the Slovak banks and their joint action. If some banks have this function before, making payments within Slovakia will be limited. To be successful, at least three large banks or half of the achievable transactions need to be involved. The introduction of this type of payments is seen by banks in Slovakia as the next logical stage in the evolution of payments, as consumers are demanding more and more convenience, faster services and availability, but investments at the level of individual banks and system operators will only be meaningful when the majority of banks are involved (Globsk, 2017).

For example, Slovenská sporiteľňa has announced that it will join the National Plan as soon as instant payments are introduced in the Slovak Republic, so that this service will be launched for clients from the first day. Similarly, Tatra banka will also join instant payments from 1 February 2022 and ČSOB has also expressed its interest, but in its case it may not be immediately on the date of launch of the service in Slovakia. According to VUB, this is a technically very demanding service, but it will try to offer it to its clients on the set date, i.e. as soon as 1 February 2022 (Touchit, 2021).

Instant payments are a major technological change in payment processing. They will bring benefits especially for clients who expect funds on the payee's side to be available immediately. For consumers, they will enable cashless person-to-person instant payments and new innovative types of payments using smart devices. They will also allow them to make a quick 'emergency' payment at any time. For businesses, instant payments can reduce late payments and help speed up the payment of invoices. This will promote easier management of a firm's cash flow and minimise the need for external funding to cover temporary insolvency. They will speed up and streamline e-commerce processes, especially at the end of a purchase, by minimising the risk of unpaid payments. They will speed up the payment of taxes, social security and other administrative fees in

the public administration. Thanks to their speed and simplicity, instant payments can not only replace SEPA payments, but mainly cash payments and partly also card payments.

For instant payments to make sense and be useful to customers, it is important that as many banks in Slovakia as possible get involved. It's also a trend for users to have just one mobile banking app where they can manage accounts at different banks.

4 Discussion

Despite the fact that we live in a world of instant communication, it can still take several working days to make an electronic payment.

In the case of instant payments, the money is available in the recipient's account within seconds, 24 hours a day, 365 days a year. In some countries this option already exists. However, it should exist in all European countries, not only for euro payments to individuals and businesses in the same country, but also for foreign payments to other European countries. To make this a reality, European payment service providers have agreed on a single set of rules and standards for instant payments, called the SEPA Instant Transfer Scheme.

Instant payment is available to the bank's customer every day of the year, regardless of holidays or weekends, and is credited to the recipient's account within ten seconds.

Payment service providers in the Slovak Republic are monitoring innovations in payments and also the status of the introduction of instant payments in other European countries. As they want to provide their clients with modern payment services in the future and do not want to lag behind the developments in other European countries, they have decided to introduce instant payments in Slovakia.

Basic information on instant payments, the main national specifics for instant payments and also the plan for their introduction in the Slovak Republic are provided by the National Plan for the Introduction of Instant Payments in the Slovak Republic, which was developed jointly by the Slovak banking sector represented by the Slovak Banking Association, the Ministry of Finance of the Slovak Republic, the State Treasury and the National Bank of Slovakia in an effort to coordinate the introduction of these payments in practice. The aim is to introduce immediate payments in Slovakia within agreed deadlines and with set national conditions. The ultimate goal is the ubiquity of real-time payments. Achieving it means addressing scale and stakeholder diversification. Financial institutions must also develop strong use cases, enhance security and fraud prevention, and build resilient technical infrastructures to be part of a world where payments are truly instant. Instant payments will unquestionably bring multiple benefits to people and businesses. The transformation of payments is a big challenge for Slovak banks and is also proving to be a big opportunity. By providing TIPS, the Eurosystem will ensure that the demand for instant payments is met at a European level and will further facilitate integration in the euro area.

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Slovak Businesses in times of coronavirus pandemic in light of an empirical research

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Abstract

In our article, we have followed a path that has not been taken so far. We had to develop our research questionnaire and review the relevant literature in a very short time. In the introduction to our article, we refer to the specific nature of our topic. In our article, we first review the most important literature sources related to our research topic. Following this, we present the Slovakian research experiences related to the third wave of COVID-19 implemented by a collaboration between 13 Hungarian and Slovakian universities in 2020 and 2021. This research is part of a larger research collaboration across six Central and Eastern European countries. In this article, we present only a few general research findings.

Keywords: COVID-19; Bussiness; Human resource management; Slovakia.

JEL Classification: E21, J21, M1

Article Classification: Research article

1 Introduction

Covid-19 has for the time being unpredictable impact on society and the economy worldwide. Measures taken to prevent the spread of the epidemic, such as the introduction

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of border locks, restrictions on transport, reduction of public transport capacities, mandatory quarantine on entering and leaving countries, restrictions on mass events, the requirement to maintain greater personal distance mean serious challenges for organizations (Sipos et al., 2020).

Unlike the previous financial crisis, the current crisis does not affect the economic sectors equally. There are winners and losers alike. Do not just pay attention to negative consequences but try to bring out something new and forward-looking (Morris, 2020). In the following table, we highlight the sectors that can be considered the most winning and the most losing sectors. The year 2020 resulted a significant profit growth for tech- and IT-companies globally. Border restrictions and virus protection measures have had an immediate and lasting negative impact on tourism and hospitality.

Table 1 Winning and losing sectors of Covid-19 pandemic; Source: (CNN Business Staff (2021); These businesses were the surprise winners of 2020)

Winning sectors	Losing sectors
» IT-tech industries (eg. Zoom + 300%)	» Traditional industries (eg. Boeing)
» Solar industry (+ 300%)	» Oil industry (–30%)
» Real estate sales (eg. suburbs)	» Airlines
» Shopping centers (+ 7–19%)	» Tourism, hotel industry
» Video games	» Traditional cinemas (–80%)

Slovakia's economy relies heavily on services and industry. The emergence of the pandemic has therefore painted a particularly worrying vision for economic actors. Analysts predicted a 6-8% economic downturn in early 2020 (Pažický-Žúdel, 2020). Businesses still remember the economic crisis of more than 10 years ago, so trying to avoid the shutdown and layoffs, the companies did everything they could to get through this period. One and a half years after the outbreak of the pandemic, actual economic performance reports a much more moderate decline. Countries around the world have tried to deal with the situation in different ways. Somewhere the defense was more successful, with fewer casualties and less economic impact. At the same time, there are countries, where the number of human casualties and the economic impact show some worst picture. Based on our research results and the data collected by statistical offices, we present the impact of pandemic on businesses' everyday lives and livelihoods in Slovakia.

2 Material and methods

We have kept two different approaches in mind in the design and development of our present research. According to one, our present knowledge is dependent on past knowledge. In this context, we consider it is important to highlight Diamond's (2019) statement that "We can successfully prepare for the challenges of the future if we intelligently understand all that is possible from the past." In this context, our article reviews the history of the "war" with viruses and then summarizes some of the experiences of the recent world crisis of 2008-2009. However, in addition to looking at the past, we also do not forget that our present knowledge is not wholly dependent on past knowledge. In this context, we cite Harari's (2021) idea that we have no idea what the job market will look like in 2050. It is generally agreed that machine learning and robotics will change almost every line of work - from producing yoghurt to yoga teaching. In this regard, it is important to point out that robotics and artificial intelligence will play an important role in the post-COVID world.

2.1 Pandemic and other disease in the European history

Leprosy, plague, cholera, typhoid fever, smallpox ... A series of epidemics have plagued humanity throughout the history, and the causes have not been found for centuries. However, the rudimentary methods of defense were very similar.

Plague is usually considered to be the most horrible epidemic, although in terms of its insidious spread, smallpox, or malaria (which is still present today), are a greater threat. The first and largest plague of 1347-53, claimed many lives, roughly halving the population of Europe, but the plagues that followed in waves were no longer so devastating. Smallpox claimed half a million lives a year, and those who recovered were blinded, or scarred for the rest of their lives. However, thanks to effective vaccinations, it is the only contagious disease that has been eradicated from the Earth (Jász, 2020). Let us not have the illusion, leprosy, plague, the cholera, still exist in the remote corners of the planet, only their destruction is much less (Honigsbaum, 2020).

The pandemic that swept across all continents was one of the extremely virulent types of flu, the so-called Spanish flu, introduced throughout the history by soldiers from America during World War I. It arrived our country in the summer of 1918, and its mortality rate reached 10% by December (Jász, 2020). More measures similar to today were taken at that time: public transport was forbidden to get in without a mask, cinemas, theaters, nightclubs, colleges, universities, cafes were closed with limited opening hours, and telephones could be used wrapped in tissue paper. The epidemic caused more casualties than World War I; it could have killed 2 million people in Europe, and 25-50 million worldwide. It was the most devastating epidemic in the modern age, but in the Middle Ages, with poor hygiene and health conditions and a lack of basic information, the situation was much worse (Oldstone, 2010).

People have suspected since ancient times that infections are spread by things invisible to the naked eye, perhaps “tiny seeds.” and they also knew quite well which disease was contagious and which was not, but they did not receive an answer until the end of the 19th century. The science of bacteriology was born in the 1870s, which made possible to detect microorganisms under a microscope. From that time, it is easy to identify bacteria and viruses, as well as drugs and the first vaccines were born (except for smallpox, because vaccination against it was discovered as early as the 18th century accidentally).

However, in addition to confusing theories, even without microbiological knowledge, humanity has been able to recognize that infections are spread through human contact and trade routes - in fact, this has led to the creation of the public health system. The epidemics were closely related not only to the famine, but also to the wars and the movement of the army, especially the bloody disease: during the siege of Vienna in 1529, when Suleiman's troops were presumably destroyed by a bloody belly, also called “morbus hungaricus” (later this term has been applied to TBC) (Rosenwald, 2021).

Already at the time of the first major plague in the 14th century, bribe locks were established, the first in Venice for 30 days in 1374, and then in Ragusa in 1377 for a regular 40-day quarantine (hence the name quarantine derives from the 40-day confinement). In the Hungarian Kingdom, the first record dates from 1510 that a city was bribed and escaped the plague; there are also reports that Pest and Buda even defended themselves against each other during the plague of 1738 (Jász, 2020).

The infected were also tried to segregate - initially in their own homes, later, from the 18th century, separate bribery institutes and epidemiological hospitals were set up for this purpose. After the plague of 1738, during the reign of Maria Theresa, bailouts were also set up on the border from Transylvania to the southern part of the Habsburg Empire,

quarantining merchants from the East for several months, causing considerable damage to the business.

Mostly because of this, the diseases were concealed, since the closures of the towns caused serious livelihood problems, and the inhabitants, living mostly from agriculture, could not get to the lands to harvest the crop. In addition, in most cases the infected were expelled by the community, sometimes whole families were driven out from the village into the woods. During the first great cholera epidemic of 1831, a cholera revolt erupted from the fear of livelihood problems, during which desperate peasants attacked landlords, doctors, priests, and officials (Oldstone, 2010).

Central, high-volume precautions were taken only in the case of large national epidemics. There were diseases we learned to live with, like the annual flu or smallpox. In the 18th century, 4-5 major epidemics, typhus, plague, diphtheria, smallpox or dysentery (and cholera from 1831) ran through our country every ten years, typically receding in the summer. They were also characterized by periodicity: as soon as a community acquired immunity to a certain disease, it disappeared for 20-30 years, but as a new generation no longer protected appeared, epidemics linked to that pathogen flared up again - for example, plague attacked the inhabitants in a 20-30 years' periods (Rosenwald, 2021).

In times before bacteriological research and vaccines, therefore, quarantine was the most effective solution against major epidemics.

Since the beginning of the new millennium, over 35 severe conflicts and some 2500 catastrophes – including the various virus outbreaks – affected the human population worldwide (Mosley, 2020; UNEP, 2020). Although many consider the coronavirus pandemic to be an unexpected so-called "black swan" event, in reality, the global monitoring organisation of WHO warned about the threat of a coming pandemic in September of 2019, in which they pointed out global unpreparedness (WHO, 2019).

2.2 Learning from last global crisis (2008-2009)

The 2008-2009 crisis was the collapse of the over-crediting bubble and the loss of trust that resulted from this. It is worth outlining that there are publications in the literature (Adams-Prassl et al., 2020) that highlight the different effects in the context of the experience gained during previous crises and the current economic crisis in COVID-19. One of the major lessons learned from its handling was how the value of unconventional solutions increased (Blinder & Zandi, 2015). In the following, without wishing to be exhaustive, we summarize some of the key lessons from the indicated crisis (Verick & Islam, 2010; ILO, 2020):

- From a macroeconomic point of view, it is important to point out that in the pre-crisis years (2002-2007) a strong, synchronized global economic boom was common throughout the world. A similar situation was typical before the current crisis broke out;
- However, it was also characteristic that there were certain financial shortcomings of the boom period (failing for increasing household incomes, loosing monetary regulation and borrowing over housholds 'means). Today's world has learned a lot from the 2008-2009 crisis. Before the current crisis, the banking world was stronger and the population was not so indebted as it was before the previous crisis;
- "V" like economic development was characteristic of the recovery at that time;
- The previous crisis was characterized by price fall and a slowdown in inflation;

- Global job losses were lower (10% <) during the current crisis than in the Great Depression the 1930s (25%);
- Implementation of subsidized reduced working-time scheme (Kurzarbeit) and other incentive packages were also used during the previous crisis;
- The previous crisis has had a very negative impact on certain occupational categories. Thus, we mean, among others, young men and women under 25 in developed and developing economies, as well as workers with low level education and as migrant status, and interim and non-standard employees. These were more affected by the redundancies (Fodor et al., 2011). In this respect, there is no difference between the two crises (Adrjan & Lydon, 2020);
- An important difference between the then and the current crisis is that the lockdown was not the thing in 2008-2009.

2.3 Impact of pandemic on Slovak economy

Over the last 20 years, the Slovak economy has been characterized by dynamic growth and strong, broad-based expansion. The average growth rate prior to the global financial crisis in 2008/09 was 5,7% (2000-2007). Although it has been able to return to growth relatively quickly, the growth stayed moderate after the global financial crisis: 2,6% between 2010-2019 (World Bank, 2021).

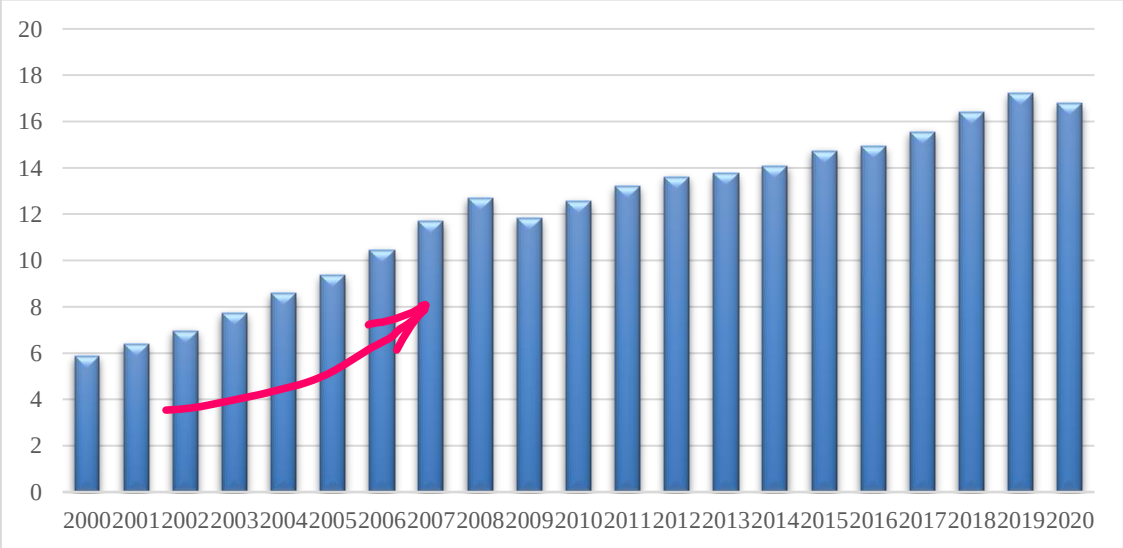

Figure 1 Development of GDP per capita during 2000-2020 (ths €); Source: modified by (Slovak Statistics Office, 2021)

Following its development path, the country is benefitting from strong links with the world economy, especially in automotive sector. Half of the total industrial production and 13% of GDP is created by the automotive industry. Slovakia is by far the global leader in car production per capita. The four car producers, and their supply chain employs more than 10% of all employed (Sario, 2021).

Until 2019 the unemployment has fallen below 7%, a historically low level. Strong employment growth due to investment inflows and the booming economy have even brought labor shortages in some areas. “Foreign investors have already asked for additional immigration to ease the supply of skilled workers” (OECD, 2019).

In times of boom, the previously mentioned position carries a lot of growth opportunities. However, in times of crisis, over-dependence on trading partners can make the country's economy vulnerable. One of the most important goals of the catching-up CEE (Central Eastern European) countries is to achieve innovation-driven economic growth that enables sustainable, sovereign growth, driven by own innovations and outward FDI. The size of R&D expenditures well reflects the country's ability to increase its own innovation capacity. In the case of Slovakia, significantly higher R&D investments are needed, as currently still lags behind not only the developed countries and the OECD average, but also the other countries in the CEE region.

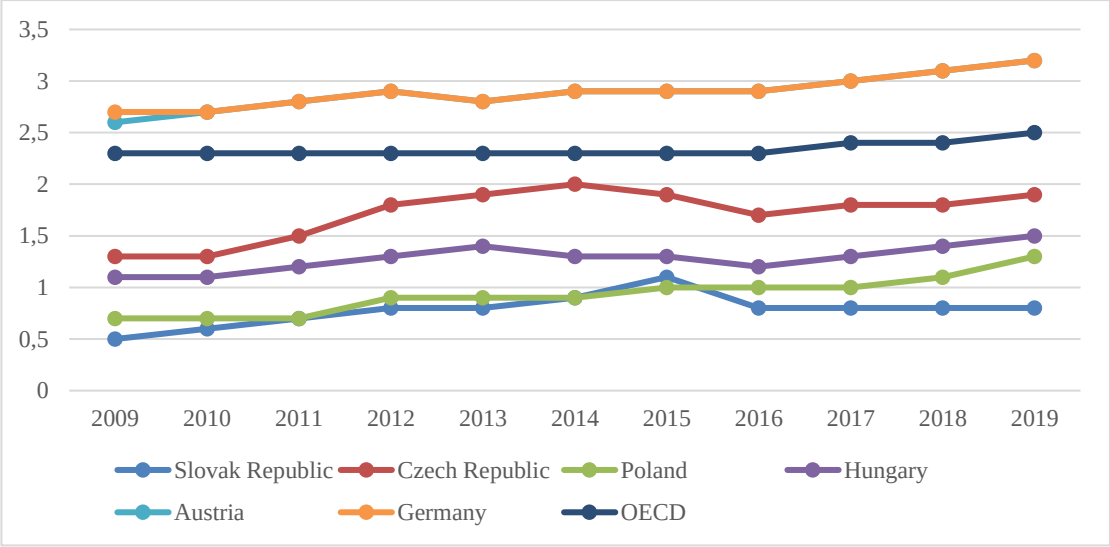

Figure 2 R&D expenditures in % of GDP; Source: modified by (OECD, 2021)

The structure of the Slovak economy is characterized by predominance of services, more than 70% of value added is generated by the services sector, other 25.6% by industry and 2.6% by agriculture (Spectator, 2021). The stimulus effect of foreign capital inflows which has been flowing in over the last 30 years has determined the growth opportunities of the Slovak economy and shaped the economic structure. The Slovak government has done much in recent decades to attract foreign capital investors and to create favorable conditions for them. This played important role in achieving the current investment-driven growth some 25-30 years ago. In order to achieve the desired innovation-driven sovereign growth, domestic businesses need to be supported in their internationalization process. For domestic companies, joining the international value chain not only opens up channels for access to new markets, but also contributes to a division of labor in which the organization can increase its prestige, partly compensating for its modest infrastructural or financial capacity with its professional, creative and learning capabilities. The internationalization of a business is a multi-stage, complex activity. When a company moves out of the well-known domestic environment, it has already begun this process (Duelfer & Joestingmeier, 2011). Several stages of such expansion can be distinguished, from an enterprise operating entirely in the domestic market, first to a region, then to a continent and finally to the whole globe (Adler & Ghadar, 1990). Barlett and Beamish (2011) point out that entering a foreign market has two important influencing elements: the amount of resources allocated to a country's market and the degree of governance of the organization to be established in that country. The cheesy steps of internationalization are the export of goods and the export of capital.

As the following graph shows, in the previous years, exports increased in line with imports until the 2020 downturn. According to the official data (SSO, 2019) 92.4% of goods produced have been exported. The top export goods of Slovakia are cars ($ 23.8B), vehicle parts ($ 5.22B), video displays ($ 4.56B), broadcasting equipment ($ 3.5B), and rubber tires ($ 1.73B). Exporting mostly to Germany ($ 19.7B), Czechia ($ 9.47B), Poland ($ 6.41B), France ($ 6.23B), and Hungary ($ 5.6B). Slovakia is the world's biggest exporter of coin ($ 65.6M) (OECD, 2020).

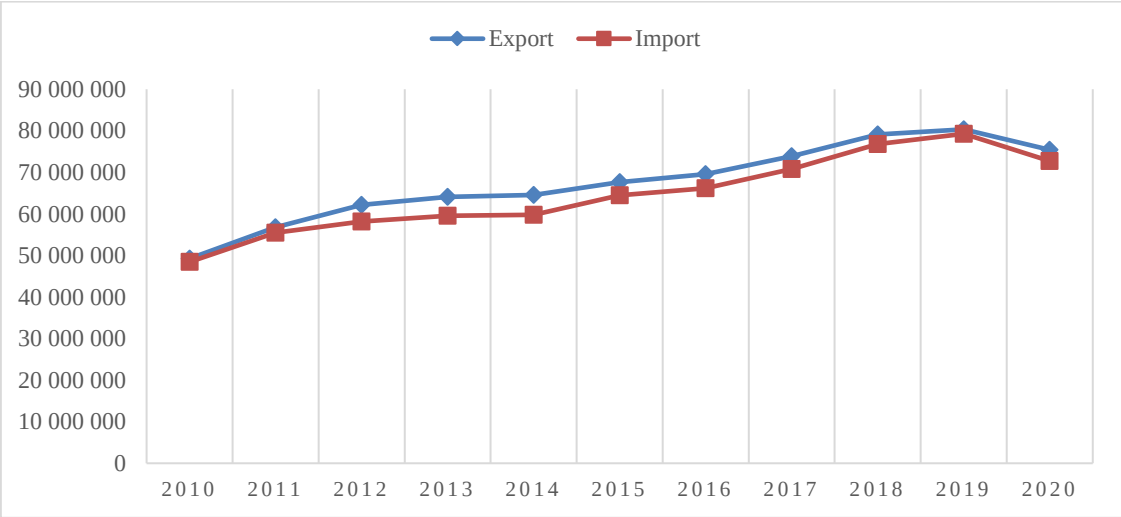

Figure 3 Development of export and import 2010-2020 in EUR; Source: modified by (Slovak Statistical Office, 2021)

In 2019 Slovakia was the number 60 economy in the world in terms of GDP, the number 38 in total exports, the number 41 in total imports, the number 48 economy in terms of GDP per capita and the number 15 most complex economy according to the Economic Complexity Index (ECI) (OECD, 2021).

In terms of capital exports, Slovakia is currently lagging behind its neighbors. Outbound FDI accounts for over 0,8% of GDP. This indicator is 1.9% in the Czech Republic, 1.3% in Poland, and 1.5% in Hungary in 2019 (World Bank, 2021).

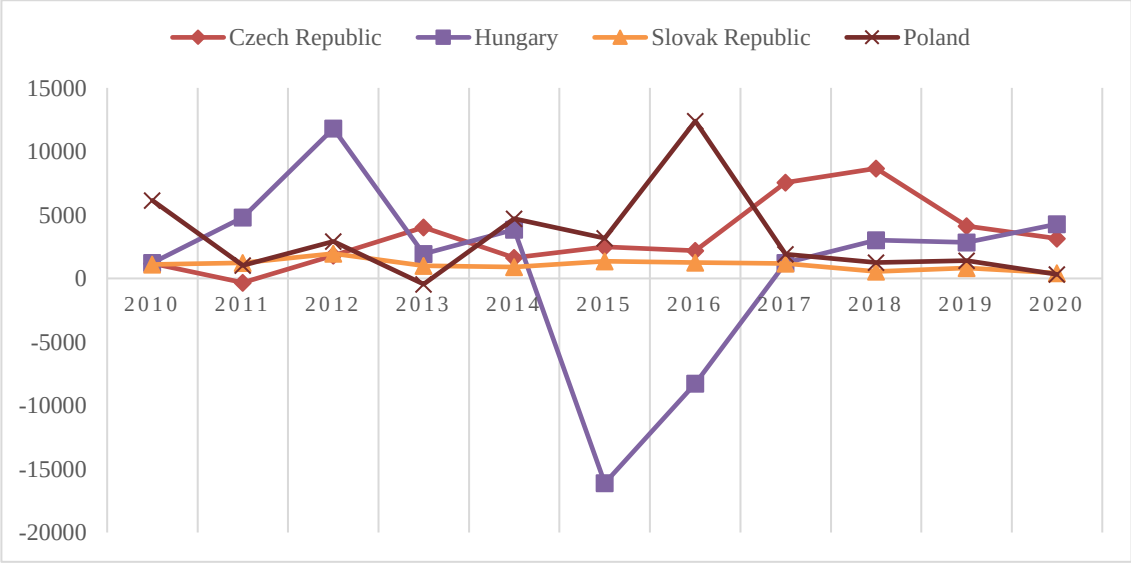

Figure 4 FDI outflows 2010-2020 (Mln USD); Source: modified by (OECD, 2021)

2.4 Slovak economy hit by coronavirus pandemic

Coronavirus is having a significant impact on every aspect of our lives in Slovakia and globally. Officially declared as a pandemic by the World Health Organization in March 2020. The primary concern is to minimize the spread of the virus, to mitigate its effects and to protect those most vulnerable in society. The SARS-CoV-2 pandemic has fundamentally shaken the global and EU economies, with very serious socio-economic consequences (EC, 2020). Businesses and organizations have a role to play and a responsibility to their own people and wider society. They also have to confront a wide range of practical, commercial and legal challenges associated with the spread of the virus (Cms, 2020).

Employers have minimized physical contact to protect the health of their employees. In jobs where it was possible to work from home (teleworkable jobs), the home office has been introduced for a longer or shorter period. A home office was typically feasible for office- and some intellectual jobs. Thus, the education between March-June 2020 and October 2020 - April 2021 was implemented in an alternative form, using online education method. In the case of jobs where working from home is not feasible, the health of employees had to be protected in other ways. Such measures include separation of workplaces with plexiglass, ensuring greater physical distance, more frequent disinfection, placement of disinfectants in the workplace, etc.

The pandemic situation has also led to redundancies in some sectors. Compared to the previous year, employment fell by 1.9% for the economy as a whole. The largest decline was recorded in the industrial sector, where the number of employees decreased by 4.2%. The winner of the pandemic situation is the IT sector, which has grown not only in terms of sales but also in terms of the number of employees. The following figure 5 shows the change in employment in Slovakia between 2019 and 2020 by sector.

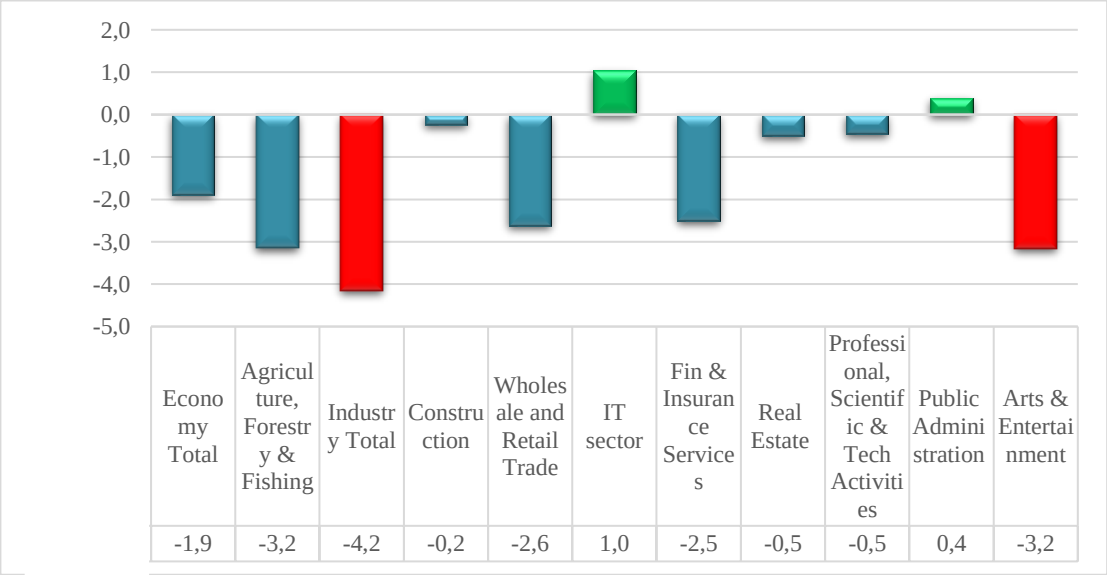

Figure 5 Changes in number of employed in Slovakia between 2019 and 2020 by sector; Source: modified by (Slovak Statistical Office, 2021)

In terms of employment data, the industrial sector was affected most by the pandemic in Slovakia. Slovak industry recorded a historic decline in activity during the first wave of the pandemic. The main reason was the dependence of the automotive industry, but quarantine measures also contributed to the downturn. Given that industry

in Slovakia, especially the automotive industry, is the key sector, the question arises as to what effect this situation has had on output and income generated. The following table shows how GDP in Slovakia developed in 2020 and early 2021 compared to other parts of the world.

Table 2 GDP around the Globe in 2020 and early 2021; Source: modified by (Euronews, IMF, OECD, World Bank, Slovak Statistics Office, 2021)

Countries and regions	2020	2021
Global GDP	from +2,6 to -7,5%	from +4 to +6,5%
USA	-4,2%	+4,2%
Japan	+2,6%	+6,5%
EU-27	-7,5%	+5%
EU-Eurozone	-8%	+5%
Slovakia	-4,8%	+4,8%

In comparison with other parts of the world, the economic impacts of coronavirus for the Slovak economy are rather moderate. The summer months, with favorable epidemic developments, required industrial activity, driven primarily by the rapidly booming automotive industry. As a result, the production recovered faster than during the global financial crisis (Plutzer, 2021).

In terms of export and import there were even bigger decline recorded. Exports fell by 6% in 2020 compared to the previous year, and the import fell by 8% (Slovak Statistics Office, 2021).

Similarly, to the export of goods, the export of capital also declined. In the CEE region, only Hungary was able to increase its foreign capital investments. In other countries it has been decreased, in Slovakia the outward FDI fell by 48%, in the Czech Republic by 24%, in Poland by 77% (OECD, 2021).

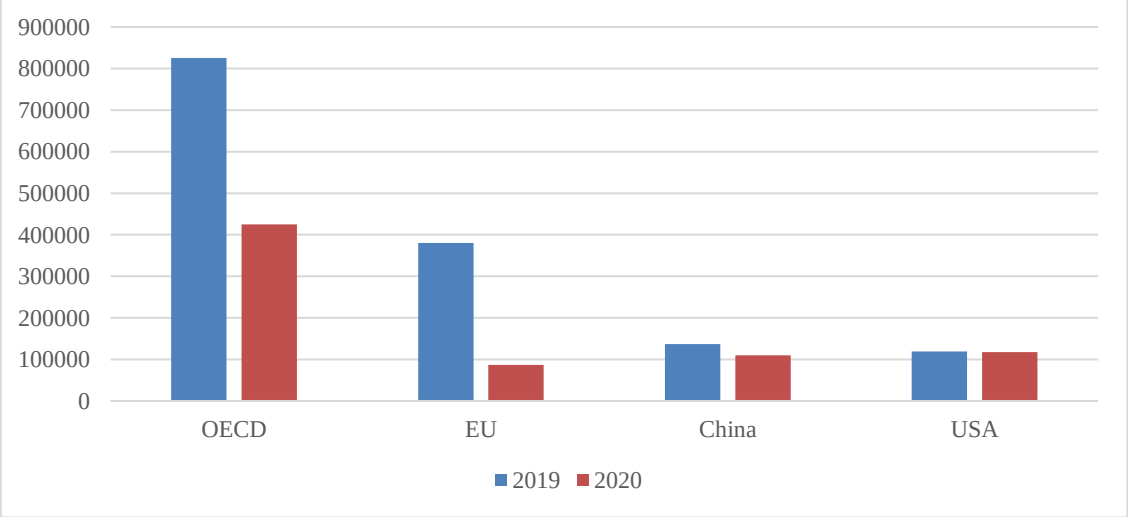

Figure 6 Change on outward FDI 2019-2020 – biggest economies / regions;
Source: modified by (OECD, 2021)

3 Results

The outbreak of the pandemic came unexpectedly, hit everyone by surprise. Its emergence was unpredictable for both businesses and governments, as well as households

/ individuals. However, immediate decisions had to be made to deal with it, new solutions had to be invented. The end of the pandemic is still impossible to predict, but its effects must be measured. Although statistical offices collect usual data, it does not provide answers about the direct impact of the current situation on people's lives. Since the beginning of the pandemic, some research has been done in the topic across Europe, some of them are still ongoing. EUROFOUND's international research on the effects of the pandemic reached more than 85,000 people in EU Member States by 30 April 2020. The "COVID-19 E-Survey" examined the effects of the epidemic on subjective quality of life, health perceptions, institutional trust, and concerns linked to work and workplace. The international online survey: "International Survey on Coronavirus" by Global Research Data Alliance has examined the health effects, fears and ways of coping with pandemic, reached more than 110,000 respondents. The Global Research Data Alliance is a voluntary community of more than 10,500 professionals from 145 countries around the world, and their goal is to collaborate, share data and results from different disciplines (RDA, 2020).

3.1 About Corona HR research project

Current article discusses the results of the empirical research: „Corona HR – Challenges and HR responses" conducted in 6 European countries. The research has been carried out in cooperation with universities, human organizations and research centers of 6 Central and Eastern European countries (Austria, Bulgaria, Bosnia Herzegovina, Hungary, Romania and Slovakia).

Our empirical study is basically an ex-post research study, so we examine the impact of coronavirus crisis on domestic human resource management practices based on opinions and factual data related to the observation period. The survey measures the responses of managers, HR managers or owners of participating organizations. It was a one-respondent type survey, so only one respondent from each organization participated in the survey. The questionnaire we have used, includes both closed and open questions. In the closed questions, the respondents were asked to indicate the most characteristic one of the pre-formulated answers.

3.2 Slovak Businesses in the era of Covid-19 pandemic

In the following, we would like to present some of the results of our empirical survey. As the research is still ongoing in most of the countries studied, such as Slovakia, the final statistical analysis has not yet been carried out. At the same time, the data collected so far provide valuable information on the current situation of businesses. In the Slovak sample, 284 evaluable questionnaires have so far been collected from the organizations addressed. The survey is not considered representative, at the same time respondents range from very small companies to large companies, and the sample covers the whole territory of Slovakia. Foreign owned private companies are represented by 75%, the share of domestic private enterprises is 23% in the sample.

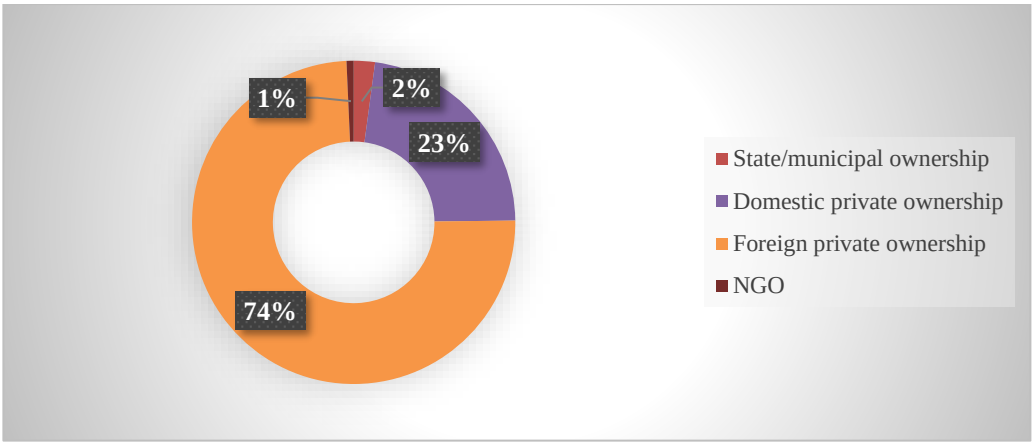

Figure 7 Slovakian respondents by ownership (n=282); Source: own elaboration

The distribution of the responding organizations according to the field of activity corresponds to the Slovak practice. 63,6% of the respondents belong to the services sector, 29,3% to manufacturing and 7% operate in agriculture. The services sector is represented in the sample by: construction, hospitality, retail and wholesale, IT and telecommunications, finance and insurance services, science and admin, public administration, education, healthcare and energy services. In terms of organization size, the Slovak sample is in line with practice. 94.6% of the respondents are small and medium-sized enterprises, 2% are large companies and the rest are self-employed.

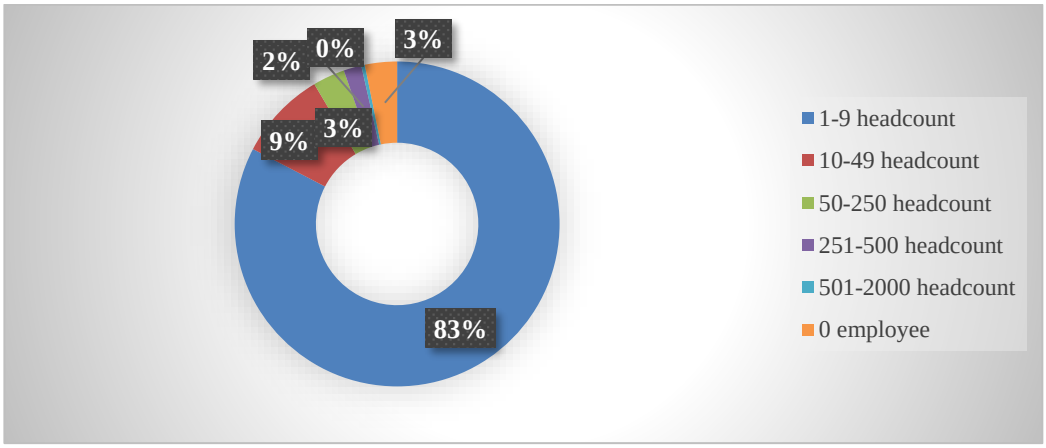

Figure 8 Slovakian respondents by number of employee; Source: own elaboration

As mentioned in previous chapters, it has been 100 years since the last similar pandemic. We were curious to see if the responding organizations had an operational plan developed for such a pandemic situation. According to the survey results, only 4% of respondents had already developed a pandemic plan before the emergence of coronavirus pandemic. Almost 60% of them is a domestic privately-owned enterprise. Half of them stated that they were able to apply the pandemic plan unchanged, and the other 50% said that the existing plan should be adapted to the current situation. 83% of companies with existing pandemic plan are small and medium-sized enterprises and 17% are large companies. 78,5% of respondents did not previously have a pandemic plan, but developed it because of the appearance of coronavirus. 17% of respondents still do not have any plan for pandemic.

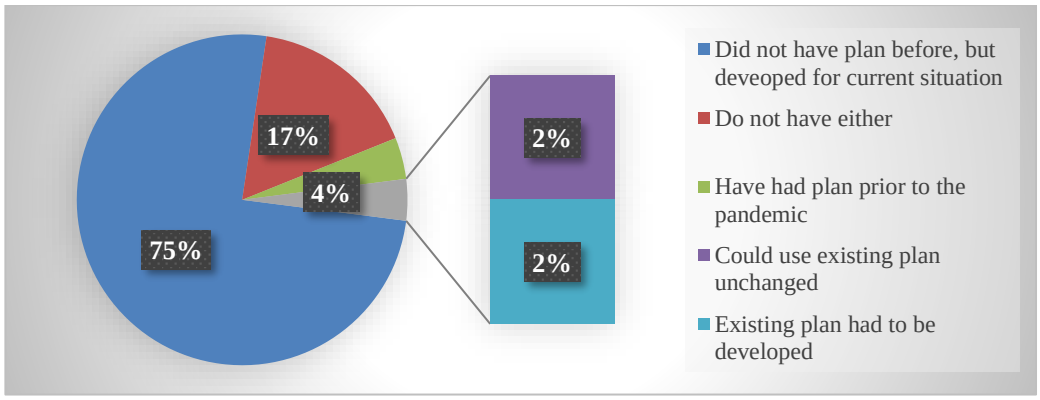

Figure 9 Distribution of respondents in terms of pandemic plan (n=282); Source: own elaboration

The answers show that we cannot foresee unexpected situations, but it is still worth preparing for. Organizations need an emergency protocol that takes effect when an unexpected situation, e.g. pandemic occurs. Participating organizations were also asked what external factors mediated the impact of the crisis on their organization. Respondents scored a predetermined response options on a 1-4 Likert-scale, where 1 is not typical and 4 is very typical. The largest share of respondents indicated a decrease in domestic and / or foreign demand. The answers are illustrated in the figure 10.

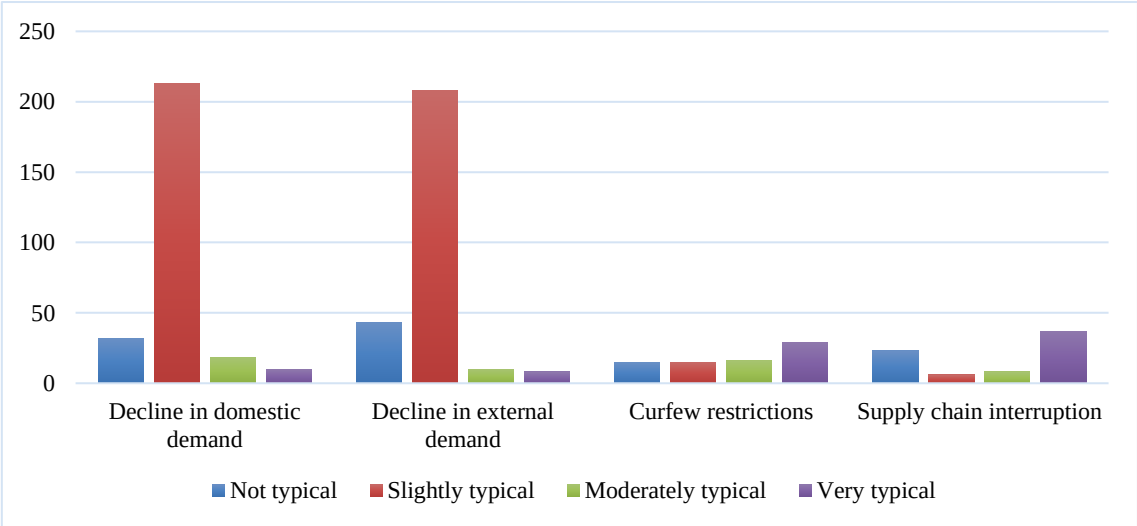

Figure 10 Most typical external factors mediated the impacts of crisis on Slovak businesses; Source: own elaboration

Due to the pandemic, only 9% of respondents were forced to suspend their activities. Most of them continued to operate during the pandemic. Redundancies occurred in 7% of respondents. 93% of the participating organizations did not have redundancies due to the pandemic. The following figure shows the change in headcount in 2020 compared to the previous year.

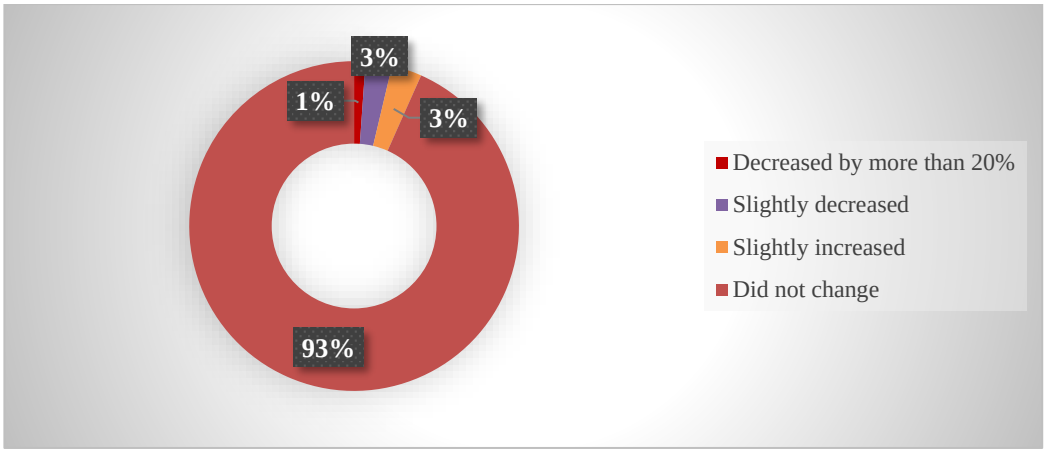

Figure 11 Change in headcount in 2020 compared to 2019; Source: own elaboration

Survey participants were also asked about their future expectations. Regarding the expected sales revenue by 2021, almost 80% of the respondents stated that the revenue expected to decrease by about 10%. Revenue growth is expected by 3% of respondents, and 13% believe that sales in 2021 will be similar to 2020.

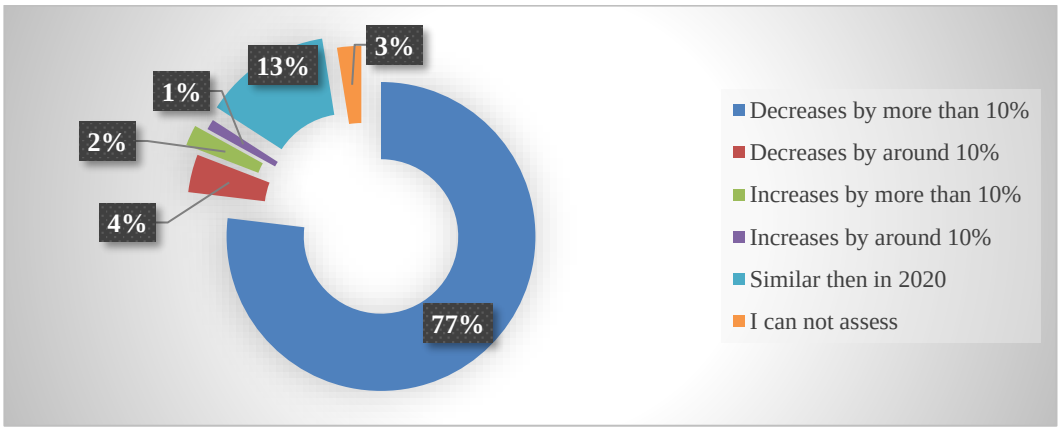

Figure 12 Expectation on sales revenue in 2021; Source: own elaboration

The participating organizations were also asked about their expectations regarding the protracted nature of the current crisis. According to the majority of respondents, the virus situation will last until the end of the year 2021. However, there are those who say that the crisis could drag on until 2025 and even beyond 2025. The vast majority of participants, therefore, do not feel so desperate about the present situation.

Referring to the listed responses, it can be said that the current coronavirus crisis has not yet caused a setback similar to the 2008 crisis. Only a small percentage of companies had to laid off employees. Most of them managed to keep the company running. The loss of revenue affected most of the participating companies, but it can be said they are rather optimistic about the recovery.

4 Discussion

There is currently no shortage of studies predicting an apocalyptic future (Remchukov & Rozhok, 2020), but there is great interest in models that attempt to offer complex solutions for business world as a whole or its individual subsystems.

The fact that the majority of economic actors, with the exception of hotel and hospitality organizations, successfully maintained their operations during the epidemic, underpins forecasts of 4-5 percent economic growth for this year (OECD, 2021).

We are fully aware that our sample is not representative, but the organisations participating in it represent different parts of the Slovakian economy. When preparing our current publication, we completed our research in other countries in the CEE region (Austria, Bosnia and Herzegovina, Bulgaria, Hungary and Romania). Soon we will be able to perform several in-depth statistical studies based on the mentioned samples.

Acknowledgements

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The analysis of strategies of selected foreign Smart cities as best practices for Slovakia

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Abstract

The population in urban agglomerations is growing. Cities are currently solving several problems about providing quality urban services for their inhabitants. The use of information and communication technologies (ICT) is a significant help in providing services in areas of the city. City management has differences from corporate management. However, several similar characteristics remain. Deploying the Smart City concept is a managerial task. The proper definition of the strategy, its implementation can create from cities, such a space that will be sustainable in all areas and suitable for the life of the population. This article aims to create general recommendations for Slovak cities based on the analysis of selected foreign cities that have been marked as "smart". The output of the article is the framework of the smart city strategy. Utilizing all the opportunities that city management creates is the main point of building a modern city.

Keywords: City management; Smart City; Strategy.

JEL Classification: M21, M15, M10

Article Classification: Case study

1 Introduction

Digitization has now become a common part of people's lives, businesses, but also public administration. In the public sphere, it has reached directly the municipalities, which can simplify several processes through using digitization. The term smart city began to be used in the 90s of the 20th century. The massive development of information and communication means brought completely new possibilities for the city's management. There is no single definition of the term "Smart City" itself (Kubina et al., 2021; Trindade et al., 2020) Simply put, it is a city that uses ICT to develop and support

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a sustainable city in all urban areas to improve the quality of life of the population (Koman et al., 2018). The global problem is population growth, which is subsequently visible in ever-expanding urban agglomerations. The UN says the world's population will increase by 2 billion over the next 30 years, from 7.7 billion to 9.7 billion by 2050 (www.imarcgroup.com). Cities are getting bigger, and this is generating a lot of problems. These are mainly problems in the areas of infrastructure, transport, public buildings and public spaces, the environment. Urban development reduces urban greenery, traffic generates noise, and environmental pollution, which significantly reduces the quality of life in cities. These problems also have a global impact on observed climate change. ICT solutions or "Smart" solutions can more effectively manage all areas of the city (Shamsuzzoha et al., 2021).

Strategy is also associated with the Smart City area in public administration. In general, the strategy focuses mainly on the formation of the state of the object. Furthermore, the strategy determines how the desired future state can be achieved. The paths set should be firm, not on the other hand broad enough to can respond to external influences. Each organization is governed by certain assumptions, which are based on goals, results, but also customers. The role of the strategy is to enable organizations to achieve the set goals even in conditions that are unpredictable. Last but not least, it should be emphasized that the role of the strategy is to positively influence the performance of the organization. The organization's strategy should focus on the development of the organization and it is necessary to create a portfolio of areas where the organization will operate (eg various spheres of production, service provision, focus on the non-profit sector, etc.). The whole creation of a strategy represents a complex process where decisions are made at the highest level of management. The process of creating a strategy is shown in Figure 1. (Donnelly et al., 1997; Hitmár, 2011; Kicová & Nadányiová, 2015; Majtán, 2001).

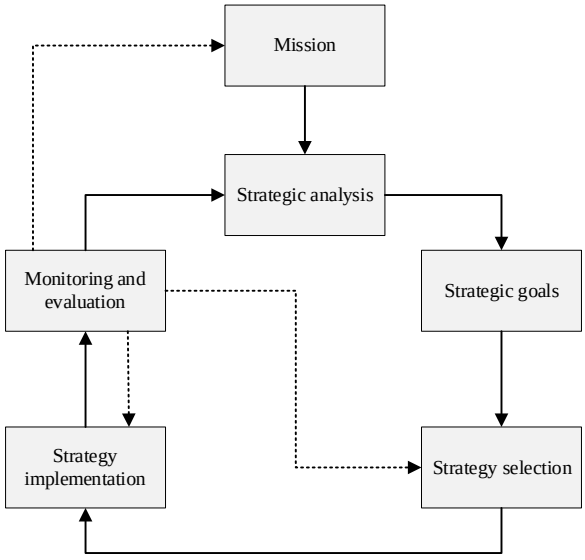
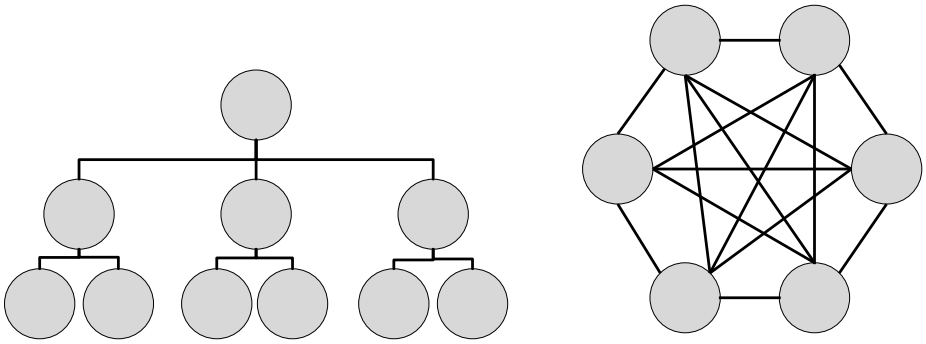


Figure 1 Strategy creation; Source: (Hitmár, 2011)

The process of creating a strategy begins with defining the mission of the organization. The mission should be a kind of guide that sets the basic direction for the formation of the organization in the future. The basis for defining the strategy is strategic analyzes that determine the organization's current market position. Several analyzes need to be performed to determine the starting position of the organization within the

environment. Analyzes should focus on the internal environment, where it is possible to obtain information about the strengths and weaknesses of the organization, and also on the external environment, which can determine what the competitive position is. The results of the analyzes can be used to set goals. Objectives must be of practical significance and should not be defined in general but specifically with a clear possibility of their measurability, which will, in turn, allow control of their fulfillment. The implementation of the strategy is mainly related to the planning of individual resources.

When building a strategy, it is possible to consider two approaches, which are fundamentally different. One is the top-down approach that Henry Fayol has already described in his administration theory. Fayol promoted this approach with a focus on managerial practices and increasing efficiency in organizations. In the case of city management, this type of approach to the strategy can be described as political. It is mainly a matter of implementing various changes with which some stakeholders may not agree. The opposite approach is the bottom-up approach. This approach was mainly described by Taylor in managerial theories. He followed the processes from this point of view. This view also shows the sociological dimension and the consideration of human potential as well as other stakeholders. However, the approach itself does not prevent the implementation of changes from the opposite point of view. It is mainly the creation of various initiatives that seek to reduce economic, environmental costs, etc. through cooperation. This approach also gave rise to a shared economy - e.g. shared driving in order to reduce costs, save the environment, etc. Figure 2. shows a diagram of both approaches (Bělohlávek et al., 2001; Havelka, 1991; Pecháčková, 2019).



Top-down approach Bottom-up approach

Figure 2 Strategy approache; Source: own elaboration

Concerning city management, it is possible to observe several differences between the commercial sphere and public administration. The basic overview is in Table 1.

Table 1 Owerview differences between comercial and public sphere; Source: own elaboration

Criterion	**Sphere**	
	Commercial	**Public**
Subject	Private entities	Public entities
Interest	Private (individual)	Public (political)
Legislative restrictions	Everything except forbidden	Everything that is commanded
Position	Equivalent	Major/subordinate
Basic aim	Profit	Other values

The important fact remains that public entities pursue interests other than making a profit. From the point of view of cities, e.g. sustainability in all spheres and the creation of a quality place for the life of the population, business, etc.

2 Methodology

The article aims to create general recommendations for Slovak cities based on the analysis of selected foreign cities that have been marked as "smart". There are several cities abroad that have succeeded in implementing the Smart City concept. For the selection of individual examples of good practice from abroad, cities were purposefully selected, which are at the forefront of several evaluations of smart cities. Individual evaluations vary depending on the methodology used. Due to this fact, selected cities were selected: Vienna, Berlin, Amsterdam. The case studies were processed by content analysis and the following identifiers were followed:

- position of cities in two smart city ratings: Smart City Index, Cities in Motion index,
- population characteristics (population in the urban agglomeration, population density per square kilometer),
- a strategic approach to the concept of building a smart city (top-down, bottom-up),
- Smart City visions,
- orientation of the strategy in the city,
- sources of investment.

Document analysis was used to process the theoretical part. The article uses primary sources, which are book publications and scientific articles focusing on strategy, public administration, management, and building smart cities. Secondary sources were mainly articles focusing on smart cities.

3 Case studies

The next chapter is focused on the analysis of selected foreign cities in the field of Smart City.

3.1 Amsterdam

It is the capital of the Kingdom of the Netherlands. The population of this city is currently estimated at more than 1 million inhabitants. The city has a population density of 4,908 inhabitants per square kilometer (worldpopulationreview.com).

The city of Amsterdam has long been known for the fact that it is one of the most intelligent cities in the world. In 2016, the city received the European City of Innovation award from the European Commission. The city's primary goal was to reduce CO2 emissions. The programs focused on smart energy and smart grids. The implementation of the program itself was supported by the European Union fund. Other projects of the city were also financed through the European Union in the Horizon 2020 project. Other funding in addition to the European Union is provided as co-financing on the basis of a partner public-private platform, where funding comes primarily from the private sector.

As part of the development of the smart city concept, Amsterdam emphasizes the promotion of knowledge and the building of human infrastructure. There is a science park within the city, which has the task of supporting start-up technology companies. In terms

of openness of data in the city, there is a portal called City Data since 2015. The portal is used to collect all data and also tries to keep the data available to the general public so that they can work with the data if interested. This system collects data from the following areas: tourism, infrastructure, geography, population, transport, public space and urban greenery, urban development, energy. The main activities of this portal include (amsterdamsmartcity.com; Angelidou, 2016):

- the production of basic statistics and monitoring, which is important for all stakeholders,
- developing the city's knowledge and maintaining contacts with knowledge institutions,
- development and making data available to the city and the general public,
- facilitating the processing of large volumes of data.

The key task of the strategy is to create a concept that will ensure the cooperation of stakeholders at several levels., and also in line with the interconnection of the public and private sectors. In the case of the city of Amsterdam, more than 70 private and public partners are connected. Based on partnerships, there are also so-called "Living urban laboratories." which allow the application of smart city testing solutions directly in practice. There is also an online platform in the city, in which residents can share their projects, initiatives and thus look for further cooperation for the possible implementation of projects in practice. Due to this, it can be stated that they also apply a "bottom-up" strategy in the city, when there is an opportunity for the population to create and implement their project (Brokaw, 2016; Nori et al., 2020).

From the point of view of the population, the city ranked 9th out of the total number of 102 cities within the Smart City Index with a total summary of 80%, which belongs to Index A. Residents perceive housing affordability, safety, air pollution and public transport as the city's most problematic areas. They perceive the city's online services positively. In the evaluation of smart cities using the Cities in Motion Index, the city of Amsterdam was ranked 8 out of 174. The basic conclusions resulting from the implementation of the concept of the smart city of Amsterdam include (blog.iese.edu):

- use of funds from public-private partnerships,
- an entrepreneurial approach based on the support of start-ups,
- involvement of technological and innovative employees in the concept,
- involvement of the population in the creation of further project proposals.

3.2 Berlin

Berlin is the capital of Germany and one of the 16 German states. The city is one of the largest in Germany and is also the second most populous city in the European Union. The population of Berlin is currently more than 3.5 million. The population density of the city is 3,809 inhabitants per square kilometer (worldpopulationreview.com).

In 2015, the Berlin Senate decided to adopt a smart city strategy with a long-term vision until 2050. One of the basic goals of the strategy was to increase Berlin's competitiveness in the international arena. Another goal was the effort to use resources efficiently and climate neutrality. Other strategic goals of the smart city included (www.smart-city-berlin.de):

- long-term provision and optimization of public services,
- strengthening urban infrastructure,

- enhancing transparency in public administration decision-making.

There are currently several different interdisciplinary projects in Berlin that create and exploit synergies from the public sphere, science, and research, as well as business. They are mainly focused on energy, transport, and logistics, information and communication technologies, healthcare. In Berlin, they have set up a contact point for all stakeholders identified by the Smart City Strategy Berlin as businesses, scientific, and research institutions. The contact point called Berlin Partner becomes a basic contact point for stakeholders, especially about the possibilities of financing projects and initiating their own business projects, which are focused on building a smart city. The municipality itself applied for funding for projects through European Union funds in Horizon 2020. From the point of view of reworking the strategy, it can be described as the best part of data availability. It goes e.g. official documents, information on the decision-making of the senate, information concerning the management of the city in its various areas. At the same time, the open data system leads to the transparency of city managers. On the other hand, the work of this platform can support the participation of citizens in the further building of a smart city. As part of the development of the concept, there is a My Berlin website (mein.berlin.de) for citizens, which regularly informs residents about planned and already implemented projects in the city. At the same time, residents have the opportunity to actively participate in commenting on individual projects and are thus able to influence the formation of Berlin with their relevant views. However, some articles criticize the Berlin Strategy mainly for the absence of a well-prepared implementation plan with clear steps. At present, the strategy can be considered a combination of strategic approaches (top-down, bottom-up) as citizens have the opportunity to participate and comment on individual projects of the city, but on the other hand, the final decision on the subsequent implementation of the solution is the Berlin Senate itself (Spil et al., 2017).

The city of Berlin ranked 38th out of 102 in the Smart City Index with a 70% citizen rating. Among the biggest problems of the city, they identified: the availability of housing, traffic jams and also security in the city. On the contrary, they identified the possibility of online purchase of travel tickets within the framework of mobility, online possibilities of searching for vacancies, online purchase of tickets to cultural institutions as the biggest advantages. Within the Cities in Motion Index, the city of Berlin ranks 7th out of a total of 174 cities worldwide (www. blog.iese.edu; www.imd.org).

The basic strategic recommendations that gas from the concept in the city of Berlin are:

- creating links between public and private partners,
- creating a space for citizens (commenting on projects, creating new ones),
- support for smart city-building businesses.

3.3 Vienna

It is the capital of Austria and also the seventh-largest city in the European Union. In 2020, the city's population reached more than 1.9 million inhabitants. Vienna was a UNESCO World Heritage Site in 2001. The population density is approximately 4,000 inhabitants per square kilometer. The distribution of the population is not uniform. Some parts of the city are denser than others in terms of a settlement (worldpopulationreview.com).

The building of the intelligent city of Vienna began in 2011, when various stakeholders were involved in interviews, workshops, etc. The output of these meetings

and discussions is the development of the strategy itself, which is set with a long-term vision until 2050. In 2013, the city of Vienna signed a memorandum in the field of smart cities. The main goal was the additional possibility of obtaining funding from the European Union. The strategy of a smart city is focused on connecting the areas of energy, mobility, spatial planning, and city management, environment. The aim of connecting the individual areas is mainly to ensure a participatory approach of the city's residents to building the strategy. In 2014, the so-called digital agenda, which included external experts, representatives of the private sector, local government. The main goal was to improve the position of ICT in Vienna through the preparation of projects in various fields (digital skills, data security, e-health, public transport applications, etc.) (Roblek, 2019).

As part of ensuring the strategy in the city, the approach of the municipal government is divided into two levels of implementation. The first level is the political level and contains mainly political priorities and further definitions of policies that are directly related to the limited resources. The second level is called operational, where tasks are solved using various organizational units of the city. To this is added external cooperation. The operational level itself has a management group, where both the public and private parts are involved. From the point of view of defining a strategic approach, it is possible to speak of a combined approach. Citizens' participation in various projects and involvement in initiatives is a hallmark of a bottom-up approach. The political agenda in conjunction with the definition of individual policies about the available resources is mainly a task for city officials. In this case, it is possible to speak of a standard "top-down" approach.

The goals conceived by the strategic document of the city of Vienna are not built technologically but rather socially about the quality of life of the inhabitants. Among the basic goals that the city of Vienna has declared itself in the implementation of the smart city are (smartcity.wien.gv.at):

- reduction of CO2 emissions,
- building a wide wireless network,
- conservation of green space in cities,
- reduction of CO2 tonnes in waste systems,
- increase in direct investment in Vienna.

From the point of view of population assessment, Vienna ranked 25th out of 102 available cities. The overall rating of the city reached 70%. In the Cities in Motion Index, the city ranked 18th. The basic shortcomings identified by the population include poor access to housing, traffic jams, unemployment, and security in the city. Among the positive features of the city residents identified (www. blog.iese.edu; www.imd.org):

- online information on scheduled maintenance, fault reporting,
- the quality of the city's recycling services,
- quality public transport,
- sufficient urban greenery,
- sufficient cultural activities,
- lifelong learning,
- the business environment creates new jobs.

Among the basic conclusions arising from the strategy can be marked:

- population orientation, quality of life in cities,
- creation of space for project creation, creation of partnerships,
- involving the population in the city.

4 Recommandations for Slovakia

From these case studies, it can be seen that a smart city is not just about ICT. The concept is much broader and the greatest emphasis is placed on the stakeholders who are the "creator" of the whole city. The strategy must be designed with all stakeholders involved in building and expanding a smart city. Cities in Slovakia are also trying to build smart cities and perceive the benefits that SC itself can bring them (www.mhsr.sk).

The basic recommendations arising from foreign case studies include:

- open data system,
- cross-section of individual city areas,
- focus on all stakeholders - participation,
- support for innovative thinking and the emergence of technological start-ups.

One of the basic components of the strategy is the open data system, which was implemented in all cities in case studies. These are data that are collected within the built urban technological infrastructure, e.g. data from IoT devices (Koman et al., 2019). The data can then be used for the needs of various stakeholders (citizens, entrepreneurs, developers, researchers) who can use the data for their private as well as public needs. Data are generated for different areas of the city such as economy, transport, environment, communities, safety, housing, health). Data openness is one of the first steps and key decisions that must be made when implementing a smart city. The ideal system is to connect all data in the city - i. data from all stakeholders. This is where the question of the willingness to share data in cities arises. The city is responsible for several areas (public administration, education, health, social development, transport, environment, etc.). Each area has an impact on the other (e. g. transport and the environment). The cross-section of the areas can thus create synergistic effects. All stakeholders are an essential element. The development of the city itself is directly dependent on them. These include residents who should participate in creating the city's vision. Stakeholders in building a smart city are, in addition to residents, companies of different sizes with different lengths of business activity, research institutes, universities, non-profit organizations, civic associations, initiatives, experts in various fields, and others that have a direct or indirect relationship to the city. The importance of the participation of these entities lies mainly in the fact that they can contribute to the very development of the city - proposals for improvement in various areas, technological innovation, cooperation to obtain funding, cooperation in the implementation of technological solutions, etc. The cooperation of individual stakeholders is directly related to the principle applied in its creation. The ideal approach based on the analyzed theories of good practice is based on the application of a combined approach, which means that cities create conditions for citizens (e.g. in terms of building technological and innovative environment), and on the other hand, stakeholders have sufficient space to participate proactively in strategy. The following figure shows the procedure for creating and implementing SC.

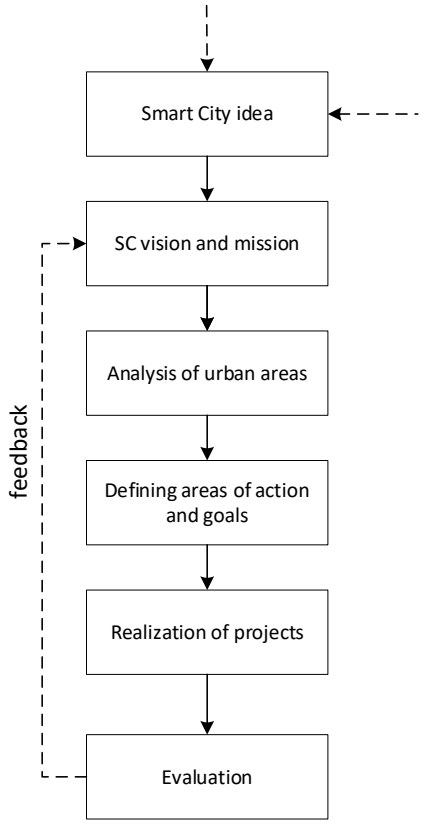


Figure 3 Process of strategy; Source: own elaboration

This model considers the first impulse to "be smart." which can come from different spheres. It can be motivation from the state, the European Union, the vision of city representatives, the efforts of other stakeholders. Then comes the definition of the vision of a smart city for a longer period (e. g. 20 years) to describe what such a city should look like. After the definition, space is created for the performance of strategic analyzes of all urban areas with the subsequent definition of areas where it is possible to start planning the implementation of the concept. After the selection of areas and the performed analysis, it is possible to define individual goals with subsequent steps that will lead to their fulfillment. Then comes the space for project implementation (implementation phase). This phase is important as it begins to transform the vision into reality in defined urban areas. In this part, cities will implement general projects about the construction of ICT infrastructure and subsequently projects in defined areas. The last phase is the control of the current state vs. the desired condition with subsequent modifications. All stakeholders who can comment on the definition of the strategy and the subsequent building of a smart city should be invited to all phases. Synergistic effects can be achieved through the cooperation of individual stakeholders (Ferrer, 2017; Mora & Bolici, 2016).

5 Discussion and conclusion

Building a smart city represents a long-term process of transforming the city with the use of ICT resources about its sustainability in all areas (Novák, 2006). The first impulse is the effort to "become smart". This impulse can come from different areas. One of them is the very vision of city officials to increase the competitiveness of the city. Other impulses may be companies engaged in digitization in municipalities. It can also

be a state that, through the legislative process, creates the conditions for the expansion of this concept. The state also plays a role in the financing of individual projects, including the possibility of using European Union funds. There is a Smart City portal in Slovakia, where representatives and other stakeholders can oversee calls for funding for their projects. The challenges are currently focused on transport, the environment, energy efficiency of buildings. Currently, in addition to the portal, the state does not create sufficient support for building SC solutions. The sphere of SC in Slovakia is thus divided into other institutions (mostly clusters), which offer solutions and consultations for municipalities. Awareness of SC is high in Slovakia in companies and local governments.

Another issue in the case of the implementation of the concept is also smaller cities, which do not have enough funds to implement all the solutions. There is also room for thinking about smart regions and networking of individual smaller cities. An important role is played by city representatives who come to the role of mayors with a certain vision for the transformation of the city. Some SC solutions may not appear to be "popular" at first (e. g. sensor installation, traffic restrictions, etc.). An interesting fact that is observed in Slovakia is the slight outflow of people from cities to the countryside. This situation is opposite to that on a global scale. A pandemic is also the reason for the relocation of the population to the countryside (Marcinčin, 2019).

Slovak cities are responding to the current situation brought about by digitization. Cities abroad have long shown that the use of smart technologies in cities and the building of the Smart City concept can solve the problems that arise. The main reason is the ever-expanding cities, which are trying to create a quality space for the lives of their inhabitants. If Slovak cities also want to be competitive, they must start using the technologies and other opportunities that the current time brings them. The vision and strategy of smart cities should exist in every city. On the other hand, the state must also create enough space to support cities in their efforts to become intelligent.

Akcknowledgements

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Regional aspects of entrepreneurial activity and characteristics in Slovakia with the emphasis on youth and seniors

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Abstract

This paper aims to identify differences in the entrepreneurial process across Slovak regions (NUTS 3 level) for the population as well as youth and seniors based on the Global Entrepreneurship Monitor (GEM) data. A pooled sample was created using the adult population survey (APS) individual-level data for Slovakia (2016-2020). We implemented descriptive statistics methods and further analysed the results according to studied groups of the population. Our findings point out recommendations for Slovak regions that policymakers should focus their attention on and consider while formulating entrepreneurship-related policies. We believe the paper provides valuable insight on entrepreneurial activity and its respective phases in the regional context with the emphasis on the population, youth, and seniors.

Keywords: Entrepreneurial activity; Entrepreneurial process; Regional analysis; GEM data.

JEL Classification: R11, R12, R19

Article Classification: Research article

1 Introduction

Understanding the formation of entrepreneurial behaviour has important implications for the creation of policies (Kibler, 2013) and presents a valuable knowledge base for policymakers. The objective is not only to foster entrepreneurial potential, intentions, and early-stage entrepreneurial activity among the population but also a culture favourable to conducting entrepreneurship in later stages as it has been previously discussed by e. g. Kautonen et al. (2011), Pilková et al. (2019), or Westlund et al. (2014). However, entrepreneurship is a complex phenomenon and thus it is important to consider various factors that influence it. In general, it is known that individual characteristics are

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important and influence one´s decision to engage in entrepreneurship. However, entrepreneurial activity draws also from the social context that to a large extend shapes and forms entrepreneurial outcomes. Furthermore, as stated by Shook et al. (2003), interaction with the regional environment is likewise crucial. The previous literature suggests that regional environment and context affect individual perceptions. In the increasing body of literature, mostly significant effects of regional factors on entrepreneurial activity and economic development have been explored (e. g. Fritsch & Schmude, 2006; Tamásy, 2006). The theory points out that regional context influences perceptions and entrepreneurial preferences (Sternberg, 2009; Bosma et al., 2009). Also, entrepreneurial behaviour is an embedded phenomenon, while triggering factors depend on contextual circumstances which may vary significantly in different locations (Lévesque & Minniti, 2006). Although there is a vast literature about individual characteristics, entrepreneurial context, and regional aspects, the researchers have yet to focus on different age generations. Particularly youth and seniors attracted the attention of researchers and policymakers due to global challenges such as long-term unemployment, different social issues as well as an aging society. One of the possible solutions to these challenges seems to be cross-generational entrepreneurship, however, a generational gap exists. The evidence shows that the total early-stage entrepreneurial activity of youth is much higher than that of seniors (Pilková et al., 2020). Even though it is known that starting a new firm "tends to be a young man´s game" (Lévesque & Minniti, 2006) higher senior´s involvement has many advantages such as not relying on pension schemes, staying active in the labour market, and contributing to the system, social inclusion, active aging, etc. On the other hand, youth can also benefit from expanding their professional networks, gaining experience, knowledge, and skills. Therefore, if the situation is to improve it is important to study age differences between generations particularly in the regional setting to gain a better overview of the situation and focus the policy interventions more precisely.

This paper makes the following contributions. It provides a literature review on regional and generational aspects of entrepreneurship. Second, the paper presents result of GEM on different phases of the entrepreneurial process across Slovak regions for the population as well as youth and seniors. Third, implications for policymakers are derived by providing detailed information on different regions and how they influence youth and senior´s early-stage entrepreneurial engagement.

The paper is organized as follows. The first part describes the theoretical background underlying the analysis. The subsequent part introduces the methods used in the empirical part based on GEM data. The third part presents the results of the analysis, while the final part discusses the findings and their implications for policymakers and further research.

1.1 Theoretical background

Studies focused on age generations and entrepreneurial activity are relatively scarce (Ratten, 2019). It is important to research entrepreneurship in general, but it is also useful to understand the differences between generations and how the factors influencing them differ. Population around the world ages therefore the need for understanding generational aspects of entrepreneurship increases as well as the importance of understanding the consequences for entrepreneurial policies. The existing studies focus on differences in behaviours, labour market orientation, perceptions, and values between youth and seniors (Pyöriä et al., 2017; Howe & Strauss, 2007). These differences are often a source of intergenerational conflicts as described by Belkin (2005). Seniors are often

found not being as smart as youth and hence a social separation exists according to Hagestad and Uhlenberg (2005). One reason for such a conclusion might be the higher cognitive skills of youth which makes them more prone to perceive opportunities and act on them (Olugbola, 2017). Another reason could be the easier use of new technology and the likelihood of technological innovation by the younger generation (Kolnhofer-Derecskei et al., 2018). Youth also exhibit a higher likelihood of looking for meaning and social responsibility in the workplace, on average achieve a higher level of education and are better at using ICT and social media platforms (Pyöriä et al., 2017).

Senior entrepreneurs are on the other hand in the next phase of their life and are likely to capitalize on their developed personal attributes, knowledge, skills, and experience (Ratten, 2019). Seniors have higher intellectual and human capital that can be used to overcome difficulties in setting up a business (Baù et al., 2017). Even though there has been very little research published compared to other groups of the population including different types of entrepreneurs (Ratten, 2019), senior entrepreneurs and setting up a business later in life are becoming more popular (Tervo, 2014) which enables seniors to stay active in their social lives and community (Isele & Rogoff, 2014). Seniors are more likely to have time to dream, dedicate their effort to set up a business, and fulfill their dreams (Hantman & Gimmon, 2014). They also might have more financial resources than youth which gives them more freedom (Menyen & Adair, 2013). However, with increasing age, the opportunity cost of time increases, and seniors might be less willing to commit to activities with uncertain results (Gimeno et al., 1997).

There is not a defined set of characteristics that would make a person an entrepreneur. It is broadly acknowledged that it is an individual choice. However, social capital has an impact on entrepreneurship, which is represented by culture, social networks, norms, values, and attitudes towards entrepreneurship that differ across various regions. The meaning of regional context is also important as entrepreneurs tend to establish ventures close to where they live (Stam, 2007). Entrepreneurial outcomes are the interplay of individual characteristics, attitudes, and regional context (Westlund et al., 2014) that determine available opportunities, resources, capabilities but also interests (Thurik et al., 2002). Regional factors influence individuals at the early stages of the entrepreneurial process (Bosma & Schutjens, 2011) and influence individual´s interest in setting up a business and entrepreneurial motivations (Stenberg, 2009). Entrepreneurial aspirations are likewise shaped to a large extend by regional attributes that further influence opportunity perception, ambiguity towards risk, entrepreneurial self-confidence in one´s own ability to start and run a business (Bergmann, 2005).

In the literature, it has been discussed that the urban environment might support venture creation by providing more entrepreneurial opportunities and resources compared to rural areas (Tödtling & Wanzenböck, 2003). Furthermore, urban environments are more likely to foster the creation of networks and collaborations that can contribute to new venture creation (Liao & Welsch, 2005). Naudé et al. (2008) argue that in urban areas the competition is usually higher as well as barriers to entry. Wealthier regions with higher income level exhibit increased spending capacity and higher demand even though the higher income levels might increase labour costs and hence a bigger proportion of the population prefer paid employment (Bosma et al., 2008). Higher regional entrepreneurial activity increases innovation, entrepreneurial diversity, knowledge spillovers, the emergence of role models, and overall higher entrepreneurial attitudes (Fritsch & Mueller, 2007; Bosma & Schutjens, 2011). New entrepreneurial activity is likely to fail, therefore business discontinuation tends to be higher. That can cause a stigma of failure in the region which might have an adverse effect on starting entrepreneurial activity (Pe'er & Vertinsky, 2008). The evidence shows that regional aspects positively but also

negatively affect the entrepreneurial process and can support or discourage individual entrepreneurial intentions.

This article aims to add to the literature by examining the regional differences of overall entrepreneurial engagement in different phases of the entrepreneurial process and that of youth and seniors in Slovakia. We use the Global Entrepreneurship Monitor approach (Reynolds et al., 2005) that is well suited for measurement and analysis of different phases of the entrepreneurial process.

2 Material and methods

The paper is based on GEM data, specifically Adult Population Survey (APS) for Slovakia during the years 2016 to 2020. GEM is the world´s foremost study about entrepreneurship that examines the entrepreneurial behaviour of individuals (their characteristics, attitudes, activities, and aspirations). The minimum sample of 2000 respondents had been collected annually which is representative of age, gender, and regional distribution. The analysis was conducted in 3 stages.

At *the first stage*, a pooled sample of APS individual-level data (adult population 18 – 64 years old) was created for Slovakia (for years 2016 – 2020) comprising of 10,001 adult population individuals. A pooled sample was also created for studied groups of the population, youth (aged 18 – 34 years old) comprising of 3,518 individuals and senior (aged 55 – 64 years old) comprising of 2024 individuals.

At *the second stage*, selected variables of the entrepreneurial process for 8 Slovak regions as well as for the whole country were computed implementing descriptive statistics methods. We used the entrepreneurship process model by Singer et al. (2012) shown in figure 1 illustrating entrepreneurial phases.

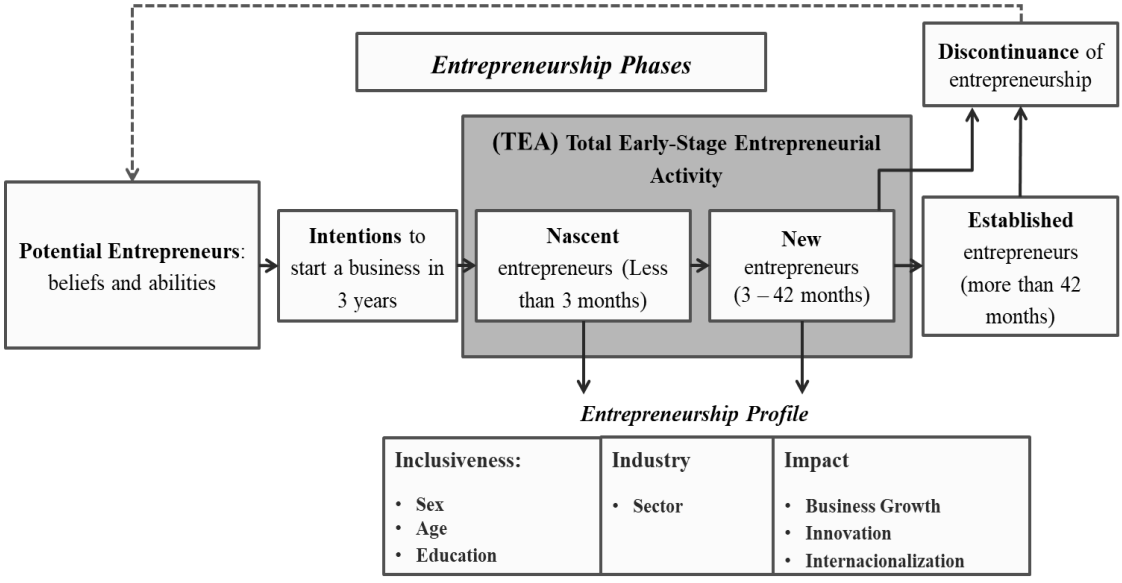

Figure 1 Entrepreneurship process model; Source: modified by (Singer et al., 2012)

GEM indicators are well suited to measure entrepreneurial phases. According to the process model shown in figure 1, the first entrepreneurial phase is represented by potential entrepreneurs. As the potential of the population to become entrepreneurs cannot be directly measured it is observed through a set of variables divided into two groups, namely: a) social attitudes towards entrepreneurship representing social capital, including variables such as media attention, high entrepreneurial status in society and perception of

entrepreneurship as a desired career choice; b) self-assessment of potential entrepreneurs including variables such as perceived opportunities (perception of good opportunities for starting a business in the next 6 months), entrepreneurial self-confidence (belief in having required knowledge, skills, and experience to start a new business), and fear of failure (indicating that fear of failure would prevent the respondent from starting a business). The entrepreneurial process then continues with the intention to start a business including individuals who expect to start a business within the next three years. Total early-stage entrepreneurial activity (TEA) consists of nascent entrepreneurs who are owners and managers of businesses up to 3 months old receiving no income yet and new entrepreneurs doing business from 3 months up to 42 months. Individuals doing business that had been generating income for more than 42 months are considered established entrepreneurs. The cycle then ends with business discontinuation that includes individuals who quit entrepreneurial activity due to various reasons.

At *the third stage*, we analysed computed variables of entrepreneurial phases for Slovak regions, presented the results, and formulated the findings as well as policy implications.

3 Results

The entrepreneurial potential of the population in the Slovak regions according to the methodology described in chapter 2 is measured through social attitudes towards entrepreneurship and self-assessment of potential entrepreneurs. The results are shown in Table 1.

Table 1 Entrepreneurial potential of the Slovak population for 2016 – 2020 (in %); Source: own elaboration

	Bratislava region	**Trnava region**	**Nitra region**	**Trenčín region**	**Banská Bystrica**	**Žilina region**	**Prešov region**	**Košice region**	**Slovakia**
Social attitudes towards entrepreneurship									
Media attention	56,1	59,0	58,5	58,9	53,5	54,3	58,6	56,6	56,9
High entrepreneurial status in society	57,6	61,3	63,0	62,1	57,9	59,0	59,4	61,4	60,2
Entrepreneurship as a good career choice	39,2	49,0	45,1	49,6	46,8	48,9	50,5	48,7	47,3
Self-assessment of potential entrepreneurs									
Perceived opportunities	52,5	42,8	31,9	36,5	23,1	32,0	26,6	28,8	33,4
Entrepreneurial self-confidence	60,3	50,5	50,3	49,2	48,6	50,5	50,0	49,6	51,0
Fear of failure	41,8	48,2	48,4	49,3	46,9	52,6	44,7	48,6	47,5

Values of entrepreneurial potential variables differ greatly across Slovak regions. Social attitudes towards entrepreneurship are the worst in the Bratislava region, particularly the high status of entrepreneurs in society and entrepreneurship as a good career choice which are both well below the average of Slovakia. Underperforming is also Banská Bystrica region which is not lacking significantly behind the Slovak average in perceiving entrepreneurship as a good career choice but on the other hand, exhibits the lowest media attention towards entrepreneurship. Considering social attitudes towards entrepreneurship, the Nitra region shows the highest media attention as well as entrepreneurial status in society. Media attention is further high also in the Trnava region, Trenčín region as well as Prešov region, where entrepreneurship is considered as a good

career choice by the highest proportion of the population. Bratislava region outperforms other Slovak regions in self-assessment of potential entrepreneurs where the highest proportion of the population perceives good opportunities for conducting business, also that they have sufficient knowledge, skills, and experience to do so and fear of failure would not discourage them from engaging in entrepreneurial activity. Contrary, the population in the Banská Bystrica region perceives the least opportunities and self-confidence. Fear of failure prevails in the Žilina region.

Table 2 presents the values of other entrepreneurial phases according to the entrepreneurship process model.

Table 2 Entrepreneurial activity of the population in Slovak regions for 2016 – 2020 (in %); Source: own elaboration

	Bratislava region	**Trnava region**	**Nitra region**	**Trenčín region**	**Banská Bystrica**	**Žilina region**	**Prešov region**	**Košice region**	**Slovakia**
Entrepreneurial intentions (among non-entrepreneurs)	15,6	11,8	11,2	9,8	10,4	11,8	10,3	12,9	11,7
Nascent entrepreneurs	11,8	7,8	8,0	9,4	7,8	6,8	9,4	8,4	8,7
New entrepreneurs	5,2	3,1	4,9	3,3	3,5	2,7	3,0	3,4	3,6
Index of "Death"	2,3	2,6	1,6	2,9	2,2	2,6	3,2	2,4	2,4
Total early-stage entrepreneurial activity (TEA)	16,6	10,8	12,8	12,5	11,2	9,3	12,2	11,7	12,1
Established entrepreneurs	10,8	6,4	6,1	6,4	5,0	6,3	6,2	5,9	6,6
Business discontinuation	5,1	4,6	5,1	4,4	3,2	4,5	4,1	4,0	4,4

Bratislava region exhibits the highest entrepreneurial intentions, TEA consisting of nascent and new entrepreneurs, established entrepreneurial activity but unfortunately also business discontinuation. Entrepreneurial intentions are the lowest in Trenčín, Prešov and also in Banská Bystrica region. In terms of TEA and its components, the Žilina region is performing the worst. However, the highest index of "death" which is an interesting variable showing the proportion of nascent and new entrepreneurs while expressing the proportion of those who fail in their initial entrepreneurial effort (nascent phase) and do not manage to overcome difficulties to become new entrepreneurs, is in Prešov region. Index of "death" in the Prešov region equals 3,2 which means that for one successful entrepreneur who manages to become a new entrepreneur more than 3 other entrepreneurs are unsuccessful. The least established entrepreneurs can be found in the Banská Bystrica region that also exhibits the lowest business discontinuation.

Tables 3 and 4 are focused on analysing the phases of entrepreneurial activity of youth.

Table 3 Entrepreneurial potential of youth in Slovakia for 2016 – 2020 (in %); Source: own elaboration

	Bratislava region	**Trnava region**	**Nitra region**	**Trenčín region**	**Banská Bystrica**	**Žilina region**	**Prešov region**	**Košice region**	**Slovakia**
Social attitudes towards entrepreneurship									
Media attention	58,5	63,4	59,5	54,8	54,3	53,8	60,3	59,6	58,0
High entrepreneurial status in society	60,4	63,7	70,1	67,7	64,5	62,6	61,5	62,2	63,9
Entrepreneurship as a good career choice	37,1	52,5	44,9	53,1	49,3	44,5	56,1	48,6	48,5
Self-assessment of potential entrepreneurs									
Perceived opportunities	57,8	49,2	38,4	38,9	26,7	36,9	32,5	36,6	38,9
Entrepreneurial self-confidence	57,6	44,7	49,1	45,9	48,1	50,6	48,8	48,2	49,2
Fear of failure	42,7	48,5	50,4	53,7	44,9	50,4	43,9	48,0	47,7

In terms of social attitudes towards entrepreneurship, youth perceive the highest media attention in the Trnava region and the lowest in the Žilina region. Entrepreneurs enjoy the highest status by youth in the Nitra region and the contrary in Prešov a Košice region. Interestingly, in the Prešov region is entrepreneurship further considered as a good career choice by the highest proportion of youth while it is the least in the Bratislava region which excels on the other hand in self-assessment of potential youth entrepreneurs. They perceive the most entrepreneurial opportunities, are the most self-confident, and exhibit the lowest fear of failure. The least opportunities perceive youth in Banská Bystrica region, the least self-confident are in the Trnava region, and the highest fear of failure they show in the Trenčín region.

Table 4 Entrepreneurial activity of youth in Slovak regions for 2016 – 2020 (in %); Source: own elaboration

	Bratislava region	**Trnava region**	**Nitra region**	**Trenčín region**	**Banská Bystrica**	**Žilina region**	**Prešov region**	**Košice region**	**Slovakia**
Entrepreneurial intentions (among non-entrepreneurs)	19,9	14,1	16,2	13,3	11,2	17,3	12,5	17,1	15,1
Nascent entrepreneurs	14,7	9,5	9,0	11,1	7,6	8,7	7,9	9,4	9,6
New entrepreneurs	3,0	2,2	6,0	3,1	2,6	5,1	3,2	3,2	3,6
Index of "Death"	4,9	4,2	1,5	3,5	2,9	1,7	2,4	2,9	2,7
Total early-stage entrepreneurial activity (TEA)	17,7	11,5	15,0	14,2	10,2	13,1	10,8	12,5	13,0
Established entrepreneurs	5,0	1,7	1,9	3,1	3,1	2,7	2,3	2,4	2,8
Business discontinuation	4,0	2,5	5,3	3,2	1,7	5,1	4,3	3,2	3,7

Youth in the Bratislava region outperform their counterparts from other regions in all phases of entrepreneurial activity except for new entrepreneurs and business discontinuation. The low proportion of new entrepreneurs also causes the highest index of "death". The lowest entrepreneurial intentions show youth in the Banská Bystrica region, where we can find also the lowest TEA but interestingly also business discontinuation. The lowest index of "death" is both in Nitra and Žilina region.

Tables 5 and 6 contain information about seniors´ involvement in different phases of entrepreneurial activity.

Table 5 Entrepreneurial potential of seniors in Slovakia for 2016 – 2020 (in %); Source: own elaboration

	Bratislava region	**Trnava region**	**Nitra region**	**Trenčín region**	**Banská Bystrica**	**Žilina region**	**Prešov region**	**Košice region**	**Slovakia**
Social attitudes towards entrepreneurship									
Media attention	55,5	63,0	55,7	60,2	53,1	59,6	54,5	58,5	57,3
High entrepreneurial status in society	56,7	61,6	58,8	56,1	52,6	53,1	55,5	57,9	56,5
Entrepreneurship as a good career choice	43,6	54,7	44,1	44,6	41,3	47,6	48,7	50,4	46,9
Self-assessment of potential entrepreneurs									
Perceived opportunities	50,3	36,0	26,9	38,5	19,0	29,5	22,2	27,2	30,2
Entrepreneurial self-confidence	58,8	45,3	44,6	50,0	38,4	44,6	44,1	46,6	46,4
Fear of failure	42,0	46,5	53,9	40,1	48,7	50,4	46,3	46,6	47,1

Regarding seniors´ social attitudes towards entrepreneurship, all three indicators exhibit the highest values in the Trnava region and lowest in the Banská Bystrica region. Banská Bystrica region is further lacking behind other regions in perceiving good opportunities for conducting business and entrepreneurial self-confidence. The highest opportunity perception and entrepreneurial self-confidence seniors exhibit in the Bratislava region. Seniors in the Trenčín region seem the most resilient against the fear of failure while those in the Nitra region are the least resilient.

Table 6 Entrepreneurial activity of seniors in Slovak regions for 2016 – 2020 (in %); Source: own elaboration

	Bratislava region	**Trnava region**	**Nitra region**	**Trenčín region**	**Banská Bystrica**	**Žilina region**	**Prešov region**	**Košice region**	**Slovakia**
Entrepreneurial intentions (among non-entrepreneurs)	12,6	5,9	3,4	6,5	9,1	5,2	3,7	7,5	6,5
Nascent entrepreneurs	5,4	3,2	3,5	6,8	8,1	5,0	8,2	4,2	5,5
New entrepreneurs	3,8	1,4	1,0	1,4	1,6	0,8	3,2	4,9	2,3
Index of "Death"	1,4	2,3	3,3	5,0	5,0	6,0	2,6	0,9	2,4
Total early-stage entrepreneurial activity (TEA)	9,2	4,6	4,5	8,2	9,7	5,8	11,3	8,4	7,8
Established entrepreneurs	13,3	7,3	8,3	11,8	7,7	10,4	9,2	9,4	9,6
Business discontinuation	5,0	3,2	4,5	4,6	4,1	4,7	3,6	5,0	4,3

Most seniors intend to start a business in the Bratislava region and least in the Nitra region. The Nitra region furthermore exhibits the lowest TEA and its components. However, the Žilina region also shows a low proportion of new entrepreneurs which causes the highest index of "death" in this region. The highest proportion of new senior entrepreneurs can be found in the Košice region with the lowest index of "death" even though the highest TEA is in the Prešov region. Bratislava region outperforms other regions in established senior entrepreneurs, especially the Trnava region where the

proportion of established entrepreneurs is the lowest. Contrary to established entrepreneurs, the highest business discontinuation is in the Bratislava region and the lowest in the Trnava region. Business discontinuation is fairly high also in Košice and Žilina region.

4 Discussion

The results of our analysis show that different phases of entrepreneurial activity across Slovak regions is quite unevenly distributed considering the Slovak population but also studied groups of the population. In general, we can conclude that the highest entrepreneurial activity in its different phases is in the Bratislava region, especially considering the population and youth even though also seniors exhibit the highest entrepreneurial intentions and established entrepreneurial activity. This is commonly supported by the high self-assessment of potential entrepreneurs whether it is in terms of the population, youth, or seniors which at the same time represents the social capital within the region. However, social attitudes towards entrepreneurship can be at best considered neutral or rather bad which seems not to discourage potential entrepreneurs who have the opportunity to also reflect on more job opportunities within the region. The most underperforming seem to be Nitra, Banská Bystrica, and Žilina region whether it is in terms of different phases of entrepreneurial activity, social attitudes towards entrepreneurship, or self-assessment of potential entrepreneurs. Considering the population, Banská Bystrica and Žilina region are the worst in both aspects, considering youth it is unequivocally Banká Bystrica region and in terms of seniors, it is both Banská Bystrica and Nitra region. In the Banská Bystrica region, we suggest implementing policies aimed at improving social attitudes towards entrepreneurship as well as educational programs to help exploit opportunities and obtain knowledge and skills to improve self-confidence and lower fear of failure focused on the population with the special emphasis on youth and seniors. Interventions in the Žilina region should be focused on improving social attitudes towards entrepreneurship while in Nitra they should focus on improving aspects of self-assessment of potential entrepreneurs.

This paper adds to the literature on youth and seniors´ entrepreneurial engagement and provides a unique insight on different phases of entrepreneurial activity and its regional distribution using a robust dataset of GEM.

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Entrepreneurship in Slovakia through the Lens of Generations

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Abstract

The main objective of this paper is to identify differences and similarities in the key characteristics of entrepreneurs belonging to the youth and senior generations in Slovakia and compare them with entrepreneurs belonging to these age groups in Europe, based on an analysis by stages of the entrepreneurial process. The results of our research suggest that despite some differences in the characteristics of the generations studied, it is possible to identify several common trends in the generations in Slovakia that differentiate it from Europe and the impact of the previous historical development can be deduced from them. These are in particular social attitudes towards entrepreneurship, the structure of initial entrepreneurial activity, but also the motivation to start a business. Properly formulated and implemented entrepreneurial policies will contribute to exploiting generational differences in favour of quantitative and qualitative growth of entrepreneurship in Slovakia.

Keywords: Entrepreneurship; Generations; GEM; Entrepreneurial Activity.

JEL Classification: L26, M13, O5

Article Classification: Research article

1 Introduction

Entrepreneurship is one of the important challenges that the global world, countries, and individuals cope with with the aim of how to use it in favour of sustainable value creation. As entrepreneurship is a complex topic its study requires a multidimensional approach. One of these dimensions is to study it from the perspectives of generations. Particularly nowadays, age and aging are hot topics of labour markets both on global and national levels. Management of employees that belong to different generations is today obvious but also a big challenge at companies of different sizes, industries, etc. In this respect, a challenge is also to lead companies by managerial

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teams/owners that consist of more generations. In this context to know generational differences of those entrepreneurs who own and manage companies are important for successful business development to avoid intergenerational conflicts but also to use these differences to achieve competitive advantage in a business environment. According to AARP Research (2020) companies with above-average diversity in age, gender, nationality, career path, industry background, and education on their management teams report the innovation revenue that is 19% higher and profit margins that are 9% higher than companies with below-average diversity (BCG, 2018). However, 53% of the surveyed companies did not include a component of age into their diversity and inclusion strategies (BCG, 2018). To achieve the competitive position from an age diversity perspective asks for both research of entrepreneurial characteristics of different generations and the use of this knowledge to build agile and permanently learning companies (organizations). Including age into competitive strategies also means taking into consideration different generations. A generation is represented by the people who were born at the same time and have experienced the same historical conditions (AARP, 2007). The theory of generation is based on the idea that individuals born in the same period and affected by the same economic, technological, and political changes share similar values, behaviour, and lifestyles (Strauss & Howe, 1991; Ensari, 2017; Chen, 2019). Current research and literature usually describe four or five different generations (Silent generation 1920 – 1945; Baby boomers 1945 – 1965; X Generation 1980 – 1995; Y Generation 1980 – 1995; and Z Generation 1995 -) based on the year range (Giancola, 2006; Ensari, 2017; AARP, 2007). The differences between generations are often described as a cause of generational conflicts that are reflected in a "generational gap" (Giancola, 2006). To study generations from an entrepreneurship perspective, researchers frequently focus on youth and senior generation. The youth generation primarily belongs to the Y generation and seniors to the Baby boomer generation. Why it is important to study and support the generation of youth entrepreneurs: l. to aid young people in their attempts to integrate themselves into the labour market; 2. to provide them with opportunities to realize their entrepreneurial ambitions (Greene, 2021). This is reasoning that has been also explored in the literature (Halabisky, 2012; Pilková et al., 2017; Rehák et al., 2017; Lez´er et al., 2019). On the other hand, to study and support the generation of senior entrepreneurs is important as late-career entrepreneurship represents an opportunity for older generations, both financial and through self-realization (Maritz et al., 2021), it is also positively associated with increased quality of life (Kautonen et al., 2017; Matos et al., 2018), an attractive option for those who do not want to fully withdraw from workforce and desire to share their knowledge, network and experience (Bau et al., 2017), and the transition from unemployment to self-employment (Kenny & Rossiter, 2018).

For above-mentioned entrepreneurial generations, it is very important to know the differences and similarities of their entrepreneurial characteristics and entrepreneurial behaviour to use them in the development of collaborative strategies in favour of successful business development. In research and literature, there are different approaches how to study these differences and similarities. One approach, so far limited, is to study how youth and seniors differ in carrying out the entrepreneurial processes (Minola et al., 2016; Halvorsen & Morrow-Howell, 2017; Kautonen et al., 2017; Gielnik et al., 2018). Among the limitations of this approach is that there are not enough studies that would focus on Central and Eastern Europe – either as single countries, like Slovakia, or regions.

Given this, the main objective of this paper is to identify differences and similarities in the key characteristics of entrepreneurs belonging to the youth and senior

generations in Slovakia, compare them with entrepreneurs belonging to these age groups in Europe based on an analysis by stages of the entrepreneurial process., and outline the main areas that should be addressed by policy makers in Slovakia to eliminate the identified differences that may be the source of our entrepreneurship lagging compared to Europe.

The paper is structured in a way that Part 2 characterizes the data sources and methods with which the research was conducted. Part 3 presents the result of the analysis and Part 4 is a discussion of the findings.

2 Material and methods

In our paper, we studied generational differences in the entrepreneurship process of Slovakia and Europe based on GEM data and following the GEM model (see Figure 1). The entrepreneurial process starts from studying entrepreneurial potential and continues to early-stage entrepreneurial activity that includes nascent and new entrepreneurs, then established entrepreneurs follow. The last stage is business discontinuation. We also investigated the generational differences between Slovak and European entrepreneurs in terms of their motivation to start a business and in an established business stage.

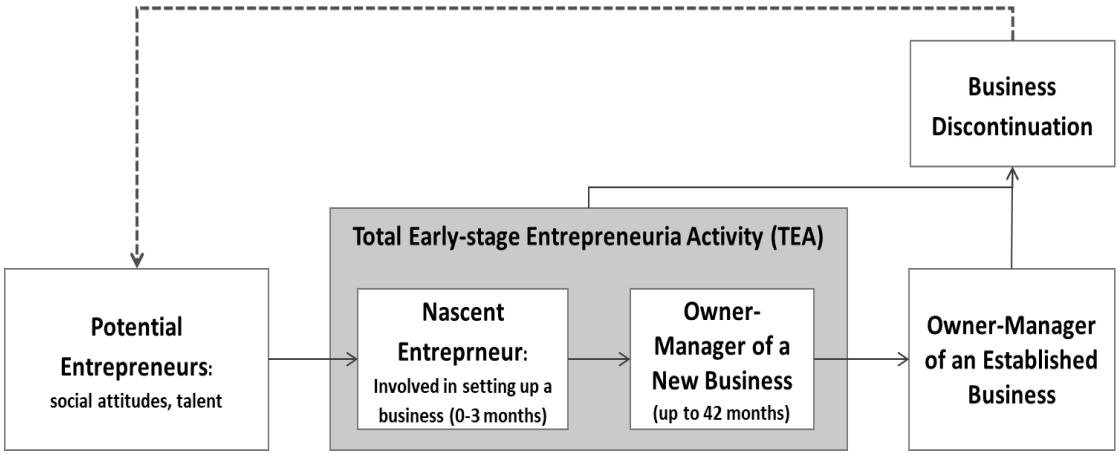

Figure 1 The Entrepreneurship Process and GEM Operational Definitions; Source: modified by (Singer et al., 2015)

The key source of data on which our research is based is an Adult Population Survey (APS) for Slovakia and a master's file for Europe for the years 2015 – 2019. Within APS each year representative sample of approx. 2000 people have been interviewed in Slovakia according to a standardized questionnaire used in each country participating in GEM. The core of our analysis are population cohorts of youth (18-34 years old) and senior entrepreneurs (50 – 64 years old). In total, our dataset contains 10,005 respondents from Slovakia and 389,308 respondents from Europe. These data are inputs for indicators used to measure each phase of the entrepreneurial process (see Figure 2) applied by the GEM methodology.

Indicator	Meaning
Perceived Opportunities	Percentage of all respondents (18 – 64) who think that in the next six months there will be good opportunities for starting a business in the area where they live.
Perceived Capabilities	Percentage of all respondents (18 – 64) who say they have the knowledge, skill, and experience required to start a new business.
Fear of Failure	Percentage of respondents (18 – 64) (among them who see opportunities) who say fear of failure would prevent them from starting a new business.
Entrepreneurial Intentions	Percentage of all respondents (18 – 64) who are non-entrepreneurs and intent to start entrepreneurship in future three years.
Egalitarianism	Percentage of all respondents (18 – 64) who prefer equal standard of living for all.
Entrepreneurship as a Good Career Choice	Percentage of all respondents (18 – 64) who consider starting business as good career choice.
High Status to Successful Entrepreneur	Percentage of all respondents (18 – 64) who attach high status to successful entrepreneurs.
Media Attention for Entrepreneurship	Percentage of all respondents (18 – 64) who agree that in their country is lots of media attention for entrepreneurship.
Early-stage entrepreneurial activity (TEA)	Percentage of respondents (18 – 64) involved in Total Early-Stage Entrepreneurial Activity.
Established business ownership rate	Percentage of respondents (18 – 64) involved in established business as owner and manager for which salaries or wages have been paid for more than 42 months.
Nascent entrepre-neurship rate	Percentage of all respondents (18 – 64) involved in nascent business and no salaries or wages are paid for over three months.
New business ownership rate	Percentage of all respondents (18 – 64) involved as owner and manager in new business for which salaries or wages have been paid for 3 to 42 months.
Discontinuation of businesses	Percentage of all respondents (18 – 64) exited a business in past year.

Figure 2 Key Selected GEM Indicators of the Entrepreneurial Process; Source: own elaboration

3 Results

In the following, we will present the results of our analysis of the differences between seniors and youth both in Slovakia and Europe according to the stages of the entrepreneurial process (Figure 1).

3.1 Entrepreneurial potential and intentions

The entrepreneurial potential is the first stage of the entrepreneurial process and is characterised as the readiness of individuals to engage in entrepreneurship. It is a complex and uneasy process to be measured that is influenced by individual characteristics of the population and the social and cultural environment that surrounds individuals. According to the GEM methodology, three groups of factors that influence entrepreneurial potential are studied: The first group consists of social attitudes towards entrepreneurship, which encompasses how individuals perceive cultural and social

aspects of the environment related to entrepreneurship. The second group consists of individuals' self-assessment of knowledge, skills, and abilities to be an entrepreneur. The third group is talent, which is examined in terms of individuals' perspectives and dispositions in terms of starting a business: whether and to what extent individuals can seize opportunities, whether they are proactive and creative, how they are perceived by their environment in terms of their innovativeness, and whether they have an idea of their future career i.e., a career plan, and willingness to follow it.

Social attitudes towards entrepreneurship are examined from the following aspects: a) the preference for an equal standard of living for all (egalitarianism), b) the attitude towards an entrepreneurial career - what is the attitude towards entrepreneurship as a suitable career choice and how is the social status of an entrepreneur perceived, c) what is the role of the media in promoting entrepreneurship, d) what is the importance of the network for entrepreneurship - what is the level of familiarity with someone who has an entrepreneurial career.

Table 1 Entrepreneurial potential and intentions; Source: own elaboration

	Youth				**Seniors**			
	SK 2019	**SK 2018**	**SK 2015 - 2019**	**EU 2015 - 2019**	**SK 2019**	**SK 2018**	**SK 2015 - 2019**	**EU 2015 – 2019**
Social attitudes towards entrepreneurship								
Egalitarianism	71,3	66,6	72,7	65,6	69,5	64,3	66,4	66,3
Entrepreneurship as a good career choice	43,7	47,1	48,4	60,5	44,5	48,1	47,5	57,9
High status in society	64,0	63,4	63,3	67,1	55,4	57,6	58,0	63,4
Media attention	53,7	53,2	57,1	52,9	53,3	56,7	57,2	56,1
Knowing an entrepreneur	73,4	41,5	44,0	40,9	54,9	24,6	35,4	28,1
Self - assessment of entrepreneurial opportunities and abilities								
Perceived opportunities	44,3	49,0	35,7	42,0	29,4	27,9	25,9	35,2
Self-confidence	55,3	53,5	47,1	42,3	42,6	45,8	47,4	42,0
Perceived difficulty of starting a business	27,3	21,3	17,7	37,4	22,2	18,5	17,1	37,8
Fear of failure of those perceiving good opportunities	42,8	26,5	37,5	40,6	50,5	27,5	36,1	34,4
Entrepreneurial intentions of non-entrepreneurs	25,0	21,6	15,4	14,6	3,7	5,4	7,7	4,1

According to the results of our analysis presented in Table 1, youth in Slovakia prefer significantly higher equality in living standards compared to seniors but also compared to youth in Europe. Youth in Europe prefer equality in living standards less than seniors, which is in line with the general trends of opinion in this area. Attitudes towards an entrepreneurial career are worse among seniors than youth in Slovakia, which is probably also influenced by historical development and age itself. However, these attitudes are significantly worse in Slovakia than Europe for both generations in the long term, which is probably also an impact of historical development but also of the worse business environment. Both generations in Slovakia rate the role of the media about the same and even better compared to Europe. The entrepreneurial network in Slovakia is more pronounced among the youth than seniors, but it is rated more highly by both generations in Slovakia than in Europe.

Self-assessment of entrepreneurial opportunities and capabilities is the second aspect of assessing entrepreneurial potential. In line with the GEM methodology, this aspect is examined through the following factors: a/ perception of entrepreneurial opportunities in their environment; b/self-assessment of their own knowledge, skills, and abilities to be an entrepreneur; c/fear of failure; d/assessment of the ease of starting a business; e/intent to start a business. In the following, we analyse these factors in detail according to the generations in Slovakia and Europe.

According to the results presented in Table 1, youth in Slovakia perceive more opportunities than seniors, but we lag behind Europe for both generations of potential entrepreneurs. On the other hand, Slovakia exhibits higher self-confidence in knowledge, skills, and abilities related to entrepreneurship than the European average for both age groups. An interesting finding is that the perception of the problems of starting a business is about the same for both age groups in Slovakia, but significantly lower than in Europe. Fear of failure is higher among youth both in Slovakia and Europe. However, while this difference between age groups is moderate in Slovakia, it is more pronounced in Europe. The impact of the factors analysed is reflected in the intention to start a business in the next three years. This intention is higher among the youth than seniors both in Slovakia and Europe, but again the difference is larger between the analysed generations in Europe. While in Slovakia the intention to start a business among seniors represents 50% of the percentage of youth, in Europe it is less than 30%.

Table 2 Entrepreneurial talent; Source: own elaboration

	Youth		**Seniors**	
	SK 2019	**EU 2019**	**SK 2019**	**EU 2019**
You rarely see business opportunities, even if you are very knowledgeable in the area	51,0	46,4	46,5	45,2
Even when you spot a profitable opportunity, you rarely act on it	60,6	53,1	54,4	51,7
Other people think you are highly innovative	43,5	49,8	38,0	45,0
Every decision you make is part of your long-term career plan	65,1	60,2	55,4	46,4

The third group of factors for examining entrepreneurial potential is entrepreneurial talent. While in the self-assessment of one's own knowledge, skills, and abilities section we examine the entrepreneurial potential in relation to the environment, in examining entrepreneurial talent we are interested in the population's own entrepreneurial potential, i.e., inside the individual. This aspect was included in the GEM methodology for the first time in 2019 and is examined according to the answers to the four questions listed in Table 2. As Table 3 shows youth in Slovakia are less likely to see opportunities and less responsive to profitable opportunities than seniors. However, they are more confident about their high level of innovativeness, and they are also more likely to make decisions that are part of their long-term plan. On the other hand, both Slovak generations lag behind in all other aspects except making decisions as part of their long-term plan. This confirms the previous finding that Slovak youth and seniors are less likely to perceive opportunities, which is also a long-standing problem in Slovakia considering the population.

3.2 Entrepreneurial activity

The GEM project defines entrepreneurial activity as the output of the interaction between an individual's perception of opportunities, capabilities, and motivation under the different conditions of the business environment in which the individual operates. It is presented by the other four stages of the entrepreneurial process (Figure 1) and is measured by the set of indicators that are listed in Table 4. The second stage represents nascent entrepreneurs, i.e. those who have started their business in the last 3 months. Those who have overcome the second stage, i.e. the obstacles that lurk for nascent entrepreneurs, and continue their business in the third phase are called new entrepreneurs. The nascent and new entrepreneurs represent what is known as Total Entrepreneurial Activity (TEA), a key indicator of the GEM project. According to the GEM philosophy, TEA is so important because the more of these entrepreneurs there are, the more likely it is that entrepreneurship will contribute to the economic growth and development of the country concerned. The fourth stage of entrepreneurship is represented by established entrepreneurs. That is, those who have been in business for more than 42 months. This is a group of entrepreneurs who are already making a concrete contribution to value-added and therefore to the country's income., and from this aspect, these entrepreneurs are very important. The last stage of the entrepreneurial process is the discontinuation of the business. This is an indicator that presents the percentage of entrepreneurs who, in the last 12 months, have interrupted, or closed their business.

Table 3 Entrepreneurial activity phases; Source: own elaboration

	Youth				**Seniors**			
	SK 2019	**SK 2018**	**SK 2015 - 2019**	**EU 2015 - 2019**	**SK 2019**	**SK 2018**	**SK 2015 - 2019**	**EU 2015 - 2019**
Nascent entrepreneurs	12,5	13,1	8,0	5,4	3,2	4,2	5,3	2,3
New entrepreneurs	6,3	4,7	3,7	3,9	1,5	0,7	2,2	1,8
Total early-stage entrepreneurial activity (TEA)	18,8	17,6	11,6	9,1	4,7	5,0	7,4	4,1
Death Index	2,0	2,8	2,2	1,4	2,2	5,7	2,4	1,3
Established business ownership	3,8	2,6	2,6	3,0	7,2	4,7	8,6	9,0
Business discontinuation	5,3	4,7	3,6	2,2	3,7	1,5	4,6	2,9

As Table 3 shows, the percentage of Slovak nascent entrepreneurs in the cohort of seniors is up to 66% of the percentage of youth entrepreneurs while in Europe it is only 37% and the percentage of both cohorts is significantly higher in Slovakia. Interestingly, the percentage of nascent entrepreneurs in the youth cohort is higher in Europe than in Slovakia, but the percentage of senior entrepreneurs in the new cohort is higher in Slovakia than in Europe. TEA is significantly higher in Slovakia than in Europe for both generations. However, the proportion of nascent entrepreneurs to new entrepreneurs (death index) is 2.2 for youth entrepreneurs in Slovakia whereas it is only 1.3 in Europe. Interestingly, the death index is higher for seniors than for the young in Slovakia, whereas in Europe the trend is reversed.

The last two stages of the entrepreneurial process, established business and business discontinuation, are used in the GEM methodology to measure business sustainability. Sustainable entrepreneurship is precisely what contributes significantly to the creation of economic and social value. It is therefore desirable that its value is as high as possible. The opposite trend is expected from the business discontinuation rate. The

higher the business discontinuation rate, the greater the negative impact on business sustainability.

As Table 3 shows, the rate of established entrepreneurship in Slovakia is significantly higher for seniors than for youth. The ratio between established youth entrepreneurs and senior entrepreneurs is significantly better at the European level. Also, the rate of entrepreneurship discontinuation for both cohorts is lower in Europe than in Slovakia. This suggests that the sustainability of entrepreneurship is worse in Slovakia compared to Europe and entrepreneurial policy support is inevitable.

3.3 Entrepreneurial motivation within TEA and established business

The motivation to start a business is an important aspect of entrepreneurial activity and behaviour. It is a complex phenomenon that is the subject of interdisciplinary research. Researchers examine motivation in terms of economic and non-economic factors. Emotions and emotional factors are an important part of non-economic factors. The economic factors are based on classical economic theory and hence, entrepreneurial behaviour is aimed at maximising wealth and achieving expected returns (Xiaohua et al., 2020).

Since 2019 the new GEM methodology draws on both classical economic theory as well as other aspects to investigate motivation. Respondents were asked to comment on the following views of the reasons for starting their business:

- Motivation to change the world,
- Motivation to build great wealth or very high income,
- Motivation to continue the family tradition,
- Motivation to make a living because jobs are scarce.

Table 4 Entrepreneurial motivation within TEA and EB; Source: own elaboration

2019	Youth				Seniors			
	SK TEA	EU TEA	SK EB	EU EB	SK TEA	EU TEA	SK EB	EU EB
Level of entrepreneurial activity	18,8	9,1	3,8	3,0	4,7	4,1	7,2	9,0
To make a difference in the world	45,4	49,1	59,2	36,0	32,8	36,6	15,1	24,5
To build great wealth or a very high income	43,2	51,9	63,0	54,8	19,9	35,8	17,4	38,5
To continue a family tradition	33,1	33,6	66,2	47,8	26,3	36,5	46,1	35,7
To earn a living because jobs are scarce	57,3	44,7	71,4	56,6	85,0	50,7	80,3	61,6

As Table 4 shows, the highest motive for engaging in entrepreneurship considering both start-up and established entrepreneurs in Slovakia for both generations is to earn a living because jobs are scarce. This motivation is particularly pronounced among seniors in Slovakia. An interesting finding is that only for youth entrepreneurs starting out in Europe the main motivation is to build great wealth or a very high income and the second reason is to make a difference in the world while earning a living is only in third place for this age cohort. The other entrepreneur groups surveyed (established youth, established seniors, starting seniors) in Europe express earning a living as the main motive for starting a business. It can be deduced from the above that the predominant group of entrepreneurs in the cohorts studied, both in Slovakia and in Europe, will not be explicitly innovative, but take entrepreneurship as a substitute for employment, which is clearly reflected in their contributions to innovation and creative change.

4 Discussion

We live in a time for which, among other things, is also typical aging of the population, which is a long-term problem in Europe and a dynamically emerging problem in Slovakia. This means that in the next 10-15 years Slovakia could get to the position of one of the oldest populations (Páleník et al., 2014). This new phenomenon has multiple impacts on society. One of them is the impact on the labour market, but also on entrepreneurship. The functioning of several generations in one workplace, but also in the management of companies themselves, whether as owners or managers, has become a common phenomenon. Harnessing this generational coexistence for the benefit of business development and sustainability requires, among other things, a thorough understanding of the characteristics of each generation. With this in mind, our paper focused on understanding the common and different characteristics of the generation of youth and senior entrepreneurs in Slovakia and compared them with entrepreneurs of the same age cohorts in Europe. Our results showed that the potential of entrepreneurship in Slovakia, in the aspect of social attitudes towards entrepreneurship, is still significantly influenced by the aspiration for the same standard of living among youth entrepreneurs, even more than among senior entrepreneurs. However, the story is reflected in the fact that both generations have a significantly higher aspiration for the same standard of living compared to Europe. Entrepreneurship as a career choice, as well as the high status of the entrepreneurs, are constant weaknesses for both generations compared to Europe. On the other hand, networking plays a significant role in social attitudes towards entrepreneurship compared to Europe, especially among the younger generation. The problem for both generations analysed is the low ability to recognise opportunities, but on the other hand, there is a high level of self-confidence, especially among the youth generation, in terms of knowledge, skills, and abilities in the field of entrepreneurship. There are no major differences between the generations in terms of fear of failure, but, interestingly, Slovak youth exhibit a lower fear of failure than the European counterparts and the senior generation has a higher fear of failure than the European one. All these factors influence the intention to start a business, which is slightly higher for both generations than the European average, but only 50% is senior's intention compared to the youth, which makes sense and confirms the trends in starting a business, which is generally lower for this age cohort. The trend of higher interest in starting a business among both generations in Slovakia is also reflected in the overall early-stage entrepreneurial activity, which is higher among both generations in Slovakia than in Europe. However, there is a difference in the structure of entrepreneurs involved in start-up activity in both generations. While in Slovakia 70% of TEA in both age cohorts are start-up entrepreneurs, in Europe it is 60% for the youth and 56% for the seniors. Thus, Slovak TEA is predominantly made up of a less stable group of entrepreneurs (nascent), which is consequently reflected in the high death index of both generations in Slovakia compared to Europe. Further, it can be assumed that this also has an impact on the lower share of established entrepreneurs and the higher rate of business discontinuation for both generations in Slovakia compared to Europe. It can be assumed that these structural characteristics also affect the motivation for starting a business in Slovakia. It is a one-way motive to earn a living. Although this is a motive that is also common to both age cohorts in Europe, with the exception of youth starting a business, its share is significantly higher in the Slovak Republic. From the above findings, there are clear conclusions for policy makers in the field of entrepreneurship in Slovakia, in particular in the following directions: a/ policies should take into account the specificities of individual generations in order to increase the interest of seniors in entrepreneurship, b/ policies should focus on

the sustainability of entrepreneurship, both in the phase of early-stage entrepreneurial activity and in established entrepreneurship.

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Trade in the reflection of the Covid pandemic

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Abstract

Identification of factors of successful management of trade and services with an impact on the consumer in the reflection of the consequences of the Covid pandemic. Analyzing the success of retail management and its modification due to extraordinary conditions caused by different degrees of measures during the Covid pandemic. Analyzing the success of retail companies operating in the TOP 10 trading companies in Slovakia with an emphasis on sales and profit in 2019 and 2020.

Keywords: Covid, Retail, Sales, Profit, Consumer.

JEL Classification: L 81, M1, M31

Article Classification: Research article

1 Introduction

With its importance, retail is the second largest sector in the EU, contributing to its GDP by 11%. As a result of the pandemic, there was a decrease in retail sales by 40%, in the area of catering and hospitality it was up to 80%. Communities around the world are responding to concerns about the consequences of a coronavirus pandemic. A pandemic poses major problems for retailers of all sizes. The importance of retailers' ability to help customers is growing in importance. Let them know that the desired product is in stock, provide information on how precautionary measures are taken to ensure safety, or how information on adaptation to the conditions is shared.

2 Material and methods

The presented paper aims to analyze the position of the Slovak retail market in the pre-Covid pandemic, during it and subsequently in the post-pidemic stage to identify the factors of successful management of business management activities in trade. We focused on the development of the Covid epidemic in the world, the EU, Slovakia, where

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we used secondary data accessible from the websites of NCZI, ÚVZ, WHO and information on the website korona.gov.sk.

Other materials from which we drew were provided by the Public Health Office of the Slovak Republic. They covered current measures, recommendations on how to protect against the disease, navigated what steps to take in the disease, made available more information about Covid-19, but also current statistics and graphs, on which we also relied. On its website, the ÚVZ made available manuals for operations, which were intended for shops and services, which became an important aid in the application of the current measures in force. We summarized the epidemiological measures taken by the Public Health Office of the Slovak Republic and the related restrictions limiting economic activity.

In order to identify the effects of restrictions on the development of retail turnover in the reflection of the Covid pandemic, we analyzed data from the Slovak Statistical Office focused on business and industry statistics. The analysis used the indicator Sales for own services recorded on a monthly basis. According to the data of the Statistical Office of the Slovak Republic, these are data obtained from the monthly statistical reporting in the SK NACE Rev. 2, section 45, 46, 47, 55, 56. We compared monthly retail data in terms of the development of revenues for own services in internal trade with a comparison of months 1-12 / 2020; 1 / 2021-7 / 2021. Subsequently, we compared the development of sales in Slovak retail in a selected category of TOP 10 retailers according to the database obtained through Finstat.

2.1 The Covid pandemic and its onset and course

A new type of coronavirus that was identified as 2019-nCoV, otherwise COVID-19 appeared in Wuhan, China at the end of 2019. The infection quickly spread to other parts of China and around the world. In January 2020, proliferation cases were already reported in nine countries, with isolated cases occurring in some EU Member States. The WHO has undertaken to coordinate a global response. On March 11, 2020, COVID-19 declared a global pandemic after spreading to more than 100 countries. The COVID-19 virus has spread throughout the world, with an impact on the enormous increase in the number of people affected. As the number of patients increased, the number of deaths gradually increased.

According to the European Union Agency (ECDC), as of September 10, 2021, 219.4 mil. cases of COVID-19 with a death toll of 4.54 mil. As of the same date, 29.9% of fully vaccinated people worldwide were registered. As of 10 September 2021, 72.1% of the adult population in the European Union had been fully vaccinated.

As for Slovakia, the first death in Covid was reported on March 30, 2020. By the end of 2020, 184,508 cases of infection had been confirmed in the Slovak Republic. As of September 10, 2021, the total number confirmed by PCR tests was 397,860 cases, deaths were 12,559.

A pandemic can be divided into so-called wave The first wave can be defined as the period from March 2020 to July 2020. The onset of the second wave was from September 2020 to May 2021. The third wave in the form of the delta variant announced the onset at the end of July 2021.

Epidemiologist Pavelka from the Institute of Health Analyzes of the Ministry of Health of the Slovak Republic stated that the delta variant manifests itself in a more severe course of COVID-19 and that the severe course also occurs in lower age categories. The risk of severe hospitalization increases approximately twofold. Numerous

epidemiological studies indicate that vaccination is the most effective form of protection against the delta variant.

As of 10 September 2021, 43.64% of the total population of the Slovak Republic were fully vaccinated. The security of the population is conditioned by collective immunity. The required limit is 60%, which would eliminate the possible economic and health impact of the onset of the next wave of the pandemic.

2.2 Retail Slovak Republik

Retail is focused on the sale of goods and services to the end customer. The biggest advantage of retail is direct contact with a customer whom he knows, and he can immediately respond to the needs and changes in customer demand by changing the range sold. According to the statistical classification of economic activities SK NACE, retail trade, except for motor vehicles and motorcycles, is divided into:

- Retail sale in non-specialized stores (department stores, supermarkets with a variety of products);
- Retail sale of food, beverages and tobacco in specialized stores;
- Retail sale of automotive fuel in specialized stores;
- Retail sale of information technology and communication equipment in specialized ICT. stores (sales of equipment with information and communication technology such as sales of computers, slot machines, software, additional units, but also radio and television equipment, recorders ...);
- Retail sale of other household goods in specialized stores;
- Retail sale of goods for culture and recreation in specialized stores (sale of books, newspapers, recordings, toys, sporting goods);
- Retail sale of other goods in specialized stores (specialized stores with clothing, footwear, leather goods, cosmetics, flowers, clocks, pharmacies ...);
- Retail sale via stalls and markets;
- Retail sale not in stores, stalls or markets.

As can be seen from the data in Table 1, which shows the indices for the same period of the previous year, in 2020 the highest increase in retail sales was recorded in Retail sale in non-specialized stores with food, beverages and tobacco, which according to NACE code 4711 includes: retail the sale of a wide range of goods dominated by food, drink or tobacco. It includes the activities of general stores, which, apart from their main sales of food products, beverages and tobacco, also have the sale of several other types of goods, such as clothing, furniture, household goods and hardware, cosmetics, etc. The sales growth index in these stores was 105 compared to the previous year. The growth of sales with an index of 102.3 was also recorded in the Ministry of Defense, except for stores, stalls and markets, within which there is internet sales.

Table 1 Revenues for own services in retail trade in the Slovak Republic, except motor vehicles; Source: own elaboration (Slovak Statistical Office)

Year	**2020**	**2021**	**2021**	**2021**	**2021**	**2021**	**2021**	**2021**
Month	**1.-12.**	**1.**	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**
Retail trade, except of motor vehicles and motorcycles	98,9	83,2	85,3	100,3	111,5	111,5	106,6	101,5
Retail trade in non-specialized stores	105,0	87,6	86,8	96,1	98,2	101,4	103,4	101,0
Retail trade in food, beverages and tobacco in specialized stores	92,0	79,7	83,6	92,9	90,5	97,1	94,5	98,7
Retail trade in fuels in specialized stores	92,5	81,7	85,8	101,7	116,3	117,5	117,1	110,0
Retail trade in ICT equipment in specialized stores	100,0	79,8	68,1	134,6	114,7	97,9	74,9	88,8
Retail trade in other household goods in specialized stores	101,5	65,6	76,1	120,4	135,6	111,8	104,9	97,0
Retail trade in goods for culture and recreation in specialized stores	87,9	55,6	69,0	119,6	186,6	101,7	102,9	97,5
Retail trade of other goods in specialized stores	94,2	83,4	73,8	88,4	125,1	124,5	106,3	98,9
Retail trade in stalls and markets	73,7	48,5	69,7	86,1	92,3	107,1	98,3	113,9
Retail trade in stalls and markets	102,3	92,5	110,5	113,6	115,4	122,9	113,3	99,8

2.2.1 Pandemic measures with an impact on retail

In the initial stage of the Covid outbreak, the epidemiological measures recommended by the ÚVZ and the Slovak government were to prevent the rapid spread of the disease. They were aimed at reducing or completely preventing social contact, which increased the risk of infection and disease transmission. These restrictions have significantly affected trade. Several operations were closed, which was reflected in a decline in sales. Until May 2021, we recorded two waves of pandemics in Slovakia. While the first wave hit businesses by not being prepared for it, the second wave of the pandemic had a stronger impact on business performance. Its impact was manifested mainly in the duration of anti-pandemic measures related to the restriction or closure of MoD operations.

From 16.3.2020, shops and operations with services were closed, with the exception of selected exceptions. Shopping centers were closed on 28-29 February 2020, with the exception of grocery stores and drugstores. Sunday was reserved for the implementation of sanitary measures, therefore all retail outlets were closed.

In order to protect the most vulnerable, ie the elderly, time has been set aside for the shopping of seniors since 21.4.2020. In the time from 9.00 am by 11:00 a. m., the full capacity of sales areas in open retail operations was reserved for them. The number of shoppers could not exceed 10 per square meter. From 20.5.2020, the permitted number of customers was increased to 15, per square meter of sales area.

From 10 June, it was possible to open all retail outlets and shopping centers, subject to strict anti-pandemic measures. On June 20, 2020, the sanitary day was canceled, and it was again possible to shop on Sundays. All retail outlets could not be reopened until July 1, 2020.

After a short summer release, the incidence of the disease in Slovakia began to rise in September 2020. The second wave began to pick up. Other regulations followed,

which limited and gradually completely closed many retail outlets. As of October 24, a curfew came into force, except for visits to the nearest groceries, pharmacy, dry cleaners, car service and gas stations. Sales from brick-and-mortar stores have shifted in favor of online sales. From 19.4.2021 it was allowed to open all retail operations in compliance with the restriction of one person per 15 m2 of sales area. On 9 May 2021, the regulation on reserved hours for purchases was repealed and on 15 May 2021, the state of emergency was ended. However, all hygiene measures for retail operations remained in force.

On 12 August 2021, the Public Health Office published Decree 240 in the Bulletin of the Government of the Slovak Republic, which deals with the conditions for the entry of customers into operations. It follows that traders determine for themselves which persons will be allowed to enter their operations on the basis of capacity and other constraints. The application for traders with a detailed description of operations manuals was published on the ÚVZ website.

2.2.2 Position of retail companies in the TOP 10 SR according to turnover

When evaluating the success of individual companies in the ranking of the TOP 10 business companies of the Slovak Republic in 2020 in terms of turnover, it is possible to state the following.

After many years, there has been a fundamental change of leadership. In the first position, Lidl replaced Tesco (see Table 2).

Table 2 Revenues of the TOP 10 retail trade in the Slovak Republic for the years 2019-2020; Source: own elaboration

	Revenues in thousands of €		**Index**	
Title of company	**2019**	**2020**	**2019/2018**	**2020/2019**
TESCO STORES SR	1432,1	1 393, 0	104,7	97,3
LIDL SR	1368,5*	1 509, 7	110,9	110,3
KAUFLAND SR	1193,7	1 290, 7	107,6	108,1
BILLA SLOVAKIA	657,0	695, 3	108,2	105,8
NAY	343,9	316,0	107,8	91,9
LABAŠ	269,1	283,2	105,0	105,2
DM DROGERIE MARKT	267,0	230, 8	113,6)	86,4
C & A MODE	188,5	126,9	85,4	67,3
OBI SLOVAKIA	146,7	147,3	115,7	100,4
TERNO REAL ESTATE	139,5	176, 8	99,1	126,7

However, in the detailed analysis of sales and profit achieved, it can be stated that there were different developments in these companies. While Lidl's sales grew by an index of 110.3 compared to 2019, Tesco recorded a decrease in sales by an index of 97.3 compared to the previous year. In terms of profits, Lidl recorded a profit growth index of 111.5. On the contrary, Tesco recorded a significant decline in profit in 2020 with an index of 66.9. See Figures 1-4 for more information.In an effort to find out the essential facts concerning the causes of the decline in profit, it is possible to positively assess the company's efforts to take a responsible approach not only to its employees, but also to the consumer public.

Figure 1 Revenues of Lidl SR for the year 2020; Source: (FinStat 2021)

Figure 2 Profits of Lidl SR for 2020; Source: (FinStat 2021)

Figure 3 Revenues of Tesco Stores SR in 2020; Source: (FinStat 2021)

Figure 4 Profits of Tesco Stores SR in 2020; Source: (FinStat 2021)

The company increased its costs for the payment of remuneration to employees, provided increased hygiene and the necessary means to protect health and comply with epidemiological measures. A positive step in relation to customers was the reduction of prices of products sold, taking into account the increased number of people at risk of poverty. According to the Slovak Academy of Sciences, their current number is 16.3%. Socially responsible behavior is also reflected in activities aimed at helping the most vulnerable. It is a daily donation of unsold food from all 153 retail establishments. Since the outbreak in March 2020, the chain has donated 1,700 tonnes of food, from which four million portions of food could be prepared. Tesco supports the Food Bank of Slovakia and other partner organizations, which play an irreplaceable role in helping people in need during a pandemic.

Kaufland came in third with a sales growth index of 108.1. This was followed by Billa Slovensko with a sales index of 105.8. It is worth mentioning the result of the Slovak trading company Labaš, which ranked sixth with a sales growth index of 105.2. During the pandemic, the company even opened three new operations, one in Spišská Nová Ves and two in Košice. In the same period, they launched their own e-shop i-fresh.sk. During the pandemic year, the work capacity of workers was even reduced. Increased hygiene, wearing protective equipment, protective plexiglass belts or antibacterial handles on shopping carts may be to blame. The top ten company is closed by Terno real Estate, which showed the highest index of sales growth of 126.7, but with a loss - € 4.585 million. However, it is positive to note that in 2020 the company reduced its loss by 56%. The network operates more than 130 stores in Slovakia under the Kraj, Terno and Moja Samoška brands.

3 Discussion

The Covidu pandemic did not mark the retail segment to the same extent as most other industries. Nevertheless, significant changes have taken place. While before the pandemic it was difficult to find enough qualified power for the shops, at the time of the introduction of restrictive measures, the interest in working in the grocery store increased. This was due to lockdowns and job losses in other sectors. While many shopping malls and shopping arcades had to remain closed, grocery and drug stores could operate at the usual time. Problems also manifested themselves in the range of specialized stores, which either left workers at home or were laid off due to the closure of stores. The Covid period has largely been marked by a modification of retail activities. The significant increase in costs related to anti-pandemic measures has reduced the profitability of retailers. During the pandemic in Slovakia, traders within SAMO invested more than 160 million euros

and additionally employed more than 700 new workers. The new situation and the need to respect the necessary epidemiological measures posed a challenge not only for retail, but also for consumers themselves. There was a need to adapt the purchasing process to new technologies, mobile devices, the implementation of new payment options via Google or Apple pay, which simplified the entire process of paying for goods. Great emphasis is placed on the connection of online and offline sales and personalization in order to maintain the highest possible attention from the customer. We can perceive the years 2020 - 2021 as years of extremes that the online environment wished for. Those retailers who were able to respond adequately to increased demand and more demanding conditions became successful. It will be questionable to what extent sustainable retail trends will begin during the post-period period.

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Attitudes of SMEs towards digital transformation in the European Union and Slovakia

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Abstract

The global trend of the 21st century is the era of digitalization, the so-called Industry 4.0. The Covid-19 pandemic has rapidly accelerated the implementation of this trend in practice because of its benefits in various fields. The aim of this paper is to identify the attitude of SMEs towards digital transformation and to reveal the common and different elements of their perceptions. The purpose of the article is to describe the implications and the attitude of enterprises towards the impact of the pandemic on their digital transformation. The motivation for writing the article was to reflect on two significant global trends in 2021, namely digitalization from a technological perspective and pandemic from a societal perspective. The methods used in the article were secondary analysis of literature, secondary analysis of surveys from DigitaliseSME in Europe and Industry4UM in Slovakia, which the authors developed in the form of a case study. In addition to the analysis, the methods of summarization and comparison were also used. The main findings of the article are different attitudes towards the impact of the pandemic on digital transformation, the same area of digital focus of European and Slovak enterprises, the preference for profitable areas of transformation without taking into account the ecological or social factor. While world countries, enterprises and experts perceive the pandemic as a driver of development and acceleration of digitalization, in Slovakia it is perceived as a threat and a cause of stagnation of development in enterprises.

Keywords: Digitalisation; Digital transformation; Small enterprises; Medium enterprises; Digital strategy; Industry 4.0; Covid-19.

JEL Classification: L26, M15, O3

Article Classification: Case study

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1 Introduction

According to consultancy KPMG, the leading technology trend of 2021 is digitalisation (Growth, 2021). The current situation of the Covid-19 pandemic has accelerated the digital transformation of public institutions (government, authorities), private enterprises and the lives of citizens (Kullova, 2020). At the same time, it has influenced customer behaviour and widened gaps in technological development and management, revealing a lack of knowledge and reduced the amount of funding necessary for future progress (Klein & Todesco, 2021). According to Wetering, Kurnia, and Kotusev, the digitalization trend has reinforced the need for strategic smart solutions through which businesses can flexibly respond to change (Wetering et al., 2021).

Dynamically changing environments, unpredictable situations, pandemics and turbulent market units generate the need to define new forms of competitive advantages for SMEs. Business success factors such as production volume, performance, low or high quality are no longer sufficient. Modern enterprises are investing and reaping the benefits through process transformation based on the digitalization trend. The development, building, implementation, use and stabilization of information systems, architectures and information and communication technologies have a positive impact on the economic, ecological, managerial and sustainable aspects of enterprises (Wetering et al., 2021).

The primary threat of digital transformation (Industry 4.0 or Society 5.0) is the lack of support for digital projects due to the limited amount of funding associated with the Covid-19 pandemic.

The aim of the paper is to identify common and different attitudes towards the digital transformation of European and Slovak SMEs in the time span from 2018 to 2020. The comparison was made on the basis of secondary data from DigitaliseSME and Industry4M.

The concept of digital transformation represents a complex process of change in the field of Industry 4.0 caused by the increased use of information and communication technologies. Digitalization is a tool that makes business activities more efficient through the transformation of processes or the enterprise as a whole based on modern innovations and technologies (Ziółkowska, 2021). The drivers of digital transformation are:

- data,
- innovation,
- customer needs, value and expectations.

A strategic level of business management that supports digital development forms the accelerator of a sustainable and successful enterprise in the 21st century (Ziółkowska, 2021).

Digital strategies are a way to achieve the goals set out in the Industry 4.0 concept in a way that satisfies not only current customer preferences and requirements, but also future ones. For effective functioning, it is necessary to harmonise all strategies into a unified whole (corporate, competitive, digital, financial, marketing, HR, manufacturing, etc.). The needs of SMEs are met by a four-step model that consists of the steps of awareness creation, implementation of the chosen strategy, continuous process improvement and final adaptation into practice (Sehlin et al., 2019).

Digitization should reflect the current state of business processes that can be improved through automation, simulation, modeling, visualization, primary data collection from the field through sensors, wireless communication, and Big Data analytics.

Digital solutions for SMEs in the Industry 4.0 concept include:

- smart products,
- predictive maintenance,
- autonomous systems and diagnostics,
- adaptive management,
- e-commerce,
- integration and monitoring of business processes,
- flexible systems in production,
- product customisation,
- digital services, robotization, etc. (Sehlin et al., 2019).

According to the results of the article by Sehlin, Truedsson and Cronemyr, 70% of the funds are invested by companies in improving product and service offerings (operational level), 20% are used to find and implement opportunities from the external environment (tactical level), and 10% of the investments are directed towards digital transformation (strategic level) (Sehlin et al., 2019).

The so-called Digital Factories strategy is divided into two dimensions, i.e. process transformation or comprehensive business change. Small and medium-sized enterprises often do not have sufficient economic and financial strength for a comprehensive change. Most managers prefer digitalization in processes that have a simple structure, easy implementation and connection to other activities or services with high added value. The key managerial functions are planning, which conveys the ability to predict and solve problems before they arise, and controlling, which compares the plan with actual results (Stoldt et al., 2018). In general, digital transformation brings benefits in the form of (Klein & Todesco, 2021):

- local management support,
- implementing and achieving objectives in the short term,
- adaptability, strategic alliances - sharing resources, ideas, mutual assistance.

Associated disadvantages are (Klein & Todesco, 2021):

- limited financial resources - SMEs do not have sufficient access to external specialists or consultants, in OECD countries in 2015, 20% of SMEs were involved in digital transformation in e-commerce, large companies up to 40%, as they had more financial capital;
- lack of technological and managerial knowledge and skills - management in SMEs prefers an operational level, short-term planning, often lacking a stable technological infrastructure.

From the external environment, they mainly influence the digitalization process (Klein & Todesco, 2021):

- Industry 4.0 innovations,
- social media - the problem of personal data protection, fear of negative reputation or viruses that can destroy enterprise platforms,
- value chains,
- digital technologies - fear of change.

Threats include (Klein & Todesco, 2021):

- Fears of insufficient return on investment,
- Fear of using new technologies and data sharing,
- the impact of the Covid-19 pandemic on business.

2 Material and methods

In the first section of the paper, the secondary literature analysis method was used. Expert sources were searched through the Web of Science and Scopus databases based on the keywords - digital transformation in small and medium-sized enterprises. The same keywords were also used to search for relevant resources from the websites. Criteria for literature selection:

- Temporal relevance - the article was to be published between 2018 and 2021;
- Professional relevance - thematic focus on digitisation and digital transformation of SMEs in connection with Industry 4.0, which is synonymous with digital transformation.

The primary objective of the article is to identify the attitude of SMEs in the field of digital transformation and to reveal the common and different elements of their perception of the issue. The purpose of the article is also to describe the global level, implications and attitude of enterprises to the impact of the pandemic on their digital transformation. To fulfil the objective, a secondary analysis in the form of a case study was conducted (Section 3). In section three, primary research results from companies were used:

- AI Multiple, which summarized survey results from PwC, IDC, Research and Markets, McKinsey, IDG, Tech Pro Research, Deloitte, Harward Business Review, Prophet, Fujitsu, Futurum, Forrester, McKinsay, Adobe, and Vision Critical, Digital Adaption;
- The emphasis on the practical use and implementation of digitalisation by geography was analysed according to the DigitaliseSME surveys for the European Union region and Industry4UM for the territory of Slovakia.

68 SME managers from 9 industry sectors participated in the DigitaliseSME research activity as follows (DigitaliseSME, 2020):

- cleaning (3%),
- textile (6%),
- healthcare (7%),
- wholescale (7%),
- consultancy (9%),
- information and communication technologies (10 %),
- tourism (12 %),
- agricultural (12 %),
- other (34 %).

The first survey across Europe captures data from 2018 to 2020. Respondents answered three questions focusing on satisfaction with digitised processes, feasibility of solutions in practice and areas for improvement by leveraging digital transformation. The survey was conducted in three phases (DigitaliseSME, 2020):

- Stage 1 - June to September 2018.
- Stage 2 - October 2018 to February 2019.
- Stage 3 - March 2019 to January 2020.

In the first phase, the criteria for the sample were written, in the second phase, a 5-month pilot version of the questionnaire was tested, and in the third phase, the main

research was carried out with the three questions mentioned above (DigitaliseSME, 2020).

The limitation of the survey from DigitaliseSME is the involvement of companies from different sectors, the smaller sample size and the limited number of questions. Despite these limitations, the authors find the survey relevant and interesting.

The Slovak surveys from Industry4UM cover the time period 2018, 2019 and 2020. In 2018, 73 respondents took part in the survey, of which 7% were micro enterprises, 20% were small enterprises, 26% were medium enterprises and 47% were large enterprises. Engineering companies accounted for 56%, electrical 5%, chemical 7% and other 32% of respondents (Industry4UM, 2018).

In 2019, there were 52 respondents, of which 10% were micro, 15% small, 25% medium and 50% large enterprises. Engineering and automotive manufacturing accounted for 50%, electrical engineering 13% and the others section 37% of the respondents (Industry4UM, 2019).

In 2020, the last year analysed, 57 respondents were involved, of which 9% were micro, 9% small, 31% medium and 51% large enterprises. 54% of respondents from the engineering sector, 16% from the electrical and electronics sector, and 30% from the other sectors combined participated (Industry4UM, 2020).

The questionnaire was addressed to the top management of the enterprise. Respondents answered a total of 13 questions, 11 of which were the same each year, with two new questions added in 2020, focusing on the impact of the Covid-19 pandemic on the digital transformation of enterprises. The results of both surveys formed the basis for our own analysis and drawing conclusions from a comparison of identified and relevant results.

In addition to secondary analysis of the literature, case studies in the form of secondary analysis of the surveys, the summarization and comparison method was also used.

3 Results

The secondary analysis of the surveys aims to identify the global level and impact of the Covid-19 pandemic on digital transformation, including identifying common and divergent attitudes of respondents in the field. The field of secondary research confirmed the growing importance of digitalisation in relation to the pandemic and the different attitudes towards digitalisation due to the geographical scope of the companies that participated in the surveys.

3.1 Findings and Analysis

3.1.1 Global level of digital transformation

According to AI Multiple, the digital market will grow at a CAGR of 23% in 2025 compared to 2019. In the near future, experts predict that there will be an 18% growth in adoption in small and medium enterprises by 2023. Despite the Covid-19 pandemic, statistics from 2020 confirm an increased investment in digital transformation of 10% (AI Multiple, 2021). According to consultants from PwC, up to 52% of SMEs plan to reduce their investment spending in the future due to the pandemic, but only 9% of them will reduce spending on digital. The preferred digitisation technologies by 2025 are artificial

intelligence and the Internet of Things (AI Multiple, 2021), according to IDC and Research and Markets.

The IDG survey results argue that 89% of businesses have adapted an initial form of digital strategy, which they are constantly trying to improve and adapt to market conditions. Tech Pro Research argues that 70% of enterprises have implemented a digital strategy or are working on its future development and use. Deloitte found that 87% of enterprises perceive a large impact of digitalisation on their business, but only 44% of those surveyed are ready for digital transformation. According to Harvard Business Review, only 23% of businesses globally do not need digitalisation. Digital transformation drives competitiveness and market growth by up to 51%. In the wake of the Covid-19 pandemic, strategic business executives are setting goals for accelerating digital transformation (37%) and promoting teleworking (37%) (AI Multiple, 2021).

McKinsey consultants are of the opinion that if a company belongs to the group of small and medium-sized enterprises with fewer than 100 employees, it is three times more likely to succeed in digital transformation than large companies. The problem, however, is often the reluctance of employees to change or the fear of giving up the established way of working. According to Prophet, Fujitsu, Futurum and PwC, the biggest challenges of enterprise digitalization are (AI Multiple, 2021):

- negative perception of digitization only in the form of additional costs rather than opportunity (29%),
- cultural differences and legislation (26%),
- difficulty of the process (76%) in terms of lack of time (75%), resources (75%), talented staff (75%), misuse of data (74%),
- lack of awareness and technological skills (45%),
- the absence or mismanagement of a Director of Digital (35%).

Forrester, McKinsay, Adobe and Vision Critical report that businesses that have a Chief Digital Officer, regularly adopt innovative technologies, are experience-driven and have a fully integrated digital strategy, manage digital transformation twice as effectively as other businesses. Bika recommends that enterprises should view digitalization as a competitive advantage, involve all their stakeholders in the process, do not confuse process optimization and transformation, and have a long-term vision with a primary focus on the customer (Bika, 2020).

3.1.2 The impact of the Covid-19 pandemic on the digital transformation of enterprises

Digital Adoption argues that in the times of the Covid-19 pandemic, digital transformation has become a priority for most businesses (Digital Adoption, 2020). According to a PwC survey in 2020, 36% of business executives considered legislative constraints to be the biggest threat to digital adoption. Conflicts in markets were second (35%), uncertainty around economic growth was third (34%), and cyber threats were fourth at 33%. In 2021, pandemics ranked first, cited by up to 52%, data security concerns in cyberspace ranked second (47%), and legislation ranked third (42%) (PwC, 2021). In 2020, IDC created a prediction of the evolution of the digital transformation of businesses before and after the coronacrisis, a graphical representation of which can be found in Figure 1 (IDC, 2021).

Covid-19 reduced the growth of digitalisation spending across all sectors, i.e. distribution and services, finance, infrastructure, manufacturing and resources, and the public sector. The highest decline was observed in manufacturing and distribution (Figure 1) (IDC, 2021).

Due to the Covid-19 pandemic, distribution logistics spending is projected to increase by $85 billion by 2027. Businesses that were able to implement elements of digital transformation during the pandemic stabilized or even increased their revenues. As many as 45% of executives in businesses with declining revenues due to the pandemic are starting to go digital. Covid-19 accelerated digital development by 3 to 4 years. Survey respondents reported that they implemented digital-based change 25 times faster during the pandemic, and remote work was done 40 times sooner than before the pandemic (Eira, 2021).

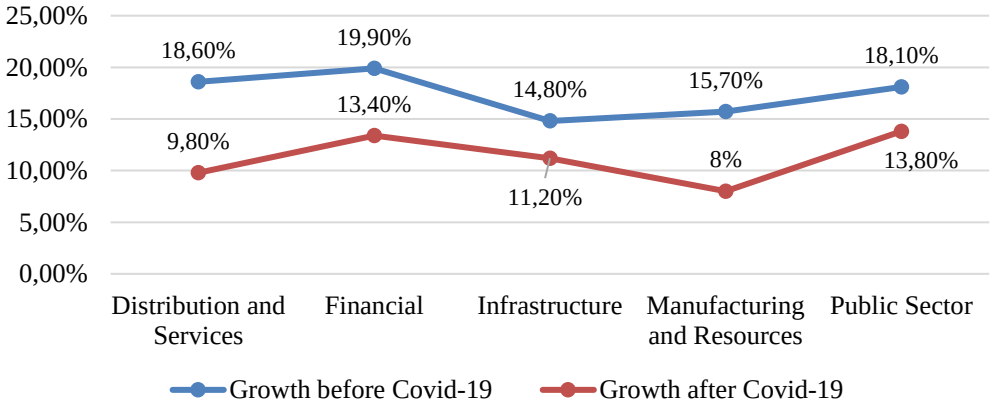

Figure 1 Impact of Covid-19 on digital transformation; Source: modified by (IDC, 2021)

3.1.3 Europe

Medium and large technology-based enterprises are at the forefront of digital transformation projects in the European Union. Small and medium-sized enterprises that focus their activities on traditional sectors such as construction or agriculture use digitalisation only at the level of 2%. Research from DigitaliseSME in 2018-2020 revealed large regional differences that have a major impact on the adoption of Industry 4.0 concepts (DigitaliseSME, 2020).

The results of the European DigitaliseSME survey are summarised graphically in Figure 2.

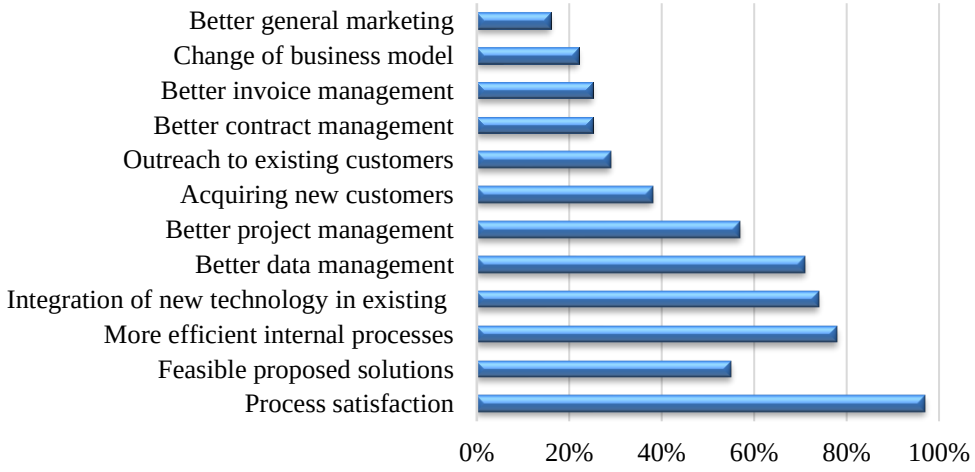

Figure 2 Results of the European SME Digital Transformation Survey (2018-2020); Source: modified by (DigitaliseSME, 2020)

Smaller businesses do not have the resources to invest in new digital technologies. If they choose to invest less, they experience great uncertainty about the return on that investment. In addition, small businesses lack sufficient awareness of effective ways to optimise processes through digitalisation (DigitaliseSME, 2020).

The survey involved 68 managers of SMEs in Europe. Up to 97% of the respondents were satisfied with the new form of digitised processes, 55% stated that digital transformation helped them to implement effective workable solutions to their problems (DigitaliSME, 2020). Respondents reported the following benefits of digital transformation for their businesses, namely (DigitaliseSME, 2020):

- increased efficiency of internal processes (78% of respondents),
- easier integration of new and existing technologies (74%),
- improved data management (71%) and project management (57%),
- winning new customers (38%),
- greater outreach to existing customers (29%),
- improving contract (25%) and invoice management (25%),
- effective business model change (22%),
- improving marketing activities in general (16%).

The new exploratory activities will be implemented between 2021 and 2027 through the Digital Europe Programme (DigitaliseSME, 2020).

3.1.4 Slovakia

The survey conducted by Industry4UM shows that the fluctuating results in the area of digital transformation were mainly in 2019, where there was a decrease in negative tendencies in 4 questions. In that year, the application of digitalization to internal processes, including production, decreased, managers were not motivated to perceive the trend of digitalization in customer collaboration during the pandemic, and negative thoughts about the increased difficulty of financing digital transformation started to prevail (Figure 3 and Table 1).

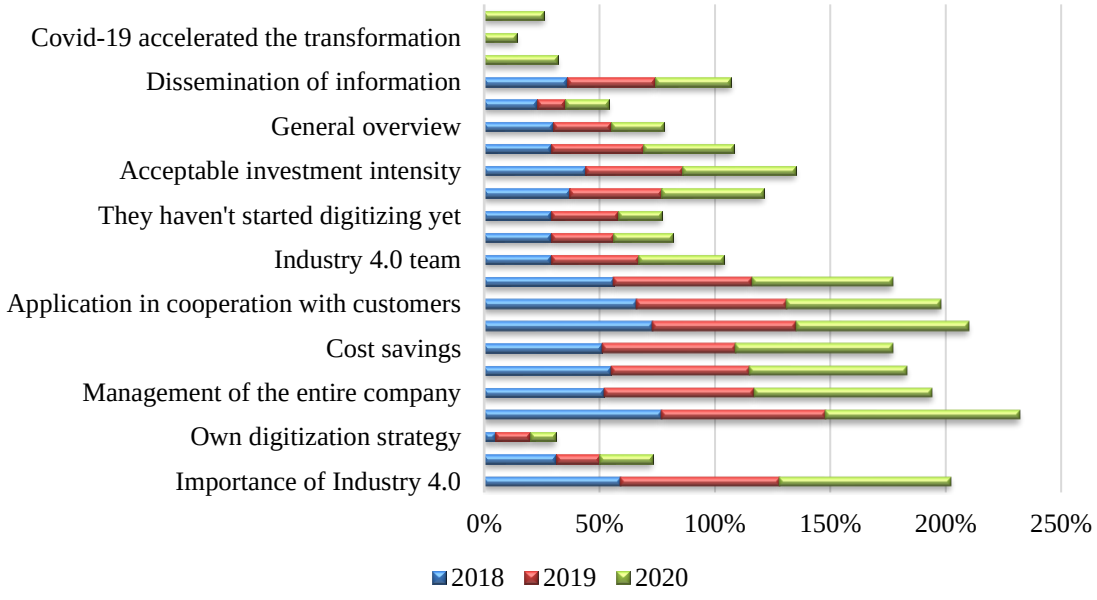

Figure 3 Results of the survey on digital transformation of Slovak enterprises (2018 - 2020); Source: modified by (Industry4UM, 2018; 2019; 2020)

Significant growth across the entire study period of 2018, 2019 and 2020 was observed in Figure 2., and Table 1 in terms of the growing importance of perceptions of Industry 4.0, greater application of digitalization for enterprise-wide management, growth in competitiveness and cost savings (10% growth in savings in 2020 versus 2019). The element of the need to change business models to reflect the trend towards digitalisation has also seen gradual growth, i. e. there has been a 4% increase in 2019 compared to 2018 and a 1% increase between 2020 and 2019. There has been a steady increase in support for training on the subject, with an annual increase of 4% in the most recent period.

Table 1 Summary of survey results in Slovakia; Source: modified by (Industry4UM, 2018; 2019; 2020)

Area / Year	2018	2019	2020	Trend
Importance of Industry 4.0 (very important)	59 %	69 %	74 %	growth
State of digital transformation:				
- first attempts	31 %	19 %	23 %	fluctuating
- own Strategy	5 %	15 %	11 %	fluctuating
Area of application:				
- internal processes	77 %	71 %	84 %	fluctuating
- enterprise-wide management	52 %	65 %	77 %	growth
- competitiveness growth	55 %	60 %	68 %	growth
- cost savings	51 %	58 %	68 %	growth
Appliction in internal process:				
- manufacturing	73 %	62 %	75 %	fluctuating
Need to apply the trend in:				
- cooperation with customers	66 %	65 %	67 %	fluctuating
Business model change due to digitalization (yes)	56 %	60 %	61 %	growth
Industry 4.0 team (yes)	29 %	38 %	37 %	fluctuating
Industry 4.0 application:				
- self-directed	29 %	27 %	26 %	decline
- not yet started	29 %	29 %	19 %	decline
Support for digital transformation:				
- trainings	37 %	40 %	44 %	growth
Investment intensity:				
- doesn't always have to be costly	44 %	42 %	49 %	fluctuating
Availability of information:				
- sufficient information	29 %	40 %	39 %	fluctuating
- overall overview	30 %	25 %	23 %	decline
- essential information is missing	23 %	12 %	19 %	fluctuating
Dissemination of information among staff (no)	36 %	38 %	33 %	fluctuating
Better preparednessfor coronary crisis due digitalisation:				
- Yes	-	-	32 %	-
- No	-	-	18 %	-
- partially	-	-	30 %	-
Covid-19 has accelerated digital transformation:				
- Yes	-	-	14 %	-
- No	-	-	26 %	-
- We have not evaluated	-	-	46 %	-

There was a decrease in the application of digital projects on their own, in the area of not initiating any actions or in the decrease in the overall overview of the issue, which is positive, as companies prefer to implement digital transformation from specialists, they

are starting to actively participate and their understanding of the information is increasing (Table 1).

The other elements reach a fluctuating character, mainly due to the beginning of the pandemic in 2019. This view is also argued by the editors of FinReport, who looked at the results of the latest survey from Industry4UM in 2020. The results show that the Covid-19 pandemic has generated uncertainty and instability for businesses in Slovakia. A greater understanding of the issues and the importance of Industry 4.0 supported the argument that businesses that implemented elements of digital transformation into their operations before the pandemic coped better with Covid-19 than those that did not (FinReport, 2020).

However, Figure 3 and Table 1 show a lack of dissemination of information about the need for digital transformation from strategic management to their employees. Currently, up to 33% of managers do not disseminate enough knowledge to others. However, according to FinReport, digital technologies are effectively implemented only by Slovak companies that have foreign capital. The results pointed to the fact that 79% of digitised businesses in Slovakia are owned by foreign capital, which finances the digitisation team. Domestic enterprises without foreign capital are only 27% involved in their digital transformation. A key problem is the lack of investment, vision and implementation of digital strategy into practice by Slovak SMEs (FinReport, 2020).

Covid-19 has caused stagnation in the adoption of digitisation measures in Slovakia. Despite the findings, up to 90% of enterprises intend to continue with the implementation of Industry 4.0 projects in the future despite the pandemic, 11% still intensified their activities in this area (FinReport, 2020).

4 Conclusions

Comparing the main results from the two surveys, the following important common elements emerge:

- a significant absence of small business finance for digitalisation,
- greater involvement of medium and large enterprises in the survey,
- medium and large enterprises are at the forefront of digitisation,
- there is a lack of quality awareness of the issue, although it is increasing, it is not yet optimal,
- the preferred area for technology implementation is internal processes,
- enterprises in Europe and Slovakia prefer digital transformation only for profit increase, neither in one of the surveys mentioned environmental or social factors.

The biggest difference is an element that emerged in the DigitaliseSME survey, namely the integration of new and old technologies. Compared to Slovakia, businesses in the European Union are better prepared technologically for change in general. Slovakia lags behind other countries. While global countries, businesses and experts see the pandemic as a driver of development and acceleration of digitisation, in Slovakia it is perceived as a threat and a cause of stagnation of development in enterprises. The authors are of the opinion that it is necessary to continuously raise the awareness of managers and employees in the field of digitalization and, above all, to change the mindset at the national level. Only in this way can the attitude of small and medium-sized enterprises in the field of digital transformation in the times of the Covid-19 pandemic on the territory of the country be improved in the future.

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Assessment of the digitization of the service provision process in enterprises from the SME sector with use of the CIT method

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Abstract

Industry 4.0 caused that enterprises of all types to become interested in changes related to the automation and digitization of their processes. The Internet, better and smaller hardware made customers want to use e-services and to shop online. Therefore, service enterprises that took advantage of the digitization of the service provision process were able to meet these requirements. The problem may be the fact that many service enterprises are enterprises from the SME sector, which means they do not have such large funds to introduce changes, which may also result in difficulties in achieving the appropriate level of digitization. The aim of the paper was to assess the digitization of the service provision process in enterprises from the SME sector in Poland and the Czech Republic. During the research, innovative approach to the method called the critical incident technique (CIT) was used. Research allowed to indicate whether service enterprises operating in the network properly used the digitization process they underwent, and how the e-services provision process is assessed by the customers. Due to the survey, it was possible to identify the problems faced by customers, which provoke their great dissatisfaction.

Keywords: e-shops; Digitalization; Service quality; SMEs; CIT.

JEL Classification: L23, M11

Article Classification: Research article

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1 Introduction

Each enterprise operates in turbulent conditions, which forces it to different changes. It must adapt to these conditions and take into account innovations that appear on the market. This applies not only to the products offered by this enterprise, but also to processes, technological and organizational solutions. Many changes are forced by Industry 4.0. This concept is a new reality of the modern economy, because innovation and technological development play an important role in every organization, and the implementation of Industry 4.0 accelerates the industrialization and competitiveness of markets in EU countries (Ślusarczyk, 2018).

One of the important instruments of Industry 4.0 is the Internet, which has created a universal and uniform platform for connecting various devices at any distance (Pietraszek et al., 2020; Oujezdsky et al., 2016; Brozova et al., 2013; Jonsta et al., 2016). With the use of the Internet in the case of e-services and e-commerce, customers can make orders regardless of the place where they are located.

Since the end of the twentieth century, we can observe the progressive digitization of everything that surrounds us, as well as the rapid development of the Internet. Currently, most European enterprises have access to the Internet, many of them offer their products over the Internet (Ingaldi & Ulewicz, 2020). Digitization is therefore becoming a competitive tool for any type of enterprise. Organizations that have not yet been established in a digital environment need to digitize their services as fast as possible (Gardenghi et al., 2020; Sliva et al., 2019).

Digitization is understood as the process of using digital technologies to create and obtain value in a new way. This is a new direction made possible by the miniaturization of hardware, powerful microprocessors and wide Internet access (Marcon et al., 2019). Digitization has become a cornerstone of competitiveness in the business and industrial environment. Managers have to deal with the complexity associated with Industry 4.0 in various dimensions to exploit the potential of the digitization process for their well-being, goals and benefits (Bejtkovský et al., 2018).

In the case of services and trade, digitization allowed for the creation of new channels for contact with customers, as well as for their purchases and ordering services. In such a channel, an important element is the ability to choose the method of payment (also electronic), or the method of delivery of the ordered service or goods. In the case of the e-services provision process, direct contact between the service provider and the recipient has been eliminated, the customer himself makes the order, contacts the enterprise only in the event of a problem. Everything is done electronically, so the time of the order is not important.

An important aspect of e-services is the assessment of its quality level. According to the theory of service quality, one of the factors shaping its value is security which to should be adequately provided. The quality of services is a multidimensional issue, defined in many ways and characterized by a developed methodology (Kowalik, 2020). In general, in the case of services, quality is not understood and assessed as in the case of various types of products (Brozova et al., 2016; Dvorsky et al., 2010; Dvorsky et al., 2011; Sliva et al., 2003; Konstanciak et al., 2013), the quality of which has been presented in many papers (Gisterek & Makuch, 2020; Kardas et al., 2017; Knop, 2019; Holota et al., 2019; Rosak-Szyrocka, 2019; Wróbel et al., 2019; Sliva et al., 2019). Not only that, the assessment of the quality of e-services also changes in relation to traditional services, specific methods are used (Parasurman et al., 1988; Cronin & Taylor, 1994; Martilla & James, 1977; Klimecka-Tatar, 2018; Borkowski & Wszendybył-Skulska, 2007; Cep et al., 2013; Sliva et al., 2010; Brozova, 2013; Kardas et al., 2017). To a large extent, the digitization of the e-service provision process is taken into account when assessing its

quality. The materiality of services is not taken into account, as is the case with traditional services. More attention is paid to the operation of the website.

It should be remembered that determining the appropriate level of customer service is one of the most important strategic decisions of each enterprise. This level is a key factor affecting revenues and costs, i.e. profits (Pilarz & Kot, 2019). Assessing the digitization of the service provision process is important as it affects the level of customer service.

As Maresova et al. claimed (2018) small and medium-sized enterprises (SMEs) from the point of view of Industry 4.0 remain a relatively little explored area. There are studies focusing on innovation processes in enterprises, the replacement of labor by capital, and the consequences of rising unemployment and globalization (Antony, 2009; Saam, 2008; Sala & Trivín, 2018; Hedvicakova, 2018). However, little is said about the quality of the services they provide.

Enterprises from the SME sector are the backbone of many national economies (also from Poland and the Czech Republic). Small enterprises are considered a key element among all economic entities, driving mainly economic growth by strongly shaping GDP, but also increasing employment and social integration (Niciejewska et al., 2021). It is also worth mentioning that the majority of enterprises in this sector are service enterprises.

The aim of the paper was to assess the digitization of the service provision process in enterprises from the SME sector in Poland and the Czech Republic. Research allowed to indicate whether service enterprises operating in the network properly used the digitization process they underwent, and how the e-services provision process is assessed by the customers. Due to the survey, it was possible to identify the problems faced by customers, which provoke their great dissatisfaction.

During the research a method called the critical incident technique (CIT) was used. However, it should be emphasized that the use of this method was innovative. A typical structured interview was not used, but an online form where the respondents could describe their observations. This means that it is not possible to deepen the problem described by respondents. In addition, one specific enterprise was not examined, but service enterprise in the SME sector in general that offer their services online.

2 Material and methods

As mentioned before, the aim of the research was to assess the digitization of the service provision process. The research concerned the assessment of the quality of service provision by Polish and Czech e-shops that belong to the SME sector. The result of the research is the development of incidents areas that cause customer satisfaction and dissatisfaction, as well as areas that require special attention from service providers.

The critical incident technique (CIT) was used as the research method, which is one of the most popular methods of the services quality assessment. J. C. Flanagan, who developed this technique for research for the Aviation Psychology Program of the United States Air Forces during World War II, is widely believed to be the author of this method (Flanagan, 1954). The basis of the CIT method is to collect incidents by means of a structured interview with people who order that service and to analyze these relationships in order to arrange them in an appropriate scheme, which allows to detect problems and their causes. Respondents are asked about specific incidents that took place in the past, incident from which they were particularly satisfied or dissatisfied (Bitner et al., 1990).

Therefore, the respondents are asked to describe in full detail the given incidents that occurred during the service provision process (i. e. situations that had a special impact

on the perception of a given service and those that significantly deviate from the average). Both the state of extreme satisfaction and extreme dissatisfaction are considered critical incidents. The customer's assessment of these incidents, based on his subjective feelings, is used to distinguish situations that are typical of negative and positive customer feelings, as well as to determine the frequency of their occurrence (Serrat, 2017). The information collected in this way is analyzed in order to identify and counteract the causes of customer dissatisfaction.

A typical CIT methodology can be presented in four steps (Ingaldi, 2018):

1. A structured interview with people who ordered services. The aim of this stage is to obtain the most accurate information about the service provided and the customer's feelings.
2. Categorization. After the information I collated, an incident identification system is created to categorize incidents based on similarities. Independent experts sort incidents into groups and categories according to their similarities, and then the results of the work are compared.
3. Final categorization. Based on the two-stage analysis carried out in the previous stage, independent experts allocate the described incidents to individual groups and categories.
4. Statistical summaries. The research consists in presenting the proportions between positive and negative incidents in each group and category, as well as between them types of incidents. Additionally, it is good idea to create various types of graphs.

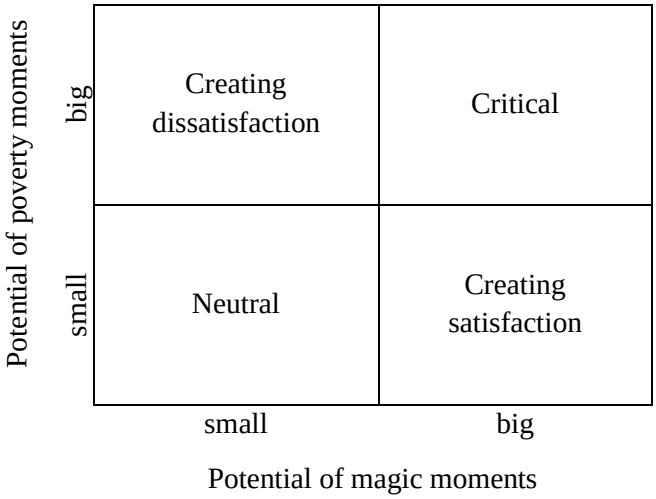

Figure 1 Matrix of classification of critical incidents; Source: modified by (Ravenscroft & Rogers, 2003)

One of the graphs that apply to the CIT method is the matrix of two variables (Figure 1), where the X axis is the number of positive incidents s assigned to each category (Potential of magic moments) and the Y axis is the number of negative incidents (potential of poverty moments). The matrix is divided into four fields according to a two-point scale: small and big. This scale is selected on the basis of the number of critical incidents in each category. The limits of the scale can be established on the basis of data according to the assumptions proposed by Urban (Urban, 2018). Lateral limits can be determined by the minimum and maximum number of positive and negative incidents,

and the division limit as a half of this range. The limits should be calculated separately for both axes.

The CIT method is usually performed for one specific service provider. In this case, the assumptions were changed and respondents who had ever used small e-shops were asked to declare their willingness to participate in the survey. Additionally, usually CIT research is conducted in the form of a structured interview. In this case, in order to collect as much data as possible, the research was conducted in the form of a web form which, in addition to indicating the country of origin, included a request to describe critical incidents, i.e. those that were particularly positive or particularly negative for customers. Respondents could describe more than one incident and could also describe both a positive and a negative incident.

The research was conducted in January-December 2021. It involved 724 respondents (498 from Poland and 226 from the Czech Republic) who described 788 critical incidents related to the use of e-shop.

The obtained responses were analyzed in detail. At the beginning, they were divided into categories and groups, and into positive and negative incidents. Then the percentages were calculated according to the aforementioned classification. The percentage of positive incidents is interpreted as a synthetic score measuring the quality experienced. Subsequently, the previously described matrix of classification of critical incidents was created and the results discussed.

3 Results

All 788 critical incidents described by the respondents in the online form were classified. These incidents were divided into 5 thematic groups and 33 categories. Table 1 presents a list of positive and negative incidents that were described by the respondents together with their classification. The categories related to digitization of the service provision process are marked in gray.

Analyzing the data in Table 1, it was found that the distribution of positive and negative incidents is similar, with a certain predominance of positive incidents (53.81%). This is a positive result, however, as 46.19% of the incidents are negative incidents, causing customer dissatisfaction. This means that e-shop customers often have problems during the service provision process in e-shops from the SME sector.

Among the positive incidents, the most numerous categories were 'Order' (G3) and 'Delivery' (G4). On the other hand, the least numerous category was 'Website of the e-shop' (G1). Among the negative incidents, the respondents described the most positive incidents belonging to the categories 'Delivery' (G4) and 'After-sale services' (G5), and the least numerous category was the category 'Website of the e-shop' (G1).

Among the positive categories, those with more than 20 incidents deserve special attention. This means that customers were particularly satisfied with the incidents related to these categories, i.e. (in descending order): 'Timely delivery' (22), 'Choice of delivery methods' (16),' Order fulfillment tracking '(21),' Information on the status of the order '(20),' Staff reliability '(9),' Confirmation of order '(18). These are the incidents that cause the highest satisfaction among customers, they can be treated as strengths of e-shops from the SME sector operating on the market. E-shops should make sure that there are as many such incidents as possible.

Table 1 Results of CIT analysis for the e-shops; Source: own elaboration

Groups and categories	**% of incidents**		
	Type of incidents		**All incidents**
	Positive incident	**Negative incident**	**Sum**
G1. Website of the e-shop			
1. Appearance of the website	1.27	0.38	1.65
2. Functioning of the website	1.14	0.63	1.78
3. Organization of the website	0.89	0.51	1.40
4. Website usability	0.76	0.38	1.14
5. Information on products	1.78	0.89	2.66
Sum for G1	5.84	2.79	8.63
G2. Contact with the e-shop			
6. Contact info	0.63	1.52	2.16
7. Chatbot	1.78	0.38	2.16
8. Staff response	2.28	1.14	3.43
9. Staff reliability	2.66	0.89	3.55
10. Speed of the reaction	2.41	2.92	5.33
Sum for G2	9.77	6.85	16.62
G3. Order			
11. Search engine operation	1.40	0.51	1.90
12. Personal information posted on the website	0.38	2.16	2.54
13. Order process flow	2.28	0.76	3.05
14. Speed of the ordering process	1.78	0.51	2.28
15. Choice of payment methods	2.03	1.78	3.81
16. Choice of delivery methods	3.43	0.51	3.93
17. Order security	2.16	2.66	4.82
18. Confirmation of order	2.66	0.76	3.43
Sum for G3	16.12	9.64	25.76
G4. Delivery			
19. Information on the date and method of delivery	1.02	1.65	2.66
20. Information on the status of the order	3.05	0.89	3.93
21. Order fulfillment tracking	3.30	0.25	3.55
22. Timely delivery	3.93	3.43	7.36
23. Condition of the packaging	0.25	2.41	2.66
24. Course of delivery	0.51	0.13	0.63
25. Compliance of the shipment with the order	0.89	2.16	3.05
26. Quality of the ordered products	2.28	3.68	5.96
Sum for G4	15.23	14.59	29.82
G5. After-sale services			
27. Return policy	1.14	2.28	3.43
28. Contact with the e-shop after delivery	0.38	0.76	1.14
29. Process of returning the ordered goods	0.38	3.05	3.43
30. Course of the complaint submission process	0.89	2.41	3.30
31. Course of the complaint consideration process	2.28	2.79	5.08
32. Opinions of customers	0.38	0.25	0.63
33. Loyalty programs	1.40	0.76	2.16
Sum for G5	6.85	12.31	19.16
Total sum	53.81	46.19	100.00

Among the most numerous negative categories, the following deserve attention (in descending order): 'Quality of the ordered products' (26),' Timely delivery '(22),' Process of returning the ordered goods' (29), 'Speed of the reaction '(10),' Course of the complaint consideration process' (31), 'Order security' (17). These are the weaknesses of e-shops and can leave customers dissatisfied. These are areas that need attention and improvement. Particularly noteworthy is the category of 'Timely delivery' (22), which is numerous among both positive and negative incidents. Probably the type of incidents in this category largely depends on the specific e-shop.

Based on the data in Table 1, the minimum and maximum number of positive and negative incidents were found (lateral limits) and the middle of the range (division limit) was calculated. In the case of positive incidents, the limits were <2; 31>, and the middle of the range was 16.5, in the case of negative incidents <1; 29>, and 15. The finished matrix was shown in Figure 2. While analyzing Figure 2, it was noticed that the most categories of incidents were observed in the 'Neutral' field. These are a few incidents that did not trigger too many positive or negative incidents.

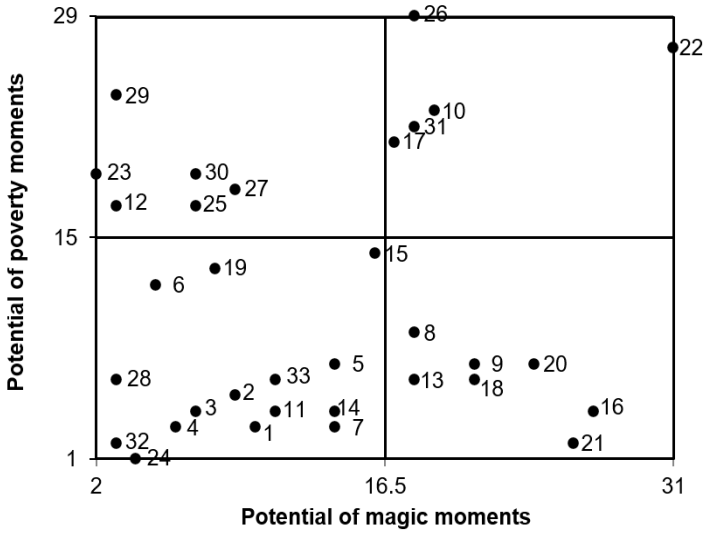

Figure 2 Matrix of classification of critical incidents for the e-shops; Source: own elaboration

Several categories of incidents have been noted which are referred to 'Critical' field. These are categories where both negative and positive incidents have been recorded. The attention should be paid to those incidents as they cause customer dissatisfaction. When it comes to 'Timely delivery' (22), e-shops should pay more attention to timeliness. The enterprise can also take delays into account and include them into the ordering process. If the customer knows immediately that the deadline is longer, but knows the specific delivery date, then may not be dissatisfied. Another category is 'Quality of the ordered products' (26). E-shops do not produce the products they sell themselves, but use intermediaries. Therefore, here it is worth considering the products sold, in particular, whether they are of the right quality. Customers also described many incidents related to 'Speed of the reaction' (10). It should be remembered that the questions were asked about e-shops from the SME sector, i.e. those with few employees, which may explain the problem with this category. When it comes to the 'Course of the complaint consideration process' (31), a large number of negative incidents may also be caused by a small number of employees, but also the quality of the sold products. However, enterprises should consider these categories and look for a solution if too few employees are a problem. The last category is 'Order security' (17). Often, e-shop websites are created by other small

enterprises, or even owners, due to the costs associated with it. Unfortunately, this often comes at the expense of customer security.

The most important field, however, is the field called 'Creating dissatisfaction', because negative incidents prevail here. There were as many as 6 categories in this field. The first three categories are related, i.e. 'Return policy' (27), 'Process of returning the ordered goods' (29), 'Course of the complaint submission process' (30). These are very important categories due to legal regulations. If the customer buys goods over the Internet, he or she has the right to return it, because he or she cannot touch it, check it or try on it. Therefore, the complaint and returns process should be designed in such a way as to make its course as easy as possible for customers. A related category is 'Compliance of the shipment with the order' (25), which unfortunately causes that the customer has to complain about the shipment and send it back to the e-shop. Another category is 'Personal information posted on the website' (12). Customers often complained about the fact that e-shops require a fairly detailed registration to complete the order, and often even when entering the website of a given e-shop, often the name and e-mail address are required. Customers must not be compelled to do so. The last category in the Creating dissatisfaction field is 'Condition of the packaging' (23). Often it doesn't really depend on e-shops, but on the suppliers of the goods. Therefore, attention should be paid to whether such incidents repeat, it should be checked whether it concerns the deliveries of a specific supplier. Or maybe the packaging used by e-shops is a problem.

The results are very general as they do not relate to a specific e-shop, but broadly to the e-shops of the SME sector used by the respondents. However, many of the categories are not directly related to the digitization of the service provision process, but to material elements. Almost 48% of positive incidents related to digitization and almost 43% of negative ones were recorded, which means a slight advantage of positive incidents over negative ones, therefore improvement actions are required in categories where particularly high critical incidents were recorded.

An interesting initiative has emerged in Poland. White and black lists of e-shops have been established (https://czarno-biala-lista.pl/). It is a website where customers can describe their positive (white) and negative (black) experiences with e-shops. This is how they advertise the whitelisted e-shops, but also warn others not to use the blacklisted ones. Therefore, it is worth taking care of customer satisfaction so that when writing about a given e-shop, they describe as many positive incidents as possible.

4 Discussion and conclusions

The industrial revolution 4.0, and its instruments such as digitization and automation of processes in enterprises, are becoming a challenge that all enterprises must face. In the case of service enterprises, digitization also applies to the service provision process. This is possible due to a properly designed website through which customers can place orders. They take part in this process themselves, there is no direct contact with the service provider. They have to choose the product, payment method and delivery themselves After completing the ordered product, they must be able to return or file a complaint. Therefore, a properly organized e-services provision process will result in a high assessment of its functioning, and thus affect the level of customers satisfaction.

In the paper, the results of research on the assessment of digitization of the service provision process in enterprises from the SME sector in Poland and the Czech Republic were presented. The research was conducted using an innovative approach to the critical incident technique (CIT). Respondents from Poland and the Czech Republic described the incidents that caused their particular satisfaction (positive incidents) and

dissatisfaction (negative incidents) in the online form. The results of the research allowed to identify the weaknesses of enterprises from the SME sector that provide their services online. Enterprises offering their online services should take these incidents into account to analyze their service provision process and see if these incidents apply to them as well. This will allow to introduce the corrective actions and improve the analyzed process in order to increase customer satisfaction.

The presented results are not free from limitations. First of all, the innovative use of the CIT method could cause that not all details on individual incidents were collected. It could also turn out that, despite the declarations that the described incidents concerned service enterprises from the SME sector, they concerned enterprises from outside the analyzed area. Additionally, the digitization of the service provision process was assessed in general, taking into account the various enterprise which services were used by the respondents, and no research was conducted for one selected enterprise. Nevertheless, the obtained answers allowed to draw interesting conclusions.

The research will be continued to confirm the received conclusions. In addition, it is planned in the future to extend the research to other countries, which will allow to compare the results between different countries and determine whether there are large differences in the level of digitization of service enterprises from the SME sector in individual European countries.

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Stakeholders of Digitalization and Digital Transformation in Slovakia

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Abstract

Digitalization and digital transformation certainly belong to the main trends that affect business organizations, entire business sectors as well as whole economies. While digital transformation of a business is clearly a firm-level event, it never happens in a vacuum, as external drivers also play a significant role. Thus, it is important to understand the national-level context and the subjects therein. Therefore, the aim of our paper is to review the concepts related to digitalization and digital transformation stakeholders, adapt the stakeholder classification to the context of Slovakia, and identify the examples of stakeholders in our national setting. In doing so, we review the academic literature, policy documents and professional and practitioner documents dealing with the issues of environmental context and its actors (i.e. stakeholders) relevant for digitalization and digital transformation of a business organization. Based on this, as a result of our paper, we propose a conceptualization of digitalization and/or digital transformation stakeholders, and we apply our conceptualization to map the complex multi-stakeholder system in Slovakia and highlight its main actors. Our findings contribute to the emerging body of knowledge in this field in Slovakia, both in academic as well as in practitioner context.

Keywords: business; digitalization; digital transformation; stakeholders; Slovakia.

JEL Classification: L22, L26, O33

Article Classification: Research article

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1 Introduction

Digitalization and digital transformation belong to the most important trends in business sector in the context of recent socio-economic a technological development. Also, digitalization and digital transformation proved out as efficient responses to the recent COVID-19 crisis (Stephan et al., 2021) that paralysed many traditional ways of doing business worldwide. For example, in Slovakia, more than a quarter of both small and medium-sized businesses, and one-fifth of large firms reported an increase of their online business activity in response to the pandemic (World Bank, 2021). Thus, it is no surprise that this phenomenon attracts an increased attention of policy makers, practitioners, researchers and, most of all, businesses themselves. Alike many areas under rapid development, also digitalization and digital transformation do not have an established terminology, and the jargon of subjects involved often uses these terms interchangeably, not following the rigorous definitions. In the presented paper, while we use both these terms due to our perspective and research interest, we at the same time intend to recognize and respect the distinction between them.

Digitalization and/or digital transformation of a business entity is operationalized with a business-centric (rather than technology-centric) perspective, focusing on products, processes and/or organizational aspects (Matt et al., 2015). While it is clearly a firm-level event, it never happens in a vacuum. Contrary, it is often driven also by external factors (as already argued above) alongside the internal drivers, and it is facilitated by multiple external environment subjects. Also, the current research on business firm digitalization and/or digital transformation often focuses on the external factors or subjects (e.g. Ismail et al., 2017; Pelletier and Cloutier, 2019). Due to the comprehensive nature of digital transformation of a business organization, there are many subjects that are important for its success. These vary depending on the size and orientation of the enterprise and the type and scope of the transformation. However, some fundamental stakeholders can be found in almost every project of digital transformation. Next, policy makers and entrepreneurship support providers at EU as well as national levels underline digitalization and/or digital transformation as one of the highlights on their entrepreneurship agenda. In line with this perspective, we focus on external stakeholders on national/regional ecosystem level in our investigation. At the same time, in the presented paper, we intentionally abstain from intra-firm actors and stakeholders that are subjects of interest of the firm-level perspective on digitalization and/or digital transformation. However, as our focus remains on a national level, we depart from this perspective.

We share an opinion that conducting a mapping of digitalization and/or digital transformation stakeholders in Slovakia can contribute to the debate in this field in our country. Also, as we found no similar work addressing the Slovak context, we believe that our findings can fill the gap in the literature nationally, and contribute to the debate in an international academic context. Therefore, the aim of this paper is to review the concepts related to digitalization and digital transformation stakeholders, adapt the stakeholder classification to the context of Slovakia, and identify the examples of stakeholders in our national setting.

2 Material and methods

The presented paper employs the grounded theory method to conduct a qualitative, secondary data- and literature-based research with an aim to conceptualize the stakeholder classification in relation to digitalization and digital transformation of business organizations. Proposing the stakeholder classification will be based on a review

of academic literature, policy documents and professional and practitioner documents that deal with the issues of environmental context and its actors (i.e. stakeholders) relevant for digitalization and digital transformation of a business organization. Then, the classification developed will be applied to the context of Slovakia, and its fit with the national setting will be tested by identifying particular actors.

To identify the stakeholders of digitalization and digital transformation of business organizations in Slovakia, we conducted a thorough examination of a complex multi-stakeholder system related to entrepreneurship and digitalization and/or digital transformation in Slovakia. In specific, we focused on evolving digital business environment with an emphasis on key drivers and interactions of groups of stakeholders in the field. There are many groups of interest who are important for successful digital transformation. These vary depending for example on the size and orientation of the institution and the type and the scope of activities that affect digital ecosystem. In this case, we focused on identifying fundamental stakeholders groups that represent stakeholders relevant for various aspects of digitalization and digital transformation. In the Results section, we present concrete examples that may come close to illustrate the stakeholders in Slovakia and validate our conceptualization.

3 Results

The aim of our paper was to review the concepts related to digitalization and digital transformation stakeholders, adapt the stakeholder classification to the context of Slovakia, and identify the examples of stakeholders in our national setting. Thus, in the first part of the results section, we present our conceptualization of the stakeholder classification in relation to digitalization and digital transformation of business organizations. Then, in the second part, we present the results of our mapping undertaken in Slovakia in form of specific examples of stakeholders using our classification.

Our review of literature related to the issues of environmental context and its actors relevant for digitalization and digital transformation of business organizations mostly came across resources grouped in the following areas: factors and drivers of digitalization/digital transformation (e.g. IDN, 2019; Morakanyane et al., 2017; OECD, 2019; Osmundsen, 2018; Verhoef, 2021; Vodafone, 2020), digital ecosystems and digital innovation districts (e.g. Brunetti et al., 2020; Li et al., 2017), policy support towards digitalization/digital transformation (e.g. OECD, 2021a; OIR POSDRU Bucharest-Ilfov, 2021), consultancy services and expertise related to digitalization and digital transformation (e.g. BCG, 2019; Deloitte, 2018; Diana and Torrance, 2019). Thus, we extracted various types of stakeholders that informed our conceptualization from these resources. The conceptual framework of business organizations' digitalization and/or digital transformation stakeholders is presented in Figure 1, while the individual categories are described below.

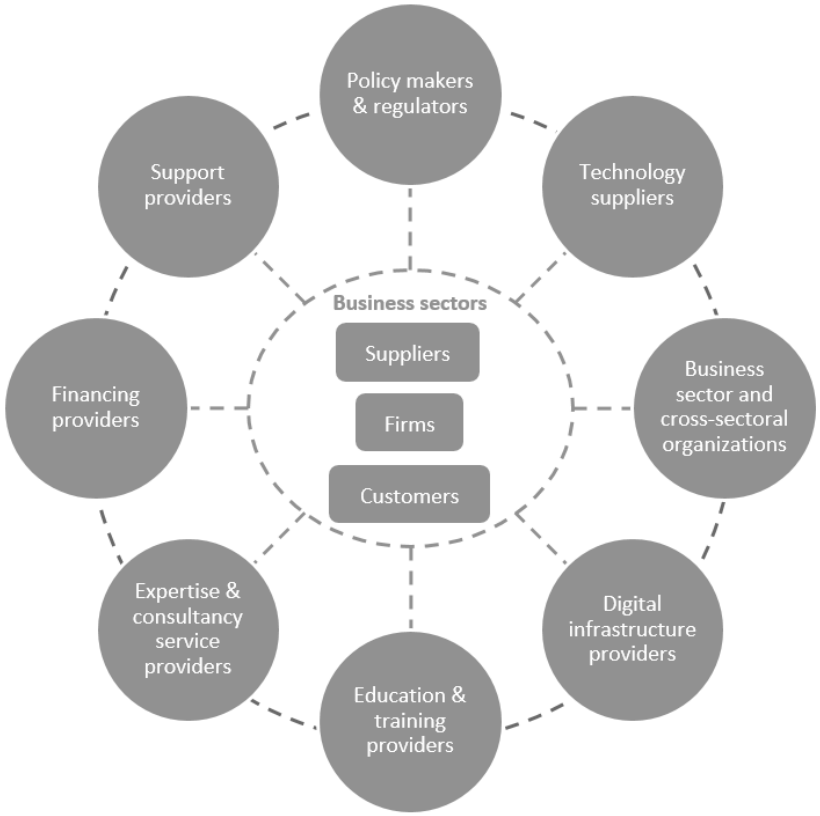

Figure 1 Digitalization and/or digital transformation stakeholders; source: own elaboration

Policy makers & regulators. In their actions, policy makers shape the framework for digital transformation and design policies aimed especially at strengthening capacities in new digital technologies, opening new opportunities for businesses and consumers, supporting the green transition, supporting people's digital skills and training for workers, and helping digitalize public services, while ensuring the respect of basic rights and values. The recent pandemic and related crisis have accelerated these initiatives even further.

Special role of EU and governments' interventions in relation to digital transformation is played by regulations and regulatory interventions. These sometimes can drive the digitalization and digital transformation of companies, as these might be pushed to transform their way of doing business or their organization in order to comply with regulatory changes (Osmundsen et al., 2018). Thus, regulators are definitely relevant stakeholders of digitalization and digital transformation.

Technology: Suppliers and Digital infrastructure providers. Digital technologies play crucial role in digitalization and digital transformation process of business organizations. Of course, technologies will not drive the transformation process themselves, but they must be coupled by certain firm-level factors, such as culture, strategy and digitally savvy staff (Morakanyane et al., 2017) as well as by awareness of their availability (Vodafone, 2020). Yet, the presence and availability of digital technologies are an important and necessary precondition. The key categories of digital technologies relevant to business digitalization and digital transformation are connectivity, process digitalization and automation, cloud, online presence, collaboration

and communication (Vodafone, 2020). Access to these digital technologies are facilitated especially by two categories of stakeholders: infrastructure providers and technology providers.

The digital infrastructure providers develop and operate both physical (i.e. digital connectivity, data centres, 5G) as well as online digital infrastructure. The latter includes for example cloud computing capacities or digital platforms for e-commerce. The platforms substantially increase businesses digital presence, their outreach and network capacity in sourcing and selling, and facilitate their access to distant markets, thus enabling, besides others, the raise of so-called born-global enterprises (OECD, 2019).

The technology providers offer products and services fostering the implementation of digital technologies in everyday business activities. Their offerings include digitalization solutions for various business processes, marketing activities, services related to gathering, storage and analysis of data for decision-making and management practices (incl. Big Data and AI solutions), solutions based on Blockchain and Distributed Ledger Technologies, or FinTech solutions (e.g. mobile banking, crowdfunding, etc.) (OECD, 2019). Also, technology providers often enable affordable access to cutting-edge technologies in manufacturing, thus enabling the implementation of Industry 4.0 (IDN, 2019).

Support providers. Support providers are uniquely positioned stakeholders, typically established or supported by national or local governments and linked to the policy level, with a mission to provide support and advice to companies that are driving toward digital transformation. Within their mission, they build awareness among businesses, they help to navigate businesses through the environment and local ecosystem towards opportunities to benefit from partnerships and other support offerings, such as financing. Also, they often undertake activities aimed at enhancing firm-level digitalization and digital transformation drivers, such as deployment of digital technologies, reskilling and upskilling towards digital competencies, or development of digital strategies and business models. Finally, they can also provide support for creation of SME-tailored digital solutions, enhance experimentation platforms and networking programmes (OECD, 2021a). Also, intermediary organisations (some of them also non-governmental), such as incubators, accelerators, mentoring organisations, development agencies, fab labs, or innovation agencies can provide guidance, inspiration, open spaces and digital tools to support businesses in their digitalisation efforts (EU, 2016).

Business sector organizations (industry-specific and cross-sectoral). An important stakeholder group in supporting business digitalization and digital transformation are sectoral and cross-sectoral organizations, such as different industry associations, entrepreneurs' associations, chambers, or cluster organizations. These organizations represent platforms where members can network and share their knowledge and experience, they help them to coordinate their efforts when representing interests towards policy makers and regulators, and they might also implement digital capacity building initiatives, help to develop digitalization standards, recommended practices and guidelines, and reference good practices in digitalization and digital transformation implementation.

Financing providers. Financial resources are one of the internal enablers of digitalization and digital transformation of business organizations (OECD, 2019). The financial aspect is one of the elements of the digital transformation strategy of any business, as it both drives and bounds the transformation, and it might also put pressure on a company leading to higher perceived urgency to act (Matt et al., 2015). Thus,

financing providers also play an important stakeholder role. Their importance is even higher in contexts where available internal resources are scarce. Access to financial resources (own or external) is supposed to be one of the preconditions to initiate and accomplish digitalization and digital transformation of businesses in developing regions. Here, companies often face challenges of insufficient own resources, and especially grants and subsidies are sought as sources of financing investments in digital transformation (Benedikovic et al., 2017). Also, the role of financing bodies is crucial when it comes to digital technologies of strategic importance at the country or regional level, such as the case of photonics and microelectronics in the EU (EIB, 2018).

Expertise and consultancy providers. Expertise and consultancy providers in the field of digital transformation provide support in developing digital capabilities, strategies, culture and talents as crucial drivers because simply using digital technologies to drive the digital transformation process is not enough (Morakanyane et al., 2017). While digital transformation is often a necessity for modern businesses, embarking on a program of digital transformation without expertise is very difficult and risky, considering the many potential pitfalls along the way, whether that's dead-end technology or improperly implemented systems. For the largest consulting companies providing professional services, technology consulting is a relatively new area, but it is becoming an increasingly important element of their offer. Besides these, there are numerous smaller consultancy providers, typically focused on a specific technology or specific field of expertise.

Education and training providers. The role of the education and training sector in digitalization and digital transformation lies in developing graduates whose skill profile matches the needs of organizations undertaking (or planning to undertake) the digital transformation. In simple words, education and training providers should provide those firm-level digitalization and digital transformation drivers that are related to education and training, such as digital skills leading to capabilities to gauge, plan, implement and optimize company's digital transformation (Vodafone, 2020). The crucial role of education in successful digital transformation is recognized and highly emphasized by policy makers at both national as well as international levels, as they recognize that the digital economy requires not only mastery of ICT skills, but also an entire set of complementary skills ranging from good literacy and numeracy skills through to the right socio-emotional skills to work collaboratively and flexibly (OECD, 2016).

Firms. Important stakeholders of digitalization and digital transformation at the business sector level are the firms in the sector themselves. Firms in the industry (either established ones or newcomers) are often initiators of digital shifts, changing or even disrupting the competitive landscape of an industry (Osmundsen et al., 2018). Due to digital technologies, competition in the markets becomes more global, and technologically advanced players gain bigger domination (Verhoef et al. 2021). Then, the companies in the respective industry often experience digitalization pressure through competitors' demonstration of digital advances, new entrants to the sector who bring disruptive digital business models, and technological progress in general, which, in turn, drives their efforts to engage in their own digital transformation (Haffke et al., 2016).

Suppliers. In addition to the firms themselves, the next important stakeholders in their digitalization and digital transformation at the industry/business sector level are the suppliers. Their position is particularly relevant in the case of entire supply chain

digitalization. In this case, besides intra-organizational digitalization, we also see the digitalization of inter-organizational processes (Holmström et al., 2019). Under the Industry 4.0 phenomenon, fully connected ecosystems are being created, and this also includes the supply chain management (Seyedghorban et al., 2020). According to Alicke et al. (2016) the "supply chains 4.0" is supposed to be faster, more flexible, more granular, more accurate and more efficient. Simply said, it is about "placing sensors in everything, creating networks everywhere, automating anything and analysing everything." which shall lead to increased customer satisfaction and improved overall supply chain performance (Alicke et al., 2016).

Customers. Finally, important stakeholders of digitalization and digital transformation of companies are their customers (both at business and consumer levels). Their changing behaviour and expectations related to the digital revolution belong to the triggers of digital transformation (Osmundsen et al., 2018). These changes include growing demand for the personalization of mass-produced products (IDN, 2019), shifting purchase processes to the online environment especially through mobile devices, increased interactions with companies through digital touchpoints, increased use of search and social media tools, sharing online product reviews (Verhoef et al. 2021). Such consumer behaviour changes often are structural, and thus the use of new digital technologies can become new normal, disrupting the traditional ways and rules of conducting a business (Verhoef et al., 2017). Companies that will fail to follow these changes might lose their attractiveness and get replaced by competitors or new entrants who will manage to do so (Verhoef et al. 2021).

3.1 Stakeholders of Digitalization and Digital Transformation in Slovakia

The following part of our results section presents the results of our mapping undertaken in Slovakia. We present the specific examples of digitalization and digital transformation stakeholders using our classification described above. However, due to the industry-specific nature of the business sector-level stakeholders (i.e. according to our conceptualization, these are firms themselves, their suppliers and customers), these are not included in our national-level mapping of stakeholders.

Policy makers & regulators. In the face of a digital revolution, also national and regional governments are increasingly defining digitalization as a strategic priority and are setting up large-scale initiatives to foster digital transformation of industry, science and society. In Slovakia, this task belongs to the Ministry of Investments, Regional Development and Informatization of the Slovak Republic. This ministry has the responsibility for preparing and monitoring of fulfilment of strategic objectives derived from two basic documents of digital transformation in Slovakia, 2030 Digital Transformation Strategy for Slovakia and Action plan for the digital transformation of Slovakia for the years 2019 – 2022. The Council of the Government of the Slovak Republic for Digitalization of Public Administration and the Digital Single Market was established as an advisory, coordinating and initiative body of the Government of the Slovak Republic for issues related to informatization, digital single market and digitalization of public administration focused on providing electronic public administration services for legal entities and individuals and electronic eGovernment systems, as well as the development of the economic environment in Slovakia towards the digital economy.

The Ministry of Economy of the Slovak Republic is another policy maker and regulator in the field of digitalization, especially for the digitalization of industry. The Smart Industry Initiative aims to address the low levels of digital awareness amongst Slovak companies and to bring the nation's business community – particularly industrial companies – closer to the principles of Industry 4.0. The focus is on collaborative R&D cooperation with industry, and eventually the deployment of more advanced technologies throughout the economy (The Ministry of Economy of the Slovak Republic, 2016).

Technology suppliers. Since Slovakia has become a member of the EU, several global technology suppliers have adapted to the domestic market, such as IBM, SAP, Oracle, Accenture, Atos, or Asseco Solutions and Asseco Central Europe as part of the Asseco Group. In addition, several domestic major players in the field of digitalization have emerged in Slovakia, such as ESET in the field of cybersecurity, Soitron with a focus on automatization, robotization, cybersecurity and data management solutions, or Aliter Technologies with ICT products and solutions used by international organizations as well as global technology companies and suppliers in the field of security and defence. As stated in the Strategy of Digital Transformation in Slovakia until 2030, in a small economy such as Slovakia, it is necessary to accept the fact that new technologies are mostly brought by big global technological players and Slovakia has an opportunity to focus on the creation of innovative services.

Digital infrastructure providers. The level of digital infrastructure in Slovakia is evaluated as generally satisfying. Especially, we see a fast growth of the coverage by mobile broadband internet. There are three major mobile operators (Orange, Slovak Telekom, and O2) and all of them have the 4G/LTE mobile coverage of the population at above 94%. Other major internet providers are, for example, SWAN, Antik or Slovanet. Also, telecommunications companies emphasize that Slovakia is one of the countries implementing advanced technologies in practice often earlier than other EU countries, which is demonstrated by the latest innovative services of Slovak telecommunications operators. Further, an advantage for entrepreneurs in Slovakia is the presence of web hosting providers who operate internationally and have a lot of experience in the field of digitalization, for instance, Wedos, Websupport or Webhouse.

Education & training providers. Due to the need for reforming the education system towards meeting the needs of the digital economy, the Ministry of Education, Science, Research and Sport of the Slovak Republic is a key stakeholder in the country. It is the central body of the state administration for elementary, secondary and higher education, educational facilities, lifelong learning, and science. According to the Action plan for the digital transformation, the Ministry of Education is responsible for the preparation and implementation of the strategic document - Programme for Informatization of Education Until 2030. Another important player in this area is the Digital Coalition, which was set up in 2017 upon the initiative of the IT Association of Slovakia. It is a successful example of activism across a broad range of public, private, academic and civic organisations and institutions in Slovakia in order to improve the digital skills of citizens. As part of its work in the Digital Coalition, the Ministry of Education has started working on the inputs to the Digital Transformation Strategy in the field of education. Together with the Ministry of Labour, Social Affairs and Family of the Slovak Republic, other activities are supported, such as: Dual education or the national project "Sector-driven Innovations towards an Efficient Labour Market in the

Slovak Republic." following the concept "Work 4.0" with a focus on readiness for a career change in the digital future.

As for the education providers in Slovakia, up to twelve universities offer the study of Computer Science and IT programs. There are also several companies providing high-quality further education (life-long learning) in IT, such as GOPAS, ELCT, IT LEARNING SLOVAKIA, IT Academy and a successful programme Cisco Networking Academy at secondary schools and universities that prepares specialists in computer networks and IoT.

Aware of the need to support gender balance in the IT world, there are initiatives in Slovakia aimed at building women's IT skills. Examples are the Mini Tech MBA, a unique training program created specifically for women that offers a comprehensive overview of information technology, improving digital skills and expanding the network of contacts, or the "AJ ty v IT", a civic association that helps women discover the magic of technology. They educate, motivate, and start their careers in IT.

Expertise & consultancy service providers. Almost all global consulting companies in the field of business digitalization and digital transformation also operate in Slovakia. The top consulting firms in Slovakia for digital expertise and consultancy services are, for example, Accenture, Deloitte, KPMG, Atos, PwC, EY, or IBM Services. The most important domestic expertise and consultancy service are, for example, Centire, EMARK or Stengl.

Financing providers. The key sources for the development of digitalization in Slovakia in the coming years will be the EU structural funds and resources from the approved recovery plan of Slovakia after the COVID-19 crisis. The EU's plan for economic recovery demands that member states allocate at least 20% of the €672.5 billion Recovery and Resilience Facility to digital transition. Investment programs such as the research and innovation-centered Horizon Europe and infrastructure-centered Connecting Europe Facility allocate substantial amounts for digital advancements as well. In Slovakia, up to €1.2 billion will be spent on digitalization and informatization from the European funding package as part of the recovery plan.

Another relevant source of financing for the digital transformation of companies in Slovakia are bank loans of commercial banks. According to the SAFE survey, this source of financing is often used and easily accessible among SMEs in Slovakia (European Commission, 2020).

Support providers. While there are many providers of support for entrepreneurs in Slovakia (for example Slovak Business Agency, Slovak Innovation and Energy Agency), the area of digitalization is still insufficiently represented. The OECD report SME and Entrepreneurship Policy in the Slovak Republic draws similar conclusions (OECD, 2021b).

Slovak Business Agency (SBA) is crucial and is the oldest specialized non-profit organization for the support of small and medium-sized enterprises in Slovakia. SBA has established a network of National Business Centres. These centers are designed to act as a one-stop-shop, providing various services to SMEs, differentiated by the life cycle of their intended beneficiaries. One part of the services is focused on supporting SMEs in the digitalization process, particularly by the workshops, seminars, consulting, and the possibility of using Creative Points.

Slovak Innovation and Energy Agency (SIEA) is a contributory organization established by the Ministry of Economy of the Slovak Republic. The main role of the

SIEA is to raise awareness about energy efficiency, renewable energy sources, and innovations in all fields of economy and provide expert consulting in those areas. In the field of innovation, SIEA focuses on the preparation and implementation of supporting schemes for businesses to support their competitiveness; analysis of innovation potential in Slovak industries, and participation in creating policies in the field of innovations and focuses on raising awareness regarding the significance of innovations on all levels.

Besides the two government agencies, there are many other supporting organizations and associations that provide various support services (training, consulting) also in the field of business digitalization, for example, The Slovak Alliance for Innovation Economy, Impact Hub, Slovak Chamber of Commerce and Industry (SCCI), etc.

Business sector and cross-sectoral organizations. In Slovakia, there are various non-profit organizations, unions, and associations representing entrepreneurs and the business sector. The most important business associations are, for example, the Entrepreneurs Association of Slovakia, the Young Entrepreneurs Association of Slovakia, the Slovak Craft Industry Federation, the National Union of Employers (NUE), Klub 500, Business Alliance of Slovakia (BAS), and others. Clusters also play an important role in digital transformation in Slovakia, as they represent platforms for collective action to help companies from different sectors to innovate better and exploit their business opportunities. A good example is Košice IT Valley, representing a regional partnership of IT companies, education institutions, and regional authorities. Other clusters and organizations in Slovakia that support digitalization include e.g. the Industry Innovation Cluster, the Cyber Security Cluster, or the Union of Slovak Clusters.

In order to improve the preparations of companies for the digital transformation, the Industry4UM platform was created as an initiative of industry representatives under the auspices of the Ministry of Economy of the Slovak Republic. Its whose ambitions are: to be an independent, expert, opinion-making authority in the field of company transformations; to bring industries together for common goals in the field of Industry 4.0; to provide companies with more information and increased expertise on Industry 4.0, digital transformation and innovations enhancement; to educate and raise awareness of the public on the subject of Industry 4.0; and to bring together experts and create a platform for the exchange and sharing of expert views and many others.

4 Discussion and conclusion

Our findings yield several implications for both further research as well as for business practice. Regarding the first, we found the body of knowledge on the researched topic very dynamic and fast-growing (especially in the recent few years) yet still under-developed. Some of the stakeholders and their roles are not sufficiently covered in the literature, so we encourage future research to address these issues. As for the latter, our findings can serve particularly different stakeholders who plan or implement initiatives and actions towards digital transformation. Namely, they might find useful the link of other stakeholders with whom they could network or even synergize their efforts. Also, businesses themselves might find useful having an access to a single list of digitalization stakeholders, whom they might need to approach to foster their digitalization projects.

Also, our work is not an excerpt from limitations. For example, as the literature review was not limited to academic literature, we were not able to adopt a systematic literature review design. We are aware of drawbacks of such approach, but we also understand its benefits, and in our opinion, the latter prevail. Yet, as stated above,

systematic literature review with this focus is highly recommended. Then, also the stakeholder mapping part could be replicated to further improve its robustness, e.g. by engaging expert respondents and practitioners from the field in qualitative inquiring.

To conclude, the aim of our paper was to review the concepts related to digitalization and digital transformation stakeholders, adapt the stakeholder classification to the context of Slovakia, and identify the examples of stakeholders in our national setting. In fulfilling this aim, we have reviewed the academic literature, policy documents and professional and practitioner documents that deal with the issues of environmental context and its actors (i.e. stakeholders) relevant for digitalization and digital transformation of a business organization. Based on that, we have proposed a conceptualization of digitalization and/or digital transformation stakeholders at the national level, while also recognizing the business sector-level stakeholders. Building on our conceptualization, we conducted a thorough examination of a complex multi-stakeholder system related to entrepreneurship and digitalization and/or digital transformation in Slovakia, in order to map the main stakeholders. With these two dimensions of our results, we contribute to the emerging body of knowledge in this field in Slovakia, both in academic as well as in practitioner context.

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Session C

Changes in business management in the context of Industry 4.0

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Transformation of Paradigm in Management of Organizations in the Context of Industry 4.0

The 4.0 Idea: Big Data and the usage in Procurement 4.0

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Abstract

Big Data is seen as an important element in the context of the 4.0 idea. Companies – not only on the automotive industry – generate a lot of unused and unstructured data. The data sources can be generated internally or can be used from external sources. Big Data and predictive analytics should make the data usable in real time. The focus in this paper will be on the automotive industry, with a more detailed analysis of the benefits of Big Data in Purchasing 4.0. GoogleTrends and MAXQDA are used as software. The literature is analyzed quantitatively and qualitatively. Methodically, secondary data will be evaluated to identify the state of research. With the results of the literature research the movement to Procurement 4.0 will be discribed and the new requirements for buyers and the cyber risk will be described more in detail. The aim of the work is to highlight the impact of the 4.0 idea and the resulting transformations in procurement.

Keywords: Automotive Industrie;|Industry 4.0; BigData; Procurement 4.0.

JEL Classification: O14, H57, L62

Article Classification: Research article

1 Introduction

The automotive industry is in the middle of a fundamental change. Combustion engines (IC) are being replaced by electric drives. Autonomous driving is also to be possible in the near future. In a 2018 study by the Verband der Automobilindustrie (VDA), the share of electric vehicles will change from the current 3% to more than 25% by 2030. The study summarizes seven fundamental trends that can only be realized in combination with Industry 4.0 and the use of Big Data (VDA 2018).

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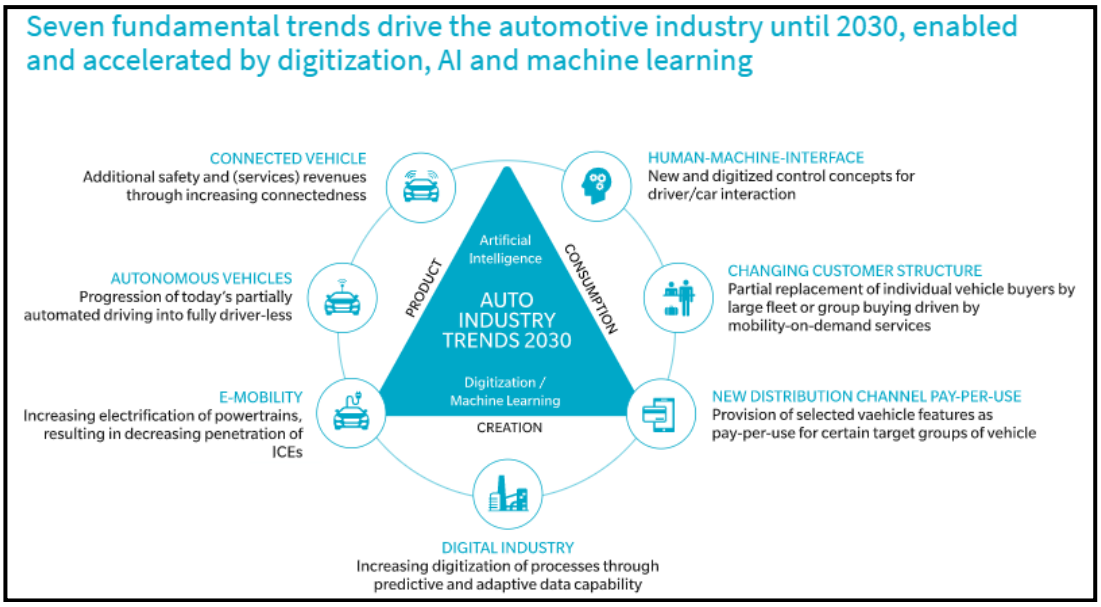

Figure 11 Seven Trends in the Automotive Industrie; Source: (VDA, 2018)

Automotive manufacturers (OEMs) are responding by shifting vertically. Key competences are being shifted to suppliers in order to have capacities for the development of new technologies. This creates new challenges for the 1-Tier supplier. These can only be met with the help of Big Data and unsing of the dark data with means also an increasing of connectivity. The scientific discussion started in 2013, but only became more intensively controversial in 2017. Currently, there is no clear definition of Procurement 4.0 (Zafari & Teuteberg, 2018). But key elements that are identified as being directly linked to the idea of 4.0 are named frequently – Digitalization – Connectivity – Networking – Automation – Sustainability – Transparency – Artificial Intelligence (AI). As shown in Figure 2 there are direct connnections to the way of implementing of Procurement 4.0. It takes on the role of a pioneer in the implementation of the 4.0 idea (Frauenhofer IML and BME e. V. 2016). Professor Kleemann's readiness model indicates how the implementation in companies can be classified. Level 1 is assigned to Operational Procurement | Level 2 to eProcurement | Level 3 as Comprehensive eProcurement | Level 4 as Selected Procurement 4.0 | Level 5 to Full Procurement 4.0 (Kleemann, 2018). Figure 2 describes the industrial revolution as an example, starting in the 18th century up to the present day. In the 20th century, the evolutionary stages are associated with the 4th Industrial Revolution, in particular with the introduction of Industry 4.0. Industry 4.0 was first published by the German Federal Government at the Hannover Messe in 2011. The motto "High - Strategy 2020" was used for this conference (Deutscher Bundestag, 2016). Wahlster, Kagermann and Lukas (2011) created the connection between the 4th Industrial Revolution "4." and the Internet of Things (IoT) ".0" with the 4.0 idea (Wahlster, 2011). This creates a link between internal and external data.

Digitization creates huge amounts of internal and external data available, which is to be made usable within the context of Big Data. Big Data is a big name and its meaning will be analyzed in more detail in this paper. By definition, this word is associated with large volumes of data that are generated from a number of different data types (Gabler, 2021). Companies generate a lot of unstructured and unused data (dark data) during their activities. To make the data usable and to use it in a decision-making-process, Big Data together with analytics is one important solution in Procurement 4.0 (Rejeb et al., 2018). With the concept of Big Data and Predictive Analytics (BDPA), data

from a large number of internal sources (intelligent production "4.-thinking") or external sources (Internet of Things – ".0-thinking) are made available in real time (Kache & Seuring, 2017). In the literature, the IoT is given a high priority in order to support communication in the supply chain. Linked to Industry 4.0 are not only IoT and Big Data, but also key functions such as cyber-physical systems, cloud robotics, artificial intelligence, sensor technology, 3D printing, autonomous vehicles, as well as quantum computing (Schiereck, 2018; Schulz, 2017). In 2015, Daimler established a cooperation with Google and IBM to use quantum computing to develop technologies that will be marketable in 10 to 15 years (Mohn, 2020). In the further part of this paper, it will be analyzed which opportunities arise from Industry 4.0 in connection with Big Data and which role Purchasing 4.0 has.

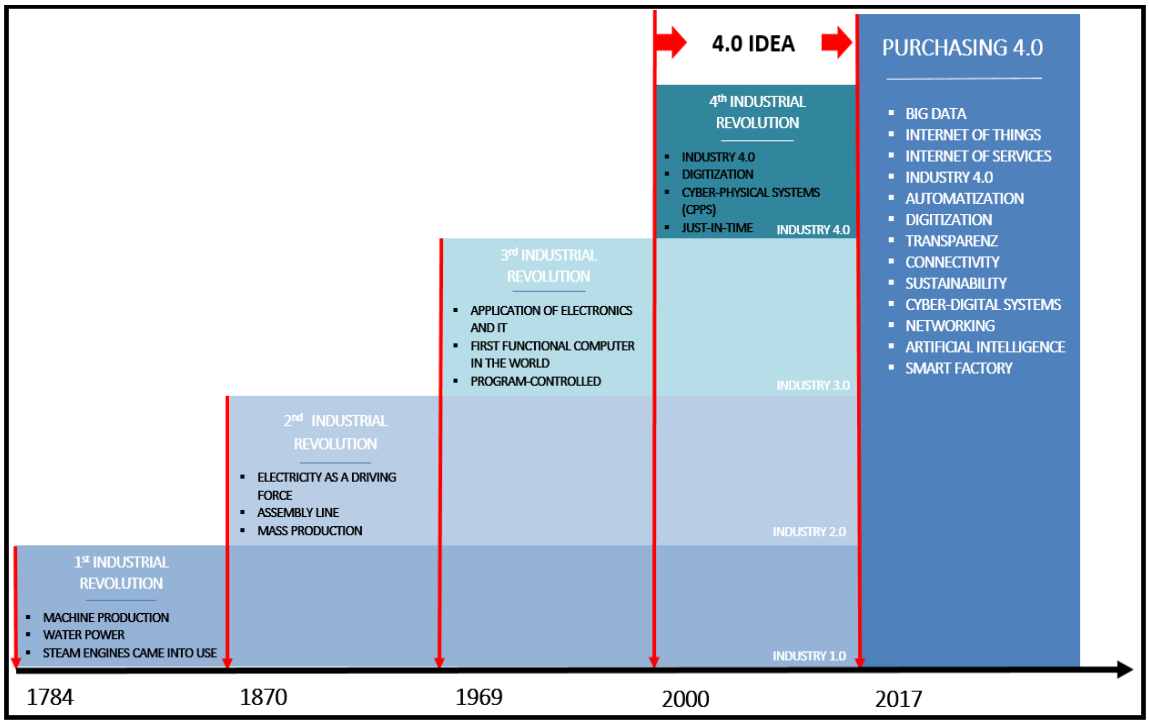

Figure 12 Evolution of the 4.0 Idea in conntection to Purchasing 4.0; Source: own elaboration

2 Material and methods

The aim of this paper is to identify the current state of scientific research on the 4.0 idea. It will be analyzed which impact new technologies have on purchasing 4.0 and which changes in purchasing are resulting from these technologies. To identify the relevant publications, the beginning of the general interest will be evaluated with the help of Google Trends. Afterwards, a quantitative and qualitative literature analysis will be conducted to summarize the results by using the mixed methods.

The methodological proceeding includes the search for the relevant literature and secondary data in order to focus on the topic. The involvement of search programms and the use of "GoogleTrends" support the quantitative and qualitative analysis of the relevant publications. By using this Mixed Methods the state of scientific research in June 2021 is identified (Kuckartz, 2014). The state of research was systematically classified in this work. Google Trends was used to analyze how search queries have developed worldwide since 2004. First, the terms "Industry 4.0" and "Big Data" were compared.

The analysis of the CSV-Data from Google Trends shows in comparison that the query of the keyword "Big Data" has increased significantly since 2011. The term "Industry 4.0" was presented for the first time with the Hanover Fair in 2011 (Deutscher Bundestag, 2016). Since 2015, the first search queries have been registered. Based on the results the literature research in this paper starts from 2011.

2.1 Qantitative Literature Research

The quantitative research in this paper includes the sampling, data collection, data preparation and data analysis during the research phases. The results are summarized in the Figure 3 (Baur & Blasius, 2014). Based on the starting year from 2011 the analysis was done by using the search programm Google Scholar | Scopus | SpringerLink | ProQuest | Emeals Insight | ACM. By using the keywords "Automotive Indsutry | Industry 4.0 | Big Data | Procurement 4.0 | Purchasing 4.0" the relevant literature could be indentified.

Jahr	Industry 4.0	Big Data
2004	0	70
2005	0	51
2006	0	53
2007	1	47
2008	0	52
2009	0	54
2010	0	66
2011	0	101
2012	0	310
2013	0	615
2014	9	863
2015	22	959
2016	37	972
2017	61	1.044
2018	80	980
2019	100	936
2020	82	826
2021	28	306
Gesamtergebnis	420	8.305

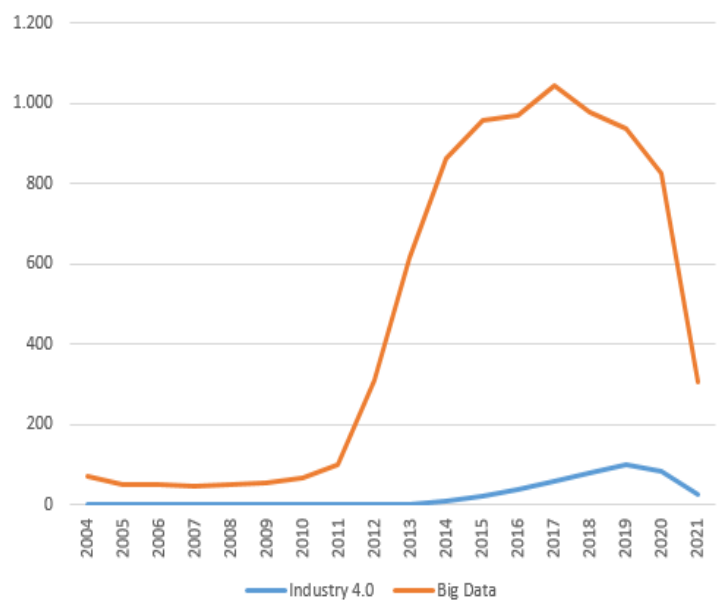

Figure 3 Analysis CSV Data Google Trends, Source: modified by (Google Trends, 2021)

The keywords were used individually and then combined with an AND relation to identify and to work out the topic. In the highest combination level ("Automotive Industry" AND "Industry 4.0" AND "Big Data" AND "Purchasing 4.0" OR "Procurement 4.0"), the keywords "Procurement 4.0" and "Purchasing 4.0" were analyzed separately. Comming from searching work there could be extracted 134 relevant publications, which were further analyzed in their contents. In particular, the search engine "Google Scholar" and "ProQuest" seem to be suitable with the results.

2.2 Qualitative Lieterature Research by using MAXQDA

From the quantitative literature research, the 134 secondary data were interpreted in relation to content in order to identify the present state of scientific research (Baur & Blasius, 2014). MAXQDA was used as the software for data analysis. The literature was

first scanned by using the “Autocode Fuction”. Here the relevant autocodes were used, which were also applied to within the search machines (“Automotive Industry” | “Industry 4.0” | “Big Data” | “Purchasing 4.0” | “Procurement 4.0” | “Einkauf 4.0”). The result is summarized in the following table. This indicates that the relevant literature focuses on the keywords in terms of their content. The number of matches and the colored table highlights the literature that focuses on the keywords. If the color is more intense, the literature is more qualified. The “Code Function” was used for further analysis of the qualified literatures and to determine the current state of scientific research. The table 1 indicates that there is only a small number of literature (134 findings), which contains the combination of all keywords.

Table 1 Quantitative Literatur Research Overview; Source: own elaboration

Keywords	Google Scholar	Scopus	SpringerLink	ProQuest	Emeald insight	ACM	∑ Total
"automotive Industry"	143.000	40.595	34.289	542.493	> 7.000	5.016	
"automotive Industry" and "Industry 4.0"	8.710	216	848	8.223	280	61	
"automotive Industry" and "Industry 4.0" and "Big Data"	4.060	24	378	3.438	155	27	
"automotive Industry" and "Industry 4.0" and "Big Data" and "Procurement 4.0"	57	0	5	39	14	0	115
"automotive Industry" and "Industry 4.0" and "Big Data" and "Purchasing 4.0"	10	0	1	5	3	0	19
					relevant Literature		134

The red marked positions indicate the literature that is classified as very suitable in connection with the keyword. The light blue literature discusses the keywords superficially and can only be used to a limited extent. Literature that does not refer to the keyword is shown in Table 2 with a “0”. In total, more than 60 relevant publications could be searched.

Table 2 Extract Literature Analysis with MAXQDA and Autocode Function; Source: own elaboration

Qualitative Analyse\ Autocode - ALL: automotive industry	Qualitative Analyse\ Autocode - ALL: industrie 4.0	Qualitative Analyse\ Autocode - ANY: BigData	Qualitative Analyse\ Autocode - ALL: procurement 4.0	Qualitative Analyse\ Autocode - ANY: purchasing 4.0	Qualitative Analyse\ Autocode - ANY: einkauf 4.0
0	0	0	0	1	0
4	126	3	6	6	0
2	116	7	1	1	0
4	15	2	1	1	0
4	15	2	1	1	0
2	0	14	5	5	0
2	64	14	1	1	0
2	75	5	2	2	0
4	129	5	20	21	0
4	15	11	101	101	0
2	0	1	0	0	0
0	140	7	1	1	0
2	201	32	2	16	0
2	11	50	2	2	0
16	46	1	1	1	0
0	23	14	0	0	0
47	0	30	0	0	0
0	12	16	0	0	0
1	0	356	0	0	0
0	3	2	0	0	0
0	2	16	0	0	0
4	12	260	24	12	0
0	2	36	0	0	0
12	0	105	0	0	0
1	4	3	0	0	0
3	0	0	0	0	0
3	0	0	0	0	0
65	0	0	0	0	0
1	0	0	0	0	0
37	0	0	0	0	0
0	1	0	0	0	0
47	0	0	0	0	0
75	2	0	0	0	0
15	0	0	0	0	0
52	0	0	0	0	0
28	0	0	0	2	0
0	83	60	2	1	0
0	27	0	0	0	0
0	180	21	60	32	2
4	137	12	12	6	0
61	124	3	0	0	0
2	116	21	2	1	0
0	35	35	40	20	0
0	27	0	0	0	0
1	43	51	4	37	35
0	3	16	0	112	0
0	3	16	0	112	0
0	0	0	0	1	0
3	6	66	0	0	0
0	106	33	0	47	47
0	88	96	0	207	201
2	182	114	34	294	277
1	121	26	20	12	2
0	1	0	0	3	3
0	16	0	2	23	20
0	8	6	2	5	4
0	3	6	0	1	1
0	5	6	0	59	59
4	15	33	202	101	0
164	5	0	0	0	0
317	0	0	0	0	0
189	4	0	0	0	0
13	0	0	0	0	0
1202	**2352**	**1613**	**548**	**1248**	**651**

3 Results

The necessary digitalization is recognized in the automotive industry in particular. For procurement, this means that the data generated in the context of Big Data must be made usable. Thereby a new transparency will develop which makes it possible to save resources and to take direct impact on the sustainable procurement. The new data transparency is also creating new requirements. Data is made usable, linked together and

made available in real time. In the future, artificial intelligences with algorhytms will help to identify trends and link data that a human being cannot capture. This brings with it new demands on employees, as well as new demands on cyber security in companies.

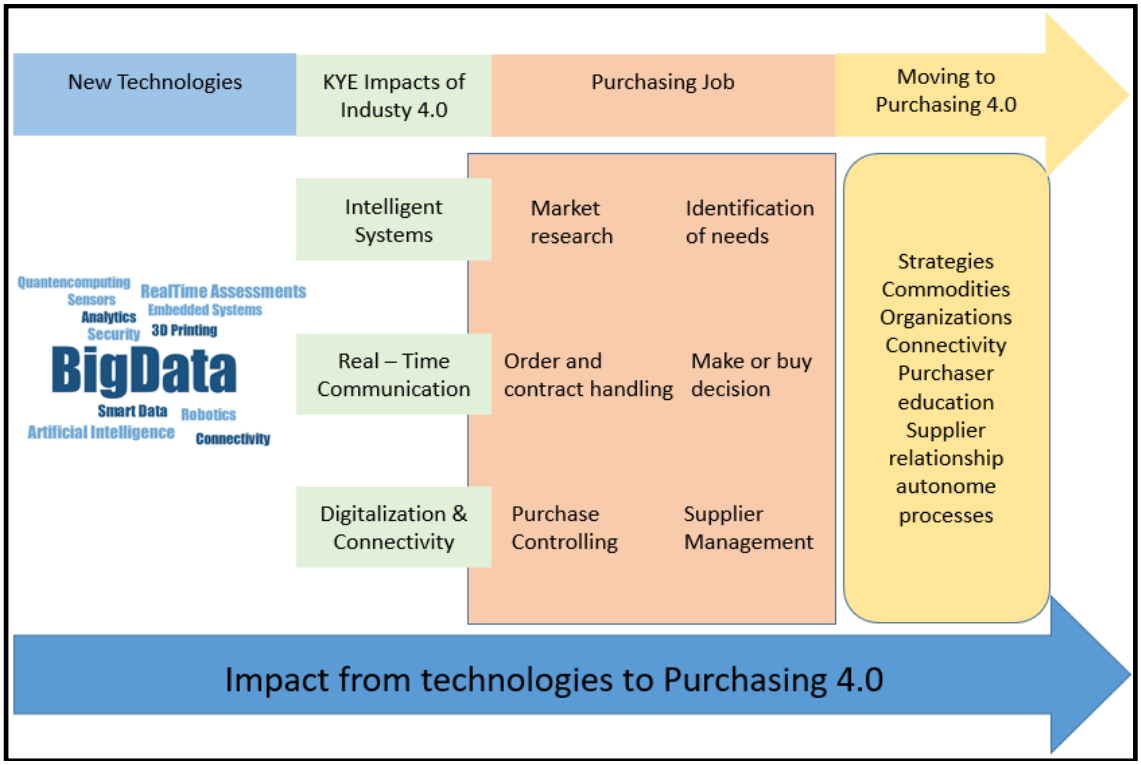

Figure 4 Technology Impact to Purchasing 4.0; Source: modified by (Kleemann, 2017)

Figure 4 shows an abstract of new technologies that are used in the context of 4.0 thinking. These have a direct impact on the activities in purchasing and are useful for realizing the transformation to Purchasing 4.0. Based on a survey from 2019 and 2020 by the Bundesverband Materialwirtschaft, Einkauf und Logistik e. V. (BME), it was identified that the industry expects the digitalization and implementation of e-tools in procurement to be necessary in order to be competitive in the future. (Bogaschewsky, 2019, 2020). To implement Purchasing 4.0, transformations are necessary that are driven by Indsutrie 4.0: Intelligent Systems | Real-Time Analytics and Communication | Digitalization and Connectivity. Intelligent systems can be used to optimize requirements as well as to do market studies. In the future, decision-making processes in the automotive industry will be carried out much faster, with a significant increase in risk for the 1-Tier supplier. Real-time data and information will be available to generate solutions together with the partner or to give risk warnings that could happen in the supply chain. Artificial intelligence is already being used today to have early warning systems to counteract bottlenecks at an early stage. The digitalization and networking with partners takes place via the standardization of processes and templates, which allow an easy exchange of data. The transparency that is created helps the supply chain to recognize where resources are being wasted. Together, the gaps can be optimized. In summary, these topics in Purchasing 4.0 will change the requirements for employees and education will have to change. In the future, purchasing will be an essential key to achieve the strategic company aims.

3.1 New requirements for the buyer

The use of new technologies is changing the future demands on employees. In the future, system affinity will be a requirement for being able to use the new options. The corporate strategy must be aligned with the new requirements. The process structure in the company must also be adapted to an end-to-end strategy.

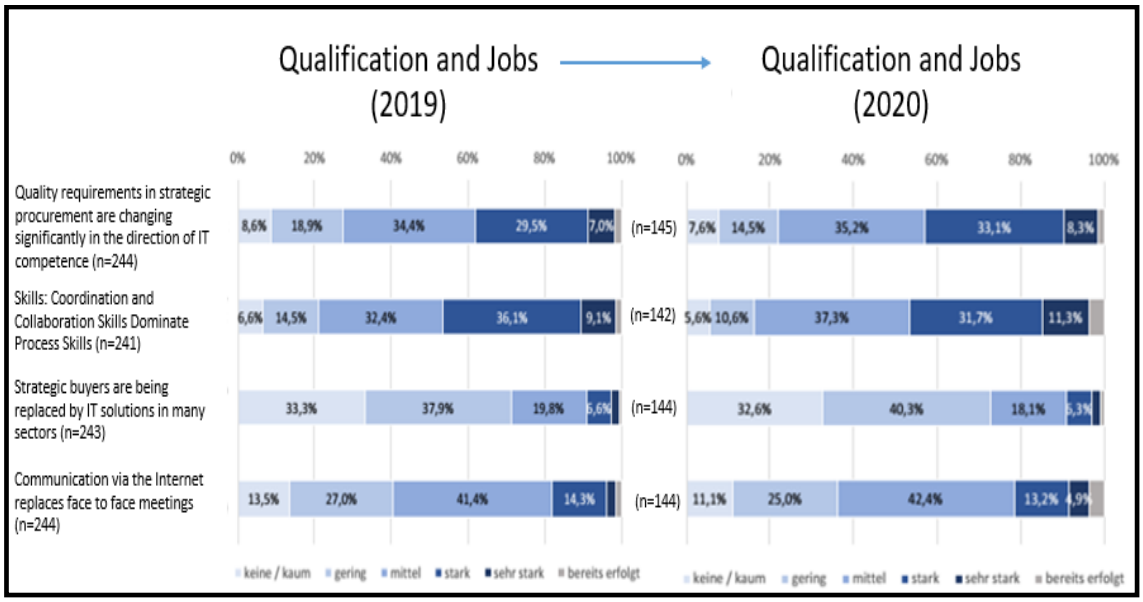

Figure 5 Chance in Qualification and Jobs; Source: (BME Barometer 2019, 2020)

The influence of Big Data on Purchasing 4.0 includes digitalization. If digitization increases, the buyer will have to have higher technical skills in the future (Blechmann & Engelen, 2020). Figure 5 compares a survey from 2019 and 2020 that shows the need for a change in the qualification of purchasers. Digitalization opens up new resources within the procurement organization that need to be used to manage an intesive supplier relationship (David, 2020). The impact of digitization and the changing demands on the buyer, have not yet been researched intensively. The operative process structure can be digitized easily. The task of the strategic buyer is enlarged by monitoring, the expertise as a data analyst and the ability of the product developer. In the future, tasks such as coordination, control and contract management, including cost transparency and negotiation, will be more in focus (Busse, 2020). OEMs are required to meet sustainability targets along the complete supply chain. With the “Lieferkettengesetzt” buyers in Germany must in future guarantee that the sustainability targets are respected in foreign supplier companies (Franke, 2021). Using Big Data Analytics will increase the transparency that the buyer will use in different ways. With the help of Big Data, a decision if a supplier will have a strategic role in the future can be made on the facts. Negotiations will also become much more data-based (Kleemann, 2017).

3.2 Cyber- Security and Big Data

The use of internal and external data creates new challenges for the IT department in companies. While strict security rules apply in the automotive industry to keep data secret, a way must be found to realize connectivity and at the same time to guarantee data security. Information in the form of data must be classified in the future in order to limit a possible risk. Cyber Security is needed to save the environment in a company. In the

future, intelligent systems will be used to analyze internal and external data as well as historical and forward-looking data in real time. This will require interfaces that directly place new demands on data security (Kleemann, 2017).

Table 3 Cyber Risk Classification; Source: internal document

Public - external	Internal	Confidential	Top secret
datas are available to everyone, even outside the organization	Internal datas that are made available only to the company's own employees	Confidential datas are only available to limited employees in the company	Top Secret datas are available only to selected and exclusively persons. Sharing it can be detrimental to the company.
no risk	**normal risk**	**high risk**	**very high risk**
	Damage effects are limited and controllable	large damage impact possible	The impact of damage can be existential, dangerous and catastrophic.

To keep the security standard, cloud computing is an important technology. For companies with sensitive data, such as in the automotive industry, Hybro Cloud comes into account. Security-relevant data is saved on local protected clouds. (Schuster & Kloé, 2018). Table 3 shows an example of internal classifications of how data security can be classified in a company. Next to the availability of data for internal employees, the risk that would arise in the event of a security leak is also always included in the classification. If the risk is higher, less employees have access to the data.

Table 4 Overview Data Security; Source: internal document

ISO 27001	International Organisatz for Standardization - is an international standard for information security in private, public or non-profit orgaizations
DSGVO	Data Protection Basic Regulation i.e. the EU Directive has been converted into applicable law by each country
BSI	Federal Office for Information Security
VDA	The German Association of the Automotive Industry is a legally responsible association based in Berlin and the joint interest group of German Automotive manufacturers and suppliers
TISAX	Trusted Information Security Assessment Exchange is a standard for information security defined by the automotive industry

The suppliers in the automotive industry must document the standard of data security. Table 4 shows an extract from the international options, whereby TISAX certification is accepted in the automotive industry (TÜV Süd 2021). The basis for the data transfer are the ISA requirements (Information Security Assesments) of the VDA, which are based on the international standard ISO 27001. A standardized data transfer takes place in the supply chain (TISAX 2021).

4 Discussion

It is still unknown what level of readiness companies in the automotive industry have reached today. Companies have recognized that e-tools will be necessary to continue to be competitive. The current study will identify the readiness level of industrialization in the departments in the companies. Big Data in combination with artificial intelligence are important factors that companies need to use. The automotive industry requires its suppliers to research new technology quickly and to produce cost-effectively. This will be achieved by those companies that will quickly make use of Big Data and quickly connect with their suppliers. This will provide more transparency in the supply chain, which can be used to save resources and strengthen sustainability. It is difficult to give a clear indication of how procurement 4.0 will develop in the future. It is necessary to

research the different aspects. Next to the opportunities, the education of the future buyers must be described more clearly. The requirements will become more complex and the level of sysem support will become more significant. By networking between partners, the risks to IT security will increase. A higher level of networking also means a higher risk in the event of a cyber attack. Solutions for these problems are currently being focused on.

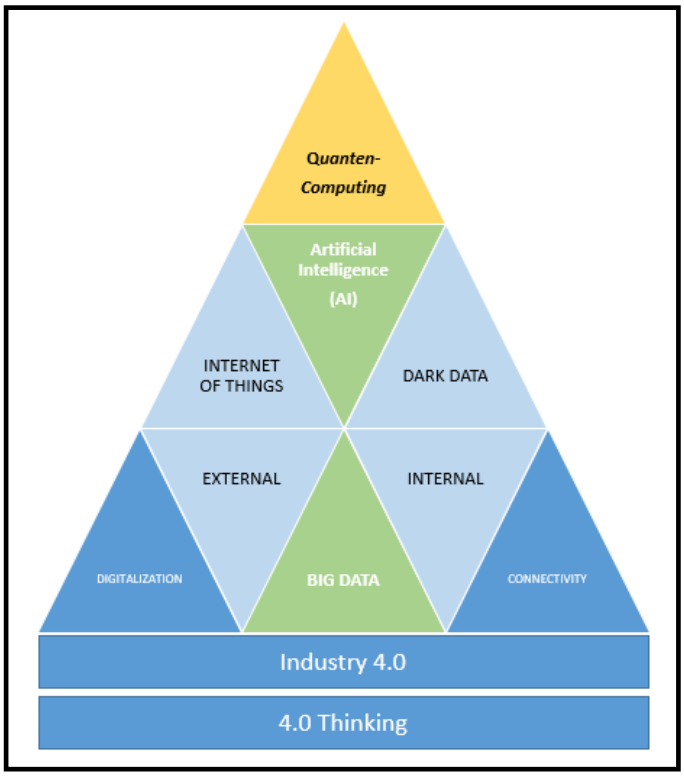

Figure 6 Theory of the usage of Big Data; Source: own elaboration

Next to intelligent systems and the use of artificial intelligence, the technology of quantum computing will become an important factor in the future: It will allow the parallel operation of computing processes. The new technology will create a new need for system affinity, which will be more important in the future to be able to use such complex technologies. Figure 5 shows an example of the results. The basis for data acquisition is the 4.0 idea, which formed the basis for Big Data when Industry 4.0 was introduced. Today, the use and connection of internal and external data are controversially discussed. The combination of data, in combination with AI, provides a significant competitive advantage. Theoretically, the use of quantum computing will speed up technological progress. However, this technology is not currently usable by the masses. However, this combination represents the next stage of evolution.

Akcknowledgements

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Quality 4.0: An Observe Study of Preparedness Factors for Implementation into Enterprises

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Abstract

Quality 4.0 is a concept where traditional quality methods are combined with Industry 4.0 to achieve a new level of operational excellence (Aldag and Eker, 2018, LSN Research, 2017). The associated organisational changes that come with the condition of digitalisation will shape the issues of quality work and its interactions in relation to the organisation (employees), suppliers and customers to ultimately design and do the work better. The main objective of this thesis is to work out which indicators are necessary as a high level of preparation. For this purpose, several empirical market studies were used as market and literature research as well as 25 expert interviews. The result was that there is a division into 2 levels, the management level and an operational level additional sub-headlines. These form the basic prerequisite for Quality 4.0 and are the basis for the assessment with the aim of identifying the preparedness factors for Quality 4.0. The interviewees have assessed these below to the used questionnaire: *Management Level:* Support of Top Management (4.88), Vision and Strategy of Quality 4.0 (4.04), Organizational Culture and Awarness of Quality 4.0 (3,64), Leadership (4.40) and Customer Centration (3.44); *Operational Level:* Knowledge and Competency of Qu ality 4.0 (4.64), Training on Quality 4.0 items (4.28) and Supplier Orientation (2.92). The participants of the expert interviews were selected by the study leader according to their professional background. Based on an extensive set of 25 expert interviews, it could be empirically proven that there is a division into 2 levels, the management level and an operational level with additional sub-headlines. These form the basic prerequisite for Quality 4.0 and are the basis for its evaluation with the aim of identifying the preparedness factors for Quality 4.0.

Keywords: Industry 4.0; Quality 4.0; Quality tools; Quality management.

JEL Classification: L15, L23, O14

Article Classification: Research article

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1 Introduction

Quality 4.0 is not a direct replacement for existing Quality Management practices in organizations that have stood the test of time. Rather, Quality 4.0 builds on existing quality systems and practices to drive significant improvements in the value chain in terms of customer satisfaction, operational efficiency and productivity. The adoption helps organizations to automate and simplify time-consuming and error-prone business processes. This leads to superior product performance from operational, economic and environmental perspectives. Quality 4.0 is the application of these Industry 4.0 technologies to quality, but it isn't really a story about technology. It's about how that tech improves culture, collaboration, competency, and leadership. It's also about the digital transformation of management systems and compliance., and although these new capabilities are advanced, this isn't a futuristic vision. Leading manufacturers have already started the digital transformation and have already achieved initial results.

This interaction leads to and formulates the research question: What are the preparedness factors for the introduction of Quality 4.0 in companies and how important are they?

In order to gain a first impression of the interest in the market, the frequency of access was determined over a period of 10 years by means of a keyword search with the help of the web-based tool Google Trends.

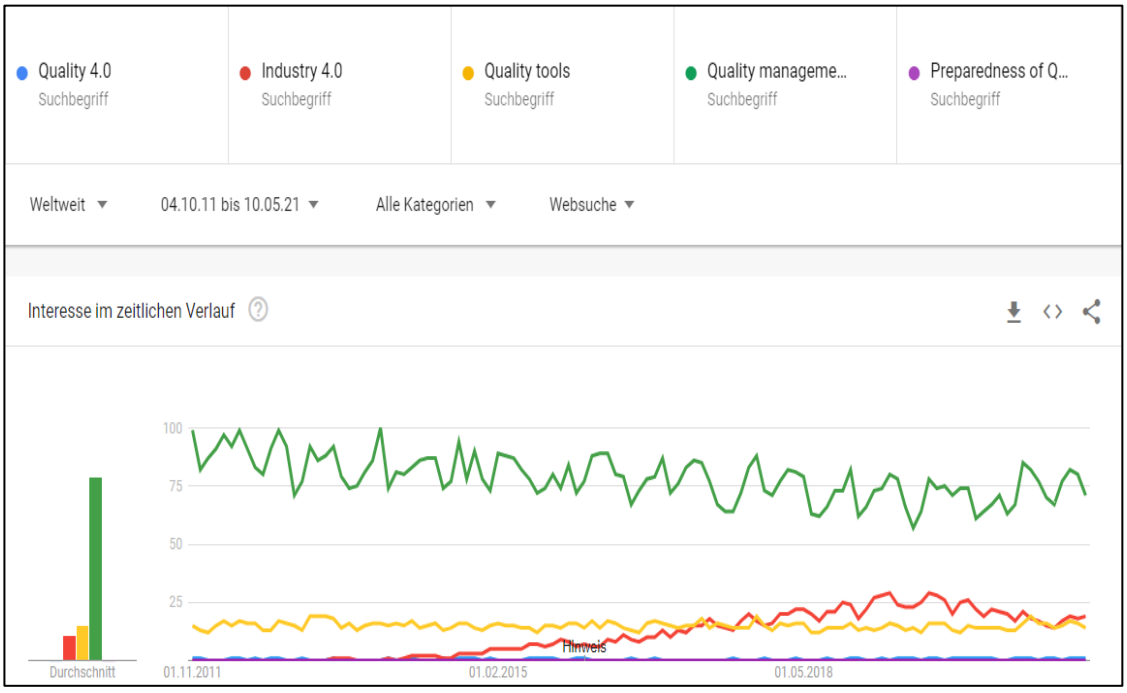

Figure 1 Google Trends, Source: own elaboration

This chart shows that the level of interest in the topics of quality tools, quality management remains constant on its level, but quality tools will increase less in the middle of 2019. The topic of Industry 4.0 has been gaining in importance since 2014 and for the topic of "Preparedness of Quality 4.0" is even very less interests into key-word reasearch. Therefore, this is also an idicator that the level of available literature is even less.

1.1 Literature review

The Key words are with specific selected literature for this article:

- Quality 4.0 | 28 literature sources;
- Industry 4.0 | 40 literatur sources;
- Quality tools | 7 literature;
- Quality management | 33 literture sources.

In the qualitative overall literature search, it is particularly noticeable that there is not very much literature on Quality 4.0. Of the 1,054 code references, 581 items (approx. 55.1%) already refer to Industrie 4.0. A further 222 items (21.6%) lead to Quality 4.0, which is seen as a partial basis for it.

The following chart shows The current scientific discussion on a clear definition of Quality 4.0 has not been finished. However, important characteristics can be identified. The review of the relevant literature using MAXQDA Code Analysis shows the current focus of the research. The analysis of the aforementioned literature Quality 4.0 also in terms of "Preparedness of Quality 4.0" that there is even low interests and therefore less literature available.

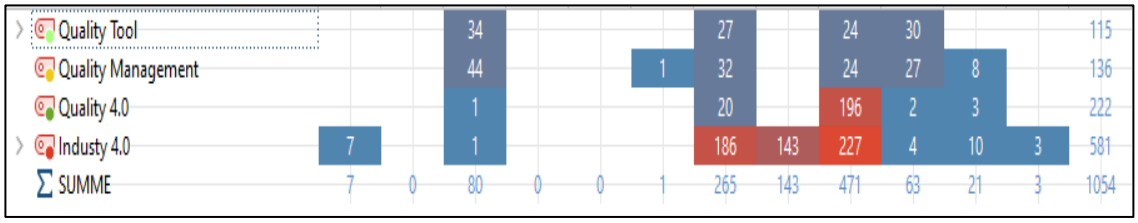

Figure 2 MAXQDA; Source: own elaboration

2 Material and Methods

Assuming and dividing a usual organisational structure, there are 2 different levels in a company exist:

1. Management Level
2. Operational level

On the basis of this, the following thematic blocks with subheadlines emerge:

2.1 Management Level

2.1.1 Support of Top Management

Top management support for quality management programs is one of the key components for assessing organizational readiness (Flynn et al., 1995). It is described as the degree to which top management understands the importance and significance of Quality 4.0 and to what extent they are willing to support, budget for and ultimately demand the implementation in the organisation. The implementation of Quality 4.0 can and will lead to major changes in the organisational structure and business processes, which is why it is even mandatory to experience them. In addition, top management support will help with the implementation of change management initiatives that are pending within the organisation as part of Quality 4.0 preparedness factor (Antony et al., 2020).

2.1.2 Vision and Strategy of Quality 4.0

Digital data is used to guide the quality of products and services in the context of Quality 4.0 (Hyun Park et al., 2017). Therefore, Quality 4.0 should be aligned with the organisation's vision and strategy so that organisations can realise their vision in the future (Zonnenshain and Kenett, 2020). Thus, to assess organisational preparedness for Quality 4.0, the degree of alignment of Quality 4.0 with the organisation's vision and strategy should be undertaken (Antony et al., 2020). These need to be made accessible to employees and this will help the organisation to adapt as a preparedness factor to Quality 4.0 initiatives.

2.1.3 Organizational Culture and Awarness of Quality 4.0

Organisational culture is defined as a set of norms, beliefs and values shared by members of the organisation (Gimenez-Espin et al., 2013). Organisational culture drives employees by influencing their behaviour, performance outcomes and the external organisational environment to achieve organisational goals (De Long & Fahey, 2000). Quality 4.0 promotes transparency and linked data exchange, within a holistic organisation, to have an up-to-date status of relevant data information at all times. Therefore, an open corporate culture is needed to embrace the change. There is also a need for a data-driven culture and new quality 4.0 technologies should be a growth opportunity for employees. There is a need to foster an organisational culture that drives organisational change in a strategic way through people and intervention management strategies. Therefore, dynamic organisational culture will be one of the dimensions of the preparedness factor for implementing Quality 4.0.

2.1.4 Leadership

Leadership is the ability to motivate activities and direct activities in the right direction to achieve organisational goals (Waddell et al., 2007). Leadership would be one of the Quality 4.0 preparedness factor that will be a critical success factor (Antony et al., 2020).

2.1.5 Customer Centration

A customer-centred organisation and its success depends on how the organisation produces products and services to meet customer needs. A customer-centred organisation is focused on meeting customer expectations in order to satisfy customers (Herrmann et al., 2000; Kuei & Madu, 2003). These are analysed and products and services are produced based on them. One source of this is customer feedback to further develop existing products and services or as development input for new products and services (Wechsler & Schweitzer, 2019; Osakwe, 2020). Therefore, a customer-centric organisation is one of the preparedness factor for implementing Quality 4.0.

2.2 Operational Level

2.2.1 Knowledge and Competency of Quality 4.0

Thus, the modern factory is becoming more complex and intelligent through Big Data analytics, machine learning and cloud computing with the advent of Industry 4.0

(Saldivar et al., 2015). Moreover, technology enablers such as IoT and IoS are making the modern workplace a complex phenomenon (Cheng et al., 2016; Wang et al., 2016). In this highly automated and integrated computing environment, the upcoming and recurring tasks are taken over by the intelligent and self-regulating CPSs. The quality management tasks left for humans require higher process integration, cross-functional perspectives, reduction of hierarchical levels, less need for central management capacity. The bottom line is that existing jobs are becoming complex and require a large repertoire of skills (Bonekamp & Sure, 2015; Frey & Osborne, 2017). Therefore, quality professionals' knowledge and awareness of Quality 4.0 will be one of the dimensions of Quality 4.0 preparedness factor.

2.2.2 Training on Quality 4.0 items

In contrast to traditional quality management, Quality 4.0 uses many new and autonomous technologies for its effective implementation (Schönreiter, 2016). Therefore, existing quality employees need to be trained and educated to take advantage of their new roles and their requirement using advanced technologies. Therefore, training would be a dimension of Quality 4.0 preparedness factor.

2.2.3 Supplier Orientation

Supplier management is one of the most important components of quality management (Theodorakioglou et al., 2006). A supplier management system enables suppliers to be monitored, analysed and audited at regular intervals to ensure that good quality materials are delivered in the agreed condition (Park et al., 2001). Proper supplier relationship management can lead to better quality products at economical prices (Rajagopal & Rajagopal, 2009). Thus, an effective supplier management system will be one of the dimensions for assessing preparedness factor for Quality 4.0.

Table 1 Quality 4.0 prepardness factors; Source: own elaboration

No.	Preparedness for Quality 4.0	Literature Sources
Management Level		
1	Support of Top Management	Flynn *et al.* (1995), Antony *et al.* (2020)
2	Vision and Strategy of Quality 4.0	Hyun Park *et al.* (2017), Zonnenshain and Kenett (2020), Antony *et al.* (2020)
3	Organizational Culture and Awarness of Quality 4.0	Gimenez-Espin *et al.* (2013), De Long and Fahey (2000)
4	Leadership	Antony et al. (2020)
5	Customer Centration	Wechsler and Schweitzer (2019), Osakwe (2020)
Operational Level		
6	Knowledge and Competency of Quality 4.0	Cheng et al. (2016), Wang *et al.* (2016), Bonekamp and Sure (2015), Frey and Osborne (2017)
7	Training on Quality 4.0 items	Schönreiter (2016)
8	Supplier Orientation	Theodorakioglou *et al.* (2006), Park et al. (2001), Cannon and Homburg (2001), Rajagopal and Rajagopal (2009)

The author used a telephone survey to collect datas, targeting 25 senior quality professionals from own network and working in large manufacturing companies. The

online survey was designed to get a first indication of information about Quality 4.0 from respondents in a very short time (Bogner et al., 2014).

The telephone survey used for this study was divided into two sections. The first, shorter section was used to elicit general information about the respondents, such as their qualifications, education and experience. The second section was dedicated to the preparedness factors for Quality 4.0. The respondents were given the preparedness factors, which were tabulated in Table 1. The five-point Likert scale from "strongly disagree" to "strongly agree" was used to capture the respondents' answers to the preparedness factor.

Data Collection

The 25 participants in the telephone interviews were conducted between April and Mai 2021. The interviews are on average 20 min long in total. The interviews were conducted in German. All interviewees are aged between 35-55 years. The proportion of men was 100% and all participants were from Germany. The company size is at least ≥ 800 employees. All interviewees were interviewed in a professional business situation. All participants accompany at least the title "Head of Quality" up to "Vice President Quality" and independently lead both central and operational areas in the company which they are working for.

Table 2 Jobtitel-Matrix of interviewees; Source: own elaboration

Job Title	Business area	Quantity
Head of Quality	Automotive Industry	10
	Aviation & Aerospace	1
	Food & Baverage	1
Director of Quality	Automotive Industry	4
	Medical Technology	4
	Machines & Equipment	2
Vice President Quality	Automotive Industry	1
	Material Manufacture	2

3 Results

No clear picture emerges from the literature review, as these preparedness factors and principles from the research question have not been sufficiently considered scientifically so far. Based on the existing information from the literature, telephone interviews with 25 participants were conducted to enrich the information content. Respondents were asked for their expertise on preparedness factors that were not evident in the literature review and to fill this research gap with practical relevance. Respondents were asked to rate the factors on a five-point Likert scale (1 - strongly disagree, 2 - somewhat disagree, 3 - neutral, 4 - somewhat agree, 5 - strongly agree). These factors were then ranked using mean values and are shown in Table 1.

Support of Top Management

According to the interviewees, top management support is indispensable and the first readiness factor for the introduction of Quality 4.0. The implementation of Quality 4.0 requires willingness to change, penetration and resources in the organisation. Without these, the implementation cannot succeed, even in the case of problems that require a

higher-level decision. Without the support of top management, this Quality 4.0 initiative will fail and ultimately cannot be implemented.

Vision and Strategy of Quality 4.0

The second preparedness factor for implementing Quality 4.0 is vision and strategy. Digital data is used by organisations to either consolidate its market position or to gain a competitive advantage by creating quality products and services at a competitive price (Porter and Heppelmann, 2014). Quality 4.0 will, therefore, help the organisation to develop its vision and strategy to ultimately achieve the goal of implementing Quality 4.0.

Organizational Culture and Awarness of Quality 4.0

The third preparedness factor for the adoption of Quality 4.0 is an organisational culture and awareness with visions and strategies towards Quality 4.0. The organisation needs to embrace the digital challenges using Big Data and other opportunities to make relevant management decisions. Members within the organisation should embrace the new technology and Big Data-driven culture.Therefore, an organisation whose culture is open to accept change will be ready to implement Quality 4.0.

Leadership

The fourth preparedness factor for implementing Quality 4.0 is leadership. Leadership is the ability to inspire, motivate and channel activities to achieve organisational goals. A leadership style that allows for innovation, learning, but also freedom will support the organisation in the transition and acceptance of Quality 4.0. Derived from this, these leaders will have an innovative and formative influence to promote the digital transformation in terms of Quality 4.0.

Customer Centration

The fifth preparedness factor for implementing Quality 4.0 is a customer-centric organisation. The success of quality management practices depends on how the organisation produces products and services to meet customer needs. An organisation that is customer-centric will align its quality programmes with customer needs to satisfy customers (Herrmann et al., 2000). An organisation whose philosophy is customer-centric will be ready to implement Quality 4.0 in the organisation.

Knowledge and Competency of Quality 4.0

The sixth preparedness factor for implementing Quality 4.0 is knowledge about Quality 4.0. Subordinate and rudimentary activities will be automated after the implementation of digital transformation, which will increase the level of training for those employees who require a large bundle of skills (Bonekamp & Sure, 2015; Frey & Osborne, 2017). Quality professionals implementing Quality 4.0 will require both complex interdisciplinary technical skills and soft skills. Therefore, interviewees felt that quality professionals' knowledge of Quality 4.0 was one of the dimensions of Quality 4.0 preparedness.

Training on Quality 4.0 items

The seventh preparedness factor for implementing Quality 4.0 is training. Quality 4.0 uses many technologies for its effective implementation (Zonnenshain & Kenett, 2020). Therefore, existing quality employees need to be trained to work effectively in the

new roles using advanced technology. Therefore, organisations where training systems are better are ready for Quality 4.0.

Supplier Orientation

The eighth preparedness factor for implementing Quality 4.0 is supplier orientation. A supplier management system enables suppliers to be monitored, analysed and audited at regular intervals to ensure that good quality materials are delivered in the agreed condition (Park et al., 2001).

Table 3 Preparedness factors for Quality 4.0; Source: own elaboration

Preparedness factors	**Mean**	**Standard deviation**
Management Level		
Support of Top Management	4.88	0.44
Vision and Strategy of Quality 4.0	4.04	0.79
Organizational Culture and Awarness of Quality 4.0	3.64	0.70
Leadership	4.40	0.87
Customer Centration	3.44	1.29
Operational Level		
Knowledge and Competency of Quality 4.0	4.64	0.57
Training on Quality 4.0 items	4.28	0.68
Supplier Orientation	2.92	0.70

4 Discussion

Quality 4.0 is a new, extended approach to enriching quality management with automated and systematic data structures and aligning it for the needs of the future. The degree of implementation in the various sectors and organisations is manageable and varies. The pioneer is the automotive industry, as it is under enormous cost pressure. Only through the effects of the combination of Quality 4.0 and Industry 4.0 will sustainability and climate protection really become possible (Markt & Technik, 2021). This is an important building block for the European Union's environmental goals of being largely carbon-neutral by 2050.

The main limitation of this study is the small sample size. This is because few companies have yet implemented the concept and approach of Quality 4.0 (Zonnenshain & Kenett, 2020), and therefore a sample size of 25 interviewees based on Germany provides a reasonable overview of the relatively new approach. Future studies should include samples from the global context so that broader perspectives on Quality 4.0 can be captured. In addition, prepared factors can be compared across sectors. There is also an urgent need for a study that examines the relationship between Quality 4.0 and business performance and growth when implementing Quality 4.0.

Further more to generate more datas it is planned to conduct a survey by Microsoft Teams in future. The distribution circle has been defined and divided as follow:

- Network of business partners (Level: CEO, VP and Director with 548 participants worldwide);
- LinkedIn by using the working groups of: Quality Management with 11,090 members and Global Quality Management with 6,732 members.

The results out of the survey will be part of the authors dissertation.

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Digitization in Cultural Tourism

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Abstract

The article provides a brief overview of the use of information and communication technologies in the tourism sector, as digitization has become an increasingly substantial area in all economic sectors including tourism. The importance of digitization in cultural tourism is confirmed based on the results of a primary survey conducted in the Vysočina Region in cultural tourism organisations, mainly museums and galleries. The digitization process is also dependent on the availability of funds for the education of professionals and for the creation of digital tools.

Keywords: Digital; Digitization; Museum; New technologies; Tourism; Virtual reality.

JEL Classification: L83, M31, M53, Z32

Article Classification: Research article

1 Introduction

Digitization has become an increasingly substantial area in all economic sectors including tourism. The digitization process depends on the development of new technologies. Information and communication technologies (ICT) generally include technologies, systems, activities and processes that enable creation, electronic display, processing, storage and transmission of information and data (Český statistický úřad, 2019).

ICT intervene significantly in all actions in the process of supply, demand and implementation of tourism services. They support e.g. the search for individual services, their comparison, ordering, completion and payment, user preferences and current availability of services. ICT further raise awareness of destinations, promote their offer and enable consumers to participate in rating and sharing of experiences (Chaloupková

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& Jarolímková, 2018). The basic pillar of ICT, arranging their existence and use, is the telecommunications and Internet infrastructure.

The transfer of information via the Internet is essential. Existing access, its speed and the way by which the connection is made are crucial to use ICT. The proportion of Internet users is constantly increasing, as the number of people in possession of diverse digital devices. The Internet is characterized by its speed and time availability 24 hours a day, 7 days a week. Information is spread immediately on the Internet and can be found almost promptly by anyone, as an interactive medium it allows customers to respond immediately (Janouch, 2014). Thanks to easier access to ICT, the worldwide development of modern technologies and the increased use of smartphones, people around the world have the opportunity to use the Internet more often and more affordably. As of January 2021, there were 4,66 billion active internet users worldwide, that corresponds to 59,5% of the global population. Of this total, 92,6% (4,32 billion) accessed the internet via mobile devices (Johnson, 2021). The Czech Republic is above the European average in sales via the Internet and in the number of company websites. In 2020, 98% travel agencies and tour operators had their own websites and 97% entities providing accommodation services. Almost 60% of companies had their websites adapted for mobile devices as well. The number of company accounts on social networks has also experienced great development in recent years (Český statistický úřad, 2021).

Tourism based on the use of ICT tools can be found in the literature under various terms as smart tourism, e-tourism or digital tourism. We use the last-mentioned term as set by Happ and Ivancsóné Horváth (2020): 'the digital tourism includes the use of all information communication tools and IT solutions that help to meet the needs of tourists and improve the competitiveness of organisations and enterprises operating in the field of tourism.'

Digitization in tourism has started first in connection with bookings, i.e. airline tickets and accommodation services. Nowadays, digital tourism includes a variety of tools and methods and is present in all areas of tourism. Some examples of the use of ICT tools in tourism are named:

- online booking sites;
- online travel agencies;
- online payment systems;
- online check in and check out;
- revenue management software;
- online price comparison websites;
- audio guides;
- own websites;
- smartphone systems in hotels;
- social media;
- tourism applications;
- virtual reality glasses (Happ & Horváth, 2020).

ICT is regarded as crucial for the success of tourism industry, it has a substantial impact on management of hospitality and on virtual tourism. Most companies are combining their business with web services and web-based platforms. The use of social media such as Facebook, Twitter, Instagram and YouTube enables the exchange of knowledge and information between service suppliers and consumers creating a worldwide accessible information database (Sutyrina et al., 2021).

Tourists using new technologies differ from other tourists e.g. in sharing their experiences during the trip through social media, in using websites and mobile Apps

during and before the trip to get the most up-to-date information, in being more familiar with the destination environment. They build a new category of so-called Smart Tourists (Naramski, 2020).

With outbreak of COVID-19 disease travelling restrictions have put in danger the tourism industry around the globe. For this reason, the digitization of tourism seems to be a suitable solution for this situation. Virtual reality is one of many very advanced opportunities in the industrial revolution 4.0. Akhtar et al. (2021) regards virtual tourism as valuable option for mass tourism during the COVID-19. It makes possible to enjoy new places and destinations without leaving home. Digital technologies are also regarded as suitable for older adults who cannot travel due to age. Virtual tourism can also be used instead of traveling, which could be time and cost consuming, e.g. due to visa and other administrative requirements. Akhtar et al. (2021) assumes that it could replace mass tourism also in the future. This conclusion differs inter alia from Happ and Ivancsóné Horváth (2020), whose research conducted before the spread of COVID-19 disease concluded that virtual reality is very popular, but so far it cannot fully replace personal experience. We agree that in the period of restrictions due to COVID-19 disease a virtual reality makes an alternative option for tourism, but it cannot fully replace the experience of the real place.

Tourism often includes a visit to a museum. Website and social media represent a new possibility where museums can reach a number of digital visitors. Online communication has in many cases already been adopted as supplement to traditional media communication and as a marketing tool to sell entrance tickets. As Navarrete (2019) confirms, digital technologies make it nowadays possible to visit the museum from anywhere at any time. A digital tourist can visit the museum remotely and view an online catalogue on the museum's website, watch videos on the museum's YouTube channel or share images from the museum's Facebook profile. Availability of collections online enables to a large number of customers experience a museum visit online. Consumer behaviour is changing as many leisure activities can be consumed at home by using ICT tools. Digital tourist has a free choice to select and view the objects of interest at his or her preferred time.

Unfortunately, the application of ICT tools is much more developed in other areas of tourism industry than in museums (Navarrete, 2019; Naramski, 2020). Museums face a lack of resources and know-how when digitizing their collections and creating an advanced digital offer. Smaller museums respond usually more flexibly to new technologies, as adapting to new trends requires fewer resources than in a large museum and is faster accomplished. Extensive research into the use of modern technologies in museums confirming the lower level of digitization was carried out in Poland in 2020 (Naramski, 2020). The results of the research showed that the current state of use of modern technologies in Polish museums in relation to the concept of digital tourism (Smart Tourism) is relatively low, but there is a potential to introduce new tools like audio-guided tours or mobile Apps. The use of social media is limited to Facebook and occasionally YouTube.

According Navarrete (2019) museums attract visitors for diverse reasons. The majority of tourists in Europe visit them due to combination of reasons including visiting relatives, doing business, having a break, going to conferences. Only 20 – 30% of tourists in Europe go to museums for cultural reasons. Museum is therefore rather a place for experience and encounter. According Camps-Ortueta et al. (2021) museum becomes a playground and a place for creativity. Socialization and play are key tools in the process of museum change. The goal of museums is not only to present extensive collections but to create a story. Gamification of museums visits by using new technologies to create

products of augmented and virtual reality is a way how to attract visitors. As a general purpose of the game is to teach and to entertain, use of video games in museums can awake the visitor's interest and also improve some skills. 'Museums have become open and plural spaces of exchange and shared knowledge' (Camps-Ortueta et al., 2021).

Industry 4.0 revolution and technological developments contribute to trends in digitization in tourism and other sectors. Enterprises operating in the tourism sector can take advantage of these innovative applications to improve the quality of products and services, to accelerate their processes and to reduce costs. The use of new technologies is also associated with a number of negative effects. These include, among others failing to get used to new technologies and thus getting out of the system, not being able to adapt to the new trends and constant updates, security vulnerabilities and privacy problems (Bahar et al., 2019).

2 Material and methods

The main aim of this study is to examine the readiness of cultural tourism organizations in the Vysočina Region to digitize their activities, the digital literacy of their staff and the requirements for the new further education course 'Museum and Tourism'. To answer these points the data about actual status and demand for digitization were collected. A questionnaire survey was applied as a quantitative research method. The survey was realized in August 2020. The questionnaire was distributed online. The database of cultural tourism organizations was provided by the regional destination management organization Vysočina Tourism and included 53 cultural organizations in the Vysočina Region.

The structured questionnaire consisted of 20 questions and was divided into four parts A – D. Closed and semi-closed questions were mainly used with different possibilities to answer (dichotomous, filter, multiple choice, scaling questions). Parts A and D included 11 questions in total and dealt with identification information about the cultural tourism organization and its involvement in cooperation with other tourism organizations. Parts B and C included 9 factual questions in total concerning the offer on digital services, responsible staff and its education focused on digitization, the annual budget for digitization and requirements on education in the field of digitization. 20 cultural tourism organizations in the Vysočina Region were willing to respond to designed questions, of which 18 museums and galleries. This number is not high, but because it represents almost half of the addressed institutions, we consider it to be sufficiently adequate to determine the conclusions of the survey. The results of the primary survey were processed using Google Forms and MS Excel programs.

3 Results and discussion

Since the main aim of this study is to conduct an analysis of requirements of cultural tourism institutions in the Vysočina Region for digitization, answers to questions from parts B and C in questionnaire survey were deeply analysed.

The questions covered present offer of existing digital services and its background and demand for knowledge in the field of digitization:

- multimedia offers for visitors in the organization;
- enlargement of offer of digital services during the coronavirus crisis;
- plans to further enlargement of offer of digital services;
- presence of employees who are responsible for digital services;
- financial source in the annual budget for digitization;

- completed professional training courses focused on digitization;
- requirements for the course ‘Museum and Tourism’.

Half of the cultural tourism institutions (50%) have some offer of digital services for visitors directly on their premises. These digital services include audio guides (4x), multimedia guides (e. g. for smart phones, 4x), video stations (3x) and multimedia stations (7x).

During the closure of cultural tourism institutions in spring 2020, in order to prevent the spread of COVID-19 disease, 40% of cultural institutions expanded their offer of digital services by including virtual tours that are accessible via the internet. The services of some of them were supplemented by online contributions and organizing of online exhibitions. Half of the entities (50%) plan to expand further its offer of digital services, of these six entities already have some digital services in their offer, four entities will start providing them.

Only 30% of the entities had direct financial sources allocated to digitization in their annual budget in 2020, of which two thirds accounted for a maximum of 4% of the total annual budget. Higher volume of funds for digitization is rather exceptional - one entity reported funds in the amount of 10-19% of the total annual budget, one entity reported funds in the amount of 20-29%.

Table 1 The importance of digitization topics for cultural tourism operatives; Source: own elaboration

	x̄ Topic importance	**Very important**	**Important**	**Undecided**	**Slightly important**	**Not important**
Successful PR and work with the public	4,05	45%	25%	25%	0%	5%
Website creation	3,9	30%	35%	30%	5%	0%
Working with social media	3,9	50%	10%	25%	10%	5%
Creating short videos	3,75	25%	45%	15%	10%	5%
Digital photography	3,7	20%	50%	15%	10%	5%
Creating digital offer in museum	3,65	15%	45%	30%	10%	0%
Storytelling basics	3,6	25%	40%	20%	0%	15%
Digitization and the law	3,55	15%	35%	45%	0%	5%
Writing texts for digital offer	3,5	25%	25%	35%	5%	10%
Online marketing	3,5	20%	25%	45%	5%	5%
Implementation of cooperation	3,5	15%	35%	40%	5%	5%
Graphic design basics	3,45	15%	45%	20%	10%	10%
Developing digital strategies	3,4	10%	40%	35%	10%	5%
Basics of cultural tourism	3,4	15%	25%	50%	5%	5%
Basics of digital inventory	3,15	10%	35%	30%	10%	15%
Basics of cultural education	3,1	10%	25%	40%	15%	10%
Visitor survey	3,1	5%	30%	45%	10%	10%

35% of entities have employees with direct responsibility for digital services (full-time or part-time). One or more employees from 45% of the subjects have already

participated in trainings focused on digitization in the past. The following professional courses were named (sorted according to the frequency of occurrence): digitization of collections, activities on social media (Facebook, Instagram etc.), audio guides creation, website creation, digitization and the law, Apps creation.

Finally, the cultural tourism organizations were asked to represent their preferences with respect to theoretical basics of digitization that form the content of the planned seminar. Respondents stated on the scale how beneficial is the proposed topic in the field of digitization for them. The question contained 17 identified topics with five-points scale level of importance (very important – important – undecided – slightly important – not important). None of the institutions involved in the survey used the opportunity to supplement the proposed topics of digitization with another one.

The results are shown in Table 1. The data are sorted descendingly by column '$\bar{x}$ Topic importance' which contains arithmetic means of the obtained scale data (5 = very important, 4 = important, 3 = undecided, 2 = slightly important, 1 = not important). Remaining five columns show the percentage of results in each scale.

The answers to this question show that all the proposed topics are considered important or the attitude towards them is neutral ($\bar{x} > 3$), the individual values of the importance scaling range from 3,1 to 4,05. In the leading positions of interest and importance appeared topics as website creation, working with social media, creating short videos and digital photography. Somewhat surprising at first was the fact that public relations was identified as the most important topic. Considering that the above-mentioned topics rated as the most important belong to the sub-tools of public relations, this result is no longer so striking. As less important of all proposed topics were rated digital inventory, cultural education focused on digital offer and visitor surveys.

The survey confirmed the importance of digitization in cultural tourism as perceived by cultural tourism employees personally. The digitization is inevitable and pervasive and needs to be addressed by acquiring the necessary expertise. The digitization process is dependent on the availability of funds for the education of professionals and for the subsequent creation of a digital offer. Our survey showed that the volume of funds for digitization is low or not represented in the budgets as a direct item at all. The need for digitization is all the greater in the current global pandemic of COVID-19, which is forcing the tourism industry to look for new innovative solutions to keep it running.

The results obtained by the questionnaire are a base for further processing, which is preparing the content of the course 'Museum and Tourism' determined for the staff of cultural tourism organisations in the Vysočina Region and in Upper Austria.

We have to state also limits of our survey, which is mainly a research sample size, concentration on museums and galleries and geographical restriction to the Vysočina Region for this pilot project. This survey can be followed up in the future by broader research in the Czech Republic.

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Research in the field of implementation of the Industry 4.0 concept in companies operating in the field of industry

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Abstract

Industry 4.0 represents interconnected communication and collaboration of people, machines, equipment, logistics systems and products, leading to full networking. Industry 4.0 is currently a much-discussed topic in the Slovak Republic and abroad, which encourages more and more companies to start implementing the Industry 4.0 concept. Industrial production is the dominant sector in the overall economy of these countries, so the implementation of the Industry 4.0 concept is mainly focused on industry, in order to maintain or increase competitiveness in the market.The paper is concerned with research in the domain of the implementation of Industry 4.0 concept in companies in the Slovak Republic. Its aim is to grasp the current awareness and the level of implementation of Industry 4.0 concept in the context of entrepreneurs acting in the industrial sector. The theoretical part characterizes the concept of Industry 4.0 and the level of its implementation. Part of the analysis of the current state is a comparison of selected countries in the area of the NRI and IMD index table in the context of the European Union.The theoretical part is followed by marketing research, which is aimed at determining the level of implementation of the concept of Industry 4.0 in industrial enterprises with respect to their size.

Keywords: Industry 4.0; Digitalization; Innovation.

JEL Classification: L20, O30

Article Classification: Research article

1 Introduction

Currently, it is possible to observe a trend of increasing market variability, shortening the product life cycle, increasing product complexity and increasing the

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influence of global supply chains. Within world industrial production, the share of developing countries has risen sharply at the expense of developed countries, and productivity growth in Western countries has fallen sharply in recent years (Cugno et al., 2021). In a given environment, companies strive to respond better to business trends and to become cheaper, faster and more flexible. One way individual companies can meet these challenges is to implement the Industry 4.0 concept (Jamwal et al., 2021).

This article focuses on introducing the reader to the issues of the Industry 4.0 concept. Part of the article is the definition of the theoretical apparatus in the area and analysis of the current situation in the Slovak Republic and abroad through a comparison of selected countries, which are EU member states. The comparison uses NRI (Networked Readiness Index) and IMD (The Institute for Management Development) indices, which focus on the readiness of countries in terms of digitization and use of ICT (Arora, 2020). The analysis of the current state is followed by marketing research, which was focused on finding out the current level of implementation of the Industry 4.0 concept in Slovak companies operating primarily in the field of industry.

2 Characteristics of the Industry 4.0 concept

The concept of Industry 4.0 is first mentioned in 2011 at the trade fair in Hannover Messe (an event dedicated to industrial technology) as “Industrie 4.0” as part of an initiative to increase German competitiveness in the manufacturing industry (Bravi & Murmura, 2021). The German government launched the initiative with the idea of countering progress in developing countries such as China or India, and as Western countries were unable to compete on production costs, the aim was to overcome them in industrial technology and the ability to individualize production (Jamwal et al., 2021).

The term Industry 4.0 or the Fourth Industrial Revolution characterizes the extensive changes that are rapidly entering today's industry. These changes include product digitization, digitization and optimization of business processes and services. Today, the Industry 4.0 concept penetrates not only into the manufacturing world of companies, but also into people's lives (Macko, 2018). Digitization opens up new possibilities, especially in production. It is a phenomenon that aims to digitize everything “that can be digitized”. Thanks to digital data and digitization, the company is able to respond flexibly and effectively to stimuli that come from customers, from its own production and from the company's own management. Instead of mass production for a unified customer, there is a time when companies can respond to the specific wishes of individual customers based on data transmitted in real time (Jesný, 2017).

Generally it is highly important for companies to improve the identification of the needs regarding development and educational needs of employees, to improve the analysis of the work process and thus assessment of employees, and to try to find out their needs in the work process (Sukalova & Stofkova, 2020).

The main function of the erudition is to provide access to everybody to apply their knowledge and skills in the process of economic, social and cultural development. The global interconnection, the world globalization bring a very sudden changes affecting wide spheres of a life (Soltes et al., 2018).

The impact of Industry 4.0 can also be observed in everyday life, for example, that classic printed books have been replaced by their electronic version, the Yellow Pages have been replaced by an online store or that there has been a shift from taxi services to car-sharing applications (Macko, 2017). The basic pillar of Industry 4.0 is mutual cooperation and direct communication between people, machines, equipment,

logistics systems and products. The result is significantly better and faster decisions about the production process using information that has not yet been processed.

It is well known that the development of today's society has brought a large increase in the number of mobile phones and headphones users. These devices are becoming an integral part of our lives (Mikusova et al., 2021).

Industry 4.0 deals with the optimization of the entire value chain in product life cycles. The given cycle is based on increasing individual customer requirements. It starts with the idea, followed by work, development, production and delivery to the final customer up to recycling, including all the services involved (Jesný, 2017). The goal of the implementation of the Industry 4.0 concept is the creation of the Smart Factory, which represents a digital model of the entire company, including production halls, construction of new products, production lines, warehouses, shipping, service and product recycling (Balga, 2018). The basis is the availability of all relevant information in real time (Forcina & Falcone, 2021). From a technological point of view, the following elements play a significant role in creating the Smart Factory concept:

- *CPS* - connecting the virtual and physical worlds. These are systems consisting of physical objects that are monitored, controlled and continuously evaluated by computer software (Kroenke, 2015);
- *Big Data* - a general term used to describe the large amount of structured and unstructured data that a company generates, usually in the range of peta bytes (10^{15} bytes) and more, beyond the capabilities of current database technologies (Balga, 2018);
- *Cloud computing* - shared resources (HW, SW), which are accessible to the user according to his needs from anywhere and at any time via an Internet connection and pays only for those resources that he uses (Haag and Anderl, 2018);
- *Internet of Things (IoT)* - a network made up of physical, clearly identifiable objects. These objects have built-in electronics, software, sensors and a network connection (CPS), which allows the objects to collect and exchange data. Through the existing network infrastructure, connected objects can be controlled remotely (Macko, 2018);
- *Digital Twin* - a system based on the cooperation of real physical production with its own digital "copy". It is a functional system in which continuous process optimization takes place. It is used to create a digital enterprise environment, where the company has the opportunity to optimize operations directly in the production chain (Haag & Anderl, 2018).

Some companies have already begun to address Industry 4.0 in real terms, and most consider it important, and have also begun to implement it, but the pace is not uniform across all processes and technologies. In most companies, Industry 4.0 is becoming a priority, but it is not yet perceived as a necessity, and many companies are just beginning to think about solutions. Businesses should start implementing as soon as possible, otherwise they will lose their market position very quickly and will not be able to be competitive (Balga, 2018).

There is no unificated plan for the implementation of Industry 4.0, each company needs an individual solution corresponding to its development strategy, the nature of production and products, the market and the visions of management (Macko, 2017). Digitization of production can take place on existing machines and equipment. It is a long-term process that has brought positive results from the very beginning. However, it is not possible to start with a massive construction of internal infrastructure, because in

the end it would not have to suit the project, it is appropriate to start with a pilot project that can prove its functionality and possibility of optimization (Macko, 2018).

In the initial phase, production companies in particular should tidy up the data, especially the product data, which does not involve any major investment. The next step should be to build a digital business, which means creating a digital model of production and products in order to reduce production costs and time and increase business productivity and efficiency (Cugno et. al, 2021). The rule here is that the simulation is performed first and only then decisions are made. The next step can be focused on searching for other product features or searching for a new business model. The initial steps for process improvement is to have a strategy, the basic intention to which we will be directed and to set up processes so that they fulfill them as effectively as possible. The necessary step is the automatic collection of data, their thorough analysis and ensuring their flow in the company environment and beyond, as Martin Morháč, Chairman of the Board of SOVA Digital, informs (Francova, 2017).

SOVA Digital, a.s. states on its website that the implementation of Industry 4.0 can be achieved by gradually fulfilling the following phases:

- creating a vision and gathering information,
- starting with the first attempts and building your own experience,
- formulation of your own strategy, based on experience,
- start with implementation,
- implementation of the strategy, fulfillment of the basic intention (Francova, 2017).

New technologies are changing the shape of our economy and our way of life. Thanks to this, the fourth industrial revolution took place. Three previous industrial revolutions were caused by the expansion of mechanical steam-powered production facilities, the introduction of mass production using electricity or electronic systems and computer technology in production, the fourth does not bring fundamental changes only for industrial production, it is a completely new philosophy bringing societal change into a range of areas from industry, through technical standardization, security, education systems, the framework, science and research, to the labor market or the social system (Bravi & Murmura, 2021). The advent of new technologies is changing entire value chains, creating opportunities for new business models, but also putting pressure on the flexibility of modern industrial production. The concept of Industry 4.0 is not just an effort to digitize industrial production, it is a complex system of change associated with a number of human activities (Jamwal et al., 2021).

3 Comparison of European Union countries

Industry 4.0 is currently a much-discussed topic in the Slovak Republic and abroad, which encourages more and more companies to start implementing the Industry 4.0 concept in order to maintain or increase competitiveness in the market (Mařík, 2016). The Industry 4.0 concept increases efficiency, speed and innovation, which are one of the important tools to support the competitiveness of companies and economic growth. In the future, it is technological innovations that will lead to fundamental changes in the supply with long-term gains in increased efficiency and productivity. Digital interconnection will not only improve efficiency but also accelerate innovation, introduce new business models that can be implemented much faster (Jesný, 2017).

The information society brings significant changes not only in the economy - the way we work, the management of production, companies and organizations, the way of

trading, but also in the daily lives of people. The basic requirements for building an information society include ensuring access to communication services and developing digital skills (Stofkova et al., 2019).

Digitization, informatization and innovation are currently key factors for both businesses and countries in general in achieving added value and making progress in competitiveness and attractiveness. It is important that adequate conditions are created for companies, which will enable them to more easily implement the Internet of Things, which will sooner or later be a necessary condition for maintaining or improving the position of companies in strong competition (Forcina & Falcone, 2021).

To compare selected countries, the NRI index was chosen, which assesses the readiness of countries and their use of information and communication technologies, and the IMD index, which assesses the level of smart cities from the perspective of citizens (Smartcity, 2021; Network Readiness Index, 2020). Although Industry 4.0 is not just about digitization, digitization is a necessary, indeed basic condition for the implementation of a given concept and for the implementation of intelligent production systems and services.

3.1 The NRI Index

The NRI index measures how countries are prepared and how they use information and communication technologies to increase competitiveness and prosperity. The current fourth industrial revolution represents the transition to completely new sets of systems that combine digital, biological, physical and information and communication technologies into new and powerful combinations. The NRI index reflects how countries are prepared to take advantage of the transition. The compilation of the ranking of countries on the basis of the NRI index is based on a large amount of information collected from international organizations, such as the International Telecommunication Union, UNESCO, the UN and the World Bank. More information comes from a World Economic Forum survey of more than 14,000 workers in more than 130 countries. The NRI examines four basic areas, namely the political and regulatory environment, the business and innovation environment, preparedness, which includes infrastructure and the availability and use of individuals, businesses and government (Network Readiness Index, 2020).

The leader in the NRI 2020 index (Figure 1) is Sweden, which gained 82.75 points. Sweden also took first place in the Technology and Impact areas. In second place, with a score of 82.19 points, was Denmark, which is the leader in the areas of Public Administration and People. The Scandinavian countries are again among the leaders. The European Union average was set at 67.49 points, with countries such as Belgium, Estonia, Spain and Malta in close proximity. Romania came in last with 54.16 points. Croatia, Greece and Bulgaria are among the countries that have scored less than 60 points. Within the countries neighboring the Slovak Republic, the best place was Austria, which placed 8th and received 72.92 points (Network Readiness Index, 2020).

The Slovak Republic ranked 20th in the NRI 2020 index with a gain of 60.78 points. Compared to the European Union average, the country gained almost 7 points less. The Slovak Republic received the most points within the *Public Administration area*, up to 73.69 points, while the best rated sub-area is *Regulation*, where the country received 78.77 points. Within the *Impact area*, where the country gained 63.15 points, the best rated sub-area is the *Contribution to SDGs* with a gain of 77.73 points. From the point of view of the Slovak Republic, the *Technology area* is rated with the number of points 54.14, while the best rated sub-area is *Access*, which focuses mainly on the availability

of an Internet connection, where the country received 78.76 points. The worst rated area is the area *People* with the number of points 52.13 within which with the number of points 58.7 the best rated sub-area *Enterprises* (Network Readiness Index, 2020).

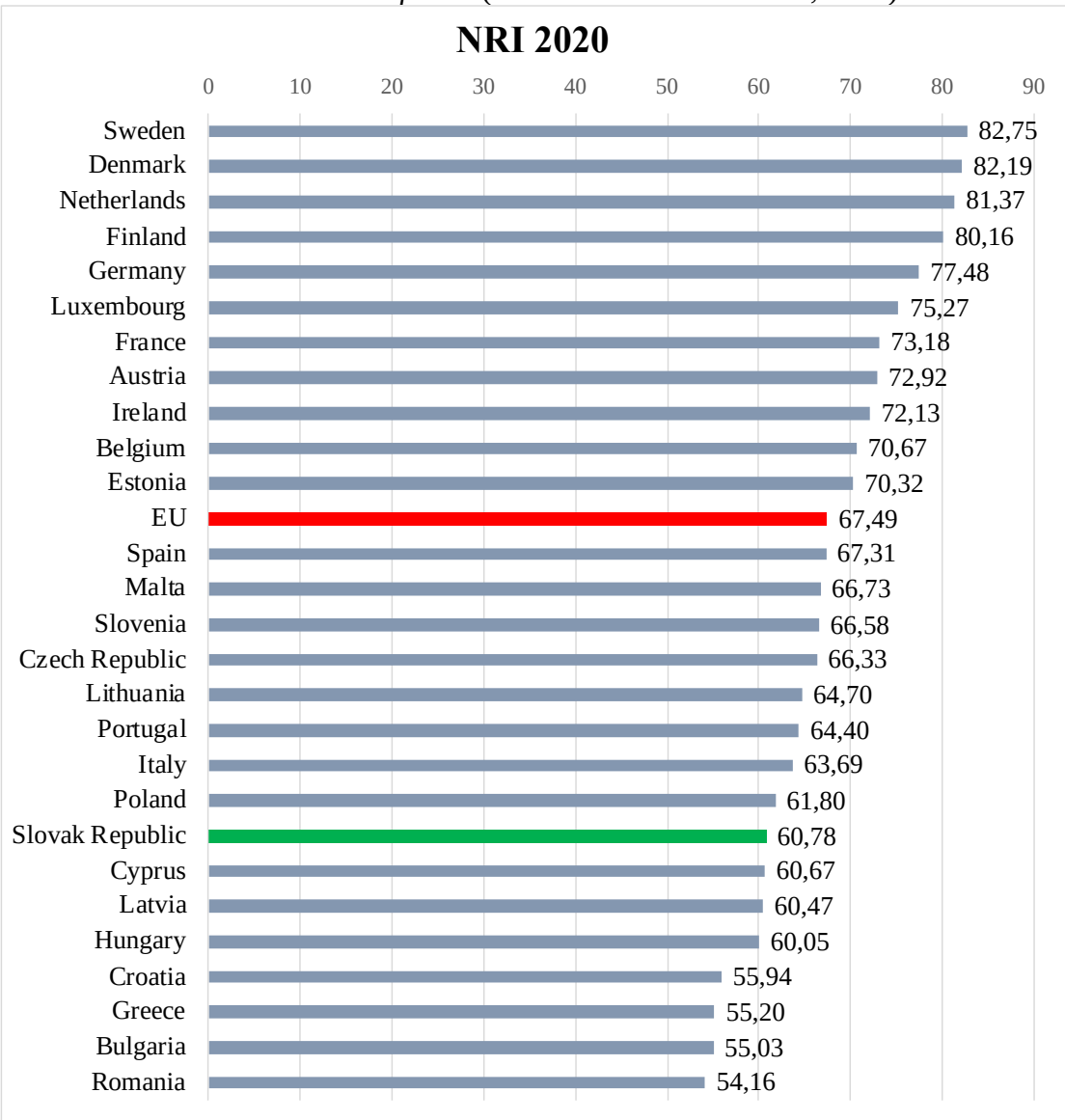

Figure 1 The NRI Index 2020; Source: (Network Readiness Index, 2020)

3.2 IMD World Digital Competitiveness Ranking 2020

The IMD World Digital Competitiveness Ranking (WDCR) analyzes and assesses the extent to which countries are adopting and researching digital technologies leading to the transformation of government practices, business models and society in general (Arora, 2020). The creators of the ranking assume that the digital transformation takes place primarily at the corporate level, but also occurs at the governmental and social levels. The assessment consists of three basic areas, namely the *Knowledge* area, which captures the intangible infrastructure needed to learn and discover the technology dimension, the *Technology* area, which aims to quantify the environment for digital development, and the *Future Preparedness* area to examine the readiness of individual economies for digital transformation. The evaluation of the three basic areas consists of

more than 50 indicators. The results of the ranking are shown in the following figure (Smartcity, 2021).

Within the IMD WDCR 2020 (Figure 2), Denmark took first place, receiving 96,013 points. Apart from Denmark, only three countries, namely Sweden, the Netherlands and Finland, crossed the 90-point mark. The European Union average reached 68,652 points. Countries such as Poland, Spain, the Czech Republic and Portugal scored a similar number of points. The last place was taken by Croatia, which gained 52,045 points. Malta was not evaluated in the ranking. The best rating in the field of Knowledge was given to Sweden, which received 89,199 points. Sweden is also a leader in the evaluation of the Technology field, where it received 88,348 points. Within the Future Preparedness area, Denmark received the most points, namely 100 points (Smartcity, 2021).

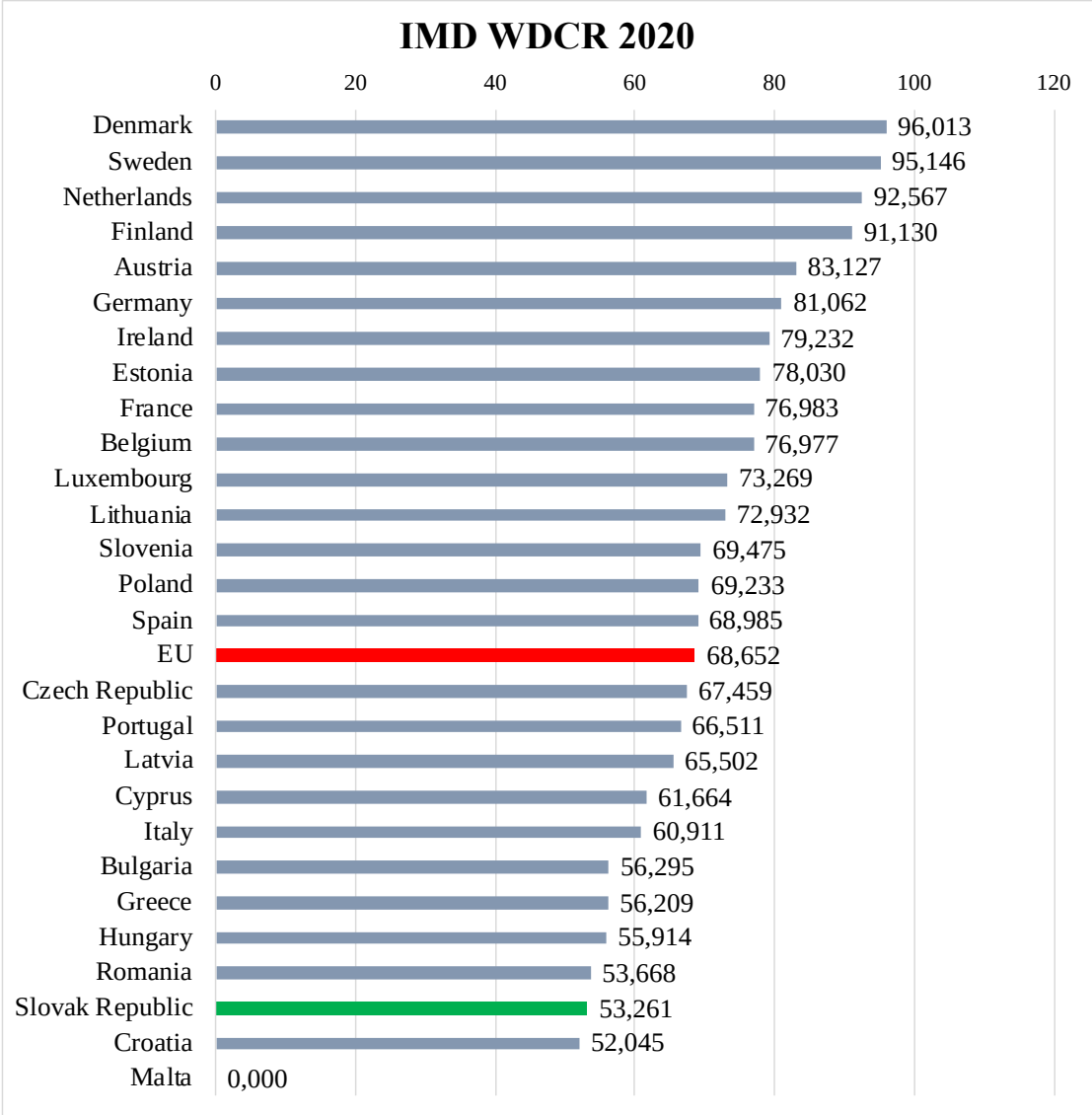

Figure 2 IMD WDCR 2020; Source: (Smartcity, 2021)

The Slovak Republic ranked 25th with 53,261 points. The country thus occupied the second worst place. The Slovak Republic gained more than 15 points less than the European Union average, ranking among the six countries that received less than 60 points. The country received the largest number of points within the *Technology* area,

namely 49,896 points. In 2020, however, the Slovak Republic received a smaller score in all areas evaluated compared to 2019 (Arora, 2020).

Based on the analysis of the above indices, it can be stated that within the member states of the European Union, countries such as Sweden, the Netherlands, Denmark and Finland are among the leaders in the field of digitization. The worst rated countries in all analyzed indices include countries such as Croatia, Greece, Romania or Bulgaria. The Slovak Republic was unable to rank above the European Union average in any of the indices. The country ranked best in the NRI index, specifically in 20th place. The weakest place was achieved by the Slovak Republic in the IMD WDRC ranking where it was placed in the second worst place.

2 Material and methods

The aim of the research was to find out the approach of business representatives to the Industry 4.0 concept. Marketing research was carried out through inquiry, specifically by electronic inquiry using an online questionnaire, which consisted of 51 questions. Before starting the research, it was necessary to specify the target group, which consisted of enterprises operating in the field of industry (29,434 enterprises operating in the field of industry as of 31 December 2020). The following formula was used to calculate the sample size (1):

$$n \geq \frac{N * t^2_{1-\frac{\alpha}{2}} * \sigma^2}{(N-1) * \Delta^2 + t^2_{1-\frac{\alpha}{2}} * \sigma^2} \quad (1)$$

Where:

n	minimum sample size (minimum number of respondents)
N	base file size
$t_{1-\frac{\alpha}{2}}$	critical value determined from tables (critical values of standardized normal distribution)
σ2	variance calculated from the standard deviation
Δ	maximum allowable margin of error

Subsequently, the determined values were inserted into the formula and based on the calculation of the sample using the appropriate formula, it was found that to fulfill it, it is necessary to obtain answers from at least 380 respondents (2).

$$n \geq \frac{29434 * 1{,}96^2 * 0{,}5^2}{(29434-1) * 0{,}05^2 + 1{,}96^2 * 0{,}5^2} \geq 379{,}22 \triangleq 380 \quad (2)$$

The sample of respondents was filled, and therefore it is possible to interpret the following results.

3 Results

Currently, Industry 4.0 is a much-discussed topic in the world, and therefore the research was focused on finding out the current level of implementation of Industry 4.0, opinions, attitudes and more detailed aspects of implementation in companies in the Slovak Republic. Businesses need to be aware of the importance and necessity of implementing Industry 4.0, which can significantly help them maintain or improve their market position, as ignoring this topic can lead to a gradual loss of competitiveness. The

results of the research are evaluated in the following paragraphs, while at the beginning the respondents were categorized on the basis of identification questions.

The largest representation of respondents was represented by companies with Slovak capital, 62%. Companies with foreign capital had a smaller share, with a 38% share.

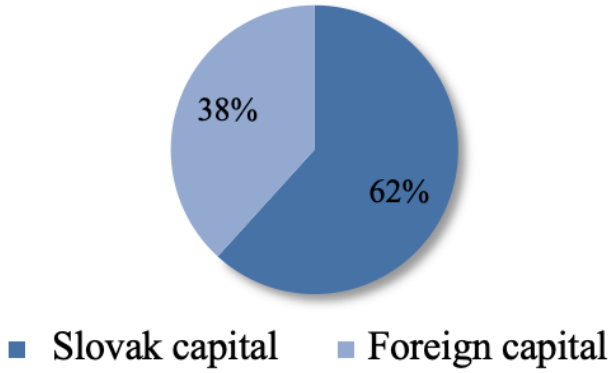

Figure 3 Majority capital of respondents who know the concept of Industry 4.0; Source: own processing

Respondents in large companies with at least 250 employees responded most often, which in percentage terms represents 38% of the solved sample. The smallest share, with a 12% share, was in micro-enterprises with 1 to 9 employees.

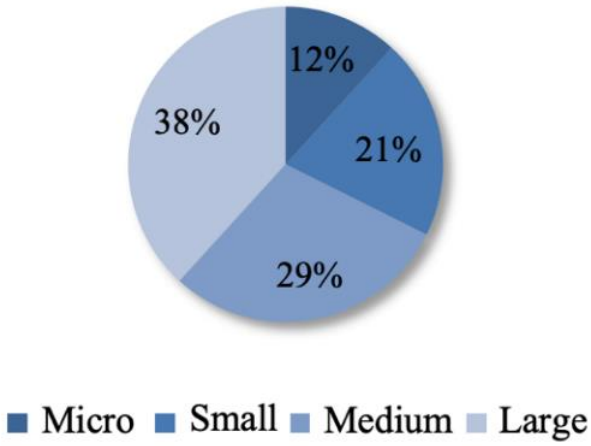

Figure 4 Size of respondents (according to the number of employees) who know the concept of Industry 4.0; Source: own processing

Respondents who know the concept of Industry 4.0 work mainly in the automotive industry, which represents 28% of the sample. This category is the most digitized production, with 50% representation. 13% of respondents stated that they work in another area, which was mainly the construction industry, which accounted for 9% of the sample.

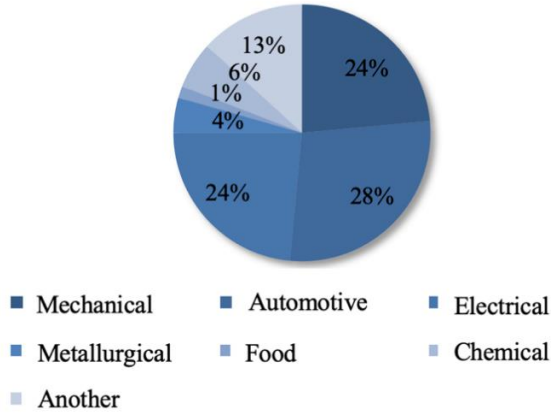

Figure 5 Areas in which respondents who know the concept of Industry 4.0 work; Source: own processing

Based on the filter questions, the respondents were divided into two groups, respondents who know the concept of Industry 4.0 and those who do not. In the following paragraphs, only the answers from respondents who know the term are evaluated, which represents 43% of the total sample of respondents.

44% of the respondents stated that they had already started implementation. Respondents who started with the implementation of Industry 4.0 work mainly in the field of mechanical, automotive and electrical engineering. Implementation is considered by 26% of respondents, who stated that they have not yet started implementation, and most often plan to start in the time horizon of 5-12 months. The other 74% of respondents do not consider implementation at all, mainly because they do not consider it necessary in the area in which they operate.

The research shows that most respondents are familiar with the content of the national Concept of Intelligent Industry for Slovakia, but only partly, which represents 49% of the sample. 32% of respondents are not at all familiar with the content. The members of the top management in particular are very well acquainted with the content.

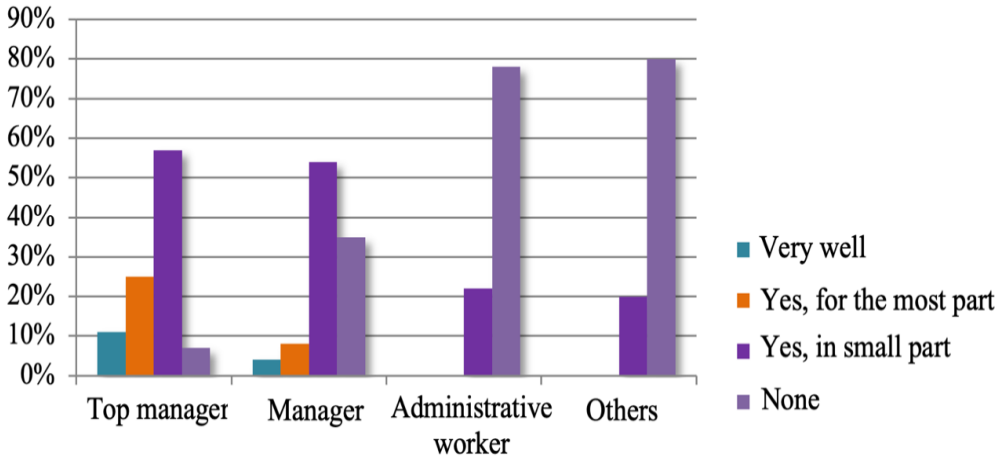

Figure 6 The relationship between job placement and acquaintance with the content of the national Concept of Intelligent Industry for Slovakia; Source: own processing

For respondents who know the concept of Industry 4.0 and started with the implementation, it was addressed in what phase of implementation they are. The results show that the implementation of Industry 4.0 takes place mainly in companies with Slovak capital, which in percentage terms represents 60% of the solved sample. The results also show that only companies with foreign capital fully implement their strategy.

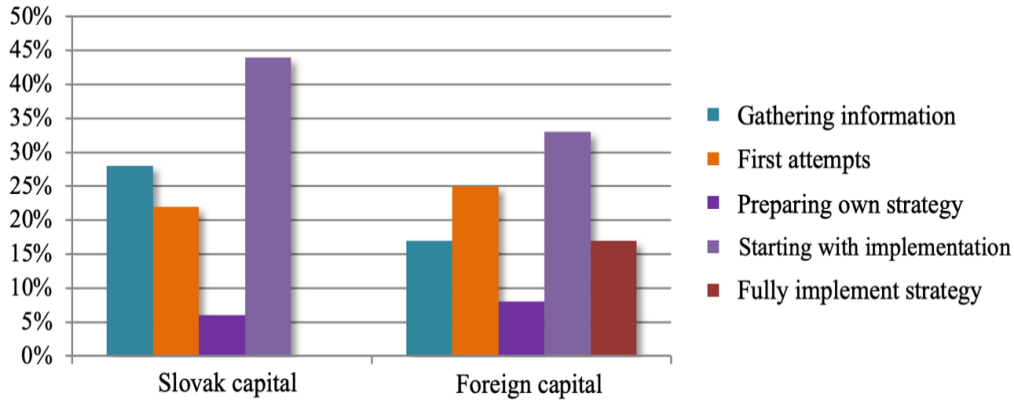

Figure 7 Phases of implementation of Industry 4.0 depending on the majority capital; Source: own processing

Subsequently, it was identified which resources are preferred in the implementation of Industry 4.0. 75% of respondents who prefer the use of external resources or a combination of external and own resources in the implementation have already really started the implementation. Most of them, up to 27%, prefer to work with CEIT.

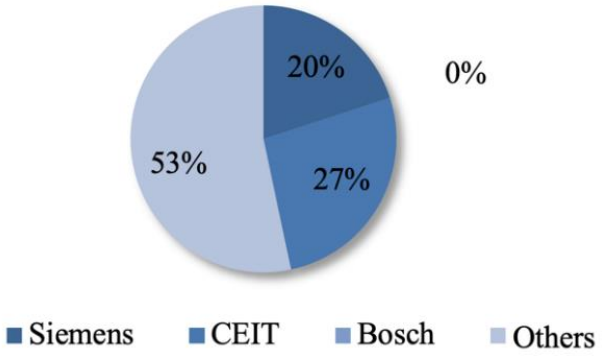

Figure 8 Companies with which the respondents cooperate in the implementation of Industry 4.0; Source: own processing

Respondents who have already started the implementation of Industry 4.0 most often have digitized technical preparation of production and the production itself, while each of these activities represents 30% of the solved sample. Relations with customers are already digitized, especially in large companies. The survey also shows that the implementation of Industry 4.0 was most often started by large companies, which represent 37% of the group.

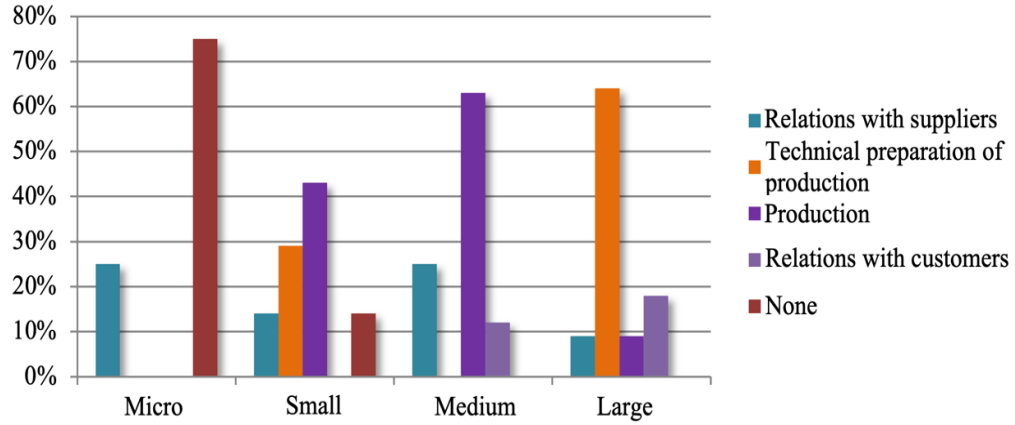

Figure 9 Digitized activities depending on the size of the company; Source: own processing

As many as 40% of respondents who started implementing Industry 4.0 most often use the Big Data element. 50% of respondents who are still considering implementation prefer Cloud computing.

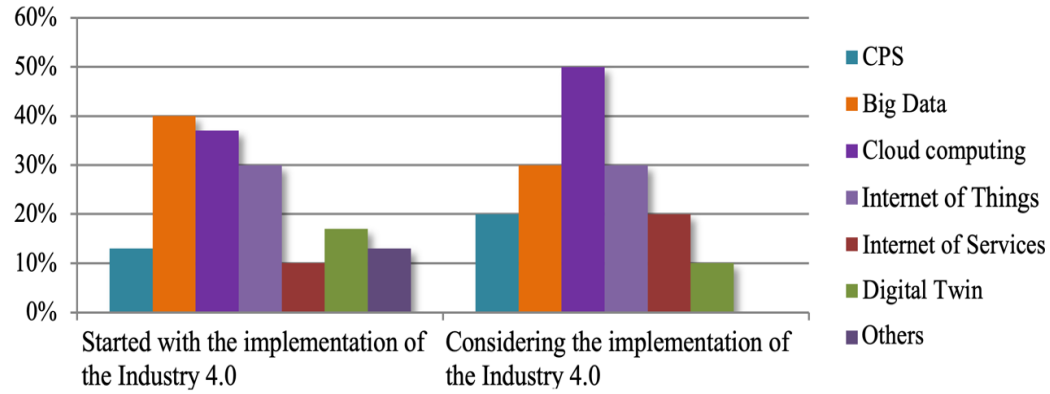

Figure 10 Industry 4.0 elements that respondents prefer; Source: own processing

The branching of the questionnaire made it possible to obtain information on respondents who do not know the concept of Industry 4.0. They were asked if they were using any of the elements of Industry 4.0, which would mean that they also started implementing Industry 4.0. It follows from the above that 24% of respondents from the total sample actually started the implementation and who were subsequently categorized through identification questions. Most of them fall into the following categories:

- companies with Slovak capital (in terms of majority capital);
- large companies (in terms of size);
- companies with an annual turnover of 1 000 001-10 000 000 € (in terms of the amount of annual turnover);
- companies operating in the engineering, automotive and electrical engineering industries (in terms of the area in which they operate).

The respondents were divided into two groups, while the first group includes respondents who actually started with the implementation of at least one of the elements of Industry 4.0. In this group, the implementation uses mainly own resources, which are used by up to 53% of respondents. When using external sources, they cooperate mainly

with Siemens and CEIT. The second group includes respondents who are still considering the implementation of at least one of the elements of Industry 4.0. The majority of respondents in this group, up to 73%, would use a combination of own and external resources in the implementation, with the most frequent preference for cooperation with CEIT.

88% of respondents who know the concept of Industry 4.0 consider implementation to be important for maintaining competitiveness in the market. The most common reason why they do not consider the implementation important was that they have regular customers who will definitely remain "loyal" to them.

It is important to draw attention to the fact that the content of the national Concept of Intelligent Industry for Slovakia, which deals with the topic of Industry 4.0, is mostly only little familiar to respondents, so the state should strive to raise awareness so that businessmen can take advantage of new opportunities and resources as effectively as possible.

4 Discussion

Competitive pressure in national and international markets is constantly growing, which requires increased production and innovation. Industry 4.0 brings new opportunities for businesses, allows access to new markets and the use of modern technologies in innovation activity and progress, and therefore individual countries should start implementing it as soon as possible and, following the example of leading countries in the field, work on creation of new legislation, infrastructure, promotion and start investing in science and research, thus ensuring sufficient conditions for the implementation of new technologies, which are a necessary condition for the economic growth of the country.

The questionnaire survey shows that 37% of respondents know the concept of Industry 4.0. Although some respondents do not know the concept of Industry 4.0, they know some of the elements of Industry 4.0 and already use them in real life in their companies, with the most commonly used element being Cloud computing. Companies that started with the implementation of Industry 4.0 are most often in the phase when they have a finished strategy and start with the implementation, while we are talking mainly about large companies operating in the engineering, automotive and electrical engineering industries. When using external sources, they cooperate mainly with Siemens and CEIT. Most respondents who are familiar with Industry 4.0 are aware of the importance of implementation in maintaining competitiveness and market position. Ignorance of concepts related to Industry 4.0 is mainly due to low awareness of managers about technological trends. Most of them are not even familiar with the content of the National Concept of Intelligent Industry for Slovakia.

The Slovak Republic can be competitive on the European market as well as the global market only if it begins to promote the Concept of Intelligent Industry for Slovakia in industry, to support areas creating modern technologies and to support companies in innovation activity.

Akcknowledgements

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Adaptation process of foreign employees in a corporate environment in the context of industry 4.0

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Abstract

The aim of the paper is to present one of the models of the adaptation process of foreign employees. Based on the personnel analysis of the Czech Post, a critical state infrastructure company. The case study is based on the concept of the state migration policy of the Czech Republic and selected projects / regimes of employee migration mobility. The text first introduces the company Česká pošta as an important part of the state critical infrastructure and then the basic documents and principles of personnel management towards the recruitment of foreign employees. The key part of the paper is devoted to the individual phases of the adaptation process of a foreign worker with the evaluation of the results and discussions of the perspective of foreign employment in the Czech Republic.

Keywords: Foreign employees; Adaptation; Migration policy; Corporate environment.

JEL Classification: D26, J15, M12

Article Classification: Case study

1 Introduction

Foreigners are an irreplaceable source of labor for the Czech labor market. The reasons for employers to use foreign workers are mainly driven by the effort to maintain competitiveness in international markets in an effort to overcome the imbalance in supply and demand in the labor market.

According to the Czech Statistical Office, there were 617,000 foreigners with permanent or long-term residence in the Czech Republic as of 30 September 2020 (MVČR, 2020). However, the total number of foreigners must be supplemented by persons without a residence permit and also by citizens of the European Union who do

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not have to fulfill the registration obligation (EU, 2021). Foreign migration increased the population of the Czech Republic in 2019 by 44,300 to a total of 10,690,000 inhabitants as of 31 December 2019 (ČSÚ, 2020a).

The share of foreigners in the total population of the Czech Republic has been steadily increasing for a long time, with the assumption that it will continue to increase. The number of foreigners applying for a residence and work permit is also increasing. The majority of the total number of foreigners are citizens of Ukraine, Slovakia and Vietnam (ČSÚ, 2020b).

This fact exposes the migration policy of the state to challenges not only administrative, social, labor law, but also security. As the number of foreigners increases, so do the challenges of successful integration and the elimination of the negative effects of integration in the form of conflicts based on cultural differences. The aim of the paper is to present the adaptation process of foreign employees on the basis of personnel company analysis, based on a case study of the state enterprise Česká pošta, which is part of the state critical infrastructure.

2 Material and methods

2.1 State migration concept

The Czech Republic's Migration Policy Strategy implies the state's interest in supporting legal economic migration, "which is beneficial for the state and its citizens so that the Czech Republic can respond flexibly to the needs of its labor market and reflect the long-term needs of the state" (MVČR, 2015). At present, we can register more emphasis on the support and expansion of projects in the field of economic migration. These have been created and implemented since 2012 within the framework of inter-ministerial cooperation of central state administration bodies. The aim of economic migration projects is to streamline the migration procedure by simplifying the process.

With the rapid increase in the number of foreign workers in the Czech Republic over the past two years, the state is paying attention to the security aspects of employing foreigners, especially in the security situation in the industrial zones of Hradec Králové and Plzeň region, where we could register in connection with increased foreign migration. the level of illegal activity, especially offenses (against public order, civil cohabitation or property) by foreigners, as well as an increased level of conflicts in the coexistence of local people with foreigners, offenses in the field of transport, prostitution and drugs. Measures implemented in 2017 and 2018, which contributed to a renewed increase in security and public order, contributed to a significant improvement in the situation in these regions (MVČR, 2019).

The integration of long-term or permanent living foreigners in the Czech Republic is a long-term and bilateral process of integration with an emphasis on the active involvement of foreigners as well as the majority society. The goal of the state's integration policy is the smooth and mutually beneficial coexistence of foreign communities and the majority society. The successful integration process of the inclusion of foreigners is a crucial factor in the elimination of negative phenomena, which may in turn prove to be strong security threats.

2.2 Czech Post - a critical state infrastructure company

Czech Post (Česká pošta, s. p., hereinafter referred to as ČP) is the holder of a postal license, is a legal entity within the meaning of Act No. 89/2012 Coll., The Civil Code, as amended.

The legal and property status of ČP is regulated by Act No. 77/1997 Coll., On a state enterprise, as amended. The company was established on 1 January 1993 in accordance with Act No. 111/1990 Coll., On a state-owned enterprise. The charter of the state enterprise was issued by the Ministry of Economy of the Czech Republic on 16 December 1992. The function of the founder is performed on behalf of the state by the Ministry of the Interior of the Czech Republic. Pursuant to Section 11 of Act No. 77/1997 Coll., On a State Enterprise, as amended, the bodies of the Czech Post are the CEO and the Supervisory Board (Česká pošta, 2020a).

In 2019, ČP had a total of 3,822 organizational units (post offices, specialized establishments, dispensing points). The recalculated average registered number of employees as at 31 December 2020 was 28,325 persons (Česká pošta, 2020b).

The Czech Post is one of the key parts of the so-called critical infrastructure (CI) of the state. The functioning of the state in general depends on the resilience of its most important controls and systems; the most important of these are critical infrastructure. This includes energy, transport, economic, financial systems, water supply, public health, food supply, etc., as well as the operation of communication systems (provided by the Czech Post). According to the definition of the European Union, critical infrastructure consists of "means, systems and parts thereof located in a Member State which are essential for the maintenance of the most important social, health, safety, security or good economic or social condition of the population and which would disrupt or destroy serious impact due to the failure of these functions " (EU, 2008).

Subject to CI according to the Crisis Act and according to Government Decree No. 462/2000 Coll. ČP became 22 November 2011 (Vláda ČR, 2000). The central body of state administration for energy, electronic communications and postal services (with the exception of things entrusted to the competence of the Czech Telecommunication Office) is the Ministry of Trade and Industry (MPO). This is the competent authority for ČP to determine the elements of CI (Česko, 1969).

The inclusion of ČP in the CI system led to the determination of a number of security aspects of the company. These are crisis plans and other documents that the company is obliged to prepare for the implementation of crisis measures, which are used to perform tasks in the event of a threat or after a crisis situation. These documents are directly linked to the Standard Plan for Resolving the Crisis Situation of Disruption of the Functionality of Large-scale Postal Services, which is prepared by a central body, ie the Ministry of Industry and Trade (MPO, 2016).

The area of crisis management, which also includes the protection of CI elements, is generally provided in the ČP company by the Security Department and in times of crisis situations (CS) and extraordinary events (EE) by the ČP Crisis Staff. In the event of the establishment of MU, which could significantly affect the activities of ČP, crisis staffs are convened at the central or regional level. These staffs are intended for the operational solution of the EE and for the adoption of strategic decisions.

The main internal regulation of ČP in the area of CI protection is the Crisis Management Directive, which is regularly updated. The directive identifies the categories of possible CS and EE that could affect the company. With the exception of the general CS and EE, these are mainly Violations of Legality (crime) at the post office; Disruption of postal services; Notification of the storage of an explosive or unknown suspicious object; Suspicious and dangerous shipments. There are more detailed procedures for each

type of EE in ČP. For EE "Suspicious and dangerous shipments." internal training is prepared with a description of procedures and activities in the event of the establishment of this EE. For other EEs, type plans are prepared with a description of activities and procedures in order to overcome the established EE (Česká pošta, 2017).

A Crisis Preparedness Plan has been prepared for the ČP company as a CI entity, and Crisis Preparedness Plans for individual CI elements have been prepared within its framework. These plans, which are part of the crisis documentation, are prepared by a specialized department of ČP - Crisis Management. The plans include a uniform methodology for safety assessment (valid for all establishments), and a breakdown of contact links with selected ČP workplaces and the Integrated Rescue System (according to regions). A possible large-scale disruption of postal services could lead to the exclusion of some elements of CI important for the provision of postal services. Within ČP, the elements of CI consist of selected establishments and, in the area of cyber security, communication and information systems operated by the company (MPO, 2014).

2.3 Personnel analysis focusing on the employment of foreigners

In 2017, the *Krajané* project was created, which builds on the previous Ukraine project and addresses ethnic Czechs and their descendants from Volhynia in Ukraine. After 2014, some Czech Volyns expressed interest in returning to their homeland. It is not just a process of recruiting employees, but of supporting their integration and adaptation in the new host environment. Foreign employees went to three pilot regions - South Bohemia, Prague and West Bohemia (Česká pošta, 2018).

The implementation of the project was preceded by the creation of corporate facilities for newly arrived employees from Ukraine. The main purpose was a consistent situation. The tool was effective communication in the form of shared stories about the course of the project and an individual approach by HR professionals. The aim of the whole project was to integrate foreign employees into the life of ČP, to motivate existing employees and to increase the competencies of managers.

ČP also joined the Qualified Employee Program, through which it recruited drivers from Ukraine. Recruitment of CP employees from third countries (especially Ukraine) is based on three basic ways of addressing potential foreign workers: 1) selection of a person in a third country, 2) recruitment advertising in Ukraine, 3) cooperation with personnel agencies in Ukraine. The whole process is described as a methodological manual in the internal document "Action steps in the recruitment of Group C drivers from Ukraine". For job seekers, the employer must obtain proof of accommodation for the period of stay in the Czech Republic, respectively validity of the employee card. In practice, this means that the ČP Security HR staff will find out from the future employee whether he is able to arrange accommodation in the Czech Republic, if not, he must offer him options (usually tips for hostels) and find suitable accommodation. These steps can complicate the recruitment of employees from third countries (Lucký, 2021). One of the impacts of this complicated recruitment procedure for foreign employees is the low numbers of ČP's foreign employees. Of the total recalculated number of ČP employees, 28,325 persons (2019), the number of foreigners was 0.1%. The year 2020 shows a slight increase to 0.2% (Lucký, 2021). The largest share in the composition of foreign nationals employed by ČP is represented by citizens of Slovakia and Ukraine.

2.4 Adaptation of foreigners in the corporate environment

Czech Post has internal guidelines for the adaptation of new employees. The goal is the successful training and adaptation of a new employee, which significantly helps the newly hired employee to reach the required professional level in a short period of time. The adaptation process (AP) includes all employees who start working for ČP. The length of the adaptation process is 3 months, regardless of whether it is a citizen of the Czech Republic or a foreigner (Lucký, 2021).

The same adaptation process was introduced for all employees of the company in 2016, until then the training of new employees in branch networks was unsystematic. However, the Czech Post suffered from considerable fluctuations, which is why the company's management carried out an in-depth analysis of its causes; It turned out that one of the reasons why employees leave after the probationary period is the process of induction, resp. non-conceptual adaptation. To eliminate this cause, a new adaptation process was created and implemented (2016) (Lucký, 2021).

The first step is training, in which the new employee is acquainted with information about postal conditions, regulations, rules and gets acquainted with the APOST e-software. This is followed by a two-week induction, which takes place in the form of work performed under the supervision of a mentor. A mentor is an older employee who has such experience and expertise that he / she can help and advise employees in the AP, and is always assigned to employees in the AP for the period of employment (Česká pošta, 2012).

ČP does not distinguish during the adaptation process whether the new employee is a citizen of the Czech Republic, a citizen of an EU Member State or a citizen of a third country. The basic premise is knowledge of the Czech language. In the case of a foreigner who does not yet speak Czech at a communicative level, a mentor is assigned who speaks another language with which he / she communicates with the foreigner. During the AP, each new employee will receive a set of information materials and a so-called reminder card with selected important information (Lucký, 2021). Throughout the adaptation process, the foreigner has his / her contact person who speaks his / her mother tongue.

3 Results

With the increased number of immigrant foreigners in the Czech Republic and their high concentration in certain regions (especially in the industrial zones of the Plzeň, Střední Čechy and Hradec Králové regions) come risks and challenges not only of a security nature, but also needs, limits and problems in education, accommodation and health care. Emphasis on the approach to the integration of foreigners is placed on cooperation with regional and local public administration and on the network of governmental and non-governmental entities to support integration. The instrument of support for integration at the regional level is the network of Centers for Support of Integration of Foreigners, which covers 14 regions. At the local level, municipal projects are a key tool for integration. In cooperation with non-governmental organizations, assistance to foreigners is being strengthened (cooperation with intercultural assistants and interpreters). A significant step was the legislative anchoring of the network of the mentioned centers and the imposition of a legal obligation (from 1 January 2021) on selected foreign groups to complete an adaptation-integration course in these centers.

In 2019, an expert group was established from representatives of the Ministry of the Interior, Police and representatives of the Střední Čechy, Hradec Králové and Plzeň regions, which are a problem of employing foreigners in the Czech Republic, illegal hostels and renting private apartments to illegal workers.

The success of the *Krajané* project required the individual approach of ČP employees, who hired compatriots at their workplaces. Emphasis was placed on creating a safe environment for all stakeholders. Based on the real needs of employees and operations, effective adaptation was formulated and created, while the feedback from compatriots was also consistent.

Complications most often arose in the field of communication. There were misunderstandings, sometimes non-acceptance of the compatriot by the team, which was mostly caused by the language barrier. The concrete result of the project was the employment of 30 compatriots - Volhynian Czechs at the Czech Post. 3 regions (Southern Bohemia, Western Bohemia and Prague) were involved in the pilot part (Lucký, 2021).

4 Discussion

The key areas with the strongest emphasis on the prevention of migration-related risks in the Czech Republic are two areas in particular - 1) illegal migration and related threats of violations of administrative, criminal and labor legislation and 2) integration associated with threats of intercultural complications, vulnerability of some foreign groups, reluctance migrants to adequate inclusion or reluctance on the part of the ethnic majority. Therefore, the integration policy is focused on the continuous evaluation of the position of foreigners in the Czech Republic through cooperation between the state administration and regional and local public administration and the non-profit sector in the form of a number of platforms, projects and measures that have cross-border implications.

Not only trade unions but also some ministries and experts oppose the "import of cheap labor" with a reserved or direct rejection. They recall the trend that afflicts foreign workers, for example, in times of economic recession. It is difficult to offer unambiguous answers to the current challenges of labor market dynamics. However, it is certain that the education system and motivational methods in the labor market will have to be adapted to complement the above-mentioned possibilities of stimulating the workforce in the Czech economy, including vocational and retraining, especially towards the unemployed and foreigners combined with elements of automation and robotization.

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The analysis of non-comformities of automotive rubber hoses as method of quality assessment

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Abstract

In many companies the quality level of products is estimated using the analysis of the level of non-comformities.The main purpose of the paper is presentsation the results of the analysis of non-comformities of automotive rubber hoses produced in one of Polish companies. This analysis focuses on the four types of products. In the paper 3 different instruments were used: control card, Pareto chart, FMEA. The results include the number of non-conformities occurring in finished products within 1 month.

Keywords: Quality assessment; Pareto chart, FMEA; Automotive industry.

JEL Classification: L15, L 62, M11.

Article Classification: Case study.

1 Introduction

The concept of quality as a value for man appeared with the beginning of a productive activity (Wawak, 2002). The development of the phenomenon of quality and the interest in it on a general scale is a specific response to practical needs. People strive to improve their level of welfare by using items of increasingly better quality. On the other hand, the development of quality-related research, that has been carried out intensively for several decades, is primarily determined by the changing production

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processes, which reach higher and higher levels in terms of effectiveness and efficiency. The improving effects of work are a guarantee of civilization progress, and thus an increase in the standard of living of the population (Hamrol & Mantura, 2011).

The rapid development of the international markets means that consumer expectations are rising very quickly. This is related not only to the wide choice of offered product or service, but also to the choice of the supplier itself. There is also a tendency to increase the needs and expectations of consumers in direct proportion to the progress caused by the implementation of new technologies (Dvorsky et al., 2010; Dvorsky et al., 2011; Oujezdsky et al., 2016; Sliva et al., 2010; Sliva et al., 2003; Brozova, 2013; Jonsta et al., 2016; Konstanciak et al., 2013), and new opportunities provided by manufacturers (Frąś, 2006; Cep et al., 2013; Sliva et al., 2019; Brozova et al., 2016; Brozova et al., 2013; Kardas et al., 2017).

This is what makes the need to meet the market demand strongly felt. However, it is necessary to emphasize that it is equally important to meet not only the needs, but also the very high expectations of customers. In order to achieve a competitive advantage, companies need effective methods that will allow to achieve a sustainable competitive advantage. That is why management and organization sciences and the possibility of their implementation in the enterprise are so popular. This can be called a kind of revolution in scientific thought related to quality. Quality is an element of interest for researchers from the very beginning of the development of the field of management. Quality is treated as one of the main elements determining the company's competitive advantage (Bugdol, 2011).

The operation of the company in the conditions of competition makes the company strive to maintain a state of balance between the normative quality (method of production) and the quality perceived by customers (Szczepanska, 2010).

In the literature many definitions of quality can be found. In the paper only the most important are presented. Each author has different perception of this term:

- According to E.W. Deming quality is a predicted degree of uniformity and reliability achieved at low cost and according to market requirements (Flood, 2003);
- For J.M. Juran quality is suitability for use or application (Oakland, 2009);
- For P.B. Crosby quality is adaptation to requirements (Costin, 2004);
- Definition of quality formulated by J.A. Pearce is getting it right the first time (Costin, 2004);
- G. Taguchi states that quality is the minimum loss added to the company by the product while it is processed (Costin, 2004);
- K. Ishikawa points to the differences between the narrow and the broad definition of quality - narrow interpretation is quality understood as product quality. A broad interpretation is quality understood as the quality of work, service, information, process, departments, people (including workers, engineers, management and management), the quality of the system, enterprise, goals, etc. (Costin, 2004);
- A.V. Feigenbaum thinks that quality in its essence is the way of managing an organization (Flood, 2003);
- Finally, also definition of ISO 9000:2015 should be presented. Quality is degree to which a set of inherent characteristics of an object fulfils requirements (ISO 9000:2015).

Nowadays, the broadly understood quality in economic processes is determined by a system of interrelationships between marketing, logistics, management methods, technique and production technology (Sliva et al., 2019).

David Garvin of Harvard Business School has identified eight important dimensions or categories of quality (Bowles & Hammond, 2005):

- *Performance* - the basic characteristics of the product;
- *Features* - physical parameters of the product;
- *Reliability* - no repairs during the warranty period or a guaranteed maximum time for service;
- *Conformance* - the degree to which the design of the product and its operational characteristics correspond to pre-established standards;
- *Durability* - a measure of a product's life in its economic and technical dimensions;
- serviceability - speed, politeness and competence in customer and ease of product repair;
- *Aesthetics* - in a common sense - subjective assessment of the attributes of a product, based on the individual preferences of the consumer;
- *Perceived quality* - consumers do not often receive complete information about a product or the features of a website, and often use the image of the product to compare.

Thus, broadly understood quality should be considered in the following aspects (Jedliński, 2009; Ostasiewicz, 2004):

- *Physical* - as a set of various properties that determine what a given thing, so it is a quantitative or measurable characteristic,
- *Functional* - as the degree of meeting the (often subjective) requirements that determine what a given item or service is (beneficial or unfavorable for the user),
- *Compliance* - as compliance with the specification of a product or service, established during the design, and therefore all deviations from it reduce quality,
- *Valuable* - in terms of costs and price, because the purchase decision is based mainly on quality and value, because in the customer's opinion, even a high-quality product is often not "at a good price." hence frequent evaluations of "best-buy" consumer associations,
- *Philosophical* - as the most general concept of being.

The quality of products, that is created in the whole life cycle, is sometimes assessed differently depending on its type. The production processes of a material nature are characterized by technical parameters as well as the properties of the materials used, which determine the quality. The policy and vision of the organization should be focused on customer satisfaction, but also on increasing the quality of products or services. This is to stimulate new potential customers needs (Wawak, 1989). The literature indicates that quality should evolve along with a change in the life cycle phase of the product that is produced in the production process. Usually, 5 different stages of life cycle of products can be distinguished (Hamrol & Mantura, 2011):

- *Product design quality* - refers to the ability to meet the consumer's requirements for the product;
- *Design quality of the implementation process* - means the ability to obtain quality at the level of the previous quality in terms of design;
- *Product workmanship quality* - is related to the proximity of the product to its prototype;

- *Quality in terms of marketing* - is the relationship between consumer preferences and the image of the product built in the customer's awareness and subconsciousness;
- *Quality in terms of service and operation* - is equated with the level of consumer satisfaction with the use of the product and its maintenance in a condition suitable for use.

In many companies the quality level is estimated by the analysis of the level of non-comformities. Non-comformity can be defined as not-fullfiment the requirements what is important for the consumer. The paper presents the analysis of the non-comformities of automotive rubber hoses. The analysis presents problems of finished products and was done using the results in real automotive company.

2 Material and methods

The paper presents the results of the analysis of non-comformities of selected products. This analysis focuses on the four types of automotive rubber hoses produced in one of Polish companies. The analysis includes the following elements:

- the analysis of the frequency of non-comformities using a control card type np;
- the analysis of the types of non-comformities in the tested products using the Pareto-Lorenz Diagram;
- the analysis of the causes and effects of non-comformities in the tested products using the FMEA method.

The analysis takes into account the actual results obtained in analysed company. The results include the number of non-comformities occurring in 4 finished products within 23 calendar days.

3 Results

The analysis of the total number of non-comformities of 4 finished products in the study period was performed. For collected data, the control card (np type) was built, the result is presented in Figure 1. The diagram shows that the frequency of occurrence of non-comformities varied randomly. The control limits were not exceeded, which proves that the phenomenon is not very dispersed. The distribution of points on one side of the central line was also not observed, which would indicate a dysregulation of the process. This proves that the production process is within the assumed limits and there is no need for special repair programs and financial investments to improve the quality of products. The variability in the occurrence of non-comformities results from increased production costs for individual products and from the fact that the test was conducted during the holiday season, which effectively contributes to the increase in the number of defects in the products.

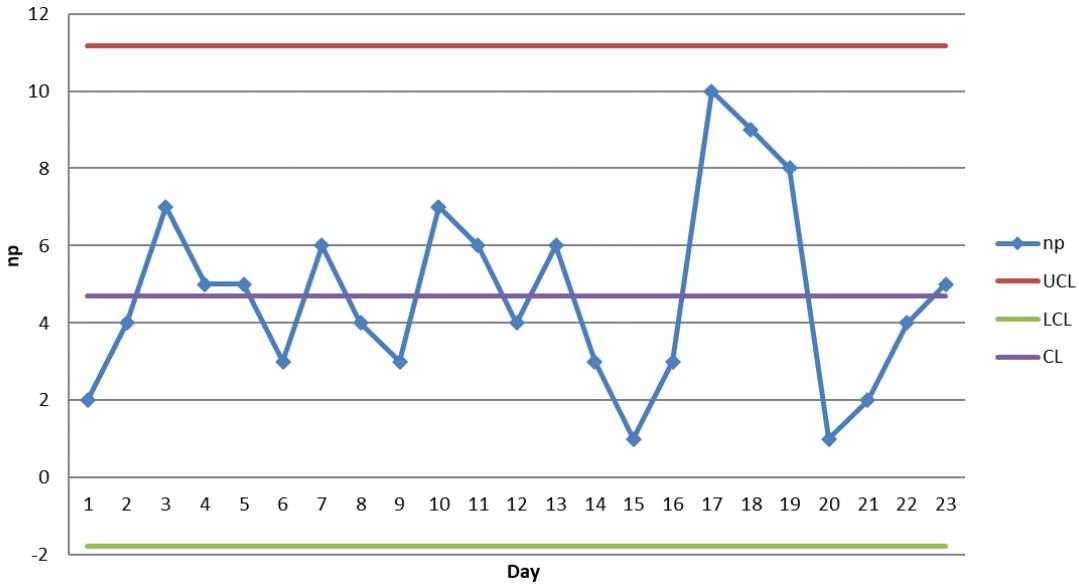

Figure 1 The control np for the frequency of occurrences of non-comformities in total production; Source: own elaboration based on Information materials (2019)

The analysis of the frequency of non-comformities in 4 selected products was carried out using the Pareto chart. The analysis period is identical to the time period taken into account in the quantitative analysis of production non-comformities. The results of the analysis is presented in Figures 2 - 5.

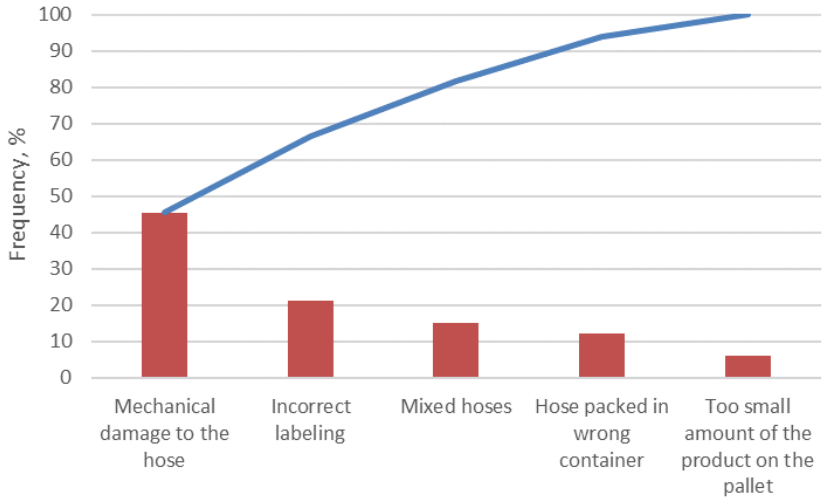

Figure 2 Pareto chart for non-conformities of automotive rubber hose No 1; Source: own elaboration based on Information materials (2019)

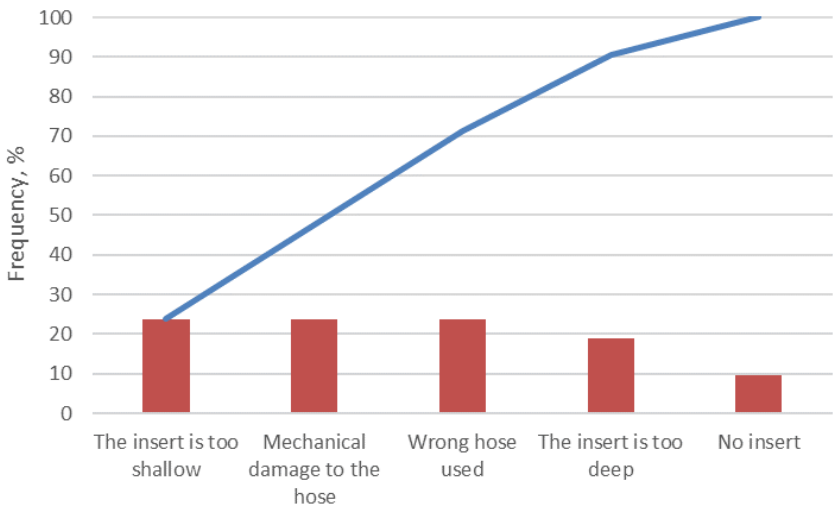

Figure 3 Pareto chart for non-conformities of automotive rubber hose No 2;
Source: own elaboration based on Information materials (2019)

According to the Pareto analysis presented in Figures 2 – 5 it can be said that:

- In automotive rubber hoses No 1 app. 82% of non-conforming products occurring during the production process are connected with 3 types of problems: mechanical damage to the hose, incorrect labeling and mixed hoses. The remaining 18% of non-conforming products are related to: hose packed in the wrong container and too small amount of the product on the pallet.
- In automotive rubber hoses No 2 71% of non-conforming products revealed during the observation of the production process of the product are due to three types of problems: the insert is too shallow, mechanical damage of the hose and wrong hose used. The remaining 29% of non-conforming products are the result of the insert is too deep and no insert.

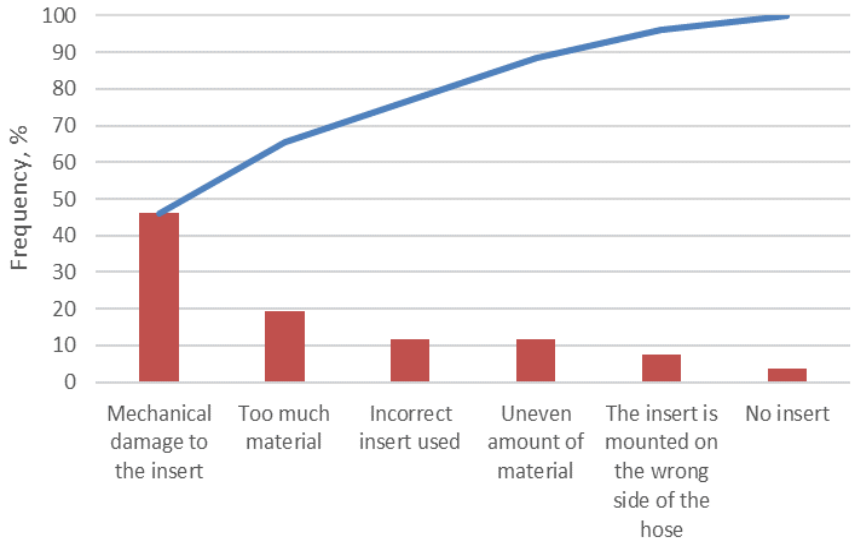

Figure 4 Pareto chart for non-conformities of automotive rubber hose No 3;
Source: own elaboration based on Information materials (2019)

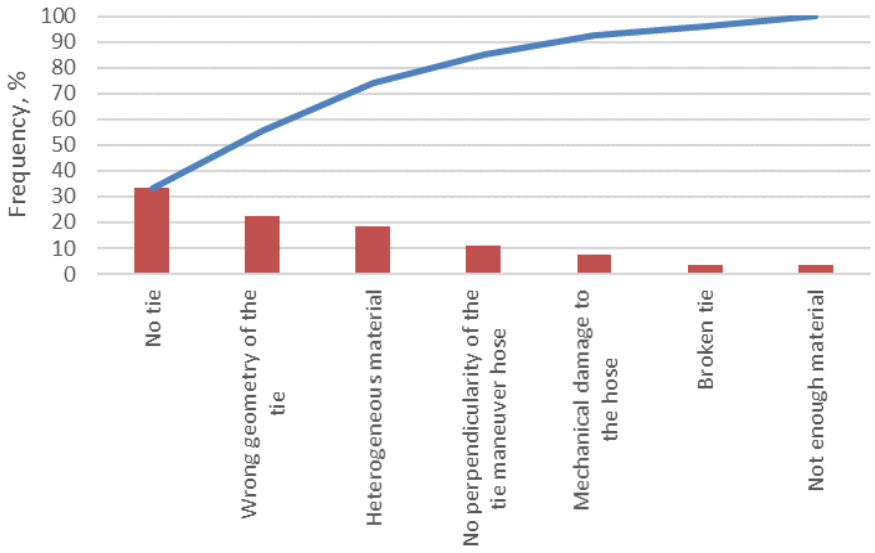

Figure 5 Pareto chart for non-conformities of automotive rubber hose No 4;
Source: own elaboration based on Information materials (2019)

- In automotive rubber hoses No 3 three types of non-conforming are responsible for 77% of non-conforming products during the production process of the: mechanical damage to the insert, too much material, incorrect insert used, 23% of non-conforming products are caused by three types of non-conformities, such as: uneven amount of material, an insert installed on the wrong side of the hose and the lack of an insert.
- In automotive rubber hoses No 4 74% of the detected non-conforming products are connected with three non-conformities, such as: no tie, wrong geometry of the tie and heterogeneous material. Four non-conformities are responsible for the remaining 26% of non-conforming products, such as: no perpendicularity of the tie maneuver hose, mechanical damage of the hose, broken tie and not enough material.

The reasons for the occurrence of particular types of non-comformities should be specified. The Failure Mode and Effect Analysis (FMEA) was used. The results this analysis are presented in Table 1 (S – Severity, P – probability, D – detection, RPN – risk priority number).

According to the results of FMEA analysis it can be said that:

- Critical value of RNP is 100 (according to the literature). Value for all non-comformities is below that value. The highest value of RNP was noted for the lack of tie (96) and incorrect labelling (90).
- For 5 non-comformities value 80 was notted (mechanical damage of the hose, too small amount of products on the pallets, the insert is too shallow, incorrect insert and wrong geometry of the tie).
- Although the critical value 0f RNP has not been reached, the production process and the number of non-comformities should be kept under constant control.

Table 1 The results of FMEA anaysis for the reasons for the occurrence of particular types of non-comformities in analysed automotive rubber hoses; Source: own elaboration based on Information materials (2019)

Non-compliance	Effect	Cause	S	P	D	RPN	Corrective actions
Mechanical damage to the hose	Leak in car or engine	Assembly tool sharp edges	8	2	5	80	Including the requirements for the tool in the Technical Specification
Incorrect labelling	The hose cannot be identified	Error while admitting to the system	6	3	5	90	The 5S standard, after scanning, the operator compares the quantity on the product label with the physical quantity of the containers
Wrong hose used	Difficult to install the hose in the car	Operator error	5	2	5	50	The Specification of Execution and the Work Card define the number of the hose, the correct representation of the hose shape with the shape elements of the assembly tool
Too small amount of the product on the pallet	Installation impossible	Error while admitting to the system	8	2	5	80	The 5S standard, after scanning, the operator compares the quantity on the product label with the physical quantity of the containers
The insert is too shallow	Leak in car or engine	Operator error	8	2	5	80	Training of operators on 5S standards.
Too much material	Visual defect	Damaged injection mold	2	3	5	30	Instrumentation guaranteeing the correct position in the mold
Incorrect insert used	Installation impossible	Operator error	8	2	5	80	The Performance Specification Sheet and the Job Sheet identify the component (insert) number
No tie	Leak in car or engine	Omitted operation	8	2	6	96	The Execution Specification Manual describes how to perform the operation
Wrong geometry of the tie	Leak in car or engine	Operator error	8	2	5	80	Information in the Specification and Performance Specification specifies the number Settings proper form.
Heterogeneous material	Visual defect	Overheated granulate in the cylinder of the injection molding machine	2	2	5	20	A system that forces the cylinder to empty after a time causing degradation of the material

4 Discussion

Based on the analyses carried out in the work, the following statements and conclusions were formulated:

- The non-comformity that appears in the largest number of cables is the mechanical damage of the hose. The company should take steps to eliminate it, at least partially, because it is a very serious defect of the product, which leads to, among others, to leaks in the engine, which is unacceptable for new cars.
- The vast majority of non-comformities analyzed is caused by the inattention of operators. The company should increase the frequency of training for all employees of the production line.
- The occurrence of non-comformities is also a consequence of inaccurately prepared Work Card. Therefore, these cards or any type of work information should be updated more frequently due to the wide variety of products manufactured by this company.
- Some non-comformities were caused by incorrectly calibrated or out of order machines. Therefore, the company should pay special attention to the condition of production equipment and carry out preventive checks more frequently.
- The use of quality management methods and tools during the production process and during the control of the parameters of finished products allows to assess the quality level of products or process parameters, determine the level of non-comformities and identify the causes of their occurrence.

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New trends in the provision of digital healthcare related to the 4th Industrial Revolution

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Abstract

The current environment is characterized by extraordinary dynamism. The advent of the 4th Industrial Revolution can be currently considered as one of the main trends in the environment, which significantly affects the dynamics and stimulates change and innovation in almost all sectors. Healthcare sector in particular, as is currently exacerbated by the ongoing pandemic, requires several changes. This paper aims to provide an overview of new trends in the provision of digital healthcare related to the onset of the 4th Industrial Revolution. The research sample consisted of 100 respondents from healthcare providers. We found out that there is no statistically significant relationship between the length of practice of healthcare providers and their degree of perception of sufficient market diversity to address the provision of digital healthcare. Moreover, there is no statistically significant difference between healthcare providers working in private institution and healthcare providers working in a state institution, in the degree of perception of sufficient market diversity to address the provision of digital healthcare. Furthermore, we can state that there is no statistically significant difference between healthcare providers operating in Western, Central or Eastern Slovakia, in the degree of perception of sufficient market diversity to address the provision of digital healthcare.

Keywords: Digital transformation, Healthcare, Digitization.

JEL Classification: O30, O31, I100

Article Classification: Research article

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1 Introduction

The 4th Industrial Revolution is characterized by radical changes that are affecting all sectors. It is characterized by development and application of new technologies which are essential for companies to implement to achieve competitiveness (Kohnova et al., 2019). The impact of the 4th Industrial Revolution on provision of healthcare is a relatively young matter, but the first mentions of eHealth as such have been observed in academia for 20 years.

In 2001, Eysenbach defined eHealth as an evolving area at the intersection of medical informatics, public health and business that relates to health services and information provided or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only technological development but also the state of mind, way of thinking, attitude and commitment to network global thinking to improve healthcare at local, regional and global levels through the use of information and communication technologies (Eysenbach, 2001). Subsequently, Eysenbach called on scientists to explain their views on a definition that would jointly clarify the field of eHealth. This invitation led to a series of works and research on definitions related to eHealth. In response to Eysenbach's invitation, Della Mea described eHealth as a popular concept that scientists have adopted in the field of trade and economics. Instead of a uniform definition, Della Mea described eHealth as a broad term that includes multiple domains. In the following years, the field of eHealth expanded and the number of studies related to the provision of digital (virtual) healthcare increased (Della Mea, 2001).

However, in addition to the very broad definition of Eysenbach in 2001, there was still a lack of a clear uniform and comprehensive definition of eHealth and its domains. Four years have passed since Oh et al. pointed out in 2005 to the problem that arose from the missing definition of eHealth: it is difficult to communicate and discuss a phenomenon that is not clearly defined. In a qualitative and systematic review, they found 51 unique definitions for eHealth as such. Although health and technology were mentioned in all 51 definitions, a uniform description of these general terms was missing (Oh et al., 2005). In 2005, Pagliari et al. mentioned the same problem (lack of a clear and uniform definition) in relation to the archiving and retrieval of eHealth studies. The authors found 36 different definitions in their qualitative studies. They found that most definitions refer to the functional scope of eHealth rather than specific applications. Based on their findings, the authors concluded that the definition published by Eysenbach was sufficient, although they made some adjustments - eHealth is an evolving field of medical informatics that involves the organization and delivery of health services and information via the Internet and related technologies (Pagliari et al., 2005).

Development in healthcare will be influenced by digital transformation. (Cassettari et al., 2019) New technologies will be used primarily for prevention and early diagnosis. They will also reach the center of the healthcare sector for closer cooperation between industry stakeholders and new service combinations. The most anticipated changes and trends under the influence of the 4th Industrial Revolution are (Aceto et al., 2020; Javaid et al., 2020):

1. Self-diagnostic systems, e.g. wearable devices - We already use wearable devices to monitor our steps, sleep, or heart rate. People are getting used to them more and more. Self-diagnostic systems e.g. in the form of wearable devices, they allow patients to monitor their health. In this way, it is possible to diagnose diseases and deteriorating health in time and without patients having to go to the hospital. Innovations in this area lead to patients having access to detailed information about their own health and enabling them to make better decisions about it;

2. Remote monitoring - An important requirement is that the healthcare delivery system be as economical as it is accessible in terms of industry 4.0 capabilities, which would also guarantee remote access for providers;
3. Digital information sharing - In the provision of healthcare, an increasing amount of data from traditional healthcare facilities and beyond has the potential to contribute to improving decision-making and addressing inefficiencies. The aim of digital information sharing is to integrate devices with digital medical records to ensure that patient and care information that has been and will continue to be updated is constantly and automatically updated;
4. The use of artificial intelligence, Blockchain, BIG DATA, or VR - All these technologies with the advent of the 4th Industrial Revolution are beginning to become an increasingly important and have a decisive role in diagnosis and therapy. There are several main areas of application in healthcare delivery, such as: skin cancer diagnosis; diagnosis of eye diseases; development of new drugs; prediction of awakening from coma, X-ray and CT description or diagnosis of depression.

Jones et al. (2005) followed etheir colleagues and presented the views of stakeholders on the concerns and promise of eHealth in future research. They found that the views of the various stakeholders (clients and providers) did not differ surprisingly greatly; their main recommendations were that the scope of eHealth research should cover the use, processing, sharing and control of information (Jones et al., 2005). The same tendencies were noted by Ahern et al., who clearly emphasize the need for a more coordinated and consistent attempt to define the scope of digital healthcare provision (Ahern et al., 2006). In our research, we tried to identify a potential change in the views of the most key stakeholders - providers.

2 Material and methods

In creating the methodology for research purposes, we took into account the recommendations of a wide range of authors of foreign literature. We mapped the available tools and techniques, analyzed and sorted the individual methods according to predetermined criteria with focus on the perception of product opportunities in the market and identified trends. The subjects of research are healthcare providers operating in the Slovak Republic, regardless of their legal form or ownership.

The object of our research was the healthcare sector, in which we focused on healthcare providers as entities that perform in the classification of economic activities SK-NACE according to the Statistical Office of the Slovak Republic - 86100 Hospital activities; 86210 General medical practice activities; 86220 Special medical practice activities; 86909 Other healthcare i. n., or a combination thereof. The research sample consisted of 100 respondents from healthcare providers. Of that sample of healthcare providers, 52 were women, representing 52% and 48 men, which was 48% of the sample.

We oriented our research to following assumitions:

1. We assumed that that there is no statistically significant relationship between the perception of market diversity in digital healthcare solutions and the length of medical practice.
2. We also assumed that there is no statistically significant difference between healthcare providers working in private institution and healthcare providers working in a state institution, in the degree of perception of sufficient market diversity to address the provision of digital healthcare.

3. Consequently, we assumed that there is no statistically significant difference between healthcare providers operating in Western, Central or Eastern Slovakia, in the degree of perception of sufficient market diversity to address the provision of digital healthcare.

We obtained the primary data thanks to research results that were quantitative in nature. As part of quantitative research, we conducted a questionnaire survey from February to April 2021. The collected data were then statistically evaluated. The data were processed mainly through two programs: MS Excel and SPSS 22. MS Excel was used mainly in the calculation of descriptive statistics, arithmetic averages and in the construction of tables or graphs. The SPSS 22 program was used for more complicated statistical calculations and their subsequent graphical interpretation. At the same time, thanks to this program, we were able to determine the median ($\tilde{x}$) or interquartile margins (ICQ) of the examined files in descriptive statistics and then program and use the correct statistical tests within inference statistics. The research results were processed into various graphs or tables. We processed the data and knowledge that were acquired by appropriate methods, by which we achieved a logical and thematic continuity of individual parts, on the basis of which we were able to achieve the effect of accurate, high-quality and especially relevant information.

3 Results

We wanted to know the providers' views on the degree of market diversity in digital healthcare solutions. Responses to providers' views on whether the market is rich enough for these solutions have been very balanced. Half of the providers think that the market is currently diverse enough for the individual solutions offered. The neutrality of the attitude to this issue was claimed by 20% of providers and 30% had antagonistic views, including 6% of providers, who categorically rejected the fact that the market would be sufficiently diverse for digital healthcare solutions. We examined market diversity in more depth and first examined whether there was a statistically significant relationship between the perception of market diversity for digital (virtual) healthcare delivery solutions and the length of practice of providers. The following table (Table 1) and graph (Figure 1) discuss the individual variables analyzed in more detail.

Table 1 Perceptions of market diversity for digital healthcare delivery solutions; Source: own elaboration

Scale	**1 - 5**
N	100
Average	3,38
Median	3,50
Sd.deviation	1,254
Skewness	-,193
Kurtosis	-1,141
Range	4
Minimum	1
Maximum	5

Based on results shown on Figure 1, we can observe that the average perception score of sufficient market diversity for digital healthcare solutions ranged from

1 (certainly insufficient market diversity for digital healthcare solutions) to 5 (certainly sufficient market diversity for digital healthcare solutions) at level 3,38.

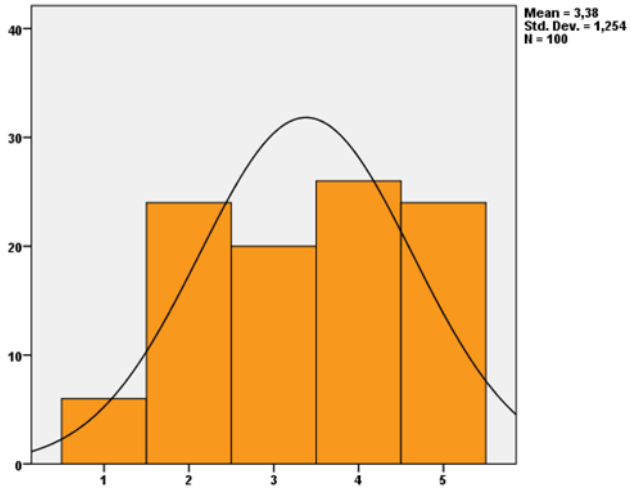

Figure 1 Perceptions of market diversity for digital healthcare delivery solutions; Source: own elaboration

In the next step, we tested the normality. For the correct choice of test, it was necessary to test the normality of the distribution of variables that were represented in the sample (whether the tested data have a Gaussian curve distribution or not). In this case, however, the ordinal variable of the length of practice does not correspond to a continuous variable, and thus we automatically used nonparametric tests based on the nature of the variables for testing. We sought to determine whether there is a statistically significant relationship between the length of practice of healthcare providers and their perception of the degree of sufficient market diversity to address the provision of digital healthcare. After analyzing the nature of the variables, we used a nonparametric Spearman correlation test for the analysis.

The value of the correlation coefficient was 0,105, which represents almost no relation to Sig. (2-tailed), which confirms our statistical insignificance, as the value is greater than 0,05. We have therefore found that the length of providers' experience is not statistically significantly related to their degree of perception of the adequacy of market diversity to address the provision of digital healthcare. Based on the results presented in Table 2, we can conclude that there is no statistically significant relationship between the length of practice of healthcare providers and their degree of perception of sufficient market diversity to address the provision of digital healthcare.

Table 2 Length of practice of healthcare providers * Degree of perception of the adequacy of market diversity to address digital healthcare delivery; Source: own elaboration

Spearman's		**Correlation**	**Test**
Spearman's rho	Correlation	Coefficient	,105
	Sig. (2-	tailed)	,297
	N		100

We also wanted to find out whether there is a statistically significant difference in the perception of market diversity for digital (virtual) healthcare delivery solutions between providers working in a private workplace and providers working in a public

workplace. The basic variables will be “workplace type” and “market diversity perception”. The following table (Table 3) and graph (Figure 2) present the individual analyzed variables in more detail.

Table 3 Perceptions of market diversity for digital healthcare solutions - Type of workplace: Private; Source: own elaboration

Scale	**1 - 5**
N	43
Average	3,37
Median	3,00
Sd. deviation	1,235
Skewness	-,129
Kurtosis	-1,167
Range	4
Minimum	1
Maximum	5

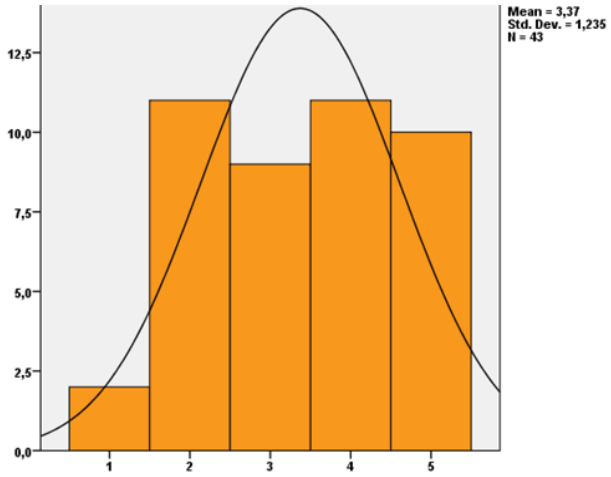

Figure 2 Perceptions of market diversity for digital healthcare solutions - Type of workplace: Private; Source: own elaboration

Based on the results shown in Figure 2, we can observe that the average perception score of sufficient market diversity for digital healthcare solutions ranged from 1 (certainly insufficient market diversity for digital healthcare solutions) to 5 (certainly sufficient market diversity for digital healthcare solutions) for doctors operating in a private establishment at the level of 3,37 and for doctors operating in a public institution at the level of 3,26.

For the correct choice of test, it was necessary to test the normality of the distribution of variables that were represented in the sample. In translation, whether the tested data have a Gaussian curve distribution or not. We used the Shapiro-Wilk normality test to determine the normality or abnormality of the distribution of data needed for subsequent verification based on sample size. By default, the Kolmogorov-Smirn test is usually used to test for normality. Shapiro-Wilkov is used for smaller samples where there are less than 50 respondents in the group.

Table 4 Perception of market diversity for digital healthcare provision, Type of workplace, Shapiro–Wilk test; Source: own elaboration

Type of workplace	Statistic	df	Sig.
Private	,891	43	,001
State	,896	47	,001

Since we found in the normality test shown in Table 4 that the data did not have a normal distribution, we used nonparametric tests for testing. We sought to determine whether there is a statistically significant difference in the perception of the degree of sufficient market diversity to address the provision of digital healthcare between private and public service providers. For analysis, after taking into account the tests of distribution normality and the nature of the variables, we used a nonparametric Mann-Whitney U-test for 2 independent selections.

Table 5 Level of perception of the adequacy of market diversity to address digital healthcare delivery - RANKS; Source: own elaboration

Workplace	N	Mean Rank
Private	43	46,64
State	47	44,46
Together	90	

Table 6 Level of perception of the adequacy of market diversity to address digital healthcare delivery - Mann-Whitney U-test; Source: own elaboration

Mann-Whitney U	961,500
Wilcoxon W	2089,500
Z	-,407
Asymp. Sig. (2-tailed)	,684

In our case, the value of Asymp. Sig. (2-tailed) is 0,684 and thus we know that there is no statistically significant difference between the groups. We have therefore found that there is no difference between providers from a public establishment and providers from a private establishment in the perception of sufficient market diversity to address the provision of digital healthcare. Based on the results in Tables 5 and 6, we can conclude that there is no statistically significant difference between private and public service providers, in terms of the perception of sufficient market diversity to address digital healthcare provision.

When evaluating the data, we also wanted to find out whether there is a statistically significant difference in the perception of market diversity for digital (virtual) healthcare provision solutions between providers operating in Eastern, Western or Central Slovakia. The basic variables are “place of operation” and “perception of market diversity”. The following tables and graphs present the individual variables analyzed in more detail.

Table 7 Perception of market diversity for digital healthcare provision - Western Slovakia; Source: own elaboration

Scale	**1 - 5**
N	36
Average	3,00
Median	2,00
Sd.deviation	1,474
Skewness	,227
Kurtosis	-1,520
Range	4
Minimum	1
Maximum	5

Table 8 Perception of market diversity for digital healthcare solutions - Central Slovakia; Source: own elaboration

Scale	**1 - 5**
N	35
Average	3,66
Median	4,00
Sd.deviation	1,235
Skewness	-,484
Kurtosis	-1,071
Range	4
Minimum	1
Maximum	5

Table 9 Perception of market diversity for digital healthcare provision - Eastern Slovakia; Source: own elaboration

Scale	**1 - 5**
N	29
Average	3,52
Median	3,00
Sd.deviation	,829
Skewness	,345
Kurtosis	-,405
Range	3
Minimum	2
Maximum	5

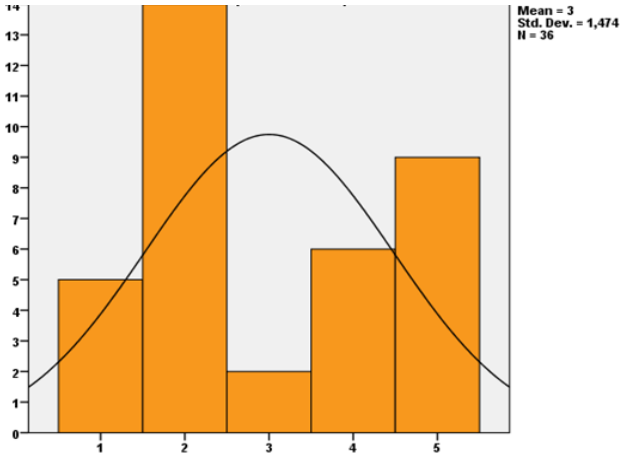

Figure 3 Perception of market diversity for digital healthcare provision - Western Slovakia; Source: own elaboration

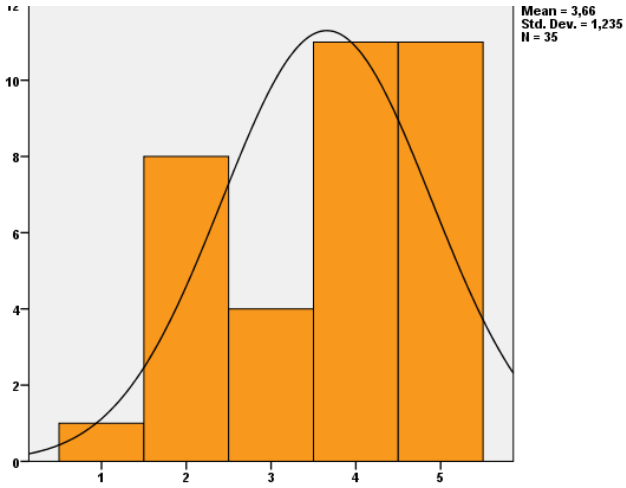

Figure 4 Perception of market diversity for digital healthcare solutions - Central Slovakia; Source: own elaboration

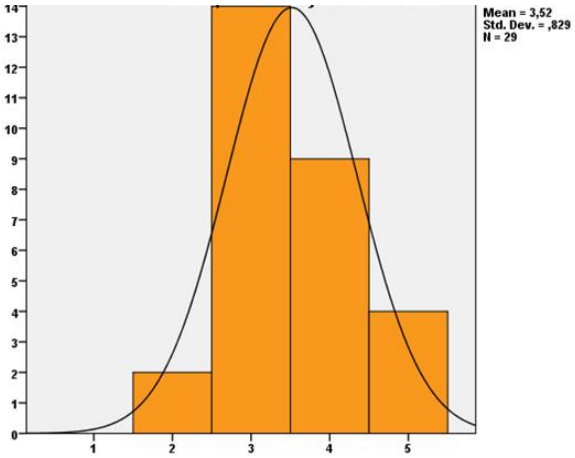

Figure 5 Perception of market diversity for digital healthcare provision - Eastern Slovakia; Source: own elaboration

Based on the results shown in Figures 3 to 5, we can observe that the average perception score of sufficient market diversity for digital healthcare solutions ranged from 1 (certainly insufficient market diversity for digital healthcare solutions) to 5 (certainly sufficient market diversity for digital healthcare solutions) for providers operating in Western Slovakia at the level of 3,00, for providers operating in Central Slovakia at the level of 3,66 and for providers operating in Eastern Slovakia at the level of 3,52. We used the Shapiro-Wilk normality test to determine the normality or abnormality of the distribution of data required for subsequent verification and based on sample size.

Table 10 Perceptions of market diversity for digital healthcare solutions, Workplace location, Shapiro–Wilk test; Source: own elaboration

Workplace location	**Statistic**	**df**	**Sig.**
Western Slovakia	,836	36	,000
Central Slovakia	,851	35	,001
Eastern Slovakia	,852	29	,001

Since we found in the normality test shown in Table 10 that the data did not have a normal distribution, we used nonparametric tests for testing. We sought to determine whether there is a statistically significant difference in the perception of the degree of sufficient market diversity to address the provision of digital healthcare between providers operating in Western, Central and Eastern Slovakia. For analysis, we used a nonparametric Kruskall-Wallis test after taking into account the normality of distribution normality and the nature of the variables.

Table 11 Perceptions of market diversity for digital healthcare delivery solutions - RANKS; Source: own elaboration

Workplace location	**N**	**Mean Rank**
Western Slovakia	36	42,64
Central Slovakia	35	56,73
Eastern Slovakia	29	52,74
Together	100	

Table 12 Perceptions of market diversity for digital healthcare delivery solutions - Kruskall-Wallis; Source: own elaboration

Chi-Square	4,679
df	2
Asymp. Sig.	,096

The Kruskall-Wallis test is used if the data do not have a normal distribution and if we want to compare more than 2 groups, in our case it is 3 groups. The resulting values of Asymp Sig. 0,096 means that there is no statistically significant difference between the groups. We have therefore found that there is no difference between providers divided on the basis of location in the perception of the adequacy of market diversity to address the provision of digital healthcare. Based on the results presented in Tables 11 and 12, we can state that there is no statistically significant difference between providers operating in Western, Central or Eastern Slovakia, in the degree of perception of sufficient market diversity to address the provision of digital healthcare.

4 Discussion and conclusion

Within the healthcare sector, efforts are expected to digitize several levels of healthcare, which would help clients and healthcare providers achieve greater independence, connect new technologies to devices and move towards personalized medicine and the involvement of the widest possible range of professionals (doctors, nurses, physiotherapists, etc.) (Vermesan & Friess, 2015). The importance of prevention, process management and innovative methods of healthcare delivery such as virtual controls, self-diagnostic systems, remote monitoring of patients, use of artificial intelligence, digital data sharing or 3D printing is growing.

As part of the perception of sufficient market diversity among healthcare providers, we found that there is no statistically significant relationship between the length of practice of healthcare providers and their degree of perception of sufficient market diversity to address the provision of digital healthcare. Moreover, there is no statistically significant difference between private and public service providers, they perceive sufficient market diversity in honey to address the provision of digital healthcare. Furthermore, there is no statistically significant difference between providers operating in Western, Central or Eastern Slovakia, in terms of the perception of sufficient market diversity to address the provision of digital healthcare. During further research we also found out that healthcare providers are statistically significantly more interested in technological innovations regarding healthcare than their clients.

The key results point to interesting findings regarding the increase in the use of modern technologies and developments in the provision of digital healthcare in connection with the transition to the 4th Industrial Revolution. At present, there is a sufficient number of digital healthcare solutions and we see the greatest room for improvement in their implementation.

Akcknowledgements

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Possibilities to Increase the Relational Capital in Automotive Sector for the Needs of Industry 4.0

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Abstract

In connection with the importance of intangible asset management, organizations are increasingly focusing on intellectual capital as the main source of value creation. Intellectual capital is connected with the ability to create and apply the potential of organizations that are based on a knowledge approach. In our study, we aimed our research at the possibilities how to increase the relational capital that is a part of intellectual capital in automotive sector. The aim of our study was to determine the level of cooperation of automotive companies and to bring some ideas how to increase relational capital and how to enhance the knowledge transfer within the sector. We revealed the weaknesses in low collaboration with other organizations inside the industry, with universities and research institutions. Automotive manufacturing companies are now facing changes coming with the concept of Industry 4.0 and with the necessity to implement new smart technologies connected to Industry 4.0. In this context, the increase of relational capital and strengthening the cooperation offers possibilities. According to the studies and findings, we summarized several opportunities and recommendations how to support knowledge transfer and strengthen relational capital of companies.

Keywords: Relational capital; Industry 4.0; Automotive industry; Supply network.

JEL Classification: L62, M5, O34

Article Classification: Research article

1 Introduction

Industrial production has undergone significant changes in recent centuries, characterized by several industrial revolutions. We are now at the beginning of the era of

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the Fourth industrial revolution, also known as Industry 4.0. This new wave of technological revolution is characterized, among other things, by the development of more advanced forms of digitization, increasing automation and the use of new intelligent technologies and systems (Popkova et al., 2019). In such a development, a new pattern of knowledge and social networking is emerging. Knowledge innovation in the scope of new environment and challenges has become a needed concept to explore (Edvinsson, 2013). Industry 4.0 describes a whole new approach to business operations, and especially the production sectors need to deal with new level of socio-technical interaction (Cabrita et al., 2019).

1.1 Intellectual Capital and Industry 4.0

Industry 4.0 is not just about technologies and machines but also about people. Knowledge could not be created without people. Intellectual capital (IC) is linked to the ability to create and apply the potential of an organization's knowledge-based capabilities. Intangible assets have become crucial for maintaining and increasing competitive advantage, organizational performance, innovation, product development, shareholder value, and so on (Papula & Volná, 2014).

The importance of IC is widely accepted in the literature, being referred as the accumulation of all knowledge, skills and expertise that lead to innovations, better competitive positions and company growth (Cabrita et al., 2019). The base of IC is the value creation that is represented by a complex of intangible property, knowledge, skills, processes, applied experience and technologies used in organizations to ensure its competitiveness (Papula & Volná, 2011). As studies confirms, the innovation capacity of a company depends heavily on its IC (Sumedrea, 2013). IC is usually described in 3 different dimensions (Figure 1).

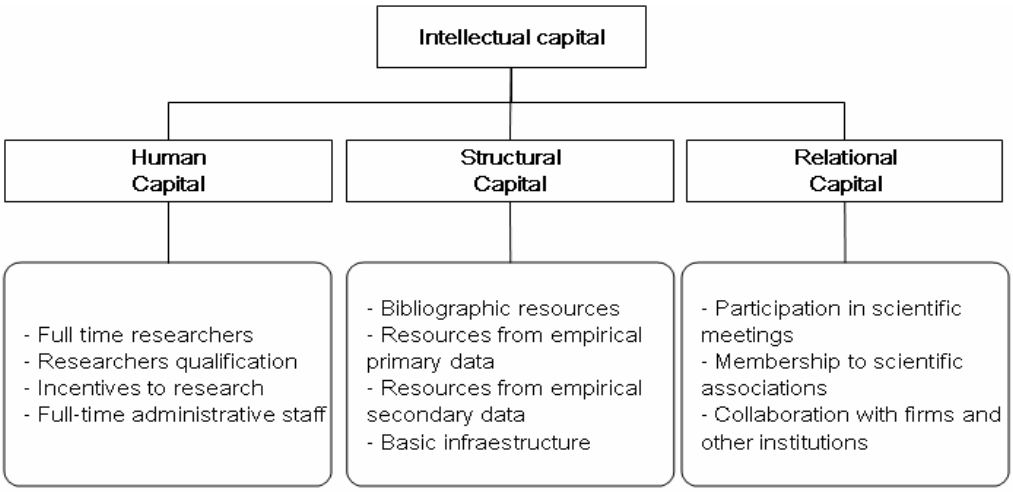

Figure 1 Components of Intellectual Capital

In the context of Industry 4.0, organizations should be prepared to deal with new paradigms and concepts (e.g. modeling, simulation, virtualization, interoperability, smart factories, intelligent manufacturing systems, additive manufacturing) and new technologies and intelligent tools (e. g. Internet of Things (IoT), Internet of Services (IoS), Big Data and cloud computing) (Cabrita et al., 2019). Intelligent manufacturing systems will require new skills and knowledge and employees who will have education and knowledge in subjects such as science, technology, engineering and mathematics (so-

called STEM subjects) and at the same time will have a thorough understanding of business processes, including production and logistics processes. Operators and technicians should be able to read and interpret data that is collected and displayed on performance metric dashboards. Engineers increasingly need to demonstrate some degree of familiarity with the management of IoT infrastructure, big data and cybersecurity, in addition to core engineering knowledge (Benešová & Tupa, 2017; Baygin et al., 2016). Cooperation between leading figures in smart industry principles, relevant science and research actors, and more traditional companies will play a very important role. Such cooperation should be covered by clusters and a network of research centers (Sacomano et al., 2016).

1.2 Relational Capital

One of the most important dimensions of intellectual capital is the relational capital (Prahalad & Ramaswany, 2000). Relational capital is defined as the knowledge embedded in the relationships with any stakeholder that influences the life of the organization. Relationships with stakeholders are the necessary condition for building, maintaining and renewing resources, structures and processes over time, as firms can access critical and complementary resources through external relationships. Some authors (Prahalad & Ramaswamy, 2000) suggest that the customer has become a new source of obtaining competitive advantage for the organization.

Relational capital represents the value that is created and maintained by having, nurturing and managing good relationships. Relational capital is framed as the total of relations between a firm and its main stakeholders and is operationalized through image, customer loyalty, customer satisfaction, link with suppliers, commercial power, negotiating capacity with financial entities, environmental activities, etc. (Bronzetti et al., 2011).

Managers have to be social skilled to understand the movements occurring in the field and to build partnerships and networks capable of supporting organizational strategies. The ability to induce cooperation in highly competitive settings appears to be an increasingly important skill for managers nowadays. The connection to universities and research centers and institutions is crucial when transferring and adapting knowledge (Papula & Volná, 2014).

In order to transfer and share knowledge resources effectively, the supply chain should establish the mechanism of trust exchange and to ensure the tacit knowledge resources sharing in the supply chain and to improve the operation efficiency of the supply chain. However, each enterprise needs to prevent the loss of their tacit knowledge resources (Zhang & Wang, 2020).

2 Material and methods

The aim of our study was to determine the level of cooperation of automotive companies and to bring some ideas how to increase the relational capital within the sector.

Our research was oriented on manufacturing companies in the automotive industry in Slovakia. We used several publicly available registers to create a list of addressed companies: SARIO, Trend.sk, Finstat and Association of the Automotive Industry in Slovakia. Data collection was based on questionnaire survey that took place over 9 weeks: February - April 2021. A total of 53 responses were obtained, which represents a return rate of 19.9% for the number of 266 addressed companies.

We also used published sources to evaluate the current state of automotive sector and to identify the structure and possibilities for cooperation inside the sector.

3 Results

In this section, we summarize specifics of automotive industry in Slovakia, as technological effects on automotive industry, as well as the development of expenditures for research activities in the automotive sector. We present the structure of supply network to understand the main relations between suppliers and another important partners. From our survey, we focused on the state of the cooperation with universities and research institutions, as well as other associated organizations in the automotive sector. This linkage can give a closer look at the current challenges regarding the Industry 4.0 concept and relational capital.

3.1 Specifics of automotive industry in Slovakia

The automotive industry also influences the Slovak economy in terms of technology. By investing in technology, it is possible to increase the capital adequacy of the economy, including the technical knowledge and skills of the workforce. The technological equipment of the economy can be developed by importing technologies from abroad or by domestic development and research. The level of imported technologies can be estimated by the state of foreign direct investment (FDI) in the country, as we assume that foreign direct investment in this sector has brought new technologies. According to the National Bank of Slovakia, it is FDI that is "the basis for the modernization of production equipment, the transfer of new technologies and know-how" (NBS, 2010-2018).

From the analysis of annual publications announcing the state of foreign direct investment in Slovakia, we can state that in the period 2010–2018, sector of services accounted a larger share of FDI, but in the case of several important sectors, we do not speak directly about importing technology (e. g. real estate activities / financial and insurance activities). In the category of industry, however, the automotive sector reached a leading position in terms of share in FDI, but in 2018 we observe a significant decline in the overall state of FDI and also in the state of FDI in industrial production (NBS, 2010-2018).

FDI in the automotive industry in Slovakia grew over the period, the difference between the situation from 2017 and from 2010 is an increase of more than 91% (NBS, 2010-2018). In addition to the increase in FDI in the automotive industry, which, among other things, results in an increase in the technological equipment of industry plants, we can also observe an increase in expenditure on research and development in this category of companies over the same period. Although this trend is unstable, between the first and last years of the last decade, a clear progress can be seen over the years in the form of a several-fold increase in spending in this area.

To look at investments in research and development (R&D), investments made by companies in the automotive industry in Slovakia were much higher each year than the average amount of investments made by companies from other sectors. However, this does not include (two) sectors that give priority to R&D. Apart from these two sectors, with the exception of one year, investments in the automotive industry were the highest among all other sectors in the Slovak economy each year. In 2019, the automotive industry invested € 102,303 in R&D, representing 5213% of total expenditure among all sectors (including divisions 85: Education and 72: Scientific R&D) in this area. In

addition, the automotive supply sectors, such as the manufacture of machinery and equipment, the manufacture of electrical equipment or the manufacture of rubber and plastic products, also invest heavily in research and development. Each of these three sectors invested an average of more than € 18,000 per year during the period under review, making them one of the 10 most active sectors in the field of research and development (ŠÚ SR, 2010-2019; Eurostat, 2021).

The average amount of annual investments in this area was less than EUR 10.000 among all sectors (except divisions 85: Education and 72: Scientific research and Development). Statistical data on expenditures of the automotive industry on research and development are unavailable or incomplete for several EU countries, so we cannot objectively evaluate the position of Slovakia in comparison with the rest of the EU. However, in the area of total expenditures on research and development (whether in terms of per capita expenditures or as a percentage of gross domestic product), Slovakia has long achieved the lowest ranking among the EU Member States (Eurostat, 2021).

3.2 Possibilities of building relational capital and partnerships

Automotive suppliers are an important part of the structure of the automotive industry in Slovakia. Car manufacturers are closely linked to the supply sector on which they depend, but the supply network is different for each car manufacturer. The structure of the supply system in Slovakia (Figure 2) can be divided into three levels, similarly to other countries. First-tier suppliers (Tier 1) supply directly to final car manufacturers (OEMs). Second-tier suppliers (Tier 2) supply first-tier, but often to other industries as well. Tier 3 suppliers supply raw materials (such as metals or plastics) and semi-finished products, and these materials are needed at all previous levels, so Tier 3 suppliers supply to Level 1 and Level 2 as well as to OEMs. Based on the analysis, we can summarize that in Slovakia there is a wide range of suppliers directly connected to the automotive industry. The network of these suppliers is relatively well developed, but their distribution is not even, and they are primarily concentrated in the western part of the country. In the territory of western Slovakia, first-level suppliers are mainly concentrated, as they need to be located close to car factories.

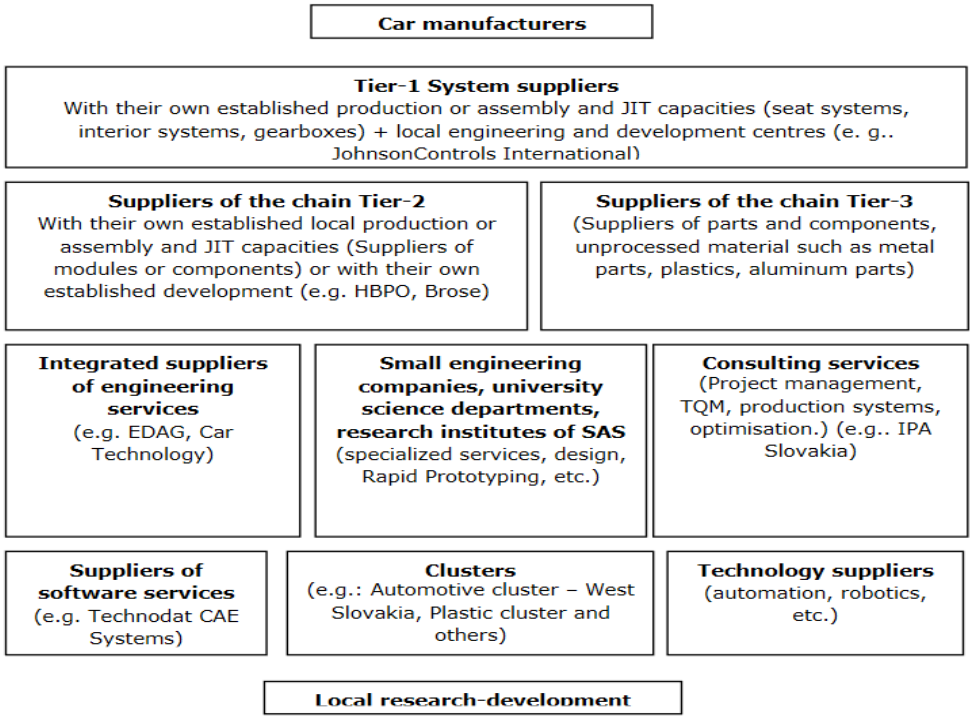

Figure 2 Structure of supply network in automotive industry

In context of Industry 4.0 implementation, we were interested whether the companies cooperate and create partnerships on solutions in automation and IT systems with other (external) groups. Respondents had to identify from the selection of selected stakeholders with which they cooperate or specify the cooperation within another partnership using the answer "Other". Results are shown on following graph (Figure 3).

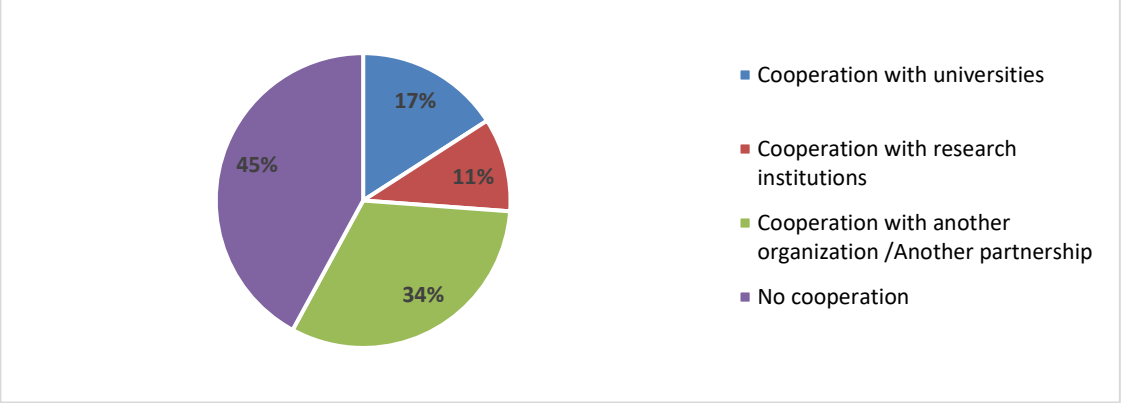

Figure 3 Cooperation in automotive industry; Source: own elaboration

We noticed that different forms of external cooperation are not very used among the surveyed companies, as almost half (50%) of companies do not use any form of cooperation. Certainly, there are possibilities and benefits of such cooperation, as companies can face different barriers implementation of Industry 4.0 component, especially high initial costs, not enough skilled workers, not sufficient knowledge or other sources (Horváth & Szabó, 2019). Companies in automotive sector have the space to cooperate not only with universities, but also with other organizations such as business incubators or SAS (Slovak Academy of Sciences). Cooperation can also create space for

the development of completely new technologies, optimization of existing systems, or automation of production processes.

We found out, that only 17% of companies use cooperation with universities, and only a tenth of companies (11%) collaborate with research organizations. The most used form of cooperation in the surveyed companies was cooperation with other organization or other form of partnership. However, none of the companies specified in the text box for this option which partnership it is. 9% of companies used two forms of cooperation at the same time, but we did not find a single company that would cooperate in all (three) forms.

4 Discussion and conclusion

Slovakia has long lagged behind in the intensity of innovation activities at the enterprise level, in expenditures on R&D and innovation projects, in technology transfer, in the use of cooperation potential, in patent activity, in cooperation of research institutions with industry, but also in a number of aspects that determine the efficient use of human resources. The persistently weak level of cooperation of scientific research, education and economic potential on the development and growth of the competitiveness on the industrial base, in conjunction with the creation of competitive innovative products, technologies and services. All these areas are closely interconnected in the concept of Industry 4.0 and usage of smart technologies.

Industry 4.0 introduces digital technologies such as the Internet of Things (IoT), cloud computing, big data and cyber-physics systems. This concept radically changes traditional business models and business processes while improving them, making them robust, autonomous, automated and intelligent. This change includes the incorporation of the latest machine technologies and infrastructure to create automated, seamless and interconnected networks. Scientists claim that the Fourth industrial revolution is significantly changing the basis of competitive advantage from tangible to intangible. In such a case, the intellectual capital of the company can play a crucial role in absorbing technology and gaining a competitive advantage (Cabrita et al., 2019).

In our study, we focused our attention to the third area of intellectual capital – relational capital as it can serve as a bridge between the organizations within the automotive sector. Our study revealed very low collaboration with another institutions, organizations, even lower collaboration with universities and research institutions. This fact could be caused by several factors dominating in the current Slovak environment (mirri.gov.sk, 2021):

- Low intensity of cooperation between the public and private sectors: The share of business resources in university research funding is constantly declining. In 2014, Slovak universities received 2.4% of the total resources for their research from corporate sources, in 2018 the share decreased to 0.7%;
- Low number of publications and research activities interconnected with public and private sector. In 2018, only 35.8 per 1 million inhabitants;
- Extremely low numbers of researchers in the corporate sector in the Slovak Republic. Only 720 researchers (FTE) per 1 million inhabitants;
- A huge decrease in the number of young researchers in Slovakia. In 2006, 11,066 doctoral students studied at Slovak universities, in 2019 it was only 6,664 doctoral students;
- The participation of the Slovak Republic in international research infrastructures is insufficient;

- Out of the total number of 48 ESFRI infrastructures, Slovakia was involved in four as a full member and in six as an associated member, resp. observer;
- Slovakia is one of the least successful EU countries in Horizon 2020.

From the presented analysis and findings, we prepared several recommendations how to create and strengthen the relational capital with another partners, organizations and academic institutions (mirri.gov.sk, 2021):

1. Support for cooperation between research institutions and universities with enterprises (support for R&D and innovation activities in enterprises with the aim of introducing the achieved innovation into the production process);
2. Support of human resources in R&D (participation in scientific and professional activities, and / or solving bachelor's and master's theses in cooperation with companies, grants for doctoral students and early-stage researchers aimed at establishing scientific careers and developing cooperation with foreign and / or business sectors; support for the return of Slovak researchers working abroad);
3. Support for the construction and modernization of central infrastructure for research and development (creating the completion, modernization and optimization of the research and development infrastructure for cooperation under the ESFRI, networking of Slovak research infrastructures for the purpose of cooperation with foreign academic research institutions and infrastructures; access to databases of scientific publications and payment of membership fees for the participation of academic institutions in the Slovak Republic in research infrastructures);
4. Support for the participation of Slovak entities in the European research and innovation area (support for the involvement of Slovak entities in projects aimed at increasing participation in the Horizon Europe program /e.g. EIC, ERA Chair, Teaming, Twinning/, support for activities within the COST network; support for highly rated projects /Seal of Excellence, MSC individual fellowships/, including direct funding for highly rated projects that have not received funding under Horizon Europe).

IC approach can help organizations to better manage their intangible assets that seems to be critical nowadays, especially with the implementation of Industry 4.0. The focus on intangible assets and the management of intellectual capital raises a series of issues that have significant implications for organizations and countries.

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Opportunities and barriers of Industry 4.0 implementation

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Abstract

The term Industry 4.0 characterizes the Fourth industrial revolution and the set of elements and changes this revolution brings. It is a term that is generally known and discussed in all developed countries around the world. There is not a general opinion on Industry 4.0 implementation. Every company can face different barriers, challenges and opportunities while adapting to these changes. In our research, we focused on discovering what challenges and opportunities are coming with Industry 4.0 from the point of view of companies operating in Slovakia and based on their current experience and level of Industry 4.0 implementation. We were also able to reveal some risks and factors that can negatively influence the implementation of elements of Industry 4.0 concept. The research was conducted on 102 companies of various size and industries. We have detected that the implementation of the changes brought by Industry 4.0 is in progress. However, this process is relatively slow and a number of enterprises, mainly micro, small and medium-sized enterprises do not have sufficient funding for this implementation. High initial costs and lack of skilled labor were perceived as huge barriers when implementing technologies from Industry 4.0 concept. Higher productivity and production efficiency, in contrary, are considered as big opportunities.

Keywords: Industry 4.0; Digitization; Automation; Opportunities; Barriers.

JEL Classification: M11, M15, M21, L62

Article Classification: Research article

1 Introduction

Industry 4.0 is a process of streamlining and optimizing production processes and other business processes and procedures using modern technologies. Nowadays, it is important for companies to realize the necessity of digital transformation and gradual implementation of Industry 4.0 elements to maintain and further increase their

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competitiveness. Industry 4.0 represent a major technological advancement and concept that was first mentioned in 2011 in a German city. It is a broad concept based on the constant development and research of new technologies with the aim of creating new modern industrial organizations (Ješko, 2016). In 2014, this concept was expanded beyond Germany. In the following years, the concept of Industry 4.0 was gradually adopted by all developed countries in the world in order to improve the operation of companies and society as well (McCabe, 2016).

1.1 Concept of Industry 4.0

The foundation of Industry 4.0 is based on the idea that people, processes, equipment, machines, systems, products and services can work together and directly with each other. The aim of this concept is to ensure that the facilities are interconnected in order to use information that has not been captured in the past. The interconnection of these devices, people, machines, systems and processes leads to increasing of productivity, saving of the company's financial and material resources, and provides individual stakeholders with timely and accurate information that they can use to their advantage at any time (Industry4.sk).

Industry 4.0 can also be characterized as a trend of automation, data exchange in individual production technologies and elements of Industry 4.0 like cyber-physical systems, the Internet of Things, cloud systems, big data and intelligent factories (i-scoop.eu).

The interconnection enabled by digitization and the concept of Industry 4.0 will change the level and future of production globally. Industry 4.0 has four main characteristics (Deloitte AG Study, 2020):

- Vertical interconnection of production and intelligent processes. Here we can include the smart factories and intelligent products that can be linked to logistics, production, sales or marketing with a strong customer orientation;
- Horizontal integration through global connectivity generation that create added value;
- Application of technologies throughout the value chain, including all processes, including the production process and the final product;
- Acceleration with the help of exponential technologies. These technologies have been on the market for a long time and have gradually evolved, but only recently have these applications become widespread on the market as their prices have fallen, making them more affordable with gradually increasing of their performance.

Industry 4.0 is based on two main ideas, digitization and the application of exponential technologies. Digitization is aimed at the smart factory. The main technological components on which the intelligent factory is built can include cyber-physical systems, the Internet of Things, big data and cloud systems (i-scoop.eu).

1.2 Industry 4.0 opportunities

Industry 4.0 brings a large number of challenges for companies, that can be seen either as opportunities or threats. To use benefits of Industry 4.0, companies need to understand how to identify and prepare for those challenges to use them for their benefits. Industry 4.0 elements can help companies with faster response to the identification of customer needs, improvement in quality, production and internal processes.

Opportunities coming with Industry 4.0 demand changes inside the companies and create basis for new business models, production processes or other innovations.

In general, the opportunities associated with the concept of Industry 4.0 can be divided into the following areas (Interreg North Sea Region, 2018; Unido, 2018):

- Increase in productivity: the implementation of Industry 4.0 will increase the productivity of companies that implement these changes. By supporting the knowledge that big data, the Internet of Things or cloud systems bring, companies should be able to better identify important factors, thus ensuring higher productivity and product quality.
- Environmental protection: many, especially industrial enterprises, produce large amounts of harmful substances in their activities or consume important natural raw materials. Industry 4.0 and related technologies can eliminate the amount of waste generated, and new production processes can use this waste for a useful product.
- Costs savings and increase of profits: this is one of the most important opportunities and at the same time the main reason why most companies invest considerable investments in the implementation of changes with the aim of their return and increase of profit.
- Better protection of health during the work: this opportunity is mainly about improving the quality and health of workers. Automation and robotization of individual production processes leads to the fact that certain dangerous operations that have been performed by workers can be eliminated, and thus no or less accidents occur.

1.3 Industry 4.0 risks and barriers

Every change can bring advantages as well as disadvantages. Companies need to realize there can be also barriers and risks coming with implementation of Industry 4.0 elements. All barriers are difficult to predict and identify, despite many studies and surveys. However, barriers are important for companies to consider when transforming processes toward automation and digitization. Many SMEs often report low preparedness to overcome barriers in various surveys, which may indicate untapped potential for innovation and increased competitiveness (Němec & Surý, 2007).

In general, companies are dealing with the following barriers and risks of Industry 4.0 implementation (Horváth & Szabó, 2019; Koleva, 2018; LaRoche & Bernard, 2018):

- Lack of skilled employees: A number of surveys and studies addressing this issue agree that one of the main barriers to Industry 4.0 is the lack of skilled workers. Companies should focus on implementing a training and retraining plan to be able to overcome this barrier and implement individual changes in society.
- High costs: Another significant barrier that companies have to face and significantly reduces the implementation of Industry 4.0 is the initial investment. The costs of purchasing or interconnecting individual processes, machines and equipment are often very costly for companies, also to provide regular updating and modernization. Nevertheless, companies should be aware that this investment may return faster than they expect, and if they do not innovate and stagnate, another company that implements the changes will be more competitive and gradually push these companies out of the market.
- Low willingness of employees or management: many employees, but also employers, associate Industry 4.0 with the loss of their job positions and their

replacement by industrial robots or automated production lines. The concept of Industry 4.0 is based on digitization and automation, these are the reasons that speak in favor of replacing individual employees with other automated devices. However, this does not mean that all production processes can be performed without qualified workers. There are many manufacturing processes that will never be replaced by a machine or a robot, processes in which the human factor is irreplaceable. These processes include innovation and the creation of new products, the creation of new business opportunities and the identification of the market and customers. The aim for companies should be to introduce automation and robotics, especially in the areas of routine and repetitive production activities.

- Insufficient strategies and inconsistent goals are presenting another barrier. Also, Industry 4.0 is currently the subject of a large number of organizations, institutions, scientists and entrepreneurs, which may be counterproductive in some ways, as many studies have been carried out which may have ambiguous objectives, that can confuse managers when creating strategies or plans of changes.
- Insufficient support from the state, lack of information and knowledge, or insufficient know - how can also represent barriers.

Despite the mentioned barriers that companies have to face, the indisputable fact remains that the implementation of Industry 4.0 is slowly becoming a necessity. Companies should therefore not ignore these changes but try to identify which of barriers can face and learn how to address them. The changes are likely to lead to an increase in the number of higher-skilled jobs; on the contrary, there will be a decrease in lower-skilled jobs where routine work is performed. Companies will increasingly seek to implement new technologies to ensure competitiveness despite existing barriers, which may be difficult for companies to overcome in certain areas (Horváth & Szabó, 2019).

2 Material and methods

The aim of the research was to determine the level of implementation of Industry 4.0 elements, to identify the opportunities and barriers of this implementation.

To obtain this data, we decided to conduct a questionnaire survey, which we distributed to companies operating in Western Slovakia. The questionnaire was answered by business managers, processed anonymously and contained 13 questions. Data collection took place during the months of January and February 2021. We received and evaluated 102 responses, which represents a return rate of 12%. We analyzed the data obtained through the questionnaire survey and processed them.

The sample was divided into several categories according to the size (micro, small, medium sized and large companies) and area of Industry (SK NACE). Almost 37% of respondents was from the category small sized companies, 34% medium sized, 11% large companies. The majority of the companies (76%) were from the industrial production/manufacturing area, 11% services and the rest were retail, finance and agriculture.

3 Results

In the following section, we describe our results and findings based on the survey. Our attention was to point out the level of Industry 4.0 elements use, such as automation,

robotics, cloud systems etc., as well as to find out the phase of their Industry 4.0 implementation. The second part reveals major opportunities, challenges and barriers connected with Industry 4.0 concept application.

3.1 The level of Industry 4.0 elements implementation

In the first part of our research, we focused on the level of implementation of individual elements of Industry 4.0. It was a scale question, with 1 representing a low level and 5 a high level. As we can see in the graph (Figure 1) from the answers of individual respondents, most elements are implemented at a very low level. The exception is mainly automation and robotization together with cloud systems, which companies have at a higher level.

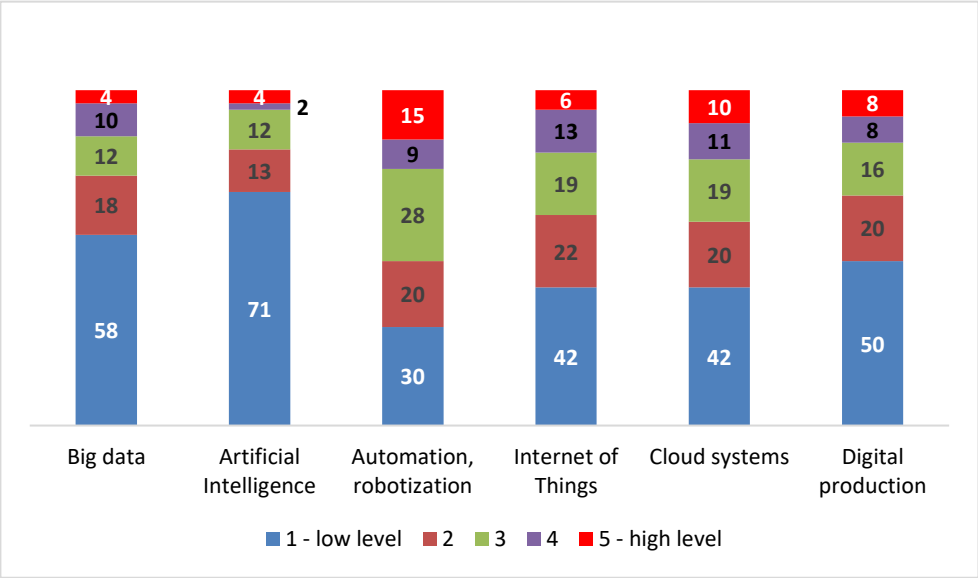

Figure 1 Industry 4.0 - elements implementation; Source: own elaboration

Based on the closer analysis, we found out that larger companies operating in industrial production have a higher level of implementation of these elements of Industry 4.0. Artificial intelligence has the lowest level of all elements.

3.2 The phase of Industry 4.0 implementation

The next part was connected to different implementation phases of Industry 4.0. As we can see from the graph (Figure 2), up to 45% of respondents stated that they have not started with the Industry 4.0 application yet. Despite this higher number, however, the rest of the companies are already preparing for implementation, or even have already implemented it.

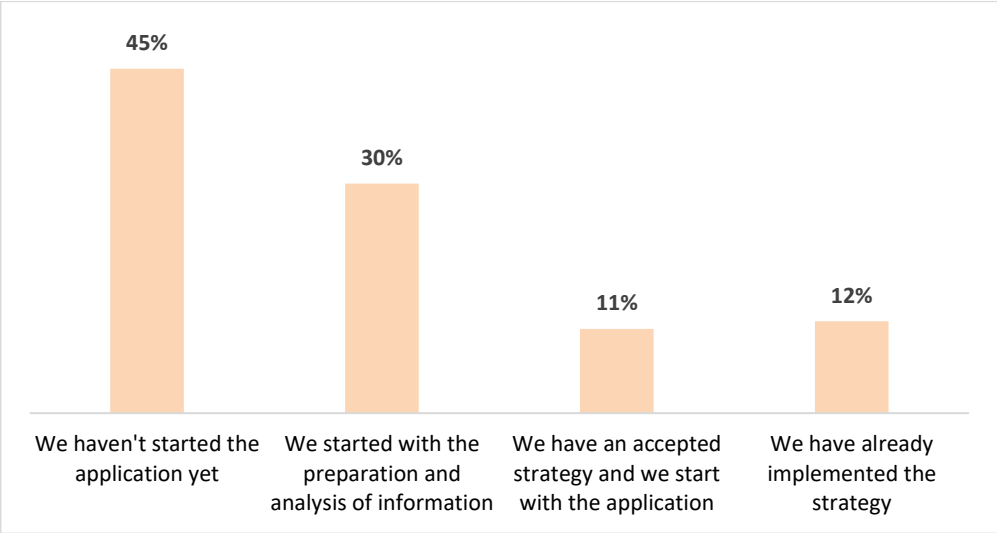

Figure 2 Industry 4.0 - the phase of implementation; Source: own elaboration

The strategy is implemented in the vast majority of larger companies with more than 250 employees operating in the industrial sector. For companies operating in other industries with fewer employees, this application is slower and more costly.

3.3 Industry 4.0 opportunities

In the next question, we focused on identifying opportunities coming with the Industry 4.0 implementation. In the following graph (Figure 3), we see that the most rated opportunity, according to our sample of companies, is to increase productivity. This possibility was identified by the majority of companies with different numbers of employees operating in different types of industries.

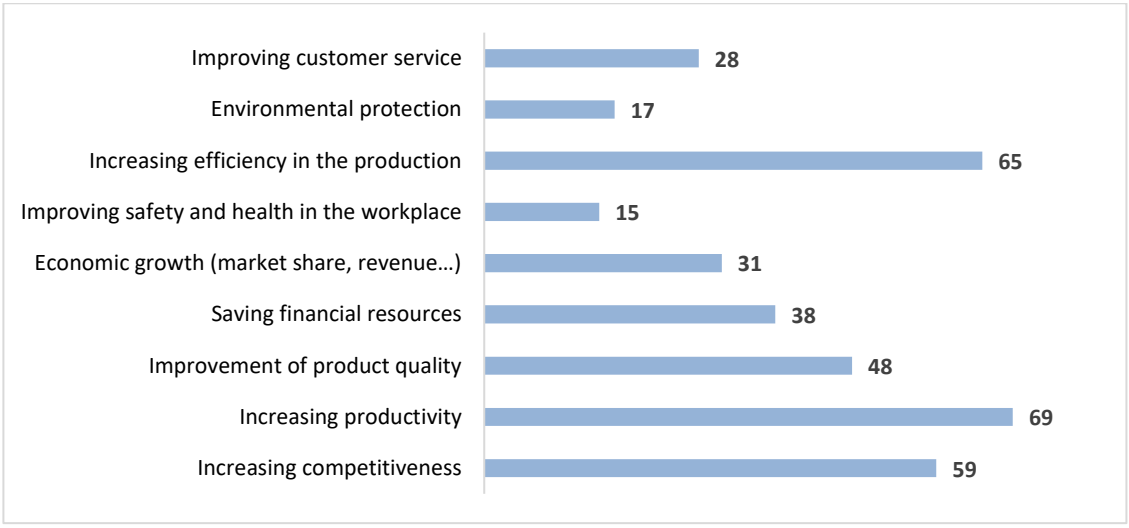

Figure 3 Industry 4.0 opportunities; Source: own elaboration

Out of 102 respondents, up to 69 indicated this possibility. The second most common answer is efficient production, followed by an increase in competitiveness, which is the main goal for most companies. These were answers that referred to companies regardless of industry or number of employees.

3.4 Industry 4.0 challenges

In the following part, companies in the sample identified the challenges of implementing Industry 4.0. There were 9 different answers to choose from (Figure 4).

One of the biggest challenges was the maintenance of jobs and the stability of production, up to 42 companies indicated that. It was a surprise that companies are not only trying to focus on profitability and efficient production, but more and more companies are also focusing on job retention and trying to find a consensus between the application of Industry 4.0 and job retention. The second most common answer to this question was to obtain by a sufficient number of qualified staff. Even on the basis of theoretical knowledge, we can confirm that this is one of the most important challenges that companies face. The third response given by 39 companies is a willingness to implement a change plan. Many managers often encounter resistance from employees or low motivation to implement changes in the company.

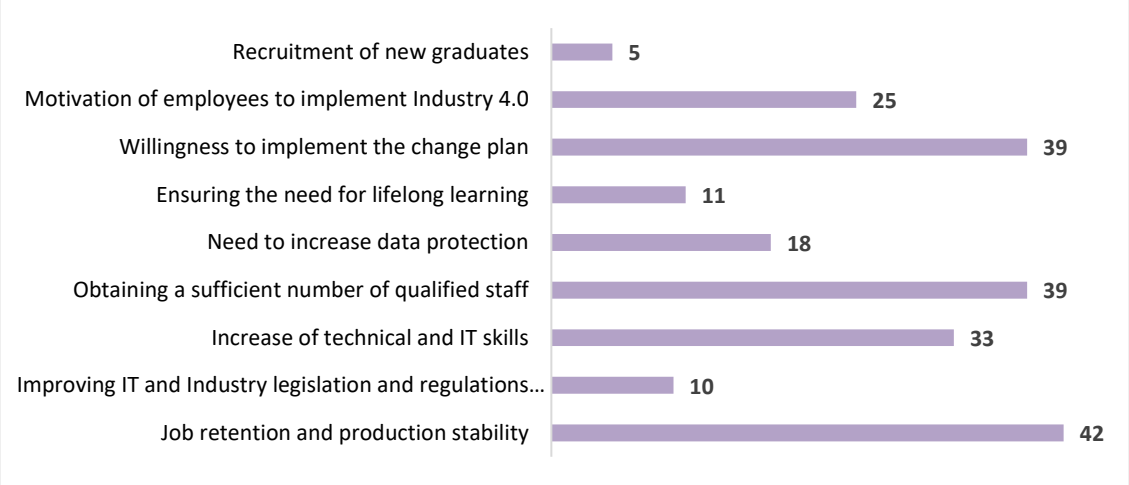

Figure 4 Industry 4.0 challenges; Source: own elaboration

3.5 Industry 4.0 barriers

The last area was concerning with the barriers that companies have to face in the implementation of Industry 4.0. There were 9 different answers to choose from (Figure 5).

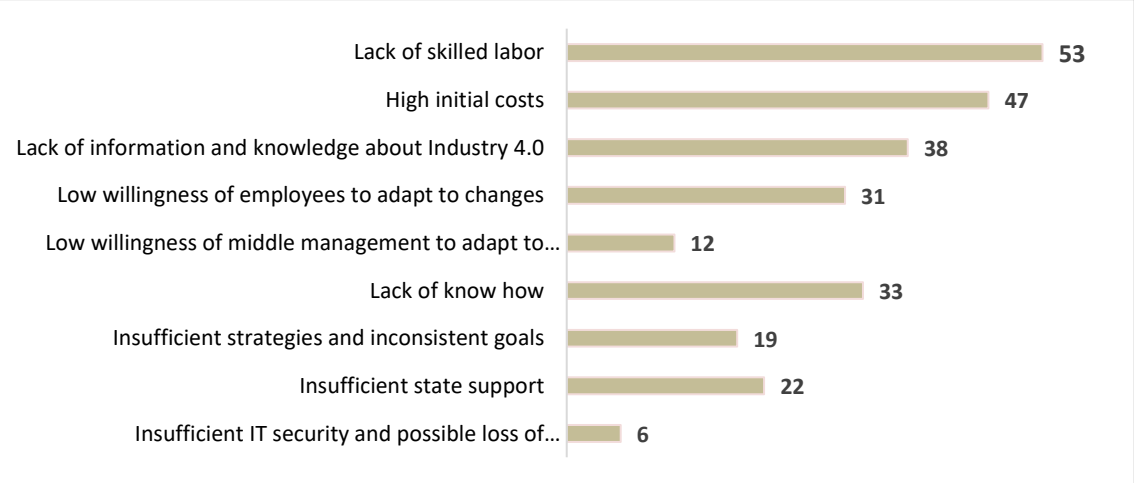

Figure 5 Industry 4.0 barriers; Source: own elaboration

The 53 companies in the survey pointed a lack of skilled labor as the biggest barrier. This is a barrier that most companies have to face, and in the future companies should focus more on acquiring a new skilled workforce. The second huge barrier that we managed to identify through a questionnaire survey is the high initial costs. This answer was provided by almost all companies, with the exception of large companies, which have sufficient funds to make these changes. The third most common answer is a lack of information and knowledge about Industry 4.0. In this response, the state should focus more on communicating this concept and offering companies more important information and the benefits.

4 Discussion and conclusion

Radical changes are coming with Industry 4.0. In particular, due to the new technologies, adaptation to Industry 4.0 is strongly affecting industrialized European countries and companies operating in them (Kohnová et al., 2019). We oriented our research on companies operating in Slovakia. The main goal of our research was the identification of opportunities, barriers and challenges coming with Industry 4.0 that are affecting companies in Slovakia and to evaluate their current level of Industry 4.0 implementation. We have detected that the implementation of the changes brought by Industry 4.0 is in progress. However, this process is relatively slow and several enterprises, mainly micro, small and medium-sized enterprises, do not have sufficient funding for this implementation.

This speed is affected by the relatively low support from the state, inconsistent goals and a large number of developed strategies, which are very difficult to translate into practice. It is important that the government and the relevant institutions begin to address this issue and give more support to the implementation of Industry 4.0 in order to increase the competitiveness of companies and the state.

Currently, most companies are dedicated to implementing and developing strategies to better embrace change. We are currently living in a time of rapidly evolving modern and industrial technologies, to which many companies with sufficient funds have no problem accessing. As we found out, many companies see barriers mainly in the lack of funds and the lack of qualified employees. Other important information, which is based on the analysis of a questionnaire survey and concerns the identification of opportunities presented by companies, is higher productivity and production efficiency. Based on the results, we can see that the level of implementation of individual elements of Industry 4.0 in Slovakia is relatively low, but many companies have the potential and sufficient opportunities to implement these changes.

Countries and companies should focus on implementing changes and look for a model and inspiration in modern companies and other developed countries that have Industry 4.0 at a higher level. Likewise, micro, small and medium-sized enterprises in particular should focus on working with various institutions to help them implement the changes. We can point out the possibilities for collaboration with external partners and stakeholders (Volná & Papula, 2013), like research institutions, universities or with business incubators.

Nowadays, Industry 4.0 can be considered as a necessary concept for every company that wants to stay on the market and expand further. Industry 4.0 is also opening the space for improvement on the state level. Improvement of the education system is needed in order to ensure a sufficient supply of skilled labor within this concept. Another

issue in the near future is the change in the social system and the promotion of employment in times of increasing automation and robotics, which entails job losses.

Acknowledgements

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Knowledge Management in the Context of Industry 4.0: The Case of Slovakia

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Abstract

Researchers try to find answers to questions arising from Industry 4.0 era through various theories. Knowledge management is one of the valuable and useful concepts. The aim of the paper is to analyze the application of selected principles of knowledge management in companies operating in Slovakia. Our results based on the questionnaire survey show that companies apply mainly the technocratic and behavioural school principles, but it is necessary to balance applying principles of these two schools. As a part of the economic school, companies can create solutions that could be applied in other companies. However, they do not make enough economic benefits from them (e. g. from patents).

Keywords: Behavioural school; Economic school; Industry 4.0; Industrial revolution; Knowledge management; Technocratic school.

JEL Classification: M10

Article Classification: Research article

1 Introduction and Theoretical Background

At present, we are no longer on the threshold of the fourth industrial revolution. We have already entered it. This revolution has excellent potential to bring more incredible progress than previous revolutions combined (Xu et al., 2018). In combination with the ongoing global pandemic of the coronavirus COVID-19, Industry 4.0 brings, among other things, the use of technologies that have a significant impact on our lives

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(Ślusarczyk, 2018). The main pillars of Industry 4.0 relate to technologies are cloud computing, big data, simulations, horizontal and vertical system integration, cybersecurity, additive manufacturing, augmented reality, autonomous robots and the Internet of Things (Erboz, 2017). These pillars provide opportunities for sustainable production using ubiquitous communication and information technology infrastructure (Stock & Seliger, 2016; Kohnová et al., 2019). The ability of companies to collect, store and quickly evaluate data is considered very important (Pavlou & Sawy, 2010; Papula et al., 2019). These technologies are already being used in workplaces where discussions have recently been held on their possible use and the changes that their use may bring (Orlikowski et al., 2016). Using information technologies currently includes assistance in decision-making processes in senior management positions (Copuš, 2016) as well as day-to-day help in lower administrative positions (Park, 2011; Strážovská & Vilčeková, 2021).

In the context of Industry 4.0, a significant impact on human resources (Šajgalíková & Copuš, 2018), changes in the requirements for their structure and efficient use are generally expected in management discussion and practice (Stachová et al., 2019). During the previous three industrial revolutions, various changes in human resource requirements in terms of their knowledge can be identified (Wojčák et al., 2018). In the first industrial revolution, neither formalized education nor training during employment was required. At the same time, no specific knowledge and skills were required when starting a job. Knowledge was informally "inherited" from older workers to younger ones. In the second industrial revolution, employees suitable for the position were selected, and the employees were trained after starting their job. During the Third Industrial Revolution, future employees needed to have the appropriate education before starting the job.

The digitization-based pillars of Industry 4.0 point to the growing importance of human resource readiness for the knowledge needed to master the information technologies used in companies (Bellanca, 2010; Papulová et al., 2019). In the context of Industry 4.0, changes in the requirements for professional and personal characteristics necessary for the performance of work tasks can be expected, especially in terms of information technology (Grzybowska & Łupicka, 2017).

Some current management theories have addressed the growing expansion of information technology and human resource management capabilities, but not exactly with a specific focus on Industry 4.0. However, several basic principles from them are applicable in the era of Industry 4.0 and are essential for the future success of companies. For example, the concept of knowledge management (Meski et al., 2019).

Knowledge management includes acquiring, coordinating, disseminating, creating, and using knowledge to improve basic organizational processes (Harman, 2007). This concept seeks to respond to the changes in the current economic environment (Ansari, 2019). The increase in knowledge-intensive organizations and the growing number of knowledge workers are associated with the increasing importance of knowledge (Zelinska et al., 2020), which companies perceives as a source of competitive advantage (Polyanska et al., 2014).

Knowledge management can also be defined via three schools: the technocratic school, the behavioural school, and the economic school (Earl, 2015). The traditional view of knowledge management represents a technocratic school, which perceives knowledge management as a set of organizational processes and systems, especially information technology systems. The behavioural school emphasizes the importance of the human factor in the processes of knowledge management. It focuses on creating processes and mechanisms that facilitate the sharing of workers' knowledge within

interpersonal interaction. The economic school considers the primary goal of knowledge management activities to be the effective monetization of knowledge in the companies to achieve measurable economic benefits. From this perspective, knowledge management activities are focused on producing value-creating products and services and protecting knowledge capital in patents or trademarks.

In 2016, the Ministry of Economy of the Slovak Republic presented the state concept of Slovakia for Industry 4.0 entitled *Smart Industry for Slovakia* (Ministry of Economy, 2016). Its purpose is to support Industry 4.0 in the Slovak manufacturing industry by transforming it into a new type that uses knowledge in the broader context. The aim of this paper is to analyze the application of selected principles of the three schools of knowledge management in companies operating in Slovakia.

2 Methodology

The analysis of the application of the selected principles of three schools of knowledge management (technocratic school, behavioural school, economic school) is based on a questionnaire survey. Totally 203 respondents (employed in companies operating in Slovakia) filled out an electronic questionnaire distributed via email and social networks (mainly by LinkedIn). Principles of voluntary participation and anonymity were upheld during data collection.

The questionnaire contained seven questions characterizing the company in which respondent work (e. g. number of employees, ownership structure, registered office of the companies, main activity and others). In this paper, we use the question regarding the number of employees. Other questions concerned three schools of knowledge management. In this paper, we use 15 questions that identify 15 principles of knowledge management. The selection of questions does not aim to cover the full range of principles of individual schools of knowledge management but seeks to select key ones. Respondents had the option of choosing answers on a scale at *none - lower rate - higher rate*.

Since the size of the company is one of the factors that affect its business activities, we analyze the results based on the number of employees in four categories:

- 9 and less employees *(micro company),*
- 10 – 49 employees *(small company),*
- 50 – 249 employees *(medium-sized company),*
- 250 and more employees *(large company).*

The results were analyzed by descriptive statistics in the MS Excel software environment and by a test for differences using analysis of variance (one-way ANOVA) in the SPSS software environment.

3 Results and Discussion

The analysis of the application of the principles of knowledge management schools in companies operating in Slovakia is divided into three parts according to the defined schools mentioned above.

3.1 Technocratic school

According to the technocratic school, knowledge management summarises organizational processes and systems for sharing knowledge, especially information technology systems.

The following principles in our survey characterize this school:

- *Q1_T: formalized contribution to employee knowledge and sharing with co-workers through the company's knowledge database;*
- *Q2_T: support of employees from the company in their work for the use of knowledge available in the knowledge database;*
- *Q3_T: availability of knowledge from various sources (e.g., book, intranet, internet - printed or electronic sources), in which employees can find the necessary information;*
- *Q4_T: clarity of knowledge provided by the company.*

Figure 1 shows that, according to the respondents, most companies apply all four selected principles of knowledge management to a certain extent (more than 88% of respondents stated this to a greater or lesser extent). The results of the one-way ANOVA show that there is no statistically significant difference between the application of individual principles, as the *p*-value reaches the level of 0.052.

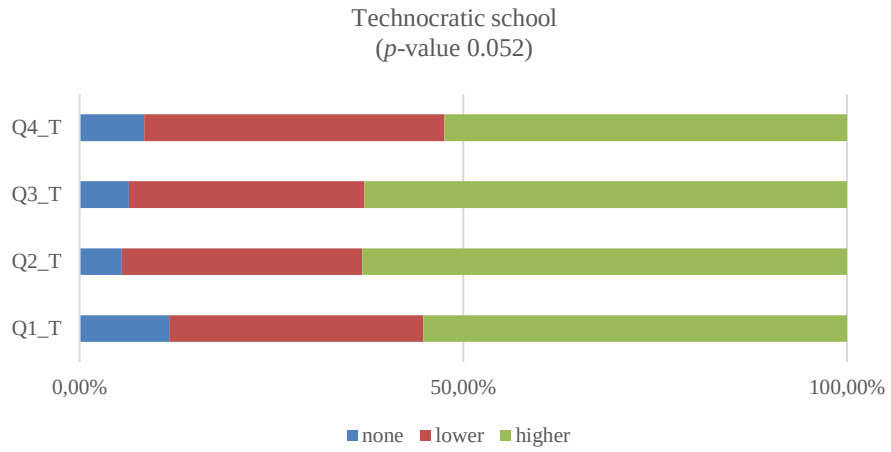

Figure 1 Technocratic school – principles; Source: own elaboration

Figure 2 shows the differences in applying knowledge management principles according to the number of employees of the company in which the respondents work. The one-way ANOVA test results show a statistically significant difference between companies by size only in the Q1_T principle (*p*-value 0.001).

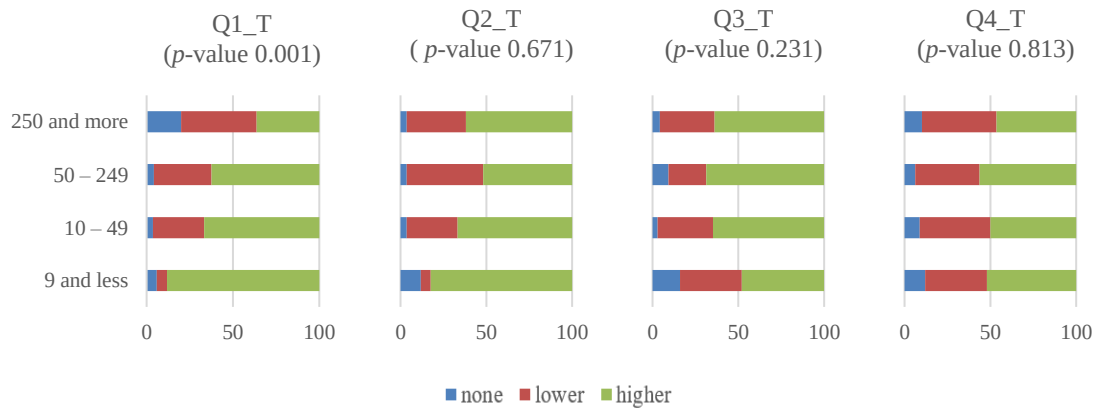

Figure 2 Technocratic school – principles/categories of companies; Source: own elaboration

A deeper analysis of the Q1_T principle shows a statistically significant difference between micro and large companies (*p*-value 0.002), between small and large companies (*p*-value 0.015) and between medium-sized companies and large companies (*p*-value 0.045).

According to the results, in large companies compared to smaller companies, the contribution to sharing knowledge with employees through the company's knowledge database is lower. According to Tsai (2002), many hierarchical levels have a negative impact on in-house knowledge sharing. Nevertheless, when it comes to knowledge sharing and ICT, employees can choose whether to contribute to or collect from the database (Heinz & Rice, 2009). Concerning this fact, willingness to share knowledge is an important variable that depends on such factors as trust (Roberts, 2000; Gar et al., 2013) or identification with the team or group (Hinds & Pfeffer, 2003). A higher number of employees and relatively rigid organizational structures with many hierarchical levels might prevent large companies from creating a climate of mutual trust and deep identification with the organization.

3.2 Behavioural school

According to the behavioural school, knowledge management is based on the importance of the human factor and the creation of processes and mechanisms that facilitate the sharing of knowledge of employees within interpersonal interaction.

The following principles in our survey characterize this school:

- *Q1_B: formal dialogue as a form of knowledge sharing,*
- *Q2_B: coaching as a form of knowledge sharing,*
- *Q3_B: the possibility of personal knowledge sharing with colleagues,*
- *Q4_B: employee learning from each other as a form of knowledge sharing.*

Figure 3 shows that, according to the respondents, most companies apply all four principles of knowledge management to a certain extent (more than 91% of respondents stated this to a greater or lesser extent). However, the one-way ANOVA analysis results show a statistically significant difference between applying individual principles, as the *p*-value is at the level of 0.001.

The in-depth analysis shows a statistically significant difference between principles Q1_B and Q3_B (*p*-value 0.001), between Q1_B and Q4_B (*p*-value 0.003), between Q2_B and Q3_B (*p*-value 0.001) and between Q2_B and Q4_B (*p*-value 0.001). The first two principles (Q1_B and Q2_B) include the formal sharing of knowledge

within human interaction, while the other two principles (Q3_B and Q4_B) include informal sharing within human interaction. According to Estrada et al., 2016, formal ways of sharing information are mainly supportive ways of informal knowledge sharing, and there is a difference between their intensity.

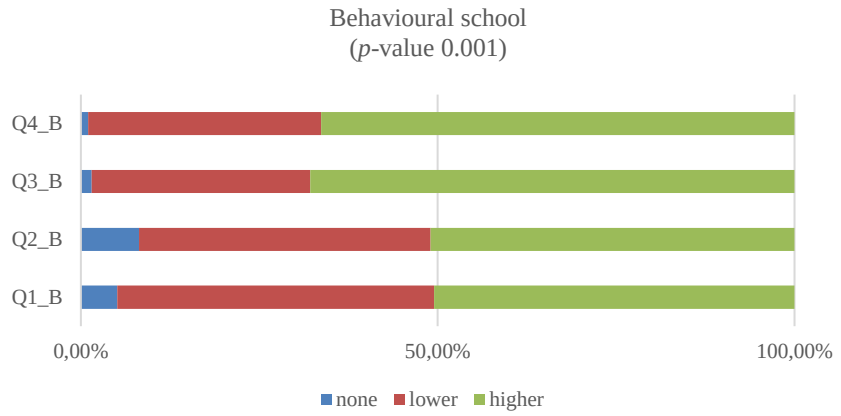

Figure 3 Behavioural school – principles; Source: own eleboration

Figure 4 shows the differences in applying knowledge management principles according to the company's size in which the respondents work. The one-way ANOVA test results show a statistically significant difference between companies by size in principles Q2_B (*p*-value 0.043) and Q4_B (*p*-value 0.045).

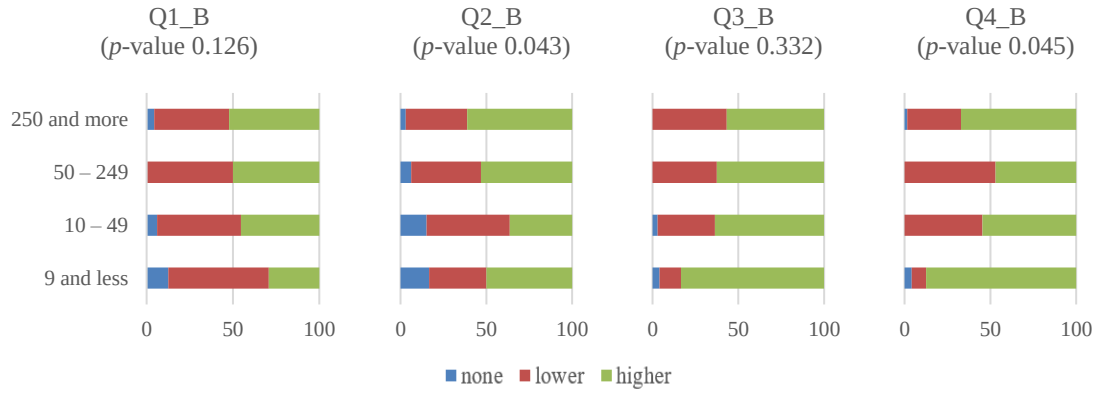

Figure 4 Behavioural school – principles/categories of companies; Source: own elaboration

A deeper analysis of the Q2_B principle shows a statistically significant difference between small and large companies (*p*-value 0.034). A deeper analysis of the Q4_B principle shows a statistically significant difference between micro and medium-sized companies (*p*-value 0.040). As statistically significant differences were identified only in these two cases, it is impossible to interpret this result accurately. However, concerning technocratic and behavioural school results in relation (mainly the principles Q1_T and Q4_B), results indicate that effective use of knowledge management in Industry 4.0 calls to balance applying technocratic school and behavioural school principles – the balance between digitization-based pillars of Industry 4.0 and human aspects of an organization. Johanessen et al. (2001) pointed out that using IT systems to share knowledge will over-emphasize explicit knowledge, relegating essential strategic tacit knowledge to the background. The sharing of codified knowledge can produce new knowledge through its integration with existing tacit knowledge. The transfer of tacit

knowledge depends highly on direct interpersonal interaction, and thus physical proximity, to be effective. From this perspective, sharing tacit knowledge is more likely applied in smaller companies because, in large companies, many employees, departments, and organization levels work as barriers for practical knowledge sharing in the organization.

3.3 Economic school

According to the economic school, knowledge management includes effective monetization of the company knowledge to achieve measurable economic benefits (producing value-creating products and services and protecting knowledge, e.g., patents or trademarks).

The following principles in our survey characterize this school:

- *Q1_E: use of own innovative, creative solutions in comparison with all used solutions in the company,*
- *Q2_E: creating own procedures and solutions applicable in other companies,*
- *Q3_E: selling the own company's innovations (own creative solutions) to other companies.*

Figure 5 shows that according to the respondents, the majority of companies (more than 97%) use their creative solutions (Q1_E), which according to more than 76% of respondents, are applicable in other companies (Q2_E). However, more than 84% of respondents stated that companies do not monetize these own procedures and solutions by selling them to other companies (Q3_E). The results of the one-way ANOVA also confirm statistically significant difference among individual principles, as the *p*-value reaches the level of 0.001.

A more in-depth analysis shows a statistically significant difference between principles Q1_E and Q2_E (*p*-value 0.005), Q1_E and Q3_E (*p*-value 0.001) and Q2_E and Q3_E (*p*-value 0.001). Thus, although companies have creative solutions that other companies could apply in their businesses, they are not able to create measurable economic benefits from these solutions in the form of, for example, patents or trademarks. The small number of Slovak patents also confirms this result compared to, for example, the Scandinavian countries, which are leaders in this field (European Commission, 2020).

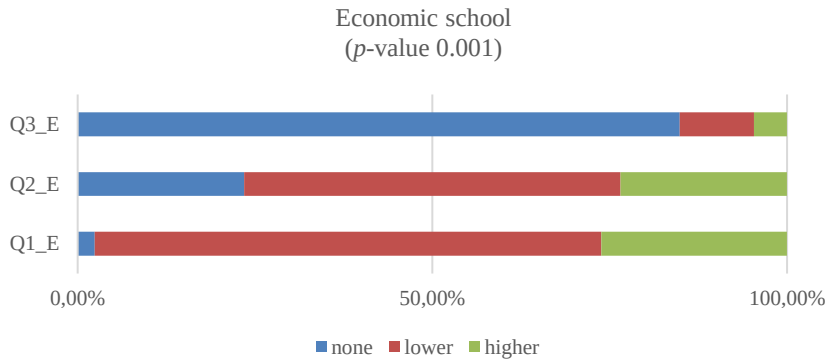

Figure 5 Economic school – principles; Source: own elaboration

Figure 6 shows the differences in applying knowledge management principles according to the size of the companies in which the respondents work. The results of the

one-way ANOVA show that there is no statistically significant difference between the use of individual principles.

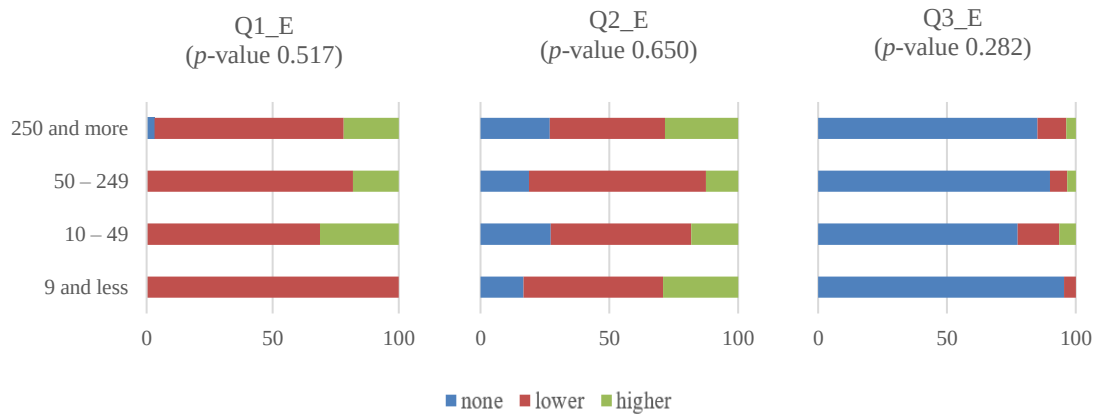

Figure 6 Economic school – principles/categories of companies; Source: own elaboration

4 Conclusion

At present, we are no longer on the threshold of Industry 4.0, but we are part of it. This fact opens up various opportunities for organizations and companies to respond to it for several years or decades. In every industrial revolution, we can see examples of the successes of nations, states or organizations that have seen these opportunities and knew how to utilize them (Wojčák et al., 2018). At the same time, Industry 4.0 raises several questions that will need to be examined, such as what will be the requirements for human resources in terms of their knowledge in the context of Industry 4.0? One possible answer is the transition from traditionally perceived organizations to organizations based on knowledge management. It is knowledge, the ability to create and share it that can bring companies success in Industry 4.0.

The aim of this paper was to analyze the application of selected principles of the three schools of knowledge management in companies operating in Slovakia in the context of Industry 4.0. Our results show that companies relatively effectively apply principles of the technocratic and behavioural school, but it is necessary to balance applying principles of these two schools. However, the application of principles of the economic school is problematic because even though companies use their creative solutions, which other companies can also apply, they do not know how to create measurable economic benefits in the form of their monetization. We have reached a similar result with theoretical research (Copuš et al., 2019), where we pointed out that, on the one hand, Slovaks can be flexible and with minimal available resources successful in various fields. On the other hand, their efforts are not often visible in economic benefits. In this context, it is necessary to support innovative thinking, presentation of own unique ideas and legal awareness, which can help employees and companies operating in Slovakia be innovative and benefit economically.

Therefore, our results raise important questions regarding applying knowledge management schools in companies in Slovakia and by their employees, which are mostly Slovaks. For example, in the context of preparing adepts for their future employment and developing the ability mentioned above to be not only innovative but also to be able to monetize this ability.

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Importance of human potential in value creation in business models

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Abstract

There has been valuable research conduced to understand the changes of external and internal enviroment as the result of 4.0 industrial era influence. To cope with new demands companies are redefining their strategies or even redesigning their business models. The paper aims to bring insigh into value creation and key sources with the focus on human resources as the key component. The paper contains partial resluts of the study researching the reflextion of value changes in the perceptions of people in organizations in relation to the values that are preferred in business and that form the core of business models. The research confirms increasing imporance of human resouces as the component of the added value process, especially the intelectual assets. The importance of tengile sources, such as company property and land seems to be perceived as less crutial due to the core of competitive edge of companies in 4.0 industry. We have confirmed that quality, customer service and innovation potential are the core values of 4.0 industry businesses. These are mostly driven by human resources and intelectual assets.

Keywords: Industry 4.0; Business model; Human potential; Value.

JEL Classification: M12

Article Classification: Research paper

1 Introduction

The Industry 4.0 era represents an environment of fundamental change for human resource management. The theory is very much concerned with the changing role of human resource management units in companies and especially their position in the role of strategic business partner, emphasising the importance of corporate culture for the implementation phase of strategic decisions of all kinds. The authors discuss the competencies of HR specialists and their adaptation to value, system and methodological

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changes in people management. Customer orientation and value creation are emphasized. There is a strong appeal to segmentation, individual approach, adaptation to customer specifics. The customer-oriented perspective and the application of the principles of marketing strategies are being incorporated into the concepts of human resources management systems, as the employee becomes an internal customer. Human resource management specialists are expected to be knowledgeable about business, capable of a process perspective focused on the effectiveness of management systems and entrepreneurial.

Employees and the management of their competencies are a determinant of value creation and business performance determination. The position of human resources and their level of competence reflects the values purued by enterprises, which in the era of the fourth industrial revolution are moving away from industrialisation and capitalisation towards innovation and knowledge as the pillars of business competitiveness.

The analysis of the human resource component of the business model in the literature consists in identifying the role of human resources in the value creation and performance of business models. In this context, human resources are thought of as intellectual or human capital. In general, three perspectives are emerging to view human resources as a component of business models, namely as a potential for innovation, strategy implementation or value management (Fielt, 2011). One of the earliest frameworks that attempted to explain the human resource component in business models for the purpose of performance evaluation came from the audit environment. In this framework, human resources and their competencies were defined as implicit aspects of the management structure, in the execution of key processes and in the management of resources (Nielsen & Lund, 2012).

In the Business Model Canvas (Osterwalder & Pigneur, 2010), the definition of value is the core to understanding the business model and competencies are an explicit part of the framework as a separate building block. Within the strategy map, the component of human factors is understood as either competencies, which are considered as the basis for value creation, or employee satisfaction, which influences performance (Kaplan & Norton, 2010). Other literature sources refer to the concept of intellectual capital management and measurement in the context of business model performance, referring to human capital as part of intellectual property and intangible assets, pointing to human capital as a pillar of value creation (Sveiby, 1997). Intellectual capital is referred to as one of the basic types of knowledge resources that enable an organization to deliver value to the customer (Mouritsen et al., 2003).

The research results of business models by Slávik (2014) was an atlas of business models in the Industry 4.0 era. He calls the post-distributional society knowledge-based, knowledge-informed, information-based and networked. Digitalization in technological advancement has a fundamental impact on social and economic life, in which the service sector dominates, leisure time increases and employees work , not only to satisfy the basic needs of life, but also their cultural needs. Slavik examined business models in the information technology sector, the film industry and leisure activities, and the business models of start-ups. The key competencies in the information technology industry are innovation, scholarship, speed, corporate culture, social atmosphere, cooperation and communication. Among human resources, creative workers play a dominant role, whose inventiveness and room for self-realization is key, because the entire value-creation process of an enterprise is based on the knowledge, experience and creativity of the employees. In the film industry, the key intellectual strategic resource is considered to be the result of creative potential, quality human resources and the image of the company; in startup structures, it is mainly motivated human resources and commitment. Based on

the results of a follow-up quantitative survey, Slavik concludes that personnel and know-how are considered the most important key resources, closely followed by image in the importance criterion. A high importance of the key resource was also found for managers. The most important competences are communication, speed and innovation

Based on the results of the research, it concludes that the post-industrial society is characterized by an increase in the role of human resources as an immediate provider of value, or creator of complex and professionally demanding value, which is usually a highly educated person (Slávik, 2014). The nature of work is changing from physical to mental. He describes entrepreneurship as dematerialised, which makes intensive use of human resources. The dematerialisation of business processes, partner relationships and the product itself, accompanied by its sophistication, have significant implications for the content-functionality of the business model in the post-industrial era of entrepreneurship.

Understanding the drivers of enterprise value creation can potentially lead to the identification of key performance indicators. Value creation factors can be viewed as the links between business objectives and key performance indicators (Guthrie, 2017). The author stresses that value creation factors are not result-oriented KPIs, rather they are future-oriented performance measures. KPIs are linked to strategic objectives through the identification of key value drivers, which can be interpreted as key success factors. Key success factors do not remain static, but change over time, and the cyclical evolution of the business, the business sector and the economy. The result is a change of strategy or business model followed by a redefinition of the competences of the process actors involved in the value-added chain.

Most business model frameworks include some concept of the impact of the human resource factor as part of their framework. However, human resources are used and valued in different ways in enterprises.

One way of identifying the manifestations of value change in the world of work of the Industry 4.0 era is through the perception of people in organisations. We consider as progressive and contemporary a methodology that allows to perceive business from a values perspective. Namely, the values it creates and the valuable/key resources it consumes to do so, as well as the values/revenues that result from the business. In the conditions of the fourth industrial revolution, where we are experiencing increasing scarcity of physical resources, stronger demands for sustainability of business activities, extreme conditions of competitiveness, growing tendencies of individualization of access to the customer, who has a global market and a robust information base for perceiving the price-value relationship, we consider the value perspective of the analysis of the activities of enterprises and entrepreneurship to be crucial.

With the growth ambitions of businesses in a global environment, there is a growing emplhasise for the entrepreneurial and leadership skills of HR professionals. Mastery of the nature of business, people management processes and change implementation can be conceptualised in terms of mastery of activities, the inputs they need and the value they generate, i.e. from a process perspective. To participate in the competitiveness of businesses in the Industry 4.0 era, the architecture of human resource management systems requires a perfect link to the creation of added value generated by the business. It is equally important to understand the inherent added value, its meaning for the business and the effectiveness of the people management processes by which it is created, and to see the position of the customer to whom it is addressed.

2 Material and methods

Based on the theoretical background, we conclude that it is important to research human resources as the component of business model in the enterprise in close connection with the values underlying and resulting from business activities, because the value consistency of the enterprise's activities appears to be the way of dealing with key resources in the 4.0 era.

The research question in the research conducted was formulated as follows: *What are the reflection of business value changes in the perceptions of people in organizations in business models of 4.0 industry era?*

The data collection was was carried out in 2019. The object of the research was the business model of the organization, the strategic and operational roles of the human resource management unit, and the procedures, processes and methods of the human resource management system. Into the data sample were included enterprises operating on the Slovak market, while the research sample includes enterprises that are established for the purpose of generating profit, as well as organizations of non-profit character, organizational units of state administration, or services in the public interest. The questions were organized into four sections (see Figure 1).

Thematic section	Object of the research
Characteristics of HRM department	- characteristics of the organisation in terms of number and structure of employees, form of ownership, business sector, market characteristics and market position of the organisation; - specification of the position of the human resources management unit, representation of the unit in the top management of the organisation, formulation of strategic documents; - the level of conception/implementation of people management policies; - specification of the strategic and operational role of the HR function; - key performance indicators of the HR function (turnover, sick leave, trend in satisfaction surveys) key values of organisational culture;
Business model	- the values that result from the organisation's business activities; - key resources; - key activities; - forms of customer relationship, and forms of sales/cost structure and revenue structure;
Forming of HR	- the methods and procedures of the recruitment and selection process; - elements of digitisation; - flexibility of the workplace, and working patterns diversity management programmes in the workplace;
Development of HR	- the concept of staff appraisal and training; - methods and procedures for performance management; - succession plans and career management; - remuneration instruments, both financial and non-financial, and employee benefits and services; - tools for intra-company communication and relationship management;

Figure 1 Research design; Source: own elaboration

The synthesis and interpretation of the findings from the questionnaire survey focuses on the value perception of people in companies in the environment of digitalization tendencies in processes, procedures and tools of human resource management. We research the human resource management system in the Industry 4.0 era according to the value perception changes of people in the organization with respect to the value changes of the business.

3 Results

The analysis of the business model was carried out by applying the CANVAS model. The intention of researching the human resource component of the business model, was to identify the values that organizations consider to be at the core of their business. Further, the intention was to analyze the key resources that the business uses to generate added value. The subject of the analysis is the relationship between the value of the business, and the resources (particularly the human resource component) that organisations consider to be core to their business.

Based on the results we find that the value added of products/services most frequently mentioned by organisations is high quality (68%), customer care (52.5%) and innovation (35.9%) (see Figure 2) Values such as low price, design or comfort of purchase were less frequently mentioned in the responses.

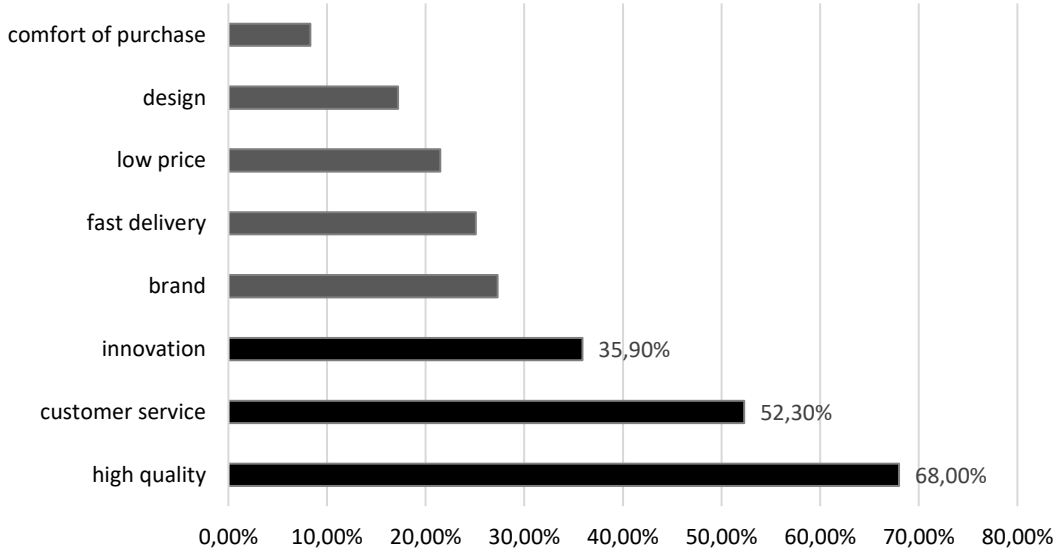

Figure 2 Value as the result of business activities; Source: own elaboration

Out of key business resources, organizations stated human resources (56.40%), intellectual capital (50.3%), and tengible assests (41.4%) among the top three priorities (see Figure 3). This shows that the resources that organisations consider key to value creation are directly linked to people.

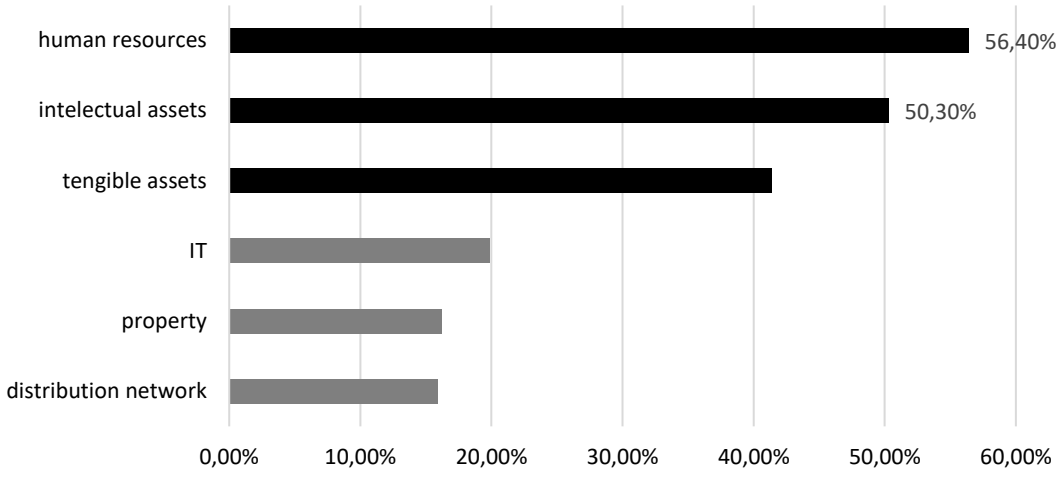

Figure 3 Key sources for value creation; Source: own elaboration

The human resources component was analysed in relation to the values identified by the enterprises as key to their business. It can be stated that enterprises that mentioned product and service innovation as a value of their business activities most often saw human resources (65.62%) and intellectual assets (63.08%) as key resources (see Figure 4). Less important but not negligible for their business were tangible resources (47.69%), property was very rarely identified as a key resource (9.23%). The results further revealed that businesses that stated design as a value consider the results of intellectual property as a key resource, thus people are perceived more as intellectual capital (61.29%) than human resources (45.61%). A similar situation is registered in enterprises where the value is a brand, the difference is significantly smaller. Information technology (46.67%) is key in enterprises where the value is convenience of purchase or innovation (33.85%). Property (33.3%) and tangible resources (51.28%) are most often identified as key resources by businesses that focus on low cost as the value of their business.

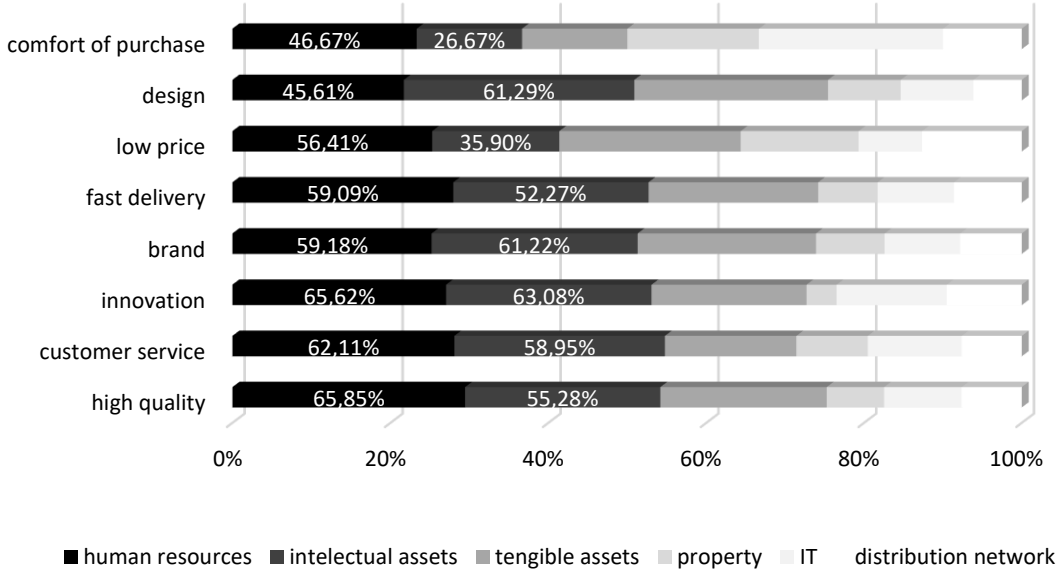

Figure 4 Values generated by business in relation to key sources; Source: own elaboration

Based on the analysis of the human resources component of the business model, it is clear that businesses, regardless of the value that results from their business, consider human resources and the outcome of their intellectual potential as key resources of the business. The importance of people to the business varies in relation to the value that the business generates. Within the examined set of enterprises, the results obtained confirmed the importance of the human factor as a determinant of the use of other production factors of enterprises in the conditions of the fourth industrial revolution, the consequence of which is a growing focus on the intellectual outputs of human activity. By analysing the other contexts of the other thematic sections from the questionnaire survey, we have investigated how value changes in business are reflecting in human resource management systems, with a focus on the formation and development of human potential.

4 Discussion

Among the manifestations of fundamental value changes we consider the change of the role of man in production systems, which results in a change in the required competence of employees. Enterprises pay particular attention to the recruitment and selection of employees. They pay attention to the competitiveness of systems for the formation of human potential, in which they deploy concepts aimed at employer attractiveness and employee retention. Adverse demographic developments in EU countries and the phenomenon of brain drain overseas are putting employers at a greater disadvantage in the labour market. On the other hand, the demands on the knowledge, skills and competences of the new generation of employees are challenging both the labour market and current education systems. Modern employers expect technological (business knowledge, technological skills, process orientation, programming), methodological (analytical skills, entrepreneurship, creativity, efficiency orientation), social (communication skills, teamwork, leadership) and personal (flexibility, tolerance, motivation) competences.

The consequence is therefore a labour market situation where labour demand remains unsaturated due to divercence of supply, both in terms of quantity and structure. This gap is widening and is taking the form of opening scissors. According to HR specialists, the situation in Slovakia is critical and will lead to value changes. Ján Odzgan, strategic advisor to the CEO for change management, says that there is such a shortage of truly valuable people on the labour market that we are starting to see the tables turning in selection interviews. There may come a time when candidates will not come to the selection interview, but representatives from organisations will visit the potential employee and compete with each other to see who can offer the more attractive terms (Odzgan, 2017). Requiring and developing skills such as entrepreneurship, creativity, analytical thinking, with the intention of increasing the level of autonomy, responsibility, and readiness to perform tasks of a strategic nature, leads to a reassessment of the object of management. The object of management becomes the competence of people and their potential, which is carried by the people themselves. The employee takes on the role of a customer whose potential (resources) is of interest.

To answer the question of what are the reflectioons of value changes in the perceptions of people in organizations in relation to the values that are preferred in business and that form the core of business models by examining the concepts of formation and development of work potential. We note that, HR professionals shape corporate culture and declare the values that are the pillars of corporate strategy to support the implementation phase towards current employees, while creating a clear picture of

expected organizational behavior, but also the possibilities of the intersection of the aspirations of the candidate and the career management programs of the organization.

Human resource management departments are taking on the role of business partner, a partner in the creation of added value for the organisation, and HR leaders are acquiring a formal position in the top management of organisations, as the presence of people management experts in the corporate strategy development phase is desirable. HR specialists in Slovakia tend to focus more on the execution of processes than on their outcome. This tendency needs to be changed by focusing on the results of their work, the effectiveness and efficiency with which they have been achieved and their meaning (relevance) for the organisation's value-creating activities. To meet this requirement, the effectiveness of HRM processes should be measurable and their impact on other processes of the organisation demonstrable. However, only through measurable results can the HRM system justify the relevance of its activities and the extent of their impact on the overall performance of the organisation, which is essential for becoming a strategic partner.

In 2015, the themes of professional conferences of the HR community in Slovakia were focused on the formation of human potential, such as the concept of employer branding, defining the expected employee value (Employee value proposition, EVP), referral programs, employee engagement management, employee diversity, new generation of employees (millennials), aging of employees (succession programs). Further, it was the measurement of performance of people management units, the choice of performance indicators for HR leaders, the HR management system in times of change, and the transformation of corporate culture. The digital era in people management, the tools and opportunities it brings and the competencies it requires were discussed. In 2017, the employee era, the employee in the role of ambassador and positive employee experience were central themes. Businesses need to be attractive to employees/applicants, they want to manage emotions. Emotions are variable, it depends on the customer/employee experience. Today, uniqueness is becoming the source of attraction. Attraction people management systems relentlessly analyze the values inherent in employees/applicants, the experience they came to the job to acquire, the experience they expect to have. A sense of excellence is engendered by a concern and focus on the individual specifics and expectations of the employee/customer.

5 Conclusion

The development of industry is an integrated process between man and machine through its inherent complexity. We are witnessing a time when mankind owns more than ever before. It is the result of man's creative activity, which has resulted in technological progress. Growth as the only acceptable outcome drives businesses towards ever more sophisticated concepts of competitiveness. Technological progress is shrinking the physical world and shaping a virtual world whose potential appears limitless. The world of work in the period of the fourth industrial revolution is the subject of scientific research and professional debate, but it is also a reason for expressing concern about changes in the nature of work, the demand for work and social insecurity.

The current evolution in the world of work is referred to as the “Emplyee age.” where people management specialists are formulating customer-centric concepts focused on a positive internal customer (employee) experience, while also focusing on financial performance, strategy and market (customer) share. Businesses need to be attractive to employees, that is, they want to manage emotions. In a global world of overexposed information, the value of experience is experiencing a renaissance and the source of

attractiveness is becoming excellence. The systemic, technological but above all value changes that result from progress are defining modern concepts of people management, the roles and competencies of their bearers. In entrepreneurial business models, the human resources component is consistently the most important determinant of the outcome of the interaction of the other components and the resulting added value.

Akcknowledgements

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Digital transformation in large companies: Case of Slovakia and Czech Republic

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Abstract

In the current pandemic crisis, the digital shift is much more important than before. The shift to the digital world shapes the organization using digital elements. The entire organization can function despite the distance and is available to both employees and consumers. The aim of this study was to identify the current approach to digital transformation among large companies in the context of its various characteristics. From the results of the research, we found that Czech companies show significantly higher quality and quantity in the use of technologies such as software and applications than Slovak companies. The same is true for foreign companies compared to domestic ones. In terms of the introduction of automation and digitization, Czech companies are better off than Slovak ones in terms of the existing situation. Branches of foreign companies in Slovakia and the Czech Republic also achieve better results in the current introduction of digitization than domestic companies and also realize activities to a greater extent in relation to future development than domestic companies. In relation to future development, large companies operating in the service sector realize more activities than industrial companies. Although we observe some differences between Slovak and Czech companies and also between different characteristics in the introduction of digitization and digital tools, in both countries large companies are increasingly implementing this trend, probably caused by the current COVID-19 crisis, which forced companies to operate in digital world. However, it is not enough to buy digital technologies for the success of companies, but also to have qualified employees who are able and willing to work in this environment.

Keywords: Digital transformation; Digital technology; Large companies; Development.

JEL Classification: O14, O33, Q55

Article Classification: Case study

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1 Introduction

Digitization is one of the most important topics of the future, affecting not only the economy but society as a whole. We can define it as the conversion of signals and media objects such as sound, images and documents into digital form. They are processed, stored and moved using networks and digital devices as a result of the use of systems based on the adoption of digital technologies (Härting et al., 2017). Digitization disrupts established rules. For example, Uber, the largest taxi service in the world, does not own any vehicles. As the largest accommodation provider, Airbnb does not own any real estate or the media owners do not create any content. The above examples demonstrate the power of digitization. Current business models will need to be re-evaluated as they are likely to become obsolete in the future, traditional structures will be under pressure or disrupted (Gimpel & Röglinger, 2015). The exchange of real-time data between machines, gradually modern systems and techniques has significantly transformed the dynamics of industries. New sectors, business models, or types of companies have been created. These factors, together with socio-economic and demographic factors, have caused significant changes in business models and labor markets. Ongoing changes determine the digital skills requirements of the workforce and the change in the way we work (Beechler & Woodward, 2009; Guthridge et al., 2008).

According to Lankshear and Knobel (2008) the adoption of digital technology to transform services or businesses is the replacement of non-digital or manual processes by digital processes or the replacement of older digital technology with newer digital technology. In addition to efficiency, digital solutions can enable new types of innovation and creativity instead of innovation and support for traditional methods through automation (Lankshear & Knobel, 2008).

Fitzgerald et al. (2013) perceive digital transformation as the use of digital technologies to enable significant business improvements (Fitzgerald et al., 2013).

The digital transformation according to Hess et al. (2016) concerns the changes that digital technologies can bring to a company's business model, leading to changes in products or organizational structures or process automation (Hess et al., 2016).

Ultimately, the digital transformation is based on the use of new technologies that will ensure significant improvement in all business segments. By digitally transforming companies, they can respond to changing customer requirements faster and turn technology into economic results and added value. For the company, new technologies mean increasing operational efficiency, innovating new products and services, building new business models, agility in the workplace, and meeting customer needs (Maheshwari, 2019).

1.1 Digital transformation in large companies

Capgemini report from 2011 shares findings on digital transformation in large companies. One of the interviews asked how often companies use analytics, mobile devices, social media and embedded devices to improve the customer experience and business processes. According to the figure 1, the first three digital technologies are most widespread in large companies. Social media is more common for interactions with customers, as consumers adopt these technologies easily and quickly. Analytics is also used more to support customers in personalizing customer products and services. Mobile devices are used equally in both areas and embedded devices are used by less than a quarter of companies (Capgemini Consulting, 2011).

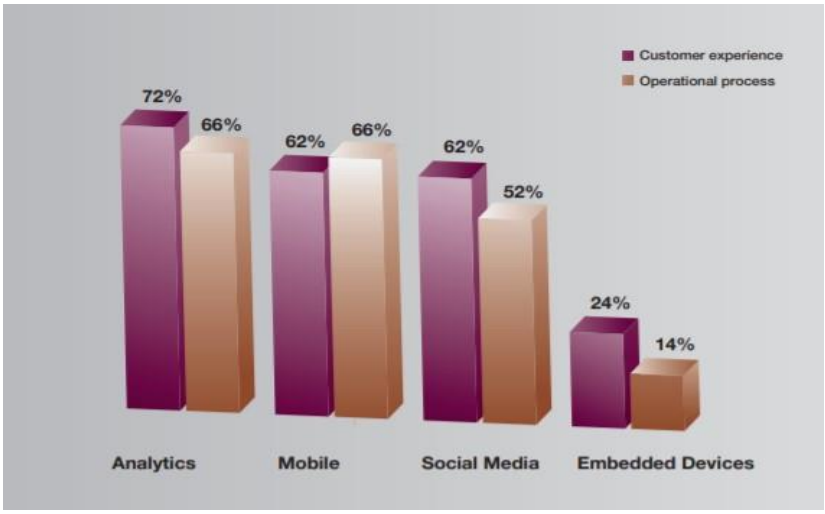

Figure 13 Applications of digital technology in customer experience and operational process; Source: (Capgemini Consulting, 2011)

The biggest barriers to digital transformation in large companies are a lack of skills (77%), cultural issues (55%) and an inefficient IT system (50%) (Capgemini Consulting, 2011).

Ruh (2019) talks about three key factors in large companies that will ensure success in the digital transformation. Leadership - it all starts with leadership, who must realize that digital skills need to be brought into the organization, which requires a change in culture, and transformation must affect every department within it. Focus - this factor has two dimensions - mastering data and analysis and ensuring that analyzes are performed. In the first dimension, it is necessary to understand what to do with data and analysis - predicting any result. It is then possible to trigger actions - thanks to analysis, people know what to do, how and when. Tech talent and execution - a sufficient number of qualified employees who are able to build an organization based on digitization, work in teams, constantly learn, meet customer requirements and respond to changes in the environment (Ruh, 2019).

1.2 Human resources in the context of digital transformation

Technology is changing the world of work. There is automation in business models, tools and tasks. In organizations, we can increasingly observe transformation by introducing artificial intelligence, robotics and digital innovation. Automation means full or partial replacement of jobs. However, on the other hand, these changes can increase efficiency and access to services. Organizations and employees must have digital and soft skills to seize new opportunities (Moueddene et al., 2019). Many jobs require the ability to process data and information using digital technologies. Workers must not only be able to operate these technologies, but they must also be flexible and adaptable. In addition to the creation and change of many jobs, there will also be job transfers and changes in the structure of employment (Broadband commission, 2017). Although the impact of automation indicates a decline in employment, the McKinsey Global Institute Report of 2017 points out that jobs in transportation, administration, food production and preparation have a higher potential for technological automation, but on the other hand areas such as management, personal care, sales and activities that are based on management, development, and decision-making have lower potential for automation (Maynika, 2017).

If organizations want to identify which skills are and will be needed, it is important to collect and analyze data on current and future job designs to identify which tasks will be automated in the industry and what new tasks will be needed, and to identify skill sets for each job role. The result is the identification of strategic competencies. Talent development planning should help identify which jobs are more important to an organization's performance than others and have a greater impact on an organization's success through a comprehensive analysis of performance data and job proposals. Changes in the acquisition and retention of talent are caused not only by globalization and digitization, but also by demographic change. Generation Z talents and millennials are entering the labor market, dominating the workforce in the near future and emphasizing independence and flexibility, unlike previous generations. They do not require permanent employment, but prefer temporary alternative or project contracts (ILO, 2015; Ustundag & Cevikcan, 2018).

Changes in the setting of work and personal life also affect the change in requirements for employees. High-density digital technologies and communication systems lead to greater work complexity and the associated higher demands on workers' abilities and skills, as well as security requirements. The digital transformation encourages organizations to rethink business models, new ideas and innovation. Increased pressure for innovation and the speed with which they come mean that the labor market is becoming more relevant and the demand for jobs is increasing. Factors such as complexity, uncertainty and time pressure increase employees' workload and cause stress. Managers may feel that they need to help their subordinates cope with the increased demands of their work to avoid overload and excessive demands. Management support can reduce perceived requirements and consequently lead to better work management (Schwarzmüller & Brosi, 2018).

2 Material and methods

The aim of this study was to identify the current approach to digital transformation among large companies in the context of its various characteristics. The research was conducted on 276 large companies operating in Slovak and Czech Republic. Research data were obtained through questionnaire in 2021. The sample of large companies was selected due the importance of technology and digitalization for their sustainability as well as the benefit of available resources for the transformation that are greater for larger companies than SMEs. In order to compare the country specifics and identify the statistical effect of variable: country of origin, 103 Slovak and 173 Czech companies were compared. In the process of data selection, the stratification method based on quota of 100 respondents in both regions as well as in industrial and service sectors. Further respondents were categorized based on the maturity level of the company, domestic company vs. subsidiary and sector (industry, services, public sector, third sector). In the research questions we have focused on the self-evaluation of current state in three types of implemented technology: hardware, software and automation (digitalization) and activities for future development (future benefits for the company) in the same selected areas of technology change. We have chosen Slovak and Czech Republic for comparison based to their similar time of adaption of new technologies, compared to for technological leaders such Germany. Slovak and Czech Republic have a common historical background as well as cultural similarity.

The data were analysed using linear regression analysis with significance level of p=0,05. Within regression analysis each technology type was analysed separately as dependent variable both in case of existing state and future activities. Independent

variables in each model were the country of origin, sector type, domestic vs. subsidiary and maturity level. Regression analysis was selected in order to identify they key dependencies, and thus allow us to understand the assumptions for future development in implementation of technology in the context of Industry 4.0.

3 Results

In the context of self-evaluation of the existing quality and quantity in each of the examined area: technology – hardware, devices; technology – applications, software, license; automation, digitalization; respondents were able to answer on the scale of 1-7 (1 – not existing, 7 – very high quality and quantity of technology). Within the whole sample of 276 large companies, we have observed that the current state of technology adoption is positive, with 73% assessing hardware with 5-7, 72% software and 61% automation, digitalization. Our sample was balanced with 124 companies operating in industrial sectors and 101 in service sectors.

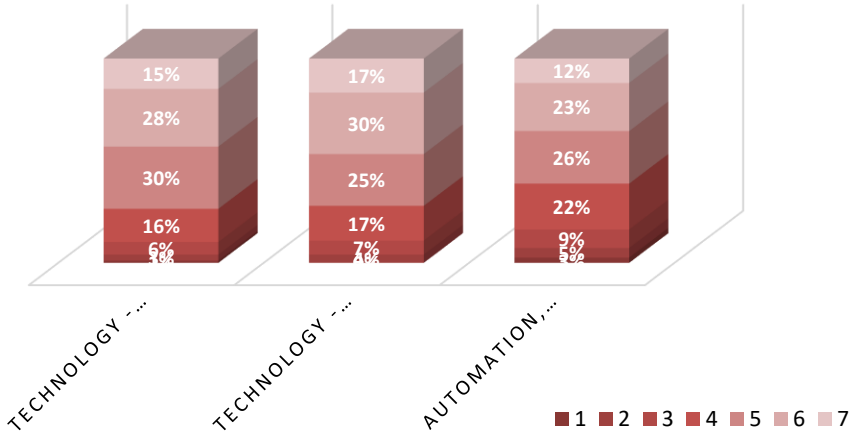

Figure 14 Percentage comparison of assessment of existing quality and quantity of selected technologies (N=276); Source: own elaboration

Further respondents assessed the current activity focused on future development of the company in the context of new technologies. The scale was set from 1 to 4 (1- no activities for future development, 4 – strong focus on activities for future development). The scale was set different from previous questions, based on low availability of potential answers based on assessing not existing state but plans and future activities, which was tested on focus groups. In case of hardware and devices, positive assessment of 3 and 4 was observed among 78%, in software among 90% of respondents and automation, digitalization among 70% of respondents.

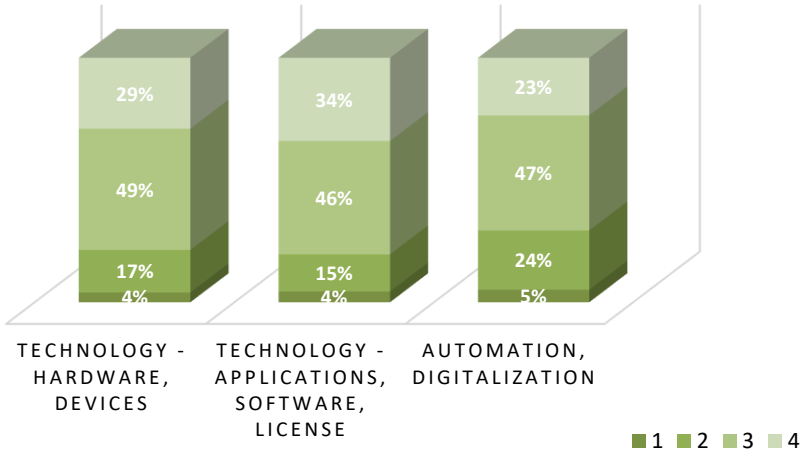

Figure 15 Percentage comparison of assessment of acitivities for future development regarding selected technologies (N=276); Source: own elaboration

While overall, strong focused is on all types of examined technologies in our sample, with software, applications and license as most important, differences may occur in the sample based on various independent variables set in the model. Thus, we chose to focus on each technology type separately and evaluate the influence of specific factors on the outcome.

In case o technology – hardware, devices, foreign based companies (subsidiaries) currently show higher quality and quantity in terms of existing technology, but in relation to activities for future development, we do not observe a difference between domestic and subsidiary (Table 1). Similarly, in the case of the third sector, where existing technology is lower than in the private sector but does not differ in relation to future activities. The public sector lags the most, which in the case of the current state and activities for future development is set behind the private sector. Country of origin was not found as significant variable in case.

Table 3 Regression analysis for Technology – hardware, devices; Source: own elaboration

Technology - hardware, devices								
	Existing quantity and quality				**Activity for future development**			
	Coeffi-cients	Standard Error	t Stat	P-value	Coeffi-cients	Standard Error	t Stat	P-value
Intercept	3,768	0,689	5,469	0,000	2,859	0,425	6,734	0,000
Country of origin	0,199	0,165	1,207	0,228	0,054	0,102	0,531	0,596
Industry vs. Services	0,207	0,171	1,207	0,228	0,071	0,106	0,675	0,500
Public sector	-0,561	0,231	-2,425	**0,016***	-0,328	0,143	-2,304	**0,022***
Third sector	-1,824	0,914	-1,996	**0,047***	-0,598	0,563	-1,062	0,289
Domestic vs. subsidiary	0,467	0,193	2,417	**0,016***	0,132	0,119	1,107	0,269
Maturity level	0,138	0,256	0,541	0,589	-0,072	0,158	-0,456	0,649

*Significance level at p<0,05

In the case of technologies such as software and applications, there is a significant difference, especially in the existing quality and quantity. Czech companies show a significantly higher existing quality and quantity than Slovak ones, as well as foreign companies in the case of domestic ones. Public and third sector lag behind private sectors, while we do not see a significant difference between industry and services within the

private sector. From the point of view of activities for future development, only the public sector is found to be significant, which lags behind the private and third sector (Table 2).

Table 4 Regression analysis for Technology – applications, software, license; Source: own elaboration

Technology – applications, software, license								
	Existing quantity and quality				**Activity for future development**			
	Coeffi-cients	Standard Error	t Stat	P-value	Coeffi-cients	Standard Error	t Stat	P-value
Intercept	4,109	0,687	5,985	0,000	2,819	0,436	6,469	0,000
Country of origin	0,371	0,164	2,256	**0,025***	0,062	0,104	0,596	0,551
Industry vs. Services	0,319	0,171	1,866	0,063	0,150	0,108	1,379	0,169
Public sector	-0,628	0,230	-2,726	**0,007****	-0,381	0,146	-2,602	**0,010***
Third sector	-2,469	0,911	-2,711	**0,007****	-0,725	0,578	-1,254	0,211
Domestic vs. Subsidiary	0,461	0,192	2,395	**0,017***	0,107	0,122	0,877	0,381
Maturity level	-0,241	0,255	-0,944	0,346	-0,063	0,162	-0,386	0,699

*Significance level at p<0,05, **significance level at p<0,01

From the point of view of automation and digitization, Czech companies are again ahead of the Slovak ones in terms of the existing state, although there is no significant difference in relation to activities for future development. Foreign companies again show better results in the existing state than domestic ones, but in the case of automation and digitization they also show higher activities in relation to future development than domestic ones. In relation to future development, it is interesting that companies operating in the service sector carry out more activities than industrial companies. Even in the case of automation, the public sector lags significantly behind both the existing state and development activities (Table 3).

Table 5 Regression analysis for Automation, digitalization; Source: own elaboration

Automation, digitalization								
	Existing quantity and quality				**Activity for future development**			
	Coeffi-cients	Standard Error	t Stat	P-value	Coeffi-cients	Standard Error	t Stat	P-value
Intercept	3,373	0,756	4,464	0	2,099	0,432	4,861	0
Country of origin	0,365	0,181	2,018	0,045*	0,123	0,103	1,186	0,237
Industry vs. Services	0,327	0,188	1,739	0,083	0,22	0,108	2,046	**0,042***
Public sector	-0,804	0,254	-3,17	**0,002****	-0,494	0,145	-3,407	**0,001****
Third sector	-2,133	1,002	-2,128	**0,034***	-0,564	0,573	-0,984	0,326
Domestic vs. subsidiary	0,531	0,212	2,505	**0,013***	0,233	0,121	1,926	**0,055***
Maturity level	-0,078	0,281	-0,277	0,782	0,023	0,16	0,143	0,887

*Significance level at p<0,05, **significance level at p<0,01

The research analysis has revealed several important findings. Large companies seem to understand the importance of implementing technology, even in the context of automation and digitalization. While existing state is in most analysed companies quite satisfying, companies further focus on activities for future development, and thus must evolve the company in other related areas besides technology. Interestingly, while the analysis has revealed several significant variables effecting existing quality and quantity of technology, most variables were not significant for activities for future development. Mainly in technologies such hardware and software. In the case of automation and digitalization however, service sectors make more activity than industry sectors as well as foreign based companies make more activity than domestic. Country of origin has not been found as important; thus these results apply to whole examined sample of 276 companies. Automation and digitalization are key drivers of dramatic technological change related to Industry 4.0 and are important in overall transformation of economies. In this case especially, domestic companies could start or support their automation and digitalization activities with the support of state, co-operating companies or other institutions or networks such as clusters to reduce the lead of foreign based competitors. In case of industrial sectors, the automation is often linked to production, however many side processes can be optimized be automation and digitalization as well, which can be currently observed in service sectors. Especially for industrial sectors many opportunities arise from supply chain cooperation on adapting new common technology, whereas it helps to release some burden regarding resources and capital.

4 Discussion

For organizations to succeed in today's digital world, it is not enough to meet the expectations of customers, employees and citizens, but to meet these commitments faster and agile. The opportunities that arise are great, but only for organizations that understand how quickly they need to transform their processes. Digital transformation is accompanied by technology, but owning digital technologies alone is not enough to succeed. There are company-wide changes, where it is necessary to develop business and operational models of the company, as well as the way people work in it. There is also a need to integrate large amounts of data to anticipate, influence, and respond to customer behavior. Digital transformation is not a one-time program, but it opens up continuous and much more effective development for organizations (KPMG, 2017).

According to a McKinsey survey of executives (899), organizations have accelerated the digitization of interactions with customers, suppliers, and internal operations by up to three to four years due to the COVID-19 pandemic. Consumers have moved to online channels, to which organizations have had to respond by rapidly moving to interacting with customers through digital channels - at least 80% of interactions have become digital. The crisis has accelerated not only customer-focused operating models, but also internal operations (back-office processes, manufacturing, research and development) and supply chain interactions. According to the respondents, many changes took place 20 to 25 times faster than expected. In the case of teleworking, respondents said the changes were up to 40 times faster than expected. In the pre-crisis period, this transformation would take more than a year (McKinsey & Company, 2020).

Akcknowledgements

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Low level of digitization and innovations in business models of companies in Slovakia

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Abstract

In the market of today, there are many changes being made on almost regular basis. This happens due to concept of Industry 4.0, which is composed of many other partial fragments. One of them is digitization, which has a huge impact on almost every business operating on the market. It is very important that digitization is intensively studied and researched in the corporation field as it is already very profitable for both businesses and global economy. If in future it will be handled in as effective way as possible, it can be even more gainful. This article describes and summarizes the actual situation in the area of digitization in Slovakia. It also tries to predict the estimated future status in this field and exposes different views on how this should be achieved. There are some programs and plans of digitization progress presented in this article as well. Most of them are prepared by Slovak government which aims for higher digital level of the country in the following decade. After the research of specific data in this article, it is important to mention that the level of digitization in Slovakia is lower than most of countries from economic groups which Slovakia is member of. It is also important to state the fact that there are conditions set in the country, which allow it to grow in the future and get to significantly higher level of digitization.

Key words: Digitization; Innovation; Business model; Slovakia.

JEL Classification: O30, O31

Article classification: Research article

1 Introduction

The phenomenon of digitization, as well as the usage of digital technologies, represents a medium of innovation for organizations. Although, a lot of organizations,

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especially SMEs, face the question of how to implement new digital technologies into their functioning and how to make the innovation work in their organization based on digitization. Realizing and running the innovation based on digitization is still a real challenge, not only for executive managers and staff. There is also a significant lack of a deeper understanding and controlling of pragmatic, but well-founded tools and methods for application in business practice. Companies often make substantial efforts to innovate in their processes and products to achieve revenue growth and to maintain or improve profit margins. Innovations that are implemented to improve processes and products, however, are often expensive and time-consuming for the company. They use to require considerable investments in everything (R&D, specialized resources, new assets and even entire new business units). Sometimes, the top of the problem is, that in the final analysis, future returns on the up-front investments are very uncertain. It is possible to show the problem in observing the particular importance of mentioned issue during economic downturns, such as the 2008-2009 global recession. Experts unanimously agree that these were unprecedented times for nearly every company in nearly every industry. With declining revenues and severe pressure on profit margins, many businesses were getting into drastic cost-cutting in order to survive and make a good position for themselves for the next economic upturn. As part of these broad cost-cutting efforts, many investments in product and process innovation, as well as investments in market expansion were reduced or even eliminated. While such cost-cutting efforts were necessary and understandable, leading to put firms on a more solid economic level, the single-minded preoccupation with short-term cost savings often caused distress among employees, thereby reducing employee motivation, commitment, productivity and even the long-term competitiveness of some companies (Genenning, 2020).

Another good example of how digitization can be challenging is represented by a study made by Slovak Academy of Sciences. According to this study, there is a relatively low level of innovation, when compared to foreign competitors, seen in the manufacturing industry of Slovakia (which has a very important role in the Slovak economy). However, Slovak companies still maintain a certain degree of innovation and thus represent the potential for successful integration among companies that are actively implementing digitization into their corporate strategy (Jeck, 2017).

These facts create some serious questions embracing the area of digitization and innovation. For instance, if there is any way for managers to innovate inside their existing markets with their already existing products by utilizing their existing resources and capabilities. Are they able to extract more value from their firm's existing resources., and if so, how? Can these managers innovate without having no other way than to make significant investments in plant, property and equipment (PPE) or in R&D, which can have negative influence on other areas of the company? In other words, are companies able to do more with the resources and capabilities they have? Answers to these questions can be found in broader analysis of digitization and the necessity of understanding it in order to its proper implementation in firms operating on the market.

Corporate managers should be interested in business innovation for several reasons. Firstly, it represents an underestimated and quite overlooked source of future value for companies. A way of creating new revenues and profits at relatively low cost. Secondly, competitors might find it difficult to follow or replicate a whole new system. It is much easier to copy a single innovation. This business model can get the company into position with a sustainable performance advantage. Next, business model innovation can be such a potentially powerful competitive tool. Therefore, managers must be prepared to the possibility of competitor’s efforts in this area. They must learn to be able to identify competitive threats that may come from beyond their traditional industry

boundaries. This can be illustrated by example of Apple and its entry into the music business from the electronics and computer business, which was enabled by its business model innovation (Zott & Amit, 2010).

However, managers must know precisely which innovations they have to use in their companies in order to apply the digitization to the business process in a harmonic way. This enables the company to keep stable position on the market in a long-term and simultaneously does not affect the company's revenues in a negative way. Sometimes it means that manager has to decide not only to use the right innovation, but even decide to restrict or even cancel the innovation that could bring more complications than benefits for the organization (Knapčíková & Balog, 2019). The proof that managers must often face such decisions is represented by following statistics of increasing and reducing investments from companies into certain technologies in Telekom company 2020/2021 made by:

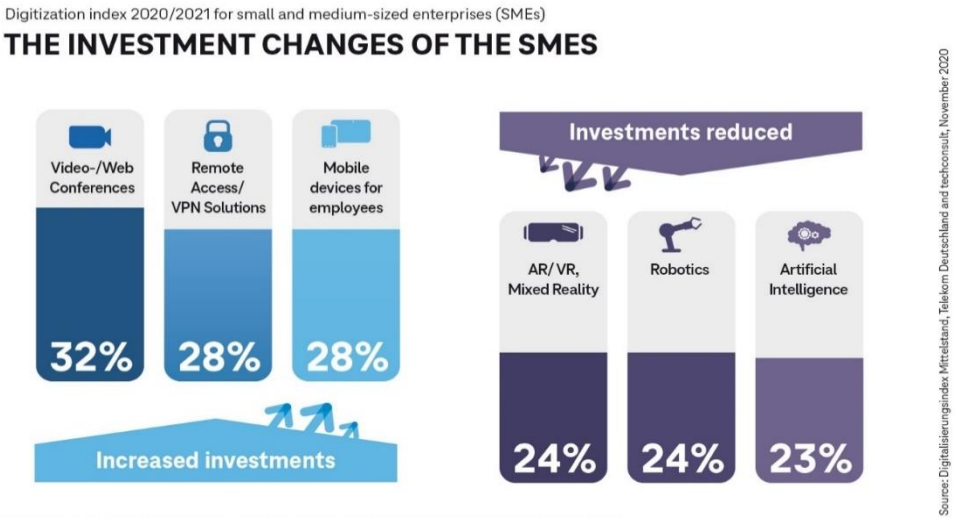

Figure 1 The investment changes of the SMEs; Source: Own elaboration

As it is obvious, these results were highly influenced by the crisis caused by Coronavirus, that changed the organization of running the business in almost every industry in the economy. Although, it does not change anything on the fact, that managers must be able to decide which innovations will be used and implemented in company processes in order for firm to grow and which innovations will be rejected because they would require too many resources in exchange for too little revenues causing losses for the company.

There are certain ways of how managers can handle the digitization while making their business decisions. One of the helpful tools designed to assist managers when managing digitization in their company is a system described in the figure 2.

This system provides a detailed analysis for manager about the specific innovation that can be in question. It is divided into explicit steps which can help manager to decide whether to use the innovation in the company or not. It is important to comprehend that he progressive digitization of all parts of the value chain is changing the business environment. Digitization is for decision making process defined as the networking of people and things and the convergence of the real and virtual worlds. This is enabled by information and communication technology and by the increased usage of digital technologies for connecting people, systems, companies, as well as products and services. Consequently, the digitization reinforced changes in the innovation process. With this system, the use of digital technologies is understood to implement the fact that different

actors are connected and interconnected and the supply of services has shifted from a single company to wide service systems. These service systems evolve, interact and reconfigure to create high value together while ultimately aim to improve service innovation. This value is created when entities of a service system work together to improve one another´s capabilities and act in specific situations or environments in a common beneficial way. The usage of digital technologies can serve as enabler and improver of service systems. In this sense, the use of digital technologies makes actors run to improve current service systems and therefore leads to innovation and creates potentials of new value. To increase the value, digital technologies must be understood and used in defined purpose.

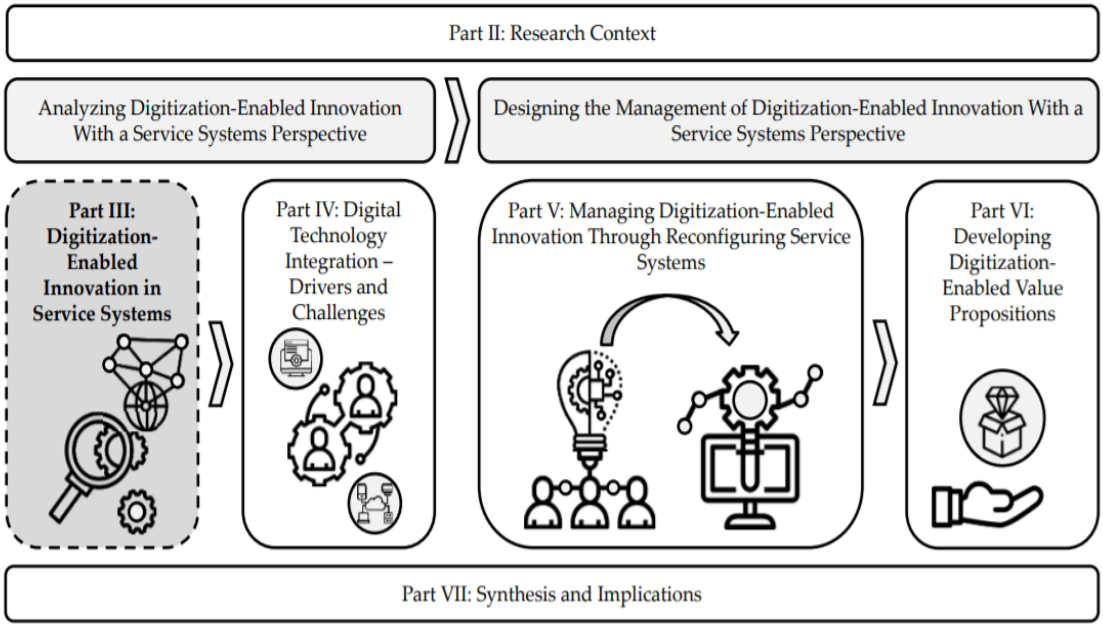

Figure 2 Inovations; Source: Genenning: Realizing Digitization-Enabled Innovation: A Service Systems Perspective for Management, 2020

The changes of the service systems which are under investigation are identified on the basis of three core elements of technology, as well as actors, information and the service system's value propositions. The focus of analysis relies on the enabling characteristics of digital technologies for the reconfiguration of service systems and the development of new value propositions for the service system as a whole. Results of this process deliver real insights for the management of digital technologies in service systems. These can be examples for possible approaches in companies (Genenning, 2020).

Fast technological advances provide new types of technology-based interactions between economic representatives. These advances opened an opportunity for companies to fundamentally change the way they run their business. Especially, how they organize exchanges and activities inside not only company, but also industry boundaries with customers, partners and other players on the market. Thanks to these technological advances, managers of focal companies could successfully increase the number of possibilities of types of structure which they use in their networks. They are now able to create groundbreaking exchanges and activities. This design is built in cooperation with business model of the company. General aim of business model of the focal company is to satisfy a suspected need in order to create value for the company and its partners. This

aim is reflected in the customer value proposition. As it was "underlined" before, a focal company's business model is determined as system composed of activities which are designed and launched by a focal company, but which rises above the focal company and expands its limits. It is composed of actions managed either by the focal company or by its partners. This concept of business model is created thanks to many plentiful sources so its origins are based on high quality content (Amit & Zott, 2010).

There have already been several studies made on this topic. Some of them even formed their own specialized ways and theoretical views on mentioned business models. For instance, one of the studies links the business model to the technology management literature and defines it as so called "heuristic logic" which links technical potential with the realization of economic value, highlighting its role in connecting technology to market outputs (Chesbrough & Rosenbloom, 2002). Another study suggests that one of important components of business models are the choices made by management in the way how the organization operates, such as compensation practices, procurement contracts, location of facilities or assets employed (Casadesus-Masanell & Ricart, 2010). Next view is based on the belief that there is no need to establish new business model unless it is not only new to the company, but in some way game-changing to the industry or market itself (Johnson et al., 2008). Additionally, there is a study which claims that business model innovation requires to include modifications in the questions of who, what, when, why, where or how much it is involved in the process of delivery of products and services to customers (Donald & Coles, 2003).

Although these views in the area of business model innovations can have their advantages, there is still high need of concentration on the other factors, such as activity system as the level of analysis and on the activity as the unit of analysis for business model innovation. The stronger the preparation of the business model innovation is made, the more caring the value creation becomes. Thanks to this, company can achieve much higher profitability and so it can establish strong and stable position on the market (Amit & Zott, 2010).

2 Methodology

This work was made by analysis of secondary data as a systematic method of interpretation, as well as analysis of official documents and announcements from official institutions. By the analysis of these specific information, there is a brief history and actual situation of level of digitization in Slovakia constructed. After this, in the conclusion all analysis is summed up and thoughts on presumed progress in this field is made.

Secondary data are collected mainly from the OECD report on Digital technology diffusion (prepared by Dan Andrews, Giuseppe Nicoletti and Christina Timiliotis in 2018) and OECD Going Digital Toolkit, based on OECD ICT Access and Usage by Households and Individuals Database. Data describing the share of individuals using the internet to interact with public authorities Individuals using the Internet to interact with public authorities are displayed as a percentage of all individuals aged 16-74 years. Measured interactions range from simply obtaining information from government websites to interactive procedures where completed forms are sent via the Internet. Excludes manually typed e-mails. It should be noted, however, that the need to submit forms, as well as the availability of online submission channels, varies between countries. Public authorities refers to public services and administration activities at the local, regional or national level.

Documents which were analyzed, come mostly from Slovak ministries (Ministry of Investments, Regional Development and Informatization and Ministry of Economy). There is also Allianz Economic Research on measuring digitality used (prepared by Mahamoud Islam, Georges Dib and Ludovic Subran). All of this data were processed and presented in order to show the present picture of how digitization and innovations in business models of Slovak companies looks like and how it can look like in near future.

3 Results

Huge problem that occurs in terms of business, economy and productivity is involvement of digitization into a production process. This is not problem only in environment of businesses themselves but in economy as a whole. According to OECD report, there is an insufficiency of diffusion of new technologies that has been quoted as one of possible reasons for weak productivity performance over the last 20 years. As a following chart presents, there is significant difference between certain OECD countries in usage of internet for communication with public authorities (E-Government concept):

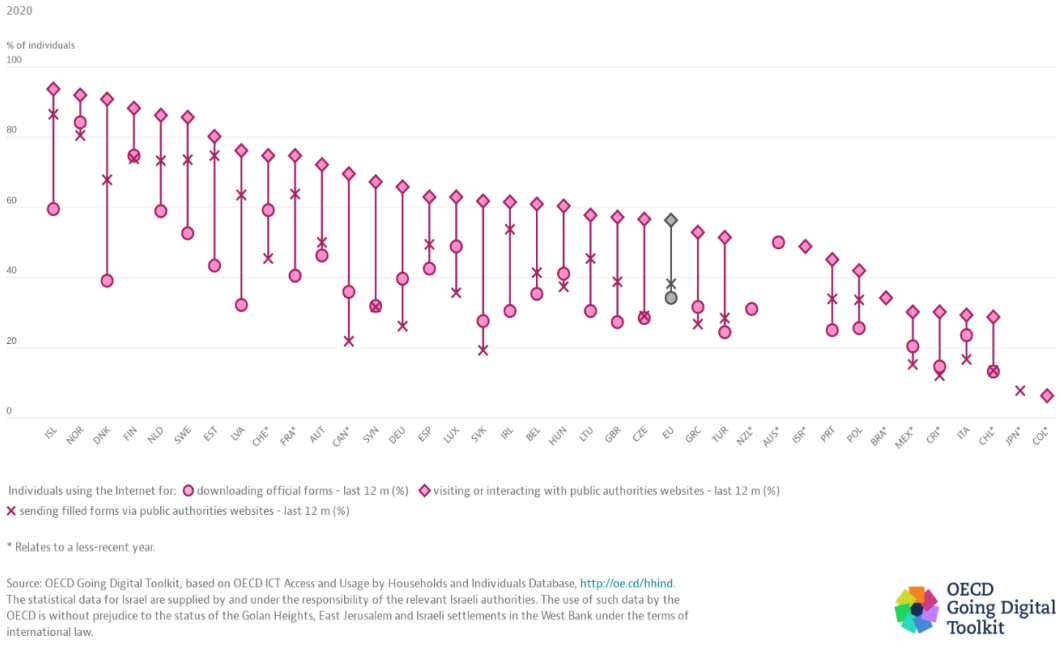

Figure 3 Share of individuals using the Internet; Source: OECD

It is clear that most of the countries did not implement E-Government concept into their functioning on sufficiently high level by 2020, as more than half of them recorded that less than 80% of their population used internet to interact with their public authorities. Unfortunately, most countries with higher representation than 80% in this statistics are proportionally smaller 'than average of OECD is and so they do not increase the overall picture of digitization inside this group of countries much. Even more alarming fact is that data are much worse when closer usage of the internet is analyzed. There are only two countries (Iceland and Norway) where more than 80% of citizens use the internet to send filled documentation to authorities. Almost all OECD countries are below 60% in statistics describing usage of the internet to download the documentation needed to deal with the authority. Slovakia is one of the worst countries in this particular rating.

Another proof of Slovakia's exigent situation in area of digitization is its position among other countries in Enabling Digitalization Index (EDI) which monitors the ability (and agility) of countries to help digital companies thrive and traditional businesses harness the digital dividend. This index scores 115 countries based on five components: regulation, knowledge, connectivity, infrastructure and size. Slovakia ended up in 2020 in 44th place, but it is more important to notice, that since 2016, the country is getting worse in the ranking. While in 2017, it was in 39th place, the following year it slid to 40th place and after 3 years, Slovakia is even 4 place lower, than previously. This is the evidence of country's stagnation in this field and so the absence of support of technological and digital business environment.

There are views on how to change this situation in Slovakia and provide a helpful environment for businesses operating in the country to implement digitization into their business model in the most profitable way possible. For instance, the strategy of digital transformation of Slovakia 2030 is a program of Slovak government which defines the policy and priorities of Slovakia in the context of the ongoing digital transformation of the economy and society under the influence of innovative technologies and global trends during the digital age. It covers the time period from 2019 to 2030 and it has been prepared as part of already launched and partially managed processes of digitalization, informatization and agenda of single digital market of the EU, as well as in the context of global priorities of a broad digital transformation. Therefore, the Strategy puts primary emphasis on current innovative technologies such as AI, Internet of Things, 5G Technology, Big Data and Analytical Data Processing, Blockchain and High-Performance Computing. This will become the new engine of the economic growth and strengthening of competitiveness. Therefore, at the national level, it will be necessary to accelerate already launched processes, connect national strategic measures with global trends as well as implement new policies based on the latest EU priorities and specific needs of Slovakia. According to ambitions of this strategy, Slovakia should become by 2030 a country with innovative industry, as well as country with effective public administration ensuring smart use of the land and infrastructure. Not only for businesses, but also for the rest of the market, Slovakia should be developed into an information society whose citizens use their potential at full and live high-quality and secure lives in the digital era.

Even though aims of Slovak government in digitization are so aspiring, there are some concerns about how this plan will be fulfilled and what is the correct way, how Slovak government and businesses should achieve it. Non-governmental organization called Slovensko. Digital observes the activity of Slovak government in digital affairs over last years and it already found many failures which occurred during the process of implementation of the digitization inside the country. On the other side, this organization helped to improve mentioned process and it still attempts to be more helpful during future actions in this area, as it claims on its official website. Also, the officials from the government itself declare that they realize mistakes that were made previously and announce to improve the system in the way which will not allow to repeat them again. In this context, Ján Oravec (secretary of Slovak Ministry of Economy), for instance, informed about the new legislation, which introduces the principle of so called one in - one out (later one in - two out). This principle means that if any new obligation for entrepreneurs is introduced in the legislation, there has to be new part of this obligation, which will have to include a proposal on how to save elsewhere. In practice, there will be no exchange of one regulation for another, but financial part of the deal will be important. It means that the amount of money in question cannot be increased when compared with previous conditions. Oravec also outlined the structure of the future Council of the

Government of the Slovak Republic for Competitiveness and Productivity, the creation of which is expected in the second half of 2021. Business representatives from Slovak entrepreneurial environment expressed their support to these plans. They also reminded the need to implement them in business practice. Representatives pointed out as well, that the tax rate for digital subjects is too high on Slovak companies, the administrative complexity is too difficult and that the enforceability of the law is too low. According to the proclamation of representatives, it is also necessary to deal with problems, such as the lack of qualified workforce, export support or R&D in Slovak companies.

4 Conclusion and discussion

As it was described, Slovakia is behind its close competition in terms of digitization among businesses (EU or OECD group). The progress recorded is at so negligible level, that other countries are getting to lead their way far from Slovakia, what can affect business models of Slovak companies in a negative manner. However, there plans and programs, how to change this situation and prepare business environment, where companies operating in Slovakia can handle the digitization in their business model effectively and so bring a progress to Slovak economy in general. On the other side, there have been ambitions like this before in Slovakia but in many cases they did not reach the success they were running for. Slovak government confessed that this happened before but promised to fix the situation and make arrangements in order prevent from previous mistakes to occur again. Important factor in achieving higher level of digitization in Slovakia is forming the right way of managing companies and creating strong business models for them in order to run them as effectively as possible. It is genuinely important for companies to be ready for constant changes in this environment. Even thought there are many views on how the preparation of accurate environment should look like, all of them agree on fact, that there are decent assumptions in Slovakia to create business environment with strong level of digitization bringing many new and valuable innovations. In case of setting productive communication and right cooperation between both businesses and government (as well as other players on the market) there is a high probability of achieving goals that government, as well as companies, already set in the field of digitization. There are many resources which Slovakia can use to reach this kind of situation (for instance EU membership or presence of many innovative companies in the country) but there is high necessity of possession of the right knowledge on how to use them in order to get to the projected level of digitization.

Acknowledgements

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Digitalization in manufacturing companies: The role of innovation departments in adoption of new technology

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Abstract

The entire organization can function despite the distance and is available to both employees and consumers. The aim of this study was to identify the current approach to digital transformation among large companies in the context of its various characteristics. From the results of the research, we found that Czech companies show significantly higher quality and quantity in the use of technologies such as software and applications than Slovak companies. The same is true for foreign companies compared to domestic ones. In terms of the introduction of automation and digitization, Czech companies are better off than Slovak ones in terms of the existing situation. Branches of foreign companies in Slovakia and the Czech Republic also achieve better results in the current introduction of digitization than domestic companies and also realize activities to a greater extent in relation to future development than domestic companies. In relation to future development, large companies operating in the service sector realize more activities than industrial companies. Although we observe some differences between Slovak and Czech companies and also between different characteristics in the introduction of digitization and digital tools, in both countries large companies are increasingly implementing this trend, also caused by the current COVID-19 crisis, which forced companies to operate in digital world.

Keywords: Digital transformation; Digital technology; Large companies; Development.

JEL Classification: O14, O33, Q55

Article Classification: Research article

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1 Introduction

Industry 4.0 embodies, in particular, the extensive and rapid changes in the manufacturing industry caused by the advent of digitization. It is the digitization and optimization of products, services and business processes using new innovative technologies. Implementing the concepts of Industry 4.0 will mean achieving a new level of organization and control over the entire value chain of the product life cycle for the company, thanks to which it will be able to better respond to increasingly individualized and demanding consumer requirements (Gilchrist, 2016). Thanks to advances in information, communication and operational technologies, companies are given the opportunity to use tools that increase the level of digitization and automation and intercompatibility of processes (Hermann & Pentek, 2015).

The core of Industry 4.0 is the management of business processes based on a large amount of structured and unstructured data coming from various sources - *Big data* (Perera et al., 2015). These large volumes of data are then subjected to analysis, the purpose of which is to reveal new knowledge, hidden correlations, trends and contribute to the overall optimization of business processes. In addition to obtaining information about the future, the key for Industry 4.0 is the ability to analyze data in real time and use it in direct, fast and efficient communication between devices (M2M - machine to machine communication). This principle can be used, for example, for predictive fault analysis, automatic replenishment of consumed material, conditional maintenance, and many others. Another evolutionary step of these M2M systems is the optimization of "behavior" controlled by artificial intelligence (Chen et al., 2020).

Large amounts of data, predictive and autonomous decision-making processes require a large "digital capacity". The concept of cloud computing solves this problem by supplying computing power, data storage, software and other IT tools in the form of a specific platform via an Internet connection (Vélasquez et al., 2018). Typically, this technology is provided to businesses as a service from IT companies. Cloud computing enables the centralization of information when applying the principles of Industry 4.0

Comprehensive digitization will also bring new challenges for companies in the form of IT security risks. Cybersecurity (Lezzi et al., 2018) is already a major issue and its importance is likely to increase over the years. It is about protecting business information and valuable knowledge in digital form from misuse, unauthorized access and theft. With expanding network connectivity, cyber-attacks are becoming more common due to the misuse of misused data for various purposes - such as financial or strategic benefits.

Technological progress can also be recorded in the field of operational technology. A new method is currently being applied in the production sphere - the so-called additive manufacturing or 3D printing (Dilberoglu et al., 2017). This technique is based on the gradual addition of layers of raw material until the final product is formed. The advantages of this method of production include the reduction of waste material, rapid prototyping of the product, flexibility and great variability of production, low demands on the skills of production operators and others.

Major changes are also expected in the field of automation with the arrival of a new generation of robotics making full use of the potential of information technology. Industrial robots are in many respects more efficient than human workers (Galin & Meshcheryakov, 2019). By robotizing production, it is possible to shorten production time, reduce costs and increase accuracy. However, automated production lines will not fully replace people. For efficient and robust production, the cooperation of humans and robots as a whole will be necessary.

Augmented reality (AR) is another technology from which companies can benefit. This technology brings an innovative way for humanity to interact with the physical and digital worlds. The main goal of AR is to increase the perception of the environment by complementing the human vision with computer-generated visual information through devices such as a smartphone with a camera, glasses and other projection devices. Computer-generated information can be in the form of images, videos, 3D models, texts, sounds, speech instructions, etc. The three key features of AR are: presentation of virtual and physical objects in a real environment, interactions with these objects in real time and synchronization of virtual objects with real objects (Cevikcan & Ustundag, 2018).

Other technologies influencing the development and shift towards the fourth industrial revolution include simulation software that faithfully captures the properties of physical objects (digital twins), fifth generation network communication technology (5G), distributed decentralized databases (blockchain), wearable smart accessories (e. g. watches) and others (Borowski, 2021).

1.1 Literature review

Originally initiated in Germany, Industry 4.0 or the Fourth industrial revolution, has attracted much attention in recent years. It is closely related with the Internet of Things (IoT), Cyber Physical System (CPS), information and communications technology (Yang Lu, 2017). When the idea was first mooted, extensive efforts were undertaken by the European manufacturing researchers and companies to embrace it. Their interest in this concept is due to the fact that under Industry 4.0, production will become more efficient and less costly (Qin et al., 2016).

Innovations associated with Industry 4.0 will bring about societal transformation in many areas of life. Industry 4.0 brings new challenges to the business environment that companies will have to face. At the same time, however, this concept also creates an enormous number of new opportunities for business development (Bylok et al., 2019). The views of experts on the fourth industrial revolution are divided into optimistic and pessimistic views. In this work, we tend to take an optimistic view, namely that Industry 4.0, like previous industrial revolutions, will bring economic growth, prosperity and an increase in the living standards of the population. The world's economies are launching various initiatives to modernize the economy in the context of the growing digital age. Digitization and technologies associated with Industry 4.0 do not only apply only to manufacturing companies. The changes will affect virtually all sectors and areas of life: services, logistics, transport, construction, healthcare, finance, retail, administration, consulting, education and more (Reinhard et al., 2016).

From a global and local economic perspective, Industry 4.0 will affect all major macroeconomic variables: GDP, investment, consumption, employment, trade, inflation and more. There will be changes in consumer behavior related to the optimization of business processes, the emergence of new services and products. We can already observe today that customers demand a comprehensive customer experience, which includes not only a functional product, but also elements such as: packaging design, brand, purchasing process, customer service and more. The way of reaching customers is also changing - the usual demographic segmentation of consumers is moving to targeting in the online environment based on the willingness of potential customers to interact and share their data.

Thanks to advanced communication systems and databases, supplier-customer relationships, logistics processes, customer relations and organizational collaborations will become much more efficient in the future (Kearney, 2017). They will be based on

transparent data sharing and high connectivity. These vertical and horizontal system integrations will be an important support infrastructure for the operation of intelligent factories, which will be able to operate at a high level of automation, flexibility and operational efficiency.

Industry 4.0 will also make big changes in the labor market. New professions will emerge that reflect the needs of the technological age. On the contrary, professions consisting of routine easily automated activities will gradually disappear. Employers will begin to require a skilled workforce with technical training and analytical skills, which will be in short supply. This fact will require changes in the training of future employees and retraining of the existing workforce (Zaležáková, 2018). There are two opposing scenarios on this topic - the first is the emergence of massive "technological" unemployment. The second scenario assumes the possibility that people whose jobs will be lost will find a better job and a new era of social prosperity will begin. It will largely depend on the complexity and speed of the changes made (Schwab, 2017).

An important supporting element of Industry 4.0 is government policy, which should enable, improve and promote the adaptation of this revolution in the economy through the preparation of strategic programs, investment incentives for enterprises, support for technical fields of study, subsidizing scientific research and other related initiatives. Financial assistance should be targeted in particular at small and medium-sized enterprises, which may have difficulty investing more in innovation (Yang, 2021).

Sustainable business in the context of environmental protection is currently a much-discussed topic. Public pressure and the influence of the media create demands for greener business practices. Until recently, investments in green business were only attractive when they were subsidized by the government. However, this is less and less true. Rapid technological advances in renewable energy, waste reduction, fuel efficiency and energy storage increase the profitability of investments and contribute to climate change mitigation.

Technological progress also opens up new topics in the field of legislation. One of the biggest challenges is the issue of cybersecurity and personal data protection. Another important and controversial aspect is determining responsibility for decisions made by automated devices. The creation of new regulations is hampered by the need for specific expertise and a rapidly evolving technological environment. New laws in this area can significantly affect the difficulty of adapting Industry 4.0 to organizations.

Companies will also face challenging changes in their internal environment. In addition to technological evolution, the transformation of the organizational structure and corporate culture will be required in parallel. However, people usually don't like to change the "status quo". Complex changes within companies will require excellently managed change management and impulses towards the support of an organizational culture with a positive approach to innovation activities (Almada-Lobo, 2016; Yin & Kaynak, 2015).

As Hlušková notes, Slovakia, as a country extremely dependent on developments in other countries on a global scale, has no choice but to participate in the implementation of Industry 4.0. The development of new technologies is currently proceeding at a pace unparalleled in history. Therefore, the speed of the countries' response to these changes - a proactive approach and efforts to identify trends is crucial (Hlušková, 2016).

2 Material and methods

The aim of this study was to evaluate innovation activities of manufacturing companies in Slovakia in the context of fourth industrial revolution, focusing on the significance of innovation departments. The research was conducted on 50 manufacturing companies in Slovakia. Primary data for the research were obtained through questionnaire realized during 2021. The character of the questions was self-assessing. The results presented relate to company's innovation strategy, digitalization activities and degree of implementation of new technologies. For the purpose of the in dept analysis, research sample was categorized based on company size, maturity, domestic vs. subsidiary and whether the company has innovation department or not.

The research questions focused on two key areas. First are regarding the approach towards Industry 4.0 and the company plans to invest in specific areas such: operation and production, supply chain, marketing and sales, maintenance, human resources, products, services, business partnerships, customer support or R&D. Second are was focused on Industry 4.0 technologies such: robotization/automation, artificial intelligence, augmented/virtual reality, data analytics and big data, cybersecurity, additive production/3D printing, cloud computing, system integration, internet of things and sensors, simulation/digital twin or blockchain; while respondents could answer on a scale 1-4 (1-insignificant technology; 2-important technology but won´t be deployed; 3-technology will be implemented in the future; 4-technology currently in place). Linear regression analysis was used in order to identify main dependencies between individual results of the research. Significance level was set at p=0,05. Independent variable was company size, domestic vs subsidiary, existence of innovation department and length of existence of the enterprise (maturity). Additionally, chi square test was used to evaluate statistical significance of two categories and their respective variables.

3 Results

Respondents answered questions to evaluate their innovative activities in connection with Industry 4.0. The sample consisted of 50 companies operating in manufacturing sector in the Slovak Republic.

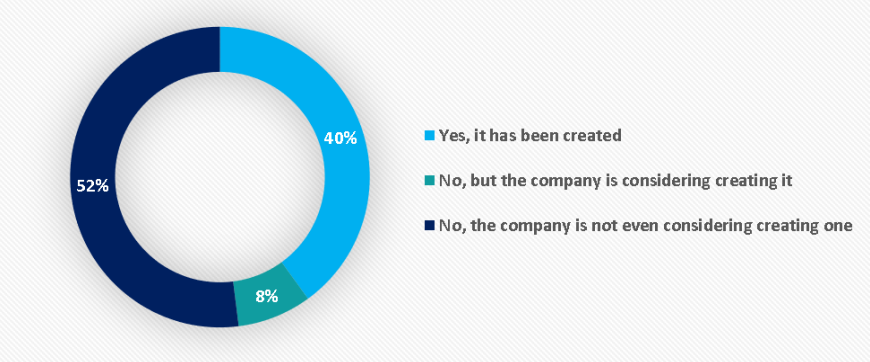

Figure 1 Existence of an innovation department or similar unit within the manufacturers; Source: own elaboration

In the research sample, 40% of respondents have an innovation department. 8% of companies do not yet have such an organizational unit, they are considering its creation in the future. The rest of the companies, which make up 52% of the innovation department, do not have and are not considering creating one.

Regarding the recognition of the concept of Industry 4.0, respondents were questioned on their approach towards Industry 4.0.

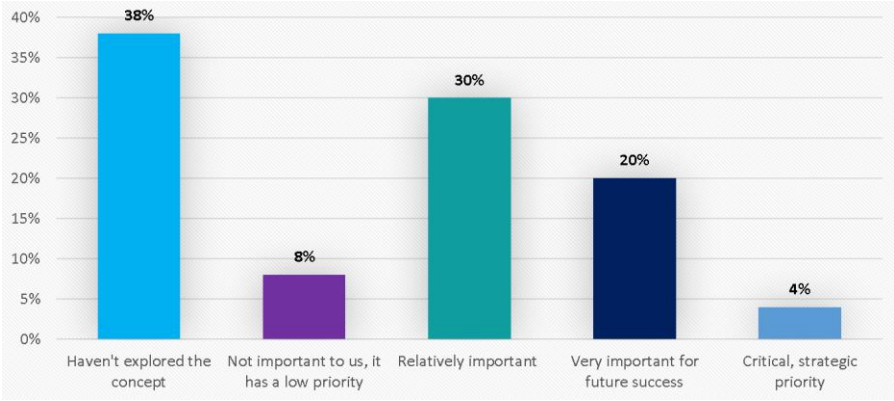

Figure 2 The companies' approach towards Industry 4.0; Source: own elaboration

The general approach of manufacturers towards Industry 4.0 was examined using five-point scale. Out of the respondents, 38 % indicated that their company is not yet interested in this concept and is therefore not on the list of their strategic priorities. Industry 4.0 is relatively important for 30% of manufacturing companies, which means that the management is at least interested in this issue and follows new trends. The concept of the fourth industrial revolution is perceived by 24% as very important for the future success of the company. Which suggests that in the future they will undoubtedly invest in this direction. For 8% of companies, Industry 4.0 is not important. The remaining 4% of companies have now identified Industry 4.0 as their critical priority, and are therefore already working hard to implement it, and this idea is a stable part of their long-term strategy.

Table 6 Regression analysis for approach towards Industry 4.0; Source: own elaboration

Independed variables	β	Standard Error	t Stat	P-value
Intercept	2.057	0.812	2.531	0.015
Innovation department	**1.062**	**0.341**	**3.118**	**0.003**
Domestic vs subsidiary	-1.211	0.404	-2.998	0.004
Maturity	0.210	0.196	1.067	0.292
Size	-0.019	0.183	-0.104	0.918

Regression analysis has revealed that companies with an innovation department consider Industry 4.0 to be more important (β = 1,062). Furthermore, manufacturing companies with Slovak capital (domestic) consider Industry 4.0 to be less important compared to subsidiaries of foreign entities (β = -1,210).

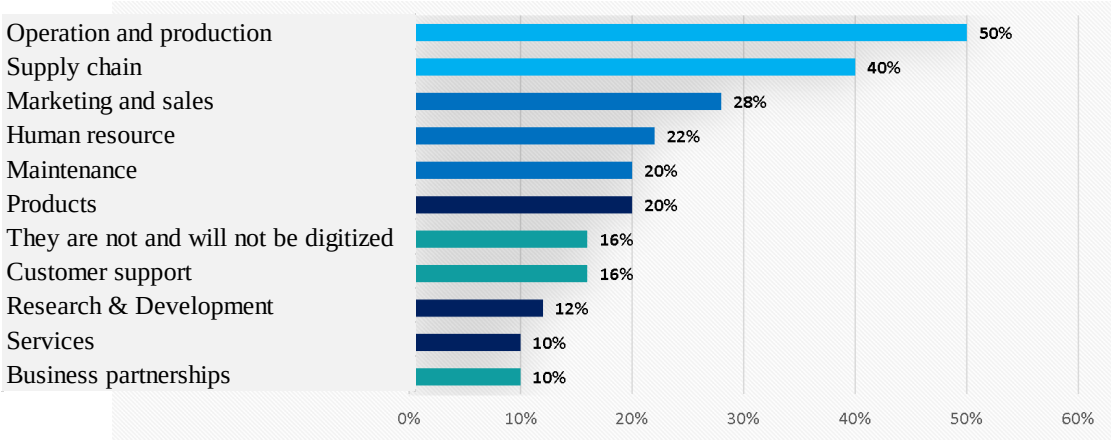

Figure 3 Digitalization of main business areas; Source: own elaboration

Digitalization is one of the key components of industrial changes in currant era. Manufacturing companies in our research sample plan to digitalize mainly production and operation (50%) followed by supply chain (40%). The positive finding is that only 16 % of respondents stated that all considered business areas in this research will remain unchanged. Marketing and sales will be digitalized by 28% of respondents. Marketing and sales are important business areas that provide demand for the company and they shouldn't be overlooked. A smaller number of companies intent to innovate processes related to human resources, maintenance, products, and customer support. In the context of digitalization manufacturers in Slovakia will pay least attention to R&D, service offerings and business relationships.

Using regression analysis, we also found that the number of innovated areas in manufacturing companies is dependent on existence of an innovation department. At significance level $\alpha = 0.05$, a beta coefficient of 1.172 was calculated – thus we state that the companies with established innovation department introduce digitization into business processes to a greater extent.

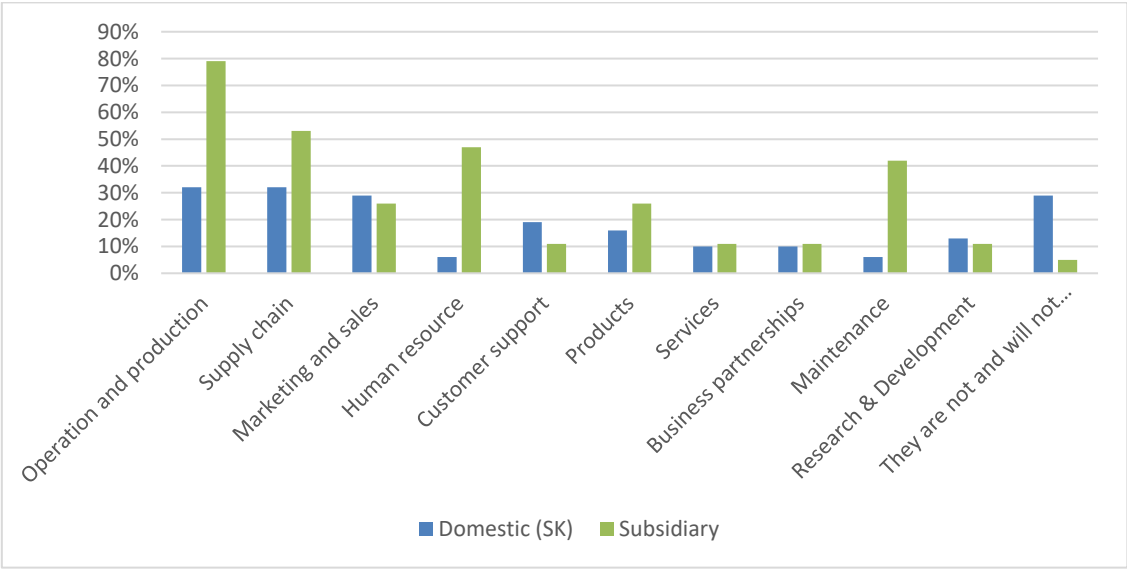

Figure 4 Digitization of business areas in the near future; Source: own elaboration

To explore digitalization of manufacturing companies in Slovakia in a further detail, respondents were divided into two groups: manufacturers with domestic capital and manufacturers with foreign capital (subsidiaries). Results of chi-square tests have shown that statistically significant differences between observed two groups are in the areas of human resources, production, as well as maintenance. These areas are being digitized to a greater extent by companies with foreign capital.

Research further focused on implementation of specific modern technologies related to Industry 4.0. Respondents assigned one of four following values to each listed technology: 1. insignificant technology; 2. important technology but won´t be deployed; 3. technology will be implemented in the future; 4. technology currently in place.

Table 2 Implementation of modern technologies; Source: own elaboration

	Not important	**Important but not planned to be introduced**	**Planned to be introduced in future**	**Currently being introduced / used**
Robotization/Automation	18%	8%	30%	44%
Artificial Intelligence	40%	30%	28%	2%
Augmented/virtual reality	54%	24%	20%	2%
Data analytics and big data	26%	28%	22%	24%
Cybersecurity	18%	18%	26%	38%
Additive production/3D printing	54%	24%	10%	12%
Cloud computing	40%	24%	20%	16%
System integration	26%	14%	28%	32%
Internet of things and sensors	38%	16%	24%	22%
Simulation/digital twin	54%	20%	22%	4%
Blockchain	62%	20%	16%	2%

Today the most useful technological solutions for manufacturing companies appear to be robotization/automatization, cybersecurity, and system integration as majority of the respondents plans to implement them in the future or already does so. On the contrary, businesses are least interested in artificial intelligence, augmented / virtual reality, additive manufacturing, cloud computing, digital twins and blockchain.

Implementation of new technologies differs based on capital structure of manufacturing companies. Currently, modern technologies are used or will be introduced mostly by companies from abroad – manufacturers located in Slovakia with foreign capital (subsidiaries). Looking at the planned implementation of technologies, we can see that companies with foreign capital are considering to put into practice advanced and more complex solutions – artificial intelligence, augmented / virtual reality and simulations / digital twins. On the contrary, companies with Slovak capital will in the forthcoming apply technologies that are by their foreign based counterparts already in use - robotics, cybersecurity and system integration.

A high percentage of producers with Slovak capital consider unimportant or do not plan to implement: artificial intelligence (84%), augmented / virtual reality (94%), data analytics (74%), additive manufacturing (94%), cloud computing (81%), simulation/digital twin (90 %), blockchain (94%). If these companies do not change their approach over time, it will be increasingly difficult for them to remain competitive on both local and global level.

We have tested the significance of innovation department in the decision to invest in analysed new technologies. Each of the technologies was separately set as dependent variable with independent variable being existence of innovation department.

Table 3 Modern technologies – domestic manufacturers vs subsidiaries; Source: own elaboration

	Not important		**Important but not planned to be introduced**		**Planned to be introduced in future**		**Currently being introduced/used**	
	Domestic	Subsidiaries	Domestic	Subsidiaries	Domestic	Subsidiaries	Domestic	Subsidiaries
Robotization/Automation	29%	0%	13%	0%	39%	16%	19%	84%
Artificial Intelligence	55%	16%	29%	32%	16%	47%	0%	5%
Augmented/virtual reality	65%	37%	29%	16%	6%	42%	0%	5%
Data analytics and big data	32%	16%	42%	5%	13%	37%	13%	42%
Cybersecurity	26%	5%	26%	5%	35%	11%	13%	79%
Additive production/3D printing	68%	32%	29%	16%	0%	26%	3%	26%
Cloud computing	48%	26%	32%	11%	16%	26%	3%	37%
System integration	35%	11%	19%	5%	29%	26%	16%	58%
Internet of things and sensors	42%	32%	23%	5%	19%	32%	16%	32%
Simulation/digital twin	65%	37%	26%	11%	10%	42%	0%	11%
Blockchain	71%	47%	23%	16%	6%	32%	0%	5%

Table 4 Regression analysis for implementation of modern technologies; Source: own elaboration

Dependent Variable	Independent Variable			
Technology	β	Standard Error	t stat	P-value
Robotization / automation	0.199	0.311	0.640	0.526
Artificial intelligence	**0.717**	**0.256**	**2.800**	**0.008**
Augmented / virtual reality	**0.845**	**0.253**	**3.346**	**0.002**
Data analytics	**0.753**	**0.326**	**2.313**	**0.025**
Cybersecurity	0.211	0.343	0.616	0.541
Additive production	0.335	0.327	1.025	0.311
Cloud computing	**0.727**	**0.344**	**2.115**	**0.040**
System integration	**0.807**	**0.334**	**2.416**	**0.020**
Internet of things and sensors	0.544	0.397	1.371	0.177
Simulation / digital twins	0.150	0.306	0.492	0.625
Blockchain	**0.592**	**0.265**	**2.229**	**0.031**

The regression analysis has revealed that the existence of an innovation department is a significant factor positively influencing the implementation of new technological solutions. This relationship was confirmed for the six technologies – artificial intelligence, augmented / virtual reality, data analytics, cloud computing, system integration and blockchain. Based on relevant beta coefficients, the innovation department increases the rate of technology implementation on a scale from 1 to 4 (1-insignificant technology, 4-technology currently in place) by 0.740 degrees on average.

4 Discussion

Manufacturing companies today are situated in the hyper competitive environment in which customers' requirements grow. Changes in the market environment are taking place at rapid pace. The manufacturing industry in further coming years will be defined mainly by volatility. The industrial sectors will see more disruption within the next five years than in the past 20 years combined (McKinsey & Company, 2018).

As innovation gap between domestic and subsidiary manufacturers remains or grows even more, it will be increasingly difficult for Slovak companies to stay competitive in both local and global market in the aspects of creating value added products, price setting, production time, service offering, customer experience and cost reduction. Domestic enterprises should take advantage of every opportunity by which competitive advantage could be obtained.

According to recent study performed by PwC, large European manufacturers are focusing most strongly on digital factory investments in their home markets. Further, 75% of companies think that the local digital factory is more efficient than offshore factories. Therefore, in recent year we could see reduction of investment activities of subsidiaries in Slovakia. Despite it being negative to the country as a whole, this could lead to less local competitive pressure for domestic manufacturers in Slovakia. In combination with very favourable geographic location of the country, this could lead to new opportunities, provided that Slovak manufacturers will be able to maintain their competitiveness. Based on our findings, manufacturing companies should consider setting up an innovation department while this organizational structure has proved to have positive impact on the level of digitalization and implementation of new technologies. Companies should also focus on implementing the principles of agile manufacturing, which will allow them to better respond and capitalize on changes in demand. Such transformation is continuous procedure that requires changes in the way processes are performed, employee's mindset and skill level as well as technological infrastructure. Another way to increase innovation capability of the companies is to utilize benefits of specialized clusters - due to the concentrations of resources and human talent, they create conditions in which businesses can evolve and implement new solutions more efficiently or other strategic partnerships within their existing or new network.

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Building Information Modelling as a support for Industry 4.0

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Abstract

Digitization is currently one of the important elements in construction in the activities of the concept of the Industry 4.0 strategy. Technologies and developments in this area are the current engines of society. More precise technologies for collecting and processing a large number of interconnected data sets, which offer various solutions to investors, designers, and end-users in the environment of building information models (BIM), are coming to the fore. The creation of virtual and digital object models allows for some form of connection with current global trends. The paper deals with BIM characteristics and emphasizes the possibilities of its use within the strategy Industry 4.0.

Keywords: 3D data; digitalizatiom; 3D models; BIM; Industry 4.0.

JEL Classification: D18, K22, M31

Article Classification: Research article

1 Introduction

Industry 4.0 is currently a well-established and ongoing strategy with continuous development, which includes the concept of an intelligent industry connected in several areas (mechanization, automation, digitalization, networking, to miniaturization) (Lasi et al. 2014). It is the area of digitization that represents a direct connection to the issue of BIM. Of the terminological meaning, BIM presents the conceptual term Building Information Model or Modeling). In a simplified sense, it is a model that allows the preparation, use, and management of a virtual model of the object, respectively.

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construction during its entire life cycle) (Erdélyi et al. 2018). It is also a tool that allows you to work with a wide range of descriptive and graphical information necessary to implement a construction project (Funtík et al. 2018), whose range of benefits is known. The Information Model (IM) has a very close connection, and connection to BIM, which is a simplified form is a three-dimensional virtual model of a building (Kundrát 2021). Often these two terms are understood under one meaning. In the conditions of the Slovak Republic, the semantic aspects of IM are further characterized in technical standards (STN EN ISO 29481-1, STN EN ISO 29481-2).

For the Industry 4.0 strategy, which concerns digitization, BIM presents a key element, especially for the construction sector. To align the aims and requirements of digitization with the emphasis on construction, the issue of BIM needs to be given close attention. As stated in the study (Begic et al. 2021) "*BIM in Construction 4.0 will metamorphose into an active internet data exchange environment, i.e., BIM 4.0*". The paper aims to present the possibilities and benefits of using BIM, emphasizing the Industry 4.0 strategy.

2 Material and methods

2.1 The importance of BIM

The constant development of technologies and the advancing development of society increases the demands on information systems and their deployment in actual conditions of practice. The current trend in construction is to create the most comprehensive model of the investment project, whose usability in all phases of the life cycle of the building will be maximum. The use of BIM technology is a trend today, with great application possibilities in several segments:

- Building construction.
- Road engineering.
- Water management.
- Other special areas of construction.

The most widespread application of BIM is visible in design practice. The process of designing and building new buildings uses BIM technology. Using available tools with techniques has changed the approach to design. For these purposes, the BIM building model presents the geometry of the building, which is made up of several objects (walls, slabs, columns, doors, windows, etc.) (Kozlovská et al., 2015) descriptive, attribute properties.

Such IM can be considered as a complex parametric model with filtering options (descriptive, geometric, spatial, technical data). This approach also takes into account the creation of a model of current conditions (Figure 1).

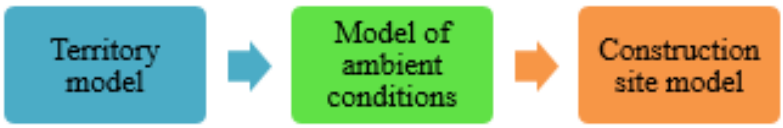


Figure 1 Model of current conditions; source: own elaboration

Advantages of data management in a unified work environment, i. in a suitable information model, enable better coordination of all activities during the entire life cycle of the building (Figure 2) and possible detection of collisions and inaccuracies in their design itself. In this respect, the BIM model is used as a comprehensive database of information about the building/object during the entire life cycle, taking into account the following aspects:

- Proposal.
- Analysis.
- Implementation.
- Operation.
- Reconstruction.
- Demolition / removal of a building / object.

Figure 2 Life cycle of a 3D building model; source: (Logothetis et al. 2016)

The application of geodesy in construction is necessary to achieve the goals of this task. The project documentation, which is directly provided by the area of geodesy through surveyors, is one of the means without which it is not possible to manage the investment construction process. When transforming an intangible idea of a proposed construction work, which is the result of the processing of a team of designers, into the form of the real object, it requires the application of the most modern approaches from all affected areas. It is necessary not only to adhere to all technical standards related to the realization of objects with a spatial composition but also to apply as much as possible all trends in the field of IT, which will significantly speed up and improve the management process. From the point of view of practical use, BIM technology can be perceived as a potential that can be used for an entire range of analyzes that are necessary for continuous and effective construction management (Kozlovská, 2015).

The purpose of the application deployment of the BIM model is to adapt to the details and accuracy of the model. From the point of view of providing project documentation, the geodesy area offers a set of spatial information needed to process the BIM model. The advantage of implementing this system is that all participants in the project are one team and can fully exchange all the necessary information. This fact brings a high degree of quality in the management of all processes in construction. The level of detail of processing the BIM model at this stage of the object's life cycle is influenced by the accuracy of capturing all deviations from the project.

2.2 Level of detail/development - LOD

Level of details, resp. Development (LOD) can define the detail and scope of information in the BIM model, i., graphical and non-graphical (Figure 3).

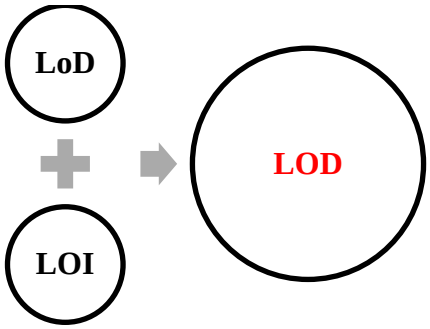


Figure 3 Level of Development of project documentation of BIM model (LoD-level of details, LOI- level of information, LOD –level of development); source: own elaboration

Within the individual stages of the project documentation, we consider (Figure 4):

- LoD 100 (Pre Design)
- LoD 200 (Schematic Design)
- LoD 300 (Design Development)
- LoD 350 (Stavebná dokumentácia)
- LoD 400 (Construction Stage)
- LoD 500 (As Built)

LoD 0 LoD 100 LoD 200

LoD 300 LoD 400 LoD 500

Figure 4 Demonstration of individual levels of Level of Development; source: (https://www.bimfo.cz)

2.3 Software tools for BIM support

Many different software solutions for BIM from a group of other manufacturers (Graphisoft, Autodesk, Bentley, Trimble, Leica, Nemetschek Company, Gehry Technologies) are available for the process of preparation and processing of 3D data within the creation of BIM models. With a BIM software solution, we can't talk about just one solution. Specifically, in fulfilling the goal based on the working methodology for BIM, we must rely on several aspects (collaborative work, interoperability, circular workflows, coordination) (Johannes 2019). The choice of software solution depends on the method and area of its use (Figure 5).

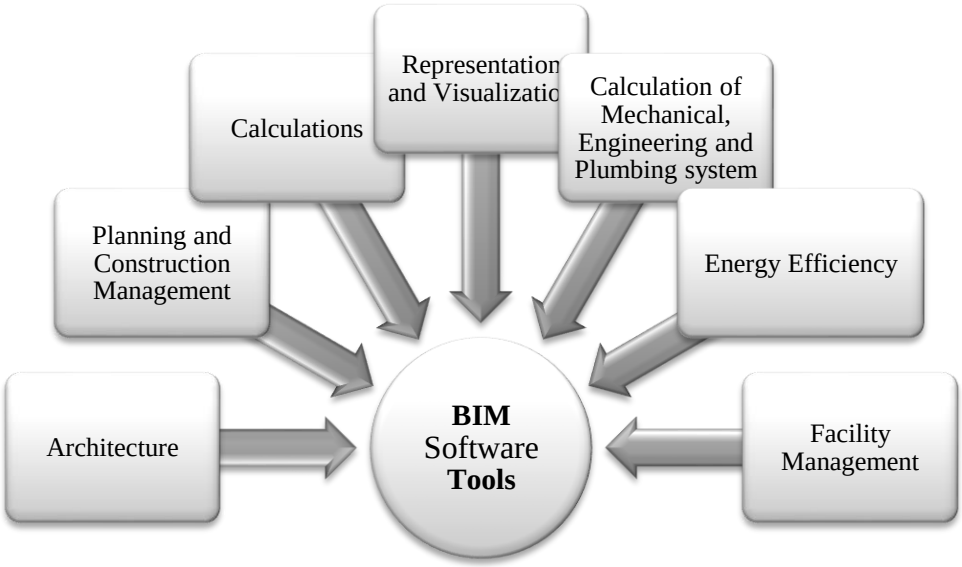
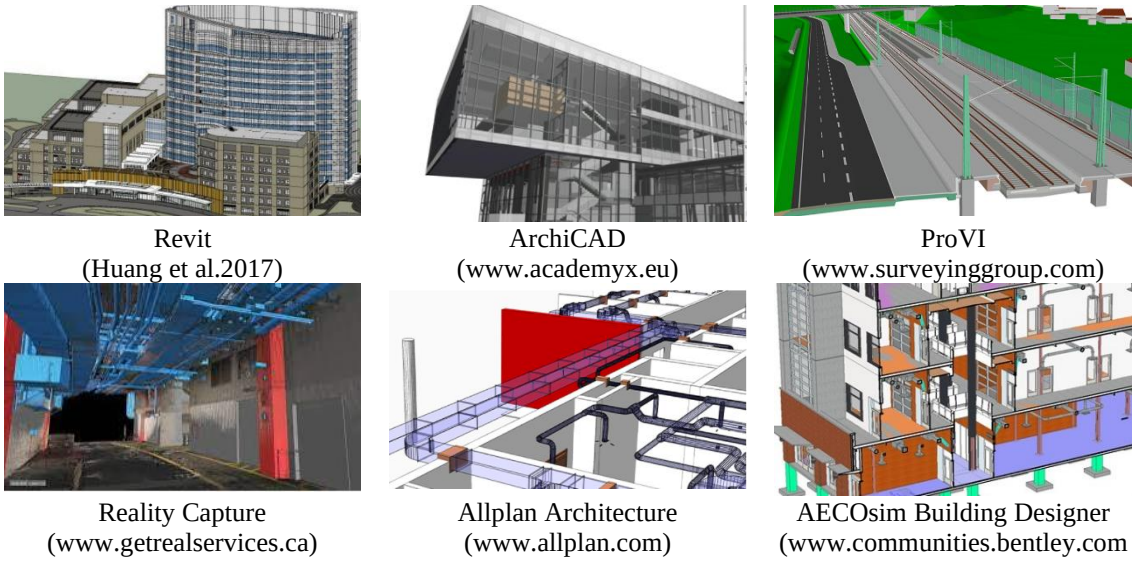


Figure 5 BIM software tools; source: own elaboration

Support in the process of 3D modeling and processing of BIM models is provided by a selected group of products (Figure 6).



Revit (Huang et al.2017) | ArchiCAD (www.academyx.eu) | ProVI (www.surveyinggroup.com)

Reality Capture (www.getrealservices.ca) | Allplan Architecture (www.allplan.com) | AECOsim Building Designer (www.communities.bentley.com

Figure 6 BIM solutions; source: own elaboration

To ensure the exchange of information from the BIM data model environment between the various stakeholders within the building life cycle, they provide interchange formats. The following part of the article is devoted to their content.

2.4 Industry Foundation Classes exchange data format for BIM

Given the wide range of different software solutions available (see section 2.2) and open workflow support, BIM interchange formats are essential. The most widely used open exchange format for working with BIM is the Industry Foundation Classes (IFC). The starting point for the IFC format schema itself is the EXPRESS data modeling language (ISO 10303-11) (Theißen et al. 2020).

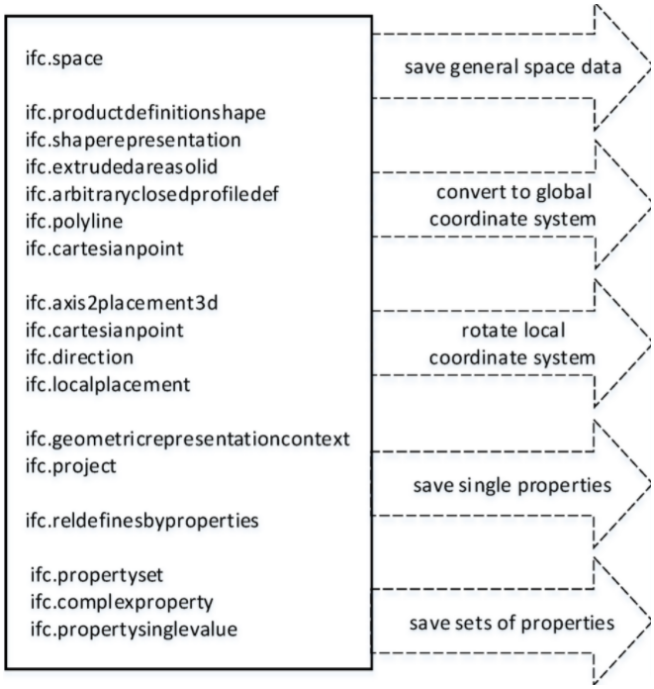


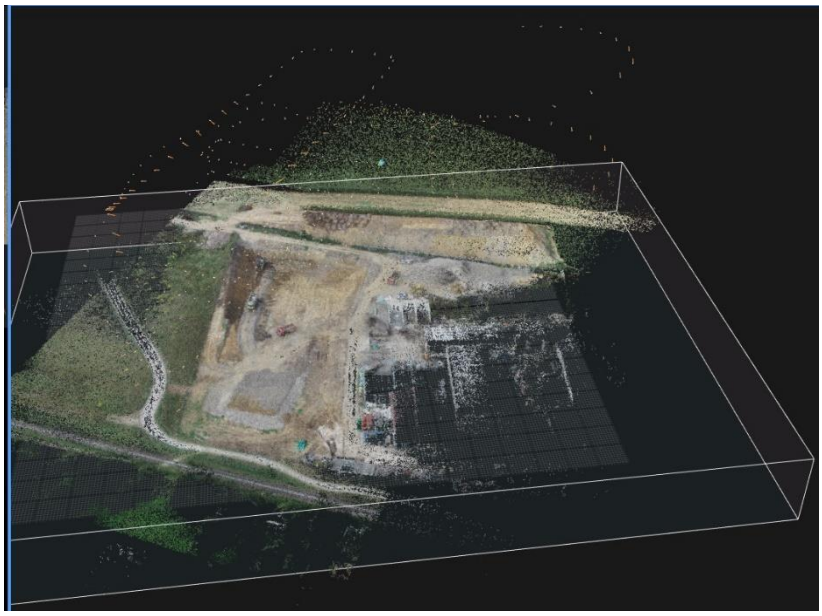
Figure 7 Contents of the IFC database schema; source: (Wyszomirski et al. 2020)

BuildingSMART develops it by the applicable ISO standards, and its classification is fundamental for the processing of BIM models (Diara et al. 2020). The content of the IFC database schema itself is presented in the following Figure 7. This schema transforms data from other different data schemas (e.g., IFC to BIGI-S).

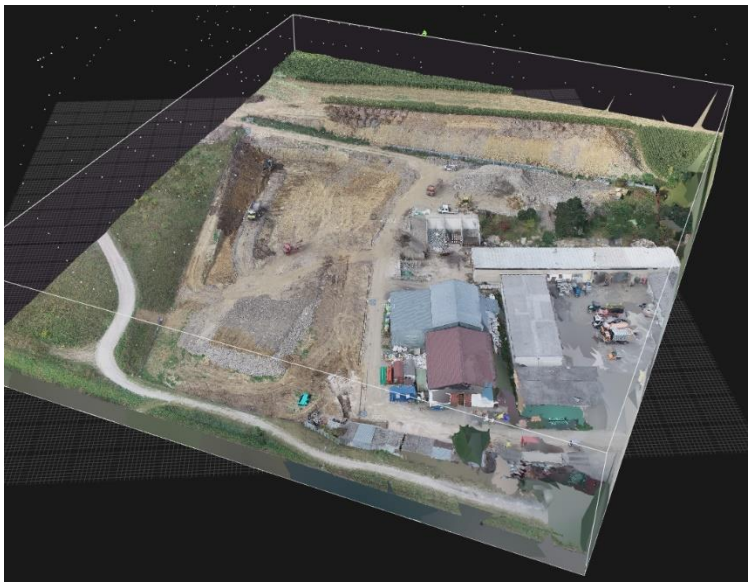
3 Results

The first phase of work in processing the BIM model is to obtain a dataset of spatial data. For project tasks solved by BIM technology, this data source is mainly represented by the results of geodetic measurements (Rakay et al. 2021) obtained primarily by GNSS RTK, photogrammetry, laser scanning technology, or LiDAR technology. All the mentioned methods of spatial data collection for BIM models provide a basis for detailed 3D information stored e.g., in interchangeable formats * .dgn, * .dwg, * .las.

For selected methods of spatial data collection, there is support for storing and processing 3D information with a code list describing each measured point for easier processing. The following Figure 8 provides a graphical example of preprocessing, processing, and postprocessing of spatial data.



Basic model



The resulting model

Figure 8 Overview of 3D data processing; source: own elaboration

The principle of the whole processing is based on the creation of 3D geometry of different groups of objects. Their selection depends on applying BIM models in practice (transport constructions, road infrastructure, construction, water management, etc.). Each of these areas of BIM deployment in design activities uses different types of objects with 3D geometry. It depends on the software product's choice for processing 3D data and creating the resulting BIM model. From frequently used 3D objects in road construction, it is possible to mention a 3D curve, a design line, a surface, a procedural surface, groups of points, etc. The creation of a basic 3D model represents another processing phase. It is necessary to work in several working levels (especially when processing a BIM model of a multi-story building). Only the final 3D model processed by BIM technology needs to be exported to an IFC file and thus ensure its storage in the given database schema.

The IFC database schema contains tables and stored procedures. The tasks of stored procedures are to write, read, update, and possibly delete data. The advantage of using the IFC data scheme is the ability to capture more detail of the model instead of what other data models (CityGML) offer. By default, the IFC file contains created 3D objects part of the BIM model with all the descriptive parameters assigned to them (Figure 9).

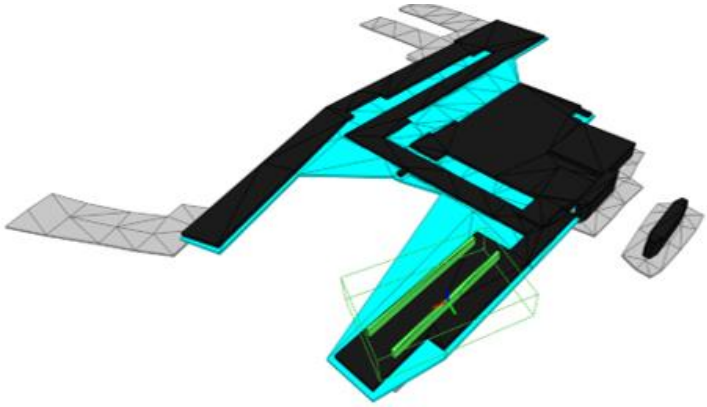


Figure 9 Example of BIM model processing in IFC forma; source: (Ochotnický 2021)

4 Discussion

The world around us is changing dynamically from day today. We are constantly witnessing increasing technological possibilities, which bring dynamic economic and social development to society. New technologies are also penetrating the construction industry. Digitalization is a significant part of society's further development. It is the driving force behind the Preimysel 4.0 strategy. It brings open possibilities for an interested group of creators and users of BIM models. Thanks to graphical and attribute data stored in BIM models, it is possible to ensure an optimized construction process. This process has many benefits on several sides (shortening construction time, saving on the need to deploy workforce and material, which leads to higher project profitability).

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The influence on the education of the development of the industrial revolutions in Czech countries

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Abstract

The presented article describes the influence of the education on the development of the idndustrial revolutios in the Czech countries. The main target is to answer, how the level of the education took influence on Czech countries and their success during the industrial revolutions and if it skills to realise the fourth industrial revolution. There is the case study, which will explore three facts – the started situation, the realization of new methods in the education and the reflection of it. The article describes the main political and international situation too. In the conclusion will be answered the research question. In the article are used especially Czech sources reflected this theme.

Keywords: education, industrial revolutions, Czech countries, industry 4.0

JEL Classification: N33, N34, N83, N84

Article Classification: General review

1 Introduction

The level of the education of the population and the success of the state in the realization of the industrial revolution became one of the main condition of this process. From the fist industrial revolution to nowadays, the importance of the education grew. The top of it comes with the industry 4.0 and Smart Factory. During this process the importance of the education more and more formed the development of the industrial revolutions. The education became the state interests. The Czech countries had a

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historical tradition of it from the time of Komensky. The main Komensky´s ideas were formed during 17th century, so their heritage is stil current. Habsburk rulers knew, that the education is the question of the state interest and it has the influence on the development and the geopolitic position of the state. This idea is still modern. In present time the influence of the Covid-19 pandemy shows how much the education is important.

2 Material and methods

The main target is to answer, how the level of the education took influence a Czech countries and their success during the industrial revolutions their skills to realise the fourth industrial revolution. There is the case study, which will explore three facts – the started situation, the realization of new methods in the education and the reflection of it. The article describes the main political and international situation too. In the conclusion will be answered the research question.

As the main publications will be used for example „Hospodářské dějiny a ekonomické teorie“ by P. Sirůček, next „Dějiny Československa“ by R. Kvaček at all or „České a slovenské dějiny do roku 1918“ by O. Uraban, “Stručné dějiny padagogiky” by V. Štverák, next “Vývoj pedagogického myšlení” by V. Jůva or “Dějiny pedagogiky” by T. Kasper.

3 Results

The start of the modern activities in the education came during the rule of Maria Teresia and her successors. The main target was the modernization of Habsburk monarchy. The victory of Prussia during two Silesias wars was the main reason to quick reform “not only in state administration but in lower and upper school system. Necessaries of the production and the state and military administration required the new order of the preparation of citizens of Habsburk monarchy.” (Štverák, 1983) This is the moment of the beginning of importance of the education in the context of the state interest. Outputs of the policy there were founded very important schools as Military school in Vienna, mining school in Štiavnica or technical school in Vienna too. As the diplomacy school there was founded Orient academy by chancellor Kounic.

In the year 1773 the Jezuit´s order was canceled and all schools were driven by the state. This process brought the new education system in the monarchy. The first industrial revolution was coming and worker in the manufactory had to been more qualified than serf in agriculture. J.I. Felbiger realised during 70th years of 18th century the main modernization educational system in the monarchy. Teachers were systematically prepared for their job too because in the past a lot of teachers were military veterans. The rule from the year 1774 “determined the educational duty (Schulzwang) for children from six to twelve years of both genders.” (Kasper and Kasperová, 2008) From the practical view the industrial workrooms were founded in the Czech countries since 1779. In this workrooms pupils were educated with technical and agricultural skills.

The emperor Josef II. canceled serfdom in the year 1781. This stap was very important for development of the first industrial revolution in Habsburk monarchy/Austria, because people were able to leave to towns, others regions, getting married or to create the future for their children. The most important the coming new workers to town´s factories was for the industrial revolution. This policy together with the new educational system formed bases of the successful realization of the first industrial revolution.

3.1 The period of the first industrial revolutin

The process of the industrial revolution came to the Czech countries later. It was started during 20th years of the 19th century and it culmitated during 60th and 70th years. The base of the industrial revolution in Austria was textile industry and Czech countries became the most industrial part of Austria. The symbol of the first industrial revolution was the steam engine. In Czech coutries was constructed the first steam engine during 1803-1807 by František Josef Gerstner. (Kvaček et al., 1990)

The period of Metternich´s absolutism was period of the industrial growth. A very important is the year 1833 when the industrial cociety "Jednota pro povzbuzení průmyslu v Čechách" was founded. This cociety had an aristocratical character, but later nonaristocratical people were its members too. Its main target was the support of the industrial development and the educational activities too.

In this period the most important document for the education was edicted by the emperor Josef II. in 1787, which determined "…the knowledge of German language as the requiered condition of the possibility of secondary school study and the possibility of craftsman´s qualification." (Kvaček et al., 1990) This policy was problematic from the view of the national ideas but its main target was to unife the diversity in the monarchy. During the 19th century it was a political and national problem.

The obligatory school attandace was declarated in the year 1805 for children from six to twelve years old, but in the practical life two decades it not accepted by the part of people. Next problem was brought by the domination of German language.

During the second quarter of the 19th century the school attandace in Czech countries had 90% of children from six to twelve years old. These children had the elementary education (Trivium) – reeding, writing and arithmetic. This situation created a lot of qualificated workers for the realising the first industrial revolution in Czech countries.

The symbol of the unit between the industrial revolution and the education in Czech countries was demand of the foundation of Czech industrial school in Prague. This target had not only the economical backround but the political too. The main person of this realization of this target was a wellknowen constructor of the railways – engineer Jan Perner. (Kvaček et al., 1990)

During 19th century a lot of nonuniversity schools were founded in Czech countries. These schools prepared specialists of the area of machinery, construction activities, chemical industry etc. In the year 1868 it was founded Czech politechnical institut of the Kingdom of Bohemia. (Jůva, 1987) The similar school was founded in Brunn too. These schools created Czech inventors and industrialists.

Graduates of these schools founded a heavy industry in Czech countries, mostly machinery industy. In this period factories were founded as Ringhoffer factory and Daněk factory in Prague. In Pilsen it was the factory of Emil Škoda. The railways infrastructure was created in this period, it was very important for the development of the industry.

Austria was one of the European power with a very large own market. There were positive facts for the development of the industry and the using of the new technologies. The educated population was a very important factor of the success in the industrial revolution.

3.2 The period of the second industrial revolution

The second industrial revolution, technical-scientific, was held from 70th years of 19th century to the beginning of the second world war. The Czech countries were in the period

of the industrial growth. „Czech countries produced approximately two third of the total industrial production of Austria." (Urban, 1991)

The most important technical progress in this period was the using of the electric power for a lot of activities. Czech coutries used a lot of modern technologies, some of them were created by Czech inventors – for example František Křižík or Emil Kolben are the most wellknown.

In the educational sphere next reform was realised in the year 1869 by Hasner´s law n. 62, which declared the national education system and it declarated the obligatory school attendance for children from six to fourteen years old. This law reformed terzian´s edict and the obligatory school attendance was prolonged of the next two years. Next changes were: "1. Science and education are liberal. 2. Religion education is a Church matter, the state is the main actor. 3. All languages in the country (in the case of Czech countries German and Czech language) are on the same level. 4. As the administration and supervisor offices are based regional, district and local school councils. 5. Teachers studied in teacher´s institute (named pedagogia) common for national schools. (Štverák, 1983) In the practice matter two types of schools were created, the state supervision of the educational process was declared, eight obligatory school attendance was confirmed for both gender. All of them confirmed the education as the state interest.

Specialized schools were founded parallely for necessities of craftsmen and traders and the evening cources were held in subjects of economical sciences too.

Secondary specialized schools were founded for needs of the second industrial revolution. The first technical school was founded in Prague in the year of 1882, others were founded in Brno and Plzeň. There were two types – higher (for four years) and lower (for two years). Comercial academies and trade schools were founded too. Besides them other schools existed – for example forest schools, agricultural schools etc.

In the year 1882 Charles-Ferdinand University was devided into two parts – Czech and German. It was a very important point in the Czech national movement.

The influence of these activities brought the end of analphabetism in Czech coutries at the biginnig of 20th century. Population of the Czech coutries were strongly educated and this fact had a positive influence on the realization of the second industrial revolution. The symbol of this period was the industrial exhibition in Prague in the year 1891.

This positive development was held during interwar period of the first Czechoslovak republic. Czech countries were more industrial than the rest of the republic. In the year 1921 "…proportion between industrial and agrarian population in Czech countries was 40:30% and in Slovakia 17:61%" (Sirůček, 2007) The positive industrial development was held although economical position of Czechoslovakia was more complicated, because the interior large market of Austro-Hungary didn´t yet exist.

In the educational matters a lot of schools were constructed and a lot of study specializations were formed. The needs of the industry were strongly supported in the educational sphere too. The most important legislative point was "Small educational law" from the year 1922. The most important parts were: "a) obligatory eight school attendance in the republic (in Slovakia was only six years attendance to the 1922) b) reliefs were interrupted ….e) the law equality between male and female teachers." (Štverák, 1983) This changes brought democracy in the educational system and the number of varios kinds of specialized schools grew.

A lot of universities were founded during this period – for example Masaryk´s Univerzity in Brno, J. A. Komenský Univerzity in Bratislava and next.

The interwar Czechoslovakia held great educational level, it was important for the development of the interwar industry, but they were problems with the small own market and the influence of the great industrial crize and the international political changes too.

3.3 The period of the third industrial revolution

Scientifictechnological, the third industrial revolution took place in the different international situation than past industrial revolutions. The cold war, bipolar world – it ment for Czechoslovakia a lot of coplications. Czechoslovakia was the part of the Soviet Union sphere.

The main development was reached during 60th and 70th years of the 20 century. The new industrial branches were created – synthetic chemistry, electrotechnology or the using of nuclear energy.

Czechoslovakia was connected with the political and economical targets of the Soviet Union after 1948, but this connection was problematic. Czechoslovkia had to change the structure of the industry from light industry to heavy and military industry. The next problem brought the interrupt of connections with western European states, as points of the industry and technological modernization. The scientific cooperation was interrupted too. There were the main reasons of total failure of the third industrial revolution in Czechoslovakia.

The new political changes had the influence for the educational sphere. For industrial needs there were created "centres of education state labour reserves", which prepared workers for metallurgy, mining and constructions. The development of the secondary specialized schools was supported too. A lot of universities were founded too. Czechoslovak science academy was founded in 1952 and next year Slovak science academy too.

The scientific-technological revolution needs higher number of qualificated workers, but these people were in deficiency. This situation formed possibility of the reform of the educational system. The main idea of this reform said, that "The education cannot be traditional, cannot be only command by practise knowledges, but really by acceptation of scientific knowledges and scientific methods too." (Kotásek and Škoda, 1966) The main problem of immediatel reaction for needs of the third industrial revolution was the speed of the new scientific discoveries. Czechoslovak educational system was not so quick and it was late. This fact and nonpossibility of application of the new western methods and technologies were the main reasons of the failure of Czechoslovakia in the third industrial revolution.

3.4 The period of the fourth industrial revolution

The fourth industrial revolution began in the break of 80th and 90th years of 20th century. The main factor is using of internet. In this time cold war and bipolar world ended too. It came the time of the globalization. The main characteristics of the fourth industrial revolution or so industry 4.0 have become the new technologies and development of the new industrial spheres – for example artifitial intelligence, robots, the new materials or synthetic food. The next target of the fourth industrial revolution is to maximalise product process by the artifitial intelligence, very quickly and cheaply. The one output of this process is the project Smart Factory, where this idea, machines, artifitial intelligence and internet work together. This process forms optimalization and racionalization of the production. This idea is reflected to the common life – for example by Smart Cities- "There is the access to the more clever management of towns, villages,

regions by the using modern technologies." (MMR ČR) The practice target of it is to improve the life quality in towns, environment and communication with authorities too.

The position of the Czech republic during the fourth industrial revolution is different than it the past. The Czech republic is integrated into the international organizations – for example NATO and EU. Next positive factor is the access to the modern industrial information and technologies too. The enter of the foreign investment, the application of modern technologies accelerated the process of the fourth industrial revolution in the Czech republic. This new situation helped to overcome failure of the third industrial revolution. The international companies started to use the new technological processes connected with the fourth industrial revolution as the first in the Czech republic. In present time the fourth industrial revolution and connected activities are the target of the state and local authorities, universities and the research centers too.

The education is a very important factor of the realization of the fourth industrial revolution. In this case the Czech republic stands on the symbolical crossroad. Social, political, economical changes have reflected in the educational system after 1989. Present trends bring more secondary school educated people with leaving exam and more university graduates. On the other side there is a small interes in technical and natural scientific programms in contrast to humanistic programms. This development is some problem for the industry 4.0, but it is a target to change this situation.

A very positive is a tradition, stability and continuity of the educational system in the Czech republic. For next development it is important to except modern technologies and steps connected with the fourth industrial revolution: "We need motivated, enterprising and creative graduates with critical thinking, ability to solve problems and make decisions. The education level of students and pupils depend of the quality of teachers. The position of the teacher will be fundamental! It is important for the teacher profession to have the best specialists with good salary and to offer them the quality in education." (MPO ČR)

The support of IT education it is the next very important point of the development of the industry 4.0 in the Czech republic. In this case three points were described: " to open the education for the new methods by the digital technologies, to improve competences of pupils in the information area and digital technologies too and to develop information thinking of pupils." (MPO ČR)

The very important part is the practice too. Students short-term attachments, stronger cooperation among companies and schools are the possibilities of realization of this development. This practise exists, but there is insufficient for needs of the industry 4.0.

The part of specialists want to make stronger role of the mathematics in the education, but this target is political by unrealistic. The subjects about information of the fourth industrial revolution, their targets and possibilities are realistic and some of them are in function in present time. For example the special office is "National centre of the industry 4.0". The Czech republic has possibilities to successfully realise the fourth industrial revolution. Its economical structure, educational system and the international orientation are important factors in success in the fourth industrial revolution.

4 Discussion

If we speak about the influence of the education on the developement of the industrial revolutions in Czech coutries, we can say, that the level of the education was a very important positive factor for success.

The first industrial revolution came from Terezian´s educational reform, which was modificated during 19th century. Obligatory school attandace, reading, writing and arithmetic were iportant social and economical points. Czech coutries as the part of Austria, had connections to western Europe, where the center of the industrial revolution and modern technologies existed. Their positive application was supported by educated population in Czech countires too.

The period of the second industrial revolution brought a great industrial development of Czech countries. This success was supported by modernization of the educational system and the foundation of Czech specialized schools. Czech industrialists and inventors formed the positive conditions for development of the second industrial revolution too. Czech coutries were the most industrial part of Austro-Hungary with a lot of connctions with foreign partners too. In the educational area the analphabetism was removed and a lot of various types of schools were founded. This positive development continued during the period of the interwar Czechoslovakia and it was the base of success of this state.

Czechoslovakia during the third industrial revolution was in a different geopolitical situation than in the past. Czechoslovakia had to reflected targets of the Soviet Union and it had to form economical and educational system as in the Soviet Union. This situation and the interaption of the cooperation with western Europe, the technological retardation brought total failure in the third industrial revolution. This position was not changed neither by the quality of education.

During the fourth industrial revolution Czech countries are in a different international situation – the integration to western structure, the influence of foreign companies and capital, glogalization, connections with modern technologies and inventions. The educational system was changed too, but still it has a high level of quality. This is very important for acceptation of the modern methods and technologies. The present problem is a small number of students in technical and environmental sciences. Common cooperation among educational institutions, companies and government and local authorities can change this situation. The Czech republic can positive by realise the fourth industrial revolution because its educational and economical systems have great possibilities. The Czech republic is considered as the important state in the process of the fourth industrial revolution too – for example in 2019 Smart Export Fórum took place in Prague among specialists from the Czech republic and specialists from eight latinoamerican countries about common cooperation in the area of the fourth industrial revolution. This position reflects the iportant role of the Czech republic similary as during the first and especially the second industrial revolution.

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