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Content

Analysis of the video game industry in the Czech Republic in 2016-2020

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Abstract

The video game industry is a branch of the industry dealing with the creation and sale of computer games, or video games. It includes dozens of specialized professions and employs lot of people around the world. The aim of the work was to analyze the Czech video game industry in the years 2016-2020. The basic data source is data from the studies of the association of Czech game developers GDACZ. A quantitative method of data analysis was used here, where data from the Czech video game industry was compared with data from the Slovak video game industry from 2016 to 2020. The research results showed that turnover increased by CZK 3 billion over five years, which is an increase of 163,3%. Furthermore, the results showed that the total turnover of the Czech Republic is greater than that of Slovakia, however, the percentage growth was greater in Slovakia. The Czech video game industry should continue to be monitored in the coming years in order to find out whether, with increasingly available and better technology, it manages to achieve even better results than in the examined period of 2016-2020.

Keywords: video games, video game industry, turnover, employment, technology

Introduction

It could be said that the video game industry started in the 1970s based on arcade video games. Since then, however, it has moved to a level that no one could have imagined at the time (Gao et al., 2021). In recent years, the gaming industry has developed into a thriving digital business segment with exceptional business prospects and has developed into a significant economic sector (Flunger, Mladenow & Strauss, 2022). In the context of the coronavirus epidemic, the video game industry has become an economic giant. Other entertainment such as sports and cinemas were limited, so people had no choice but to

find a type of entertainment that could be done from home (Formosa et al., 2022). In 2020, it even surpassed the global film industry. It also helped that new games are constantly being released and new genres are being created, which means that the target audience is also expanding. The video game industry is not just about computer games. Game consoles are also on the rise, and especially thanks to rapidly improving technology, mobile phone games as well. These account for over 50% of turnover in the video game industry (Nan et al., 2022). There are currently 118 development companies operating in the Czech Republic alone. During 2020, 58 new games were released in the Czech Republic and the turnover of the Czech gaming industry was CZK 5,3 billion, which is 17% more than in 2019 (Knazek et al., 2021). The aim of the work is to analyze the development of the Czech video game industry during the years 2016-2020. In order to achieve the goal, the following research questions were formulated: What was the turnover of the Czech video game industry in 2016-2020? What was the number of employees in the Czech video game industry in 2016-2020? How did the Czech video game industry perform compared to the Slovak video game industry in 2016-2020?

Literature Review

The development of technology and the Internet has enabled the emergence of a new kind of games. Video games are increasingly replacing traditional board games and have a direct impact on how internet users spend their free time (Baltezarevic et al., 2018). Video games have historically been associated with youth and underground culture, as well as trivial and sometimes even antisocial activities and lifestyles. Some video game developers and commentators argue that the industry is marked by its "geek culture", portraying video games as an adolescent and essentially male pastime (and thus more broadly demonstrating a trajectory similar to that of computer science) (Styhre, Szczepanska & Remneland-Wikhamn, 2018). The video game market has gone through a process of gradual but constant growth over the years. Despite its humble beginnings, the sector has thrived and generated profitable numbers that help it continue to grow. There are more and more consumers of video games and interest in them has grown in such a way that websites that deal only with the topic of video games have multiplied to satisfy users, to have an overview of all the news (Gonzales, 2019). In 2019, approximately one-third of the world's population reportedly played video games. Total spending on video game products and services that year was estimated at $152 billion. (Tsang, 2021). The significant growth of the video game industry and the production of video games in the global market is a remarkable cultural, economic and financial achievement that has not yet been fully recognized by the news media. Additionally, as a cultural expression and genre of popular culture, video games tend to be associated with previous media (especially cinema). As new handheld media (smartphones, tablets, laptops) are now widely used, new categories of players are entering the market, including for example women and the elderly (Styhre, Remneland-Wikhamn, 2021). Game development and production processes are complex and highly reflective processes - worldwide (Zeiler, Mukherjee, 2022). In addition to standard uses that contribute to the economy, the video game industry is incorporating virtual technologies in areas such as

military training, biomimicry, and display products. Knowledge of video game technology inspired managers to develop the concept of "gamification," an application that motivates employees and engages consumers. It is argued here that the technological contribution of the video game industry is far more significant than its mere economic contributions and that it affects a myriad of organizations in society (Xi et al., 2022). The year 2020 has seen many global changes in the video game industry due to the coronavirus (COVID-19) pandemic. Video games played a key role in the context of the exceptional measures taken in response to the pandemic (Angeles Lopez-Cabarcos, Ribeiro-Soriano & Pineiro-Chousa, 2020). Lockdowns and restrictions around the world, along with recommendations to avoid large gatherings of people, have led not only to an increase in gaming, but also to consumers spending more time gaming than ever before. This growing interest in playing in this atypical environment means that video games have come to play an important social role, not only as a simple option for personal entertainment, but also as a way to promote social interaction by bringing people together through a shared experience (Nunes et al., 2022). The video game industry is a dynamic and complex industry with an unpredictable future due to the many determining factors and the number of people involved in the various roles of the video game industry (Ritzki, Mukharil & Hermawan, 2019).

Methods and Data

To achieve the goal of the work, a quantitative method of data analysis will be used, in which data from the Czech video game industry will be compared with data from the Slovak video game industry in the period from 2016 to 2020. The basic data source will be data from the studies of the Czech Association of Game Developers GDACZ, prepared by the Institute for the digital economy. They will be further processed in the Microsoft Excel program. The monitored indicators will be:

- the turnover of Czech game development companies,
- the total number of workers in the game industry,
- the number of games published in the Czech Republic,
- financing of computer game development.

In addition, these data will be compared with the statistics of the Slovak Association of Game Developers SGDASK, where the monitored indicators will be:

- the turnover of Slovak game companies,
- the total number of workers in the Slovak game industry
- the number of games published in SK.

Charts created in Microsoft Excel will be used to interpret the results.

Results

Chart 1 shows the growth in turnover of Czech game companies between 2016 and 2020. The only exception is 2018, when turnover growth reached 68% (an increase of 40.37%

compared to 2017). Within the compared period, the turnover of gaming companies grew as follows: in 2017 compared to 2016 it increased by 10.62%, in 2018 compared to 2017 by 40.37%, in 2019 compared to 2018 by 16, 52% and in 2020 compared to 2019 by 14.66%.

Graph 1: Turnover of Czech gaming companies (in billions of CZK)

Turnover of Czech gaming companies (in billions of CZK)

Year	Value
2016	2,02
2017	2,26
2018	3,79
2019	4,54
2020	5,32

Source: Custom processing based on GDACZ data.

Despite the highest increase in turnover of game companies in 2018 by 40.37%, the number of games released in the Czech Republic was the smallest in that year compared to other years, when only 23 games were released, as can be seen in graph 2 (in 2016 35 games were released, 31 in 2017, 46 in 2019 and 42 in 2020), which can be attributed to the great success of only a few of them.

Graph 2: Number of released games in the Czech Republic

Number of released games in the Czech Republic

Year	Value
2016	35
2017	31
2018	23
2019	46
2020	42

Source: Custom processing based on GDACZ data source.

Chart 3 shows the sources of funding by which game companies in the Czech Republic finance game development. Almost half of the companies (48%) draw funds 100% from their own resources, 19% of them used financing from investors, 13% prefer financing their operation from custom development, 12% used additional financing from a game publisher, and 8% of them used some other source of financing (4% received a bank loan and another 4% received a subsidy in the form of creative vouchers).

Graph 3: Funding sources
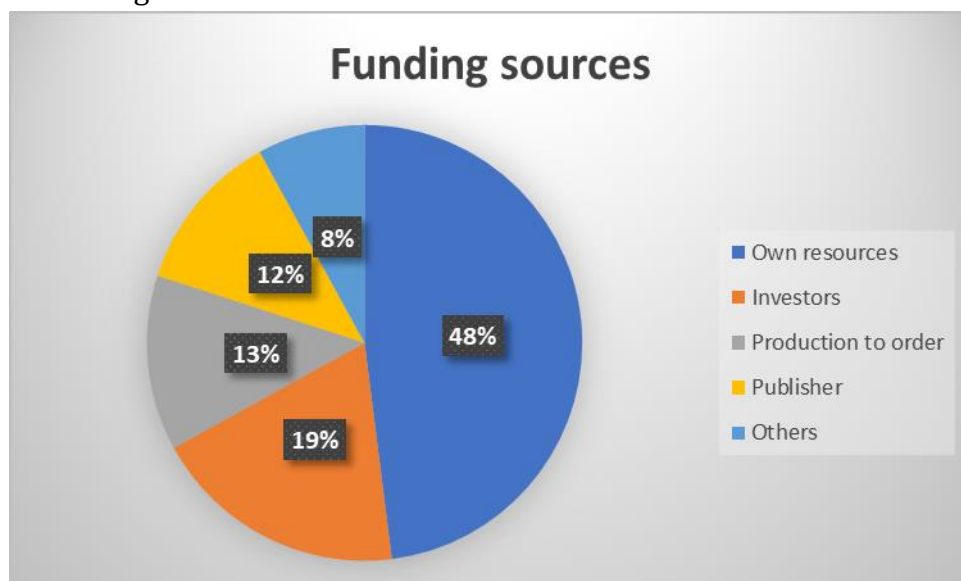
Source: Custom processing based on GDACZ data source.

The increasing trend of the Czech game industry can also be seen in graph 4, which shows the number of workers working in this industry. While in 2017 compared to 2016 the total number of employees increased by only 3.49%, in 2018 it was already by 9.73% compared to 2017. In 2019, their number increased by 14.86 % compared to 2018 and in 2020 it increased by 15.63% compared to 2019.

Graph 4: Total number of workers in the Czech gaming industry

Source: Custom processing based on GDACZ data source.

Chart 5 shows a comparison of Czech and Slovak turnover in gaming companies. It is clear from the graph that the Czech video game industry fared better than the Slovak one in each of the monitored years. In 2016, the turnover of Czech game companies was higher by 70.79% compared to the turnover of Slovak game companies, in 2017 by 60.62%, in 2018 by 70.18%, in 2019 by 72.25% and in 2020 by 66.54%.

Graph 5: Turnover of Czech and Slovak gaming companies (in billions of CZK)

Source: Custom processing based on GDACZ and SGDASK data.

Chart 6 shows that the total number of workers in the Czech and Slovak game industry is quite similar to the turnover of game companies. Compared to Slovakia, in 2016 the number of workers in the Czech Republic was higher by 60.4%, in 2017 by 64.61%, in 2018 by 64.83%, in 2019 by 56.46% and in 2020 by 58.05%.

Graph 6: Total number of workers in the Czech and Slovak gaming industry

Source: Own processing based on GDACZ and SGDASK data source.

Despite the fact that the Czech Republic led in turnover and number of employees, Slovakia led in the number of published games, as we can see in graph 7. In the years 2016-2019, Slovakia created more games than the Czech Republic every year. In 2016, compared to the Czech Republic, there were 14.63% more games released, in 2017 by 43.64% more, in 2018 by 61.67% more and in 2019 by 8% more. 2020 was the only year where it was the other way around, when there were 38.1% more games released in the Czech Republic than in Slovakia.

Graph 7: Number of games released in the Czech Republic and SK
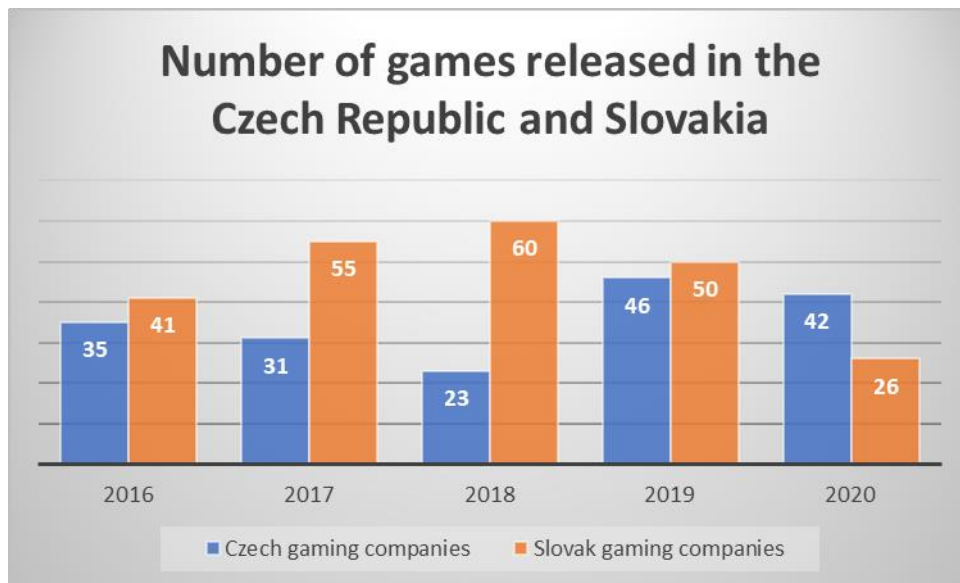
Source: Custom processing based on GDACZ and SGDASK data source.

Discussion

Based on the results, we are able to answer the research questions:

What was the turnover of the Czech video game industry in 2016-2020? From 2016 to 2020, the turnover of the Czech video game industry grew by CZK 3 billion. This is more than double what it was in 2016. Despite the fact that the fewest games were created in the Czech Republic in 2018, the biggest growth took place in 2018, when the 2 largest Czech companies Bohemia Interactive Studio and Warhorse Studios released their long-awaited the games Kingdom Come: Deliverance and Dayz. The graphs also show that the COVID-19 crisis has had no significant effect on turnover, which means that the video game industry is one of the few industries that has not been harmed by Covid-19. According to Nunes et al. (2022) COVID-19 has led to a large increase in gaming. Maybe so, but it was not reflected in the Czech turnover. The sources of financing are almost 50% from own resources. Most of these resources are from previous games that the companies have made. In the Czech Republic, development on PC and console platforms is still leading, compared to worldwide development, where mobile game development is leading.

What was the number of employees in the Czech video game industry in 2016-2020? The number of workers in the Czech video game industry increased by 776 workers between 2016-2020. This is half more than it was in 2016. The gender of the workers is predominantly male. There are 5 times more men than women working in the video game industry. 93% of workers have at least a secondary education. The most common age of workers in the video game industry is 26-35. The main reasons for this age are that those under 25 years old do not have the necessary experience to do this work, and those over 36 years old are not as trained and do not know the technology in which games are developed. The most common professions in the video game industry are programmers and graphic designers (they create the most important parts of the game - the functionality of the game and the visuals of the game). But only these two professions are not enough to produce a complete game. Testers are also important for finding bugs, thanks to which programmers or graphic designers can fix errors in the game. Level designers for creating environments in the game. Game designers and screenwriters to create the story or main idea of the game. PR, marketing, sales to successfully show the complete product that others were working on. Animators for character or environment animation. Audio designers, musicians for music and atmosphere creation. This profession occupies only 3% of the total video game professions. The main reason for this is that most of the time this profession is outsourced, which means an outside company will create the music for them. It's because game companies can't afford to own orchestras for a few hours of music.

How did the Czech video game industry perform compared to the Slovak video game industry in 2016-2020? According to the data, it is possible to say that the Czech video game industry is doing much better than the Slovak video game industry, both in terms of turnover and the number of employees. However, the number of games released during the years 2016-2020 has more Slovak video game industry. However, if the percentage growth during the years 2016-2020 is calculated, it can be found that the Czech video game industry grew by 163.3%, while the Slovak video game industry grew by 201.7%. Here it can be seen that during these years the Slovak video game industry performed better than the Czech video game industry by 38.4%. It is certainly important to continue to watch and monitor the video game industry.

Conclusion

The aim of the work was to analyze the Czech video game industry during the years 2016-2020. The goal was accomplished. In the results chapter, it was found that the turnover of the Czech video game industry increased by 163.3% over five years. The number of employees increased by 59.8%. The comparison with the Slovak video game industry turned out to be that the turnover for the Czech video game industry was approximately 3 times larger than for the Slovak video game industry. However, the turnover growth of the Slovak video game industry was 38.4% greater. The biggest limitation of the research

was that more accurate data on the Czech video game industry began to be measured only from 2016. Therefore, if someone wanted to create an analysis from, for example, 2005, it would be quite unrealistic. This topic certainly has potential for further research. A comparison with an Asian country would certainly be quite informative and interesting. Also, a comparison of all European countries could give some insight into the whole situation regarding the video game industry. The lesson learned from this work is that even unknown and not so visible industries in the Czech Republic can have a considerable influence on the Czech culture and economy in the future.

Acknowledgment

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Digital transformation in HR: Review

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Abstract

The aim of this article is to provide scientific results on the issue using the method of analysis and systematization of scientific sources in the context of digital transformation in HR, which are traceable in selected scientific databases. To meet the objective, the research questions are: What are the potential benefits of digital transformation of HR? What are the potential risks of digital HR transformation? It was based on publications (not older than 5 years), available in the scientific databases WOS and Scopus. The research method is the systematic research. The data in the results part are sorted alphabetically by author name. The results part contains, among other things, briefly written methodologies, and results of the authors. The discussion of the results includes answers to the research questions and arguments or explanations as to why these results evoke a potential risk or benefit. The main benefits for digital transformation can include simplified administration, clarity, increased efficiency, and a green approach. It should be added that the benefits of digital transformation can be gained if the transformation is not rushed and is done correctly. Also, before transforming its HR department, an organization must assess whether it can complete the transformation and is willing to fund the various training, software and other technologies associated with the transformation. Failure or misjudgement can lead to increased risks such as: selecting inappropriate elements, reduced efficiency, employees not understanding new technologies, and vulnerability of important data. Digital HR transformation may not be easy in some companies, but it's a fundamental and necessary change for some companies if done correctly and with the organization in mind.

Keywords: digital transformation of human resources, digital transformation HR, digitalization HR, challenges of digital HR, advantages of digital HR, HR 4.0

Introduction

Human Resource Management (HR) deals with those activities related to the employment and management of people in corporations – firms, institutions, organizations, enterprises, offices, companies. It includes activities related to strategic human resource management, human capital management, knowledge management, corporate social responsibility, corporate development, securing human resources (through the process of planning the required number of employees, recruiting, selecting employees to the area of talent management), performance management, employee evaluation and compensation, employee training and development, 6 employee and labor relations, employee welfare and providing various services to employees (Armstrong, Taylor, 2015). The world is in the digital age, the market, companies, and HR departments are modernizing. New methods and new technologies are introduced to make work easier or more pleasant. There are many reasons for the so-called „reform" of human resources. Companies have outdated HR systems, are losing employees or not recruiting new ones. They may also be forced to introduce new technologies by competitive pressure.

Since the beginning of the industrial revolution, the challenge for human resource management has been balance. In the paternalistic period, flexibility was at the expense of equity. In the bureaucratic period, equity has improved at the expense of flexibility. The period of high performance has again seen an increase in flexibility and alignment at the expense of equity. Equity losses in the late twentieth century, however, are small by historical standards. As a result, the stagnation in productivity growth that characterized the late bureaucratic period has eased. Current staffing practices provide the best balance in the history. Human resource management has reduced the losses resulting from the interplay of equity, flexibility and alignment goals of management, workers and society as a whole. Helped improve workplace quality in all three dimensions. However, this process involved the tides. In the long term, it is realistic to expect that continued increases in equity, flexibility and alignment will come at the expense of ever smaller short-term losses in quality (Langbert, Friedman, 2002).

Kociánová (2012) states that human resource management (personnel management, employee management) in corporations – firms, institutions, organizations, enterprises, offices, companies has always developed in accordance with a certain social and economic context of a particular period. Due to external influences and internal conditions of corporations, certain HR activities have changed over time and the demands on HR specialists, HR managers and other HR staff have grown and will continue to grow.

Despite the good intentions behind the introduction of new technologies, overall modernization can have drawbacks or even risks that can disrupt a company's established infrastructure. Every modernization in earlier times carried with it certain risks overshadowed by the benefits. Without proper research, the negative aspects of modernization may not become apparent until the whole modernization process is complete. Unfortunately, there is no one-size fits-all recommendation or approach, as every company is different and is undergoing or will undergo at least slightly different upgrades. Digital

transformation in HR is a very young and little addressed topic. The aim of this article is to determine the current situation in the field of HR through a systematic search of several selected and relevant publications. Furthermore, this article compares the data obtained from peer-reviewed publications, which can be grouped according to potential benefits and potential risks. The contribution of the results can, deepen the awareness of the current situation in the field of human resource management and contribute to new studies dealing with the same topic.

Theoretical background

Changes are coming that are affecting the market and moving it into the digital world. The digital world has completely transformed the workplace, the way employees communicate, where they work and what technologies they use to do their jobs. With this technological process comes new responsibilities for HR departments, whether from simple yet important goals such as getting employees to like their jobs and be engaged, or actively retraining employees using new technologies. With all this, new specializations are being created, which require a different approach from HR (El-Khoury, 2017).

The economic environment continues to evolve over time and with that comes unavoidable changes in the HR industry. The HR industry needs to take proactive steps and undergo updates to the established elements, where according to Rana, Sharma (2019) it is the only way to have a chance of success.

This thesis looks specifically at HR analytics, to reveal the concept of analytics applied to HR and to explain the factors that prevent companies from moving to analytics (Fernandez, Gallardo-Gallardo, 2021).

One of the main and positive features of digital HR is the interaction with employees using, for example, mobile applications, professional trainings simplified and accessible via the Internet. The upcoming wave of feedback not only from horizontal levels but also from vertical levels requires the development of HR specialists 'competences (Kapitanov, Osipova & Chikileva, 2021). The research reveals how organizations are ensuring their survival success in this age of technology through their employees. Top management must be ready and actively support new updates.

Other publication includes an exploration of the nature of the human resource management system, various models for building an human resource management system in an organization and a study of the application of a particular model to a particular organization. Furthermore, studying and demonstrating the characteristics of the objects, subjects and objectives of the personnel management system. Research on the impact of digitalization on the human resource management system, what requirements are placed on the professional competences of the staff and new and already used trends in human resource automation and recruitment that will help to work better and more efficiently. The generalization of theoretical and empirical experience, cognitive technologies based on the use of artificial intelligence and digital data in human resource management allowed us to highlight innovative solutions and propose an algorithm for

the transformation of the human resource management system in the context of digitalization of human resource processes. In addition, the authors proposed criteria and a scale for evaluating the effectiveness of the transformation of the human resource management system in the context of digitalization of human resource processes. Through this, as well as leveraging elements within human resource such as cloud technology, remote working capabilities, big data, social media and artificial intelligence, companies can increase their lead over competitors (Kholod et al., 2021).

The opinion that organization requires a transition to a human resource 4.0 strategy to successfully overcome the pitfalls is addressed by Sivathanu, Pillai (2018). This strategy involves the use of the internet on a large scale, data file administration, artificial intelligence and also tutorials. The structure of the organization and leadership must be changed for a successful transition to smart HR 4.0.

The outer circle of HR, i.e. recruitment, is also heavily influenced by digital transformation. Job descriptions spread across social networks help you find suitable candidates more efficiently. More advanced tools have revealed a statistical correlation between the gender that uses job sites and social networks. The content of the job offers and its placement in specific media must be evaluated because of differences in the perception of the message (in relation to the gender of applicants). The research was conducted in the Czech Republic (Jančíková, Milichovský, 2019).

With the era of digital transformation comes many opportunities, but also challenges. Research conducted on companies in Russia has shown the following problems. Fragmentation when using different technologies results in reduced communication between workers. The data that is transmitted to the system is isolated from other employees. Implemented technologies are inseparable from the human resource industry; once implemented, they cannot be removed. Despite these few problems, there is a paradox, because despite all the digitalization, the human factor is all the more appreciated, which is superior to technology and ensures its proper operation (Mitrofanova, Konovalova & Mitrofanova, 2018).

Another of the many questionable innovations in the HR 4.0 wave is the recruitment or sorting of candidates using an algorithm. Many questions were asked along the lines of if the algorithm is a proxy for an objective and fair approach to recruitment, how often and how thoroughly it is reviewed, or how it is perceived by applicants. Using a comparative study of two published publications on the perspectives of managers and software suppliers. Research has shown that technology can be as biased as human being working in the social sector (Chirica, 2021).

Digitalization in the HR industry is not just about buying new technology, but also about the steps taken to integrate the new changes into the day-to-day running of the business. There is a need to change the mindset of managers so that they themselves want to adopt new technologies, software and methods (Nachit, Okar, 2020).

The scientific objective is to identify the current state of digitalization and related concepts, to take into account developments in these sectors and to define the impact of these processes on human resource management and human resource marketing. The

pace of technological change brought about by Industry 4.0 along with Covid-19 has created a significant gap between the current capabilities of employees and the rapidly evolving demands on their competencies, and skills and ability to adapt to the online environment (Karas, Brezovska, 2020).

Methods and Data

The aim of this article will be to provide scientific results on the issue using the method of analysis and systematization of scientific sources in the context of digital transformation in HR, which are traceable in selected scientific databases. Publications for this research will be selected according to the relevance of the topic under study and the date of publication (publications will not be older than 5 years). To meet the objective, research questions are posed:

RQ1: What are the potential benefits of digital transformation in HR?
RQ2: What are the potential risks of digital transformation in HR?

The following keywords were used for the search: Digital transformation of HR, Digitalization of HR, Problems of digital HR, Benefits of digital HR, Digital HR, HR 4.0. The data found are from different authors in different countries with different methods or research results. The criteria of the reviewed publications is the dedication to digital transformation in HR issues.

A systematic search will be conducted to answer the research questions. A systematic review can be characterized as: a systematic, explicit and repeatable process designed to identify, evaluate and synthesis the results produced by researchers, academics and practitioners. This procedure allows the author of the research to minimize his own subjectivity and the influence of his opinions on the content of the text (Fink, 2014; Petticrew, Roberts, 2008). A systematic search is characterized by a clearly stated aim, a research question, a described search procedure, selection criteria and a described procedure for the qualitative evaluation of the texts analysed Jesson, Matheson & Lacey (2011).

From the selected publications, position papers on the approach to digital transformation in HR will be selected. The authors' opinions will be presented in the results section. Their findings will be divided into two groups – potential benefits and potential risks – in the discussion section, where they will be complemented by a commentary explaining the relevance of their findings.

Results

For this research, 7 publications were selected that discussed HR 4.0 in detail and met the criteria of publication date (publications not older than 5 years). Other publications were not selected for the research either because of insufficient focus on the topic of digital transformation in HR or because the publication date criterion was not met.

Table 1 shows the analysed publications in alphabetical order of the surname of the first author. In addition, Table 1 shows the year of publication, the method used to achieve the results, the location where the research was conducted, the classification of the research (empirical of theoretical) and the subsequent benefits or risks of digital transformation in HR.

Table 1: Selected attributes of analysed publications

Author	Year	Method	Location	Research inclusion	Benefits	Risks
Chirica	2021	Thematic analysis	Romania	Theoretical research	None	▪ Technologies can be just as biased as socially organized humans
Jančíková and Milichovský	2019	Static analysis	Czech Republic	Empirical research	▪ Finding dependencies between the gender of the job seeker and the server where the ad is located	None
Kapitanov, Osipova and Chikileva	2021	Static analysis	Russia	Empirical research	▪ With the advent of software products, opportunities open up for remote employee management	▪ Potential unusability in small businesses
Kristoff et al.	2018	Analytic analysis	Norway	Theoretical research	▪ Replacing paper-based information with digital files ▪ Potential positive impact on user experience	▪ The existence of gaps in services, in particular as regards the intuitiveness of using new tools and systems ▪ Lack of integration between systems.
Mazurchenko and Maršíková	2019	Systematic search	Germany, Finland. United Kingdom, Portugal, Sweden, Slovakia	Theoretical research	▪ Better quality with fewer human errors ▪ Increased operational efficiency ▪ Reduces HR costs, speeding up the HRM process	▪ Reluctance of employees to adopt new technologies ▪ Replacing automation ▪ The possibility of cyber-attack ▪ Security of data
Mitrofanova, Konovalova and Mitrofanova	2019	Static analysis	Russia	Empirical research	None	▪ Fragmentation, precision and unsystematic use of digital technologies in HR management ▪ Technologies used are inseparable from the functions and process of human resource management ▪ The introduction of digital technologies into the work of employees
Sivathanu and Pillai	2018	Analytic analysis	India	Empirical research	▪ Emerging technologies such as internet, big data and artificial intelligence will automate most HR processes, leading to more efficient and leaner HR teams	▪ Necessary changes in organizational structure and leadership style

Source: Authors.

One of the first publications examined came to the surprising conclusion that there is an undeniable risk of full digital transformation in HR. Gender has come to the fore with

respect to organizational diversity as an adequate solution to algorithmic bias. To ensure good talent for future candidates in the recruitment process, the starting point for the coding algorithm is to select an equal number of women and men, of different ethnicities, races, and ages. Organizational diversity could also prove beneficial to a company's image and overall profit. It was interesting that recruiters in their articles and interviews presented a highly optimistic view of digitalization and the future of work for recruiters, even though digitalization and artificial intelligence may be the end of the recruitment business, at least as we know it. The question of HR's future actions should all digital systems fail due to a malfunction is not answered. The amount of lost data could put a serious strain on the general flow of society. The final data from the paper show that technology can be as biased as socially organized human beings (Chirica, 2021).

In admissions research by the authors Jančíková and Milichovský (2019), some avoidance of gender-related questions has been noted. To test the stated hypothesis, a contingency table was created focusing on the selected sources of employment and attitudes of applicants (from a gender perspective). The contingency table shows the relationships between potential sources of employment and the gender of applicants. Candidates chose their jobs mainly through online communication tools consisting of job offers. Based on the data obtained and its processing, it can be confirmed that there is a statistical dependence between the gender of applicants and job sites and between gender and social networks. The result of these dependencies is confirmed by statistical significance. For the relationship between gender and job-servers, the significance level is 0.030 and the strength of the relationship is 0.265. For the relationship between gender and social networks, the significance level is 0.050 and the strength of the relationship is 0.262.

The results of further research showed that there is uneven involvement of Russian organizations in the digital transformation process. Nearly one in two respondents noted that HR process automation is mostly relevant for the vast majority of large and mid-sized Russian companies looking for optimization, but only one in four respondents believe that automation is the best way forward for the vast majority of large companies. Around 40 % of respondents chose the answer „all companies are equal in the digitalization process, regardless of their size – large, medium, or small. "Nearly one in three people believe that HR process automation is relevant to virtual organizations, with the advent of new software products opening up opportunities for remote employee management (Kapitanov, Osipova & Chikileva, 2021).

It was clear from the interviews that customers of GSS HR services are generally positive about digitalization and its potential. The change to replace information written on paper with digital files was particularly welcomed. Digitalization could positively impact the user experience by giving line managers more self-service tools and autonomy. This idea was supported by analysis and further research. The empowerment of line managers through digitalization can be briefly summarized as an improvement.

However, there are still shortcomings in the service, particularly in the intuitiveness of some tools and systems. The lack of intuitiveness in the interface of the services provided

by GSS HR negatively affected the user experience impacting the availability of information. In addition, the lack of integration between systems and tools negatively impacted their user experience by double-searching and adding the same information multiple times. Within this, the training category was also discussed as there was an apparent lack of knowledge of the systems within our interviews. However, if the service interface is enhanced, training should not be necessary as the systems and tools will be inherently intuitive and no additional knowledge will be required Kristoff et al. (2018).

Mazurchenko, Maršíková (2019) their research explored the current key benefits and risks of digitalization and analyzed its impact on the competencies and roles of HR professionals. The qualitative research involves the analysis of secondary data describing the current level of digital skills based on the response of more than 7 000 respondents from six EU Member States (Germany, Finland, UK, Portugal, Sweden and Slovakia). It also presents a primary analysis of data on HR social media competencies collected in the five European countries participating in the SHARPEN project. The results show that recruiters tend to be slightly reluctant to adopt technology. The results also confirmed the importance of digitalization for human resources and the increasing demand for digital skills in recent years.

As the studies show, domestic companies face the following problems when introducing digital technologies and elements of artificial intelligence into HR management: 1. Fragmentation, precision, and unsystematic use of digital technologies in HR management. 2. The technologies used are inseparable from human resource management functions and processes. Therefore, we cannot talk about the use of tools based on artificial intelligence, digital technologies, while not all modern HR management functions are implemented in our domestic companies. 3. The introduction of digital technologies into the work of employees is complicated by the fact that human resource management processes are quite complex. They involve not only HR employees, but also line managers, rank-and-file employees. 4. The law on personal data, in particular the condition that personal data of Russian citizens cannot be stored outside the territory of the Russian Federation, prevents the use of many modern foreign digital technologies because they are cloud-based and have information processing centers abroad. 5. In Russian companies, awareness of the importance of digitalization human resource management is only just emerging. According to experts, the Russian market lags behind the Western one in the development of digital technologies in the field of human resources management by about 5-7 years, also due to the lack of funding (only 18% of companies have a budget for HR automation, another 37% have a tangible need for such a budget, 57% of them did not engage in automation, 57% were forced to abandon it due to lack of funding, 17% abandoned it due to lack of time and other resources) (Mitrofanova, Konovalova & Mitrofanova, 2018).

The organization would require successful Smart HR 4.0 strategy to meet the challenges of Industry 4.0 transformation. Emerging technologies such as the internet, big data and artificial intelligence will automate most HR processes, leading to more efficient and leaner HR teams. Effective implementation of Smart HR 4.0 would require changes in

organizational structure and leadership style to enable HR departments to play a more strategic role in the overall growth of the organization (Sivathanu, Pillai, 2018).

Discussion

Potential benefits:

Finding a correlation between the gender of the job seeker and the server where the ad is located. This information can help facilitate targeted recruitment. For example, if a company offers a job position more suited to the female gender, it may have paid promotion on social media and vice versa. This is an unobtrusive search for a worker based on their gender. The chances of finding a worker with the desired gender just by a placing a suitable advert on a relevant website or social network are not 100%, so this method cannot be relied upon completely.

With the advent of new software products, opportunities for remote employee management are opening. Especially currently when many people are experiencing the home office for the first time, remote management is a great advantage. Of course, remote administration does not have to mean working from home. An HR professional in a large company may conduct assessments, delegate tasks, or arrange interviews in the comfort of their office. This can contribute to greater clarity and contribute to better time management. Effectiveness through clarity of tasks can also be increased.

Replacing information written on paper with digital files. The environmentally friendly and easy solution for recording information also facilitates its storage. No need for an archive, everything is on the digital network easily accessible and in great condition. This can increase the speed of finding certain files and make it easier to work with them afterwards.

Potential positive impact on user experience. Fewer bugs and an easier process means a better user experience.

Better quality with fewer human errors. Some HR software is very intuitive and straightforward, which is one of the many reasons why quality increases and errors decrease. Many other systems can almost do the work according to algorithms without the help of human workers (often recruitment programs or chatbots). Increase operational effectiveness with new systems and tools to facilitate HR work and digital record keeping.

Reduces HR costs, speeds up HRM processes. With the help of technology, the responsibilities of the HR department are reduced, much fewer people can handle routine work and the company can focus on other things.

Emerging technologies such as the internet, big data and artificial intelligence will automate most HR processes, leading to more efficient and leaner HR teams. Huge amounts of data that would fill an entire archive room can be moved using a USB drive in less than a minute thanks to an internet connection. Artificial intelligence is still

developing and is already active in many companies in the form of chatbots. This makes it possible to focus on other kinds of issues that require human thinking. Recently, even storing data on physical storage is becoming obsolete and servers are being used to simplify data access and increase data security.

Potential risks:

Technology can be as biased as socially organized human beings. New programmes and systems are also being introduced into the HR recruitment sphere. A recruitment programme should not be biased and select equal numbers of men and women on the basis of competence, regardless of race or religion. Algorithms that should be flawless can exhibit human-like biases. It follows that in some places the technology is not so far ahead to completely replace humans and do the job flawlessly. What is even more interesting is that such systems are less controlled than a newly trained employee would be.

Potential unusability in small businesses. According to research conducted in Russia, one in two respondents think that digital HR is only applicable in large and medium-sized enterprises. Small and micro enterprises have fewer employees, producing a product or offering a service is the primary goal. Taking care of employees and streamlining HR is somewhere towards the bottom of small enterprises' goals. Some employees can be easily replaceable for small enterprises, and this also reduces the need for HR to evolve, especially when all retained earnings are invested in production or services offered by the enterprise.

The existence of gaps in services, particularly in terms of the intuitiveness of using new tools and systems. It is important to note that some new programs specifically for HR are not very intuitive, often quite the opposite. The difficulty of working with new tools increases, especially for older employees. Training for new programs costs the enterprise money and time.

Lack of integration between systems and tools. We get to the problems of the software in question, which may not be compatible with software used for other kinds of work. In a simple example, we may have a program to check absenteeism and leave usage, and then there may be another program to evaluate employees based on absenteeism and leave usage. These two programs will not be compatible with each other, so the data would have to be entered into each separately, unless it is a micro-enterprise this work would be very lengthy and unnecessary.

Reluctance of employees to adopt new technologies. As it happens, people get used to something and usually do not welcome new changes. Digitalization is a big change that often requires a change in mindset. This change can be very difficult, especially for older employees. It should be added that the time before things settle down and employees get used to it may not be very short. This may entail a higher error rate or a longer time before the job is completed.

Replacement by automation poses more risk to the company than risk to the employees. Technology is becoming more advanced; computers can do more than they could 10 years ago, and their evolution is accelerating. Gradual redundancies due to replacement with new technologies are inevitable. Machines make fewer mistakes, don't get tired and you

don't have to send them a pay check every month. However, there is an initial investment to buy them, and it must be said that the investment may not only be in production machines, but also in various software and AI technologies. It is important to invest wisely, as the company may not be ready for some changes.

The possibility of a cyber-attack is always an inherent risk when entering the digital world with valuable data. Digital data is clearer and not as well protected as paper data in company archives. The security of the server does not have to be at such a level that it would not take a hacker just a few minutes to download all data. Cyber-attacks are becoming more and more common in both large and small enterprises nowadays. If a major company faces a cyber-attack and their data is not sufficiently secured, they are at risk of losing their know-how or even their image.

Security of data. After the successful transformation of HR into the digital age, almost all information is in digital form, whether on computers, the corporate website, or the cloud. The availability of data is generally more accessible than the availability of paper data. This can lead to the potential loss of important data during a cyber-attack.

Fragmentation, precision, and unsystematic use of digital technologies in HR management. The digital age introduced in companies can often feel chaotic. Information does not flow through employees, but directly to the source through the digital network. For many this can be an advantage, unfortunately this fact can lead to inconsistency in the company. Inconsistency within a company can led to lower efficiency.

The technologies used are inseparable from human resource management functions and processes. If all the new digital HR tools are implemented, it will be difficult to go back to pre-digital operations. Whether it is digital files or other technologies applied to the HR environment.

The introduction of digital technologies into the work of employees is complicated by the fact that human resource management processes are quite complex. The actual activity of human resource management is demanding and requires skilled staff. The problem arises when this employee does his job very well, but the inevitable digitalization has affected his job and he hasn't learned to work with new technologies.

Necessary changes in organizational structure and leadership style were classified as potential risks on the grounds that a change in organizational structure can make a difference to employees as well as to the running of the business. This can lead to a decrease in quality or quantity. If a change in structure is done in a hurry to implement digital transformation without regard to its infrastructure, then HR may be digitally transformed, but at the expense of the company's efficiency.

Conclusion

The research questions are answered in the summary table in the "Benefits" and "Risks" columns. In addition to the table, the results section provides a more extensive description of

the authors' methodology and results. In the discussion section, more attention is paid to the benefits and risks, and each point is accompanied by a commentary that elaborates on the possible uses or impacts of the benefits and drawbacks of digital transformation in HRM. The main benefits for digital transformation can include simplified administration, clarity, increased efficiency, and a green approach. It should be added that the benefits of digital transformation can be gained if the transformation is not rushed and is done correctly. Also, before transforming its HR department, an organization must assess whether it can complete the transformation and is willing to fund the various training, software and other technologies associated with the transformation. Failure or misjudgement can lead to increased risks such as: selecting inappropriate elements, reduced efficiency, employees not understanding new technologies, and vulnerability of important data. Digital HR transformation may not be easy in some companies, but it's a fundamental and necessary change for some companies if done correctly and with the organization in mind.

This article was limited by the lack of publications that could be included in the research, as the digital transformation of HR is still a new and under-researched topic. Although HRM is one of the most important sectors in companies, many authors do not sufficiently address the digital transformation of this department or do not present in detail the advantages or disadvantages of this transformation in companies.

This article should introduce the reader to the main potential benefits or risks of digital transformation of human resources. It could also contribute to other studies on the same topic.

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Exports of Central and Eastern European countries to China in terms of value-density

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Abstract

China's cooperation with the countries of Central and Eastern Europe (CEE) under the 16+1 forum has raised concerns in western capitals since it posed a new challenge in the region. On the other hand, the CEE countries viewed it as a potential new trade opportunity. Certain countries may have even viewed it as an opportunity to rebalance the influence of the West and East in the region. A decade into the 16+1 cooperation, it is more evident that the expectations of the CEE partners have not been met. An empirical study devoid of political agendas is required to provide an objective evaluation of this cooperation. The article utilizes UN Comtrade statistics to determine the value-density ratios of commodities exported to China, which are then compared to the value density of goods exported to other markets. While the results indicate that such exports contribute positively to the economies of the majority of CEE countries, the V4 countries performed exceptionally well. The fact that non-EU countries largely underperformed indicates that EU membership may be more critical for the successful exports to China than their participation in the 16+1 forum.

Keywords: 16+1 China-CEEC forum, belt and road initiative, value density ratio, export to China

Introduction

China's President Xi Jinping's goal of reconstructing the ancient Silk Road has been the cornerstone of his administration. The Belt and Road Initiative (BRI) spans over 60 nations and is comprised of an extensive network of railroads, pipelines, ports, and highways. Among these are the sixteen Central and Eastern European (CEE) countries with which China established the 16+1 forum in 2012. Greece joined later in 2019, and

Lithuania withdrew in 2021. Ever since 16+1 cooperation was conceived, it has become a subject of heated debates with opposing viewpoints depending on who conveyed them. Attitudes range from extremely favourable among Chinese intellectuals to more cautious among western academics and officials. The aim of this paper is to evaluate exports of the CEE countries to China by employing the value-density ratio of their exported products to China and the other parts of the world.

Literature research

The 16+1 strategy under the cooperative BRI framework can be viewed as China's long-term strategy for global economic growth (Musabelliu, 2017). According to Zuokui (2017), China's 16+1 Cooperation fosters a new type of international relations because it is founded on mutual respect and inclusive international cooperation, adheres to the principle of mutually beneficial and win-win cooperation, and closely observes the relevant parties' core interests and major concerns (Zuokui, 2017). Nevertheless, when viewed in a broader context, China-CEE collaboration has a relatively limited influence on public and policy levels, and is increasingly challenged by regional entities with greater strength (Vangeli, 2019). The 16+1 cooperation and the BRI initiative both emphasize increasing connectivity, collaboration, trade, and cultural exchange between China and the CEEC, according to Pepermans (2018). Since its inception, there has been considerable debate over the scope of these large-scale programs. Even though a significant gap persists between the 16+1 objectives and economic outputs, this method with Chinese elements is currently working to the initiator's (i.e. China's) favour (Pepermans, 2018).

As stated by Bąk (2019), the cooperation under the 16+1 initiative revealed the potential of effective collaboration, but it also demonstrated the limitations of the adopted solutions. Due to the wide range of economic and political differences across CEE countries, the potential for collaboration as well as the implemented approaches vary greatly from country to country. In some countries, working with China is seen as a lucrative opportunity, while in others, it's seen as less attractive (Bąk, 2019). However, Song, Fürst (2022) noted, that while the two sides' cooperation has intensified over the last decade or so, the rising discrepancies between China and CEECs, as a result of relatively modest progress in comparison to initial CEECs' expectations, have aroused a negative response from CEE countries. There is an intra role conflict between China's vision of its leadership role and the role expectations of China held by CEE Countries. China strives to forge a leadership role for itself in relation to the CEECs. In the context of typically low expectations for China's leadership position, three distinct patterns of responses can be observed among CEECs: dissenters, pragmatists, and persistent partners (Song, Fürst, 2022). Stanojevic used his theoretically coherent gravity model and a panel dataset of 167 nations to demonstrate a slowdown in Sino-CEE trade following 2012, demonstrating that cooperation has not yet resulted in considerable trade growth. Additionally, the estimations revealed that collaboration could have a more favourable impact on China's trade with non-EU CEE countries (Stanojevic, Qiu & Chen, 2021).

China has its sights set on other countries in the area, such as Belarus, which might serve as a gateway for the Belt and Road Initiative into European countries. However, the extent to which Beijing's strengthened relations with Minsk would benefit China's interests in connecting with Europe will be determined in large part by Belarus's and the EU's ability to resolve substantial disagreements in their relationship (Rinna, 2021). But these promises remain illusory considering the recent events in Ukraine. Besides, China's framing of "traditional friendship" with CEE countries on the basis of a common socialist past does not sit well with the majority of the CEE region, which has a rather problematic view of Communism as a result of its own historical experience (Turcsanyi, Qiaoan, 2020).

In the eyes of many, the BRI is China's soft power in the global arena. When compared to Europe's general media portrayal of China, empirical evidence shows that the European media first reported on this project quite positively and, to a degree, mirrored Chinese narratives of economic potential while ignoring geopolitical and security concerns (Turcsanyi, Kachlikova, 2020). China's increased focus on CEE countries and the Mediterranean through BRI poses a serious challenge to major western actors. From the very beginning, there have been concerns that some of the projects could erode European political unity or the regulations of Chinese investments in the EU. The European Union, on the other hand, has a lot of opportunities for coordination in its political cooperation toward China (Vergeron, 2018). The CEE nations' excitement about the prospect of increased collaboration with China, which they initially viewed as a viable alternative, has mostly waned in recent years. After a few years, CEE governments became gradually dissatisfied with the lack of economic outcomes. Additionally, EU membership brings certain crucial characteristics that make the Chinese propositions less desirable (Turcsanyi, Kachlikova, 2020).

In the COVID-19 period, it appears as though China-CEE cooperation has ceased. But according to Kavalski (2021), the majority of CEE governments had already been considering a halt on their engagement for some time prior to the pandemics. In this regard, the epidemic has only accelerated the estrangement of CEE countries and China. The study concludes that China's "unrequited romance" with the CEE area has significant consequences for the Belt and Road Initiative's post-pandemic trajectory (Kavalski, 2021). Apart from that, the EU's strategic positioning toward China has shifted fundamentally from "partner" to "systemic rival," with the US factor and power symmetries serving as the strongest drivers. China-EU ties will only decline in the future due to increased rivalry and disagreements (Li, He, 2022). This will have significant ramifications for the 16 CEE countries' cooperation, whether they are EU members or not.

Therefore, an adequate evaluation of such a partnership between China and CEE countries that would be free of apolitical agendas requires raw data analysis. As illustrated in Table 2, the trade figures demonstrate an increase in the exports of participating CEE countries to China. However, China is no exception. At the same time, the CEE region has increased its exports to almost all other markets. This article examines whether and to what extent participation in the 16+1 format benefits individual CEE countries.

Navigating through the numerous competing points of view on the 16+1 forum can be difficult given the subject's complexity and the enormous number of competing political agendas involved.

Those advocating for stronger cooperation with China within the 16+1 framework emphasize the potential benefits of doing business with the world's largest market, while others point out the existing red tape that prevents free access to the Chinese market despite multiple declarations made by Chinese officials to reduce the barrier.

As demonstrated in Table 2, commerce between China and the nations that take part in the 16+1 forum has increased significantly in recent years. This fact implies that the cooperation had a positive impact on all of the participants. China, on the other hand, was able to significantly increase its exports to Central and Eastern Europe during the same period. CEE countries place a high priority on China's market, and they have promoted their presence in China in the same way that advanced nations do, despite the fact that they have a limited technological advantage. Nonetheless, to what degree is this a win-win situation? Which states benefit the most from this cooperation, and to what extent is it profitable for Central and Eastern European countries?

The value-per-weight metric

A quantitative measure based on the value-per-weight ratio can be used to evaluate the profitability of exports to a certain market.

The value-per-weight ratio has been extensively employed in logistics theory. Classification of products based on their value-per-weight and time sensitivity factors enables the selection of the most appropriate mode of transportation (Dettmer, Freytag & Draper, 2014). Changes in demand structure, as a result of the shift away from high-volume, low-value products toward greater value-per-weight luxury or smart goods, have had a significant impact on transportation time and, consequently, on the chosen method of transport (Riet, Jong & Walker, 2007). Sectors that generate items with a higher value-per-weight ratio and manufacturing processes that are easily separable in time and space (such as electronics) are the most likely to be subjected to transnational outsourcing.

The higher value-per-weight ratio of commodities makes the transportation expenses relatively insignificant in comparison to the total production costs, resulting in the frequent use of air freight (Farrell, 2005). Christen (2010) points out that goods with low value-per-weight ratios tend to be shipped by ground transportation such as rail cargo vessels or trucks, whereas high value-per-weight goods may be shipped by more costly transportation. The preferred method of transportation of high value-per-weight goods depends on perishability or time sensitivity of the product, as more perishable products require quicker transport (Christen, 2010). Air-freight is a significantly more expensive mode of carriage than ground-bound modes, and it is used in the case of high value-per-weight goods and where the speed of delivery, its security, regularity, and frequency are important factors (Reynolds-Feighan, 2001).

Product's value density, referred to as eighter the value-to-weight or value-to-volume ratio, has a significant effect on the company's logistic strategy. In the case of very high value-density products, namely microchips, their production has been relatively centralised, geographically allocated to a limited number of dedicated large-scale industrial clusters. These production sites provide the world with supplies of microchips by airfreight since the transport costs are insignificant in relation to the cost of building multiple production sites around the world. On the other hand, production of bulky low value-density products (e.g. cement) is usually allocated in close proximity to the point of sale (Delfmann, Albers, 2000).

Similarly, Lovell, Saw & Stimson (2005) demonstrated in the SONY example that value-density exhibits paramount importance in supply chain segmentation as a means of governing the costs of its supply chain management. High value density makes holding the product's inventories very expensive. This puts in place measures to keep overall stock optimised and to reduce the levels of stock in transport, i.e., centralised inventories and fast modes of transport. They allow for timely supplies even in cases of high demand-volatility parts or products (Lovell, Saw & Stimson, 2005).

The weight of the product is not only its physical property, but in the case of a less homogenous product or more differentiated product, it may add to it a special distinction. Wines sold in heavier bottles are often perceived as being of higher quality. The perception was stronger among naïve consumers and weaker among experts (Piqueras-Fiszman, Spence, 2012). Data from US imports also indicate that richer countries tend to export in more product categories, and they export lower quantities within those categories but at considerably higher prices, suggesting higher quality products (Hummels, Klenow, 2005). Value density is related to the incidence of logistical, including transport costs, on the final product price to the extent that the delivery cost of low-value density products becomes a key issue for profitability (Ghezzi, Mangiaracina & Perego, 2012).

An approach by Lashkaripour (2020) to analyse the role that value density plays in international trade uncovers relations between weight and quality perception. His model predicts that firms located in high-wage economies are more likely to supply heavier product varieties, whereas firms located in distant economies are more likely to supply lighter product varieties. Heavier varieties of the same product exhibit a significantly higher quality or appeal among customers. In his model, Lashkapour (2020) assumes that the unit weight explains up to 60% of the cross-supplier variation in quality. The unit weight of country-level exports increases significantly with the exporter's GDP per capita but decreases with the bilateral distance between the trading partners. The value-to-weight ratio of exports, meanwhile, increases significantly with both the exporter's GDP per capita and bilateral distance.

Furthermore, the producer can give his product an edge simply by adding a distinctive attribute that distinguishes it from the competition, thus creating a subvariant with altered market conditions and a higher value-to-weight ratio.

Stahel (2010) in his work, studied the relationship between the productivity of a given economy and the value density of its production. He established the value-per-weight

ratio as a simple metric that can be used by economic actors, innovators, politicians, and consumers to judge the economic resource productivity of goods and services. It provides consumers and producers with information about the sustainability of competing goods directly at the point of sale. The value-per-weight ratio, along with the value-per-labour ratio and the value-from-renewable resources ratio, constitute the three key dimensions of the competitiveness sustainability triangle – economic, environmental, and social welfare. As shown in Table 1, the metric of the value-per-weight ratio enables Stahel to classify the recent economy into three distinct types of: Stone age Economy, Industrial Economy and Performance economy. While the bulk goods are made by the Stone Age Economy, the smart goods are provided by the Performance Economy, with the production of the Industrial Economy falling somewhere in between. Transforming raw steel into autos, or in other words, shifting from a stone-age product to an industrial product, allows for a 25-fold increase in the value-per-weight ratio.

Industrial Economy bulk materials — coal, steel, and electricity – have a marginally higher value-per-weight ratio than Stone Age Economy products. However, by integrating these materials into high-value-added consumer goods such as autos and white goods, the Industrial Economy increases the value-per-weight ratio significantly. Razor blades, notebook computers, and other smart goods have a significantly higher value-per-weight ratio than bulk products. Utilizing smartness enables goods to have a higher value added. Extending the life of bulk durable products, such as automobiles and buildings, enables them to achieve a value-per-weight ratio comparable to that of smart goods.

Tab. 1: Product examples categorized into one of the three distinct economy types

	Value-per-weight ratio of goods		
	Stone age Economy	Industrial Economy	Performance Economy
Sand and gravel	1 ¢/kg		
Cement	6 ¢/kg		
Ready-mix concrete	4 ¢/kg		
Filet steak		20 €/kg	
Automobiles		20 €/kg	
Chateau Suduiraut		80 €/kg	
Razor blades		500 €/kg	
Natural fragrances		700 €/kg	
Notebook PC		700 €/kg	
Spinnaker Boutique cloth		800 €/kg	
Spectacle frames			5000 €/kg
Memory stick			8000 €/kg
amorphous carbon coating			40 000 €/kg
Fe_2O_3 tracer for drug delivery			100 000 – 500 000 €/g
"rebif" interferon			5 mil. €/g
Enzymes			up to 10 mil. €/g

Source: Stahel (2010).

However, for other goods in the Performance Economy, such as immaterial goods, intellectual property, and knowledge-based services (R&D, software, brands),

establishing a physical weight at the time of sale is challenging. Companies that successfully integrate the intelligent use of science into their company strategy will emerge as long-term winners.

Data and methods

Despite the fact of doubling the 16 CEE countries' exports to China (Tab. 2), a decade into the cooperation, it becomes evident that the early export and investment expectations of the participating CEE countries won't be materialized.

Tab. 2. The export to China by the CEE Countries participating in BRI and 16+1 forum (millions of USD)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Poland	1,627.5	1,860.9	1,748.9	2,119.7	2,251.0	2,017.3	1,911.1	2,305.0	2,501.4	2,701.6	3,059.8
Czechia	1,213.9	1,667.8	1,670.8	1,916.7	2,038.3	1,849.5	1,913.7	2,414.4	2,583.5	2,469.7	2,604.7
Slovakia	1,286.1	2,074.4	1,733.5	2,120.5	1,826.0	1,130.7	1,263.1	1,380.5	1,608.8	1,898.5	2,344.5
Hungary	1,529.0	1,683.0	1,810.6	1,997.3	2,156.2	1,796.8	2,244.6	2,663.9	2,371.5	1,666.4	2,062.8
Bulgaria	250.0	406.9	764.0	860.0	708.9	610.6	517.3	768.9	901.1	922.9	1,052.4
Greece	420.4	425.2	491.1	557.1	370.1	252.9	363.1	535.4	1 063.8	999.1	975.2
Romania	410.1	544.0	494.4	663.6	759.4	581.8	682.5	827.1	883.6	849.9	942.9
Serbia	7.3	15.3	19.8	9.1	14.2	20.2	25.3	62.2	91.7	329.2	377.0
Slovenia	119.8	126.8	174.0	168.7	186.5	164.5	300.7	359.1	360.2	297.4	318.9
Estonia	155.4	304.7	137.7	157.4	204.0	171.3	189.1	248.3	221.0	187.8	281.3
Latvia	33.1	55.8	59.9	111.1	139.9	120.3	133.1	161.5	187.6	179.4	177.4
North Macedonia	89.2	127.5	158.8	107.0	92.6	146.4	47.8	10.2	65.3	166.0	163.7
Croatia	37.7	54.7	45.9	76.4	68.1	77.3	83.8	126.0	158.4	120.5	96.7
Albania	85.2	48.6	53.1	108.4	83.0	52.1	60.0	70.8	52.7	56.5	46.3
Montenegro	0.2	1.0	4.9	5.2	3.4	8.8	20.9	7.3	16.6	19.7	25.4
Bosnia Herzegovina	5.0	5.8	5.6	7.1	9.2	16.0	14.7	22.1	22.4	17.1	15.2
TOTAL	7,270	9,402	9,373	10,985	10,911	9,017	9,771	11,962	13,090	12,882	14,544

Source: UN Comtrade, 2022.

The value-density metric is used to undertake an empirical examination of the export data. It can be determined in either unit or weight terms. Although UN Comtrade's trade statistics include some unit data, they are frequently incomplete, and reported units differ from one country to another. For practical reasons as well as the scope of applications, the value-density used in the further text is the value-to-weight ratio. As the name of the metric suggests, it is calculated as:

$$\frac{value}{weight} \tag{1}$$

The straightforward use of the value-density ratio, calculated as value-to-weight ratio, is its estimation for a single commodity. Since various commodities possess different

qualities, they also have various value-density ratios. Because the items within each commodity category are not totally the same, there is always some degree of heterogeneity. Even the quality attributes of crude oil, iron ore, or agricultural commodities can differ significantly according to their place of origin. This fact results in some ambiguity when employing, to some extent, aggregated statistics reported by the UN Comtrade. The value-per-weight ratio of a given commodity exported by two different exporters or exporting countries to a specific market is a reliable metric of the export effectivity. An established wine exporter with a good name can achieve a higher value-per-weight ratio than a novice to the market who has yet to earn his reputation. The higher the value-density a producer can sustain in a market, the more of his production costs, transport costs, or profit margin is covered. Higher production costs, depending on the product, could be the result of higher labour costs that can translate into higher salaries or employment. Higher production costs can also be the result of more expensive inputs that suggest higher quality, which often enables higher added value, hence profitability. The final product has usually a higher value-density than the value-density of the inputs it contains. Since the transport expenses associated with a higher value-density variant account for a smaller proportion of the total value, the trade can be conducted over a greater distance. This increases the sustainability of the trade by allowing for a greater area of supply operations.

Comparing value density ratios of a product category achieved by exporting countries reveals how solid footing they have in the specific product category and market. But comparing the country's overall exports, as opposed to exports within a product category, using a value density ratio is a more complex issue. Due to the high number and diverse nature of the goods exported by a country, calculating the value density ratios of each of the product categories would be highly impractical. Since every commodity possesses a unique value-density attribute, the commodity structure of the trade will play a crucial role in evaluating the value-density of a country's overall exports. The bigger the share of high value density products in the overall export, the higher the value-density ratio of the country's overall export.

The value-per-weight ratio of a country's total exports to another country is calculated as the average of the value-per-weight ratios of all product categories weighted by the proportion of product categories in the total exports:

$$VpWr = \sum_{i=1}^{n} \frac{v_i}{w_i} * \frac{v_i}{v_t} \tag{2}$$

where v_i is the export value of the commodity i to a specific country, w_i is the weight of the exported commodity i to the country, and v_t is the value of all commodities exported to the country by the exporter. From the construction of the index, it is obvious that while it provides a glimpse of the value density ratio of a given exporting country to a given market, in fact, it doesn't say much about the competitiveness nor sustainability of the exports because of the structural variability in trade among countries. While some

countries export advanced technology, others rely on exports of natural resources. The export structure is, to an extent, a result of the country's natural endowments. Therefore, the value density ratio is not a relevant measure for multinational comparison.

On the other hand, the application of the value density ratio allows for the assessment of one country's exports to another country in the context of economic benefits. The higher the reported value density for export to the destination market compared to the other markets, the higher the additional income the particular export generates. The exporting markets can then be ranked according to their premiums that reflect the economic benefits the exporters make from their exports. Given that there is a country A exporting to a country B, the overall value-per-weight ratio can be determined (i.e., the price for a kilogram of an exported commodity) for all commodities flowing from the country A to the country B:

$$p_i^{A,B} = \frac{v_i^{A,B}}{w_i^{A,B}}$$

(3)

$p_i{A,B}$ is the value-per-weight ratio of A's export of the commodity i to the country B, $v_i{A,B}$ is the value of the export, and $w_i{A,B}$ is its reported physical weight. The obtained figure $p_i{A,B}$ is, at the same time, the average commodity price per weight unit. To be able to assess the price level in a particular destination market, it needs to be simply compared against the value-per-weight ratio of the same commodity exported to the rest of the world. This is calculated as follows:

$$p_i^{A,W-\{B\}} = \frac{v_i^{A,W-\{B\}}}{w_i^{A,W-\{B\}}} = \frac{v_i^{A,W} - v_i^{A,B}}{w_i^{A,W} - w_i^{A,B}}$$

(4)

$p_i^{A,W-\{B\}}$ is the value-per-weight ratio of the commodity i exported by the country A worldwide, except for the export of the commodity to the country B. By multiplying the weight of the commodity exported to country B ($w_i^{A,B}$) by the world market price $p_i^{A,W-\{B\}}$, the hypothetical revenue $r_i^{A,B,W}$ from the hypothetical sale of the product is calculated.

$$r_i^{A,B,W} = p_i^{A,W-\{B\}} * w_i^{A,B}$$

(5)

$r_i^{A,B,W}$ is the revenue that could have potentially been generated from the sale of the commodity i in world markets if it hadn't been sold to country B due to the price difference between the market price of the country B and the average price in the rest of the world. It is a hypothetical number because those prices aren't by any means guaranteed.

The difference between the actual value of the export to country B and the hypothetical revenue $r_i^{A,B,W}$ (6) uncovers the extent of the economic benefits harvested by exporting the commodity to the market of country B. A positive value of the difference indicates higher than average revenue from the sales to the market of country B. That can be considered an export premium, whereas a negative one shows lower than average

incomes from country B, pointing to the costs of lost opportunity from selling the commodity i to the market B.

$$g_i^{A,B,W} = v_i^{A,B} - r_i^{A,B,W} \qquad (6)$$

This way, the value-per-weight ratio can be used to assess export markets for any commodity for which there is available data on weight. Export markets can be assessed as a whole by summing up the surpluses and gaps ($g_i^{A,B,W}$), i.e., premiums and costs of lost opportunity for all n commodities, to a single value. The sum then represents the whole of the gains and losses associated with exporting to the market. The sum can be a positive value, a negative value or 0. The higher the total value $g^{A,B,W}$, the more beneficial the export is for an exporter.

$$g^{A,B,W} = \sum_{i=1}^{n} g_i^{A,B,W} \qquad (7)$$

The construction of the formula (8) indicates that the calculated economic costs and gains depend on the relative proportion of the value-per-weight ratio of the exports to China to the value-per-weight ratio of the same goods exported to the rest of the world. The exports of the countries whose exports to China are relatively limited demonstrate rather high volatility as a result of the strong influence of individual export contracts.

Additionally, the $g^{A,B,W}$ indicates a greater, lower, or identical price level in the destination market B in relation to the other export markets. The relative export price differential is computed simply by dividing $g^{A,B,W}$ by the country's total export value $v^{A,B}$ to the country B.:

$$PX^{A,B,W} = \left(\frac{g^{A,B,W}}{v^{A,B}}\right) * 100 \qquad (8)$$

Results

Over 99 percent of all exports are reported in kilograms as well. Countries with smaller exports to China tend to show higher volatility of $g^{A,B,W}$ (in millions of USD) due to their sensitivity to individual purchases, whereas more established exporters (i.e., V4 countries) exhibit more consistent values of $g^{A,B,W}$. The results of the analysis are in Table 3.

Tab. 3: The premiums and costs of exports ($g^{A,B,W}$) to China are calculated using data from 16 Central and Eastern European countries (millions of USD)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Albania	15.1	-4.1	-0.1	37.6	0.1	13.5	-3.9	16.5	19.7	14.3	15.5
Bosnia Herzegovina	0.2	-1.6	-0.4	0.1	-0.3	0.9	-0.4	-0.4	-2.7	-6.6	-3.3
Bulgaria	-249.0	30.9	-44.9	-20.7	-76.1	-182.4	-147.1	-671.3	-295.7	-247.8	-333.0
Croatia	-55.7	-523.7	-75.7	-76.7	-84.0	7.0	-3.3	-2.2	37.1	32.2	25.0
Czechia	140.2	170.8	230.1	360.1	360.9	332.9	414.1	410.6	364.2	507.3	553.3
Estonia	-27.7	-29.2	-17.7	-18.0	2.6	18.5	48.9	51.7	44.1	27.7	48.9
Greece	-60.5	-25.3	3.5	32.4	22.6	22.5	3.0	55.2	61.8	80.5	23.0
Hungary	310.5	362.2	502.9	518.8	505.5	395.7	482.7	442.3	476.1	490.2	484.9
Latvia	-13.1	6.6	-7.5	-4.5	25.0	-40.6	25.6	31.2	24.6	-38.9	25.6
Montenegro	-0.3	0.5	4.2	-0.3	0.2	2.1	3.1	6.0	3.4	3.4	-2.0
North Macedonia	-8.4	-10.9	7.0	6.3	6.2	12.7	-1.3	-6.5	-4.8	32.9	18.7
Poland	118.8	55.4	-25.7	67.7	174.9	202.7	229.9	195.4	400.2	475.7	578.8
Romania	29.0	47.4	37.8	-102.7	142.3	95.5	-852.3	150.5	128.8	157.3	91.4
Serbia	1.3	3.3	1.7	-1.6	1.2	6.0	2.3	4.3	-4.3	-9.2	-8.0
Slovakia	-56.7	308.6	247.5	195.2	68.1	126.2	44.2	76.0	202.1	346.8	316.6
Slovenia	-25.0	-2.6	-33.4	15.6	29.2	33.7	36.3	74.5	64.1	55.2	70.4

Source: Author's own calculation based on UN Comtrade data, 2022.

The price differential between exports to China and the rest of the world is then estimated in relative terms using the formula (8) and the results for respective CEE countries are presented in Table 4.

Tab. 4: The export price differential ($PX^{A,B,W}$) between the prices at which 16 Central and Eastern European countries exported their goods to China and to other global markets in 2020.

Albania	33.5%	Czechia	21.2%	Latvia	14.4%	Romania	9.7%
Bosnia Herzegovina	-21.8%	Estonia	17.4%	Montenegro	-7.8%	Serbia	-2.1%
Bulgaria	-31.6%	Greece	2.4%	North Macedonia	11.4%	Slovakia	13.5%
Croatia	25.9%	Hungary	23.5%	Poland	18.9%	Slovenia	22.1%

Source: Author's own calculation based on UN Comtrade data, 2022.

Discussion

The Belt and Road Initiative as a symbol of the new China's emerging strength has sparked debates between the West and East. China's 16+1 forum has raised significant expectations both in China and among participating CEE nations.

Gao (2019) observes that the Chinese government and state-run media portray the Belt and Road Initiative in multiple positive ways, such as: "Development," "Mutual respect and mutual trust," "Ancient Silk Road Story," "Action Speaks Louder than Words," "China is a Partner, not a Colonialist," and "Win-Win". However, Matura (2019) emphasizes that the

growing and intensifying cooperation between China and 16 Central and Eastern European countries has drawn widespread criticism from EU institutions and western European countries, who believe China is attempting to gain political leverage in the EU via its CEE members. Meanwhile, the never materialized Chinese trade and investment promises have contributed to rising disillusionment in a number of Central and Eastern European countries. Nevertheless, a realistic view of the cooperation within the 16+1 framework is needed. This article examines how the value-density index, which is mostly applied in logistics, may be used as a comprehensive metric for sustainability in exports to China.

Table 2 shows that CEE countries' exports have seen a twofold rise since 2010. Certain countries managed to raise their exports tenfold or even more. While some may view this as a success, others may find it disappointing. However, the CEECs' exports to China must be viewed in the context of their global exports. The value density enables comparisons between the price per kilogram of a product exported to China and the price of the same product sold globally. A positive price difference indicates an additional benefit of exporting to China, whilst a negative difference is a sign of sales at a lower price than the products are sold for elsewhere. The sum of these gains and losses from exports to China constitutes a comprehensive measure $g^{A,B,W}$ (in millions of USD) of the exports of a given CEE country to China.

Farrell (2005) considers value density a vital part of a country's prosperity since the value-per-weight ratio constitutes one of the tree dimensions of his sustainability triangle. The results show that EU members of the CEE region outperformed non-EU nations on average, with V4 members outperforming significantly.

The higher the value-per-weight ratio of a product, the lower the transportation costs as a percentage of the total value of the product delivered to distant markets, meaning that a greater proportion of the product's value can be used to cover other costs or to generate a profit margin. The exported goods that have lower value-per-weight ratio tent to face more competition as there is usually higher number of available producers with substitute goods at the distant market, which, in order to cover higher transport costs, consequently, drives its selling prices below the price levels on markets in its closer proximity.

These findings support (Lashkaripour, 2020) conclusion that the value-to-weight ratio of exports grows significantly with both the exporter's GDP per capita and bilateral distance, all the more so given that China is one of the most geographically distant markets relevant to CEE exporters.

Conclusion

The CEE region is not a uniform entity but rather a diverse group of countries at different levels of industrialisation and development. The 16+1 format is more of a regionally defined group led by a dominant country than a block of countries with shared values or common interests. The diversity of the participants is also evident in their export figures to China (Tab.2). In 2020, almost 70% of all the CEE region's exports to China came from

the V4 countries, another 26% from other participating EU members (Bulgaria, Greece, Romania, Slovenia, Estonia, Latvia and Croatia), and only 4% from the regional non-EU countries participating in the 16+1 format. Except for Albania, the other CCE countries increased their exports to China between 2010 and 2020. Whereas these are absolute figures that do not take the size of the economy or selling prices into consideration, the proposed comprehensive measure $g^{A,B,W}$ in millions of US dollars enables the assessment of the economic gains / losses of exporting to China.

The V4 members managed to increase their gains significantly since 2010. In 2020, Hungary sold its products to China at 23.5% higher prices than it was selling for elsewhere, Czech Republic by 21.2% higher, Poland 18.9% and Slovakia 13.5% higher prices than charged in the rest of the world. Greece has so far failed to substantialize its close ties with China, which stem from China COSCO majority ownership of the Greek Piraeus Port. Nevertheless, Greece's export prices to China are slightly higher (2.4%) than those to the rest of the globe. Bulgaria, on the other hand, seems to be the single most disadvantaged country in this relationship with China. As indicated by the $g^{A,B,W}$ values, Bulgaria's export prices to China are significantly lower than its global average. If Bulgaria's weight data is right, the prices charged in China in 2020 were more than 30% below Bulgaria's average prices in other regions of the world.

Three regional non-EU countries' (Bosnia and Herzegovina, Montenegro, and Serbia) exports to China deteriorated further, with their $g^{A,B,W}$ in 2020 being negative and even lower than a decade ago. Only North Macedonia managed to improve its exports to China in terms of $g^{A,B,W}$ over a ten-year period. This means that these countries are exporting their goods to China at lower prices than they export to other markets. The question here is why these countries would export commodities to China for even lower prices than the adequate price elsewhere. Albania, despite an almost 46% decline in sales to China, achieved about the same gains as it did ten years ago, thanks to much higher selling prices (+ 33%) for its commodities in China than in other export markets in 2020 (Tab. 4).

The findings suggest that the EU membership is perhaps more essential for CEE countries' economic gains from exporting to China than their participation in the 16+1 format. Similar assumptions, however, would require the development of an econometric model with variables such as GDP, EU membership status, and foreign investments.

Acknowledgement

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Impact of the Covid-19 pandemic on the operation of small and medium-sized enterprises

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Abstract

The onset of the pandemic and the subsequent introduction of restrictive measures created many risks for the functioning of SMEs. But at the same time, it also brought a lot of opportunities. Although many economists long expected the arrival of the crisis and in 2019 the first signs of recession appeared in advanced economies, no one expected that it would be accelerated and deepened by the global pandemic. SMEs had to adapt to the new situation as quickly as possible to survive. Moving those activities, the nature of which allowed them, to the online environment became key. The aim of the article is to theoretically define what changes SMEs had to deal with after the spread of the Covid-19 pandemic. As part of the fulfilment of this goal, on the one hand, we decided to monitor several indicators capturing the economic situation in SMEs and, on the other hand, their approach to the modernization of the process. Within this research, we identified how the share of employees working via home office changed during the pandemic period, how SMEs prepared for the possibility of introducing a home office, how added value and employment in SMEs developed during this period, as well as whether the share of innovative SMEs in the Slovak economy changed.

Keywords: added value, Covid-19, home-office, innovations, Slovakia, SMEs

Introduction

The Covid-19 pandemic, which broke out at the end of 2019 in China and spread to the whole world in a short time, represented an unprecedented shock to the operation of all economies, Slovakia including. At a time when a vaccine had not yet been developed, the only successful means of combating the highly contagious Covid-19 disease was social isolation. Although some developed countries initially pursued the path of building

collective immunity in order to have as little impact on the economy as possible, the evolution of the situation eventually forced them to adopt restrictive measures. Enterprises in economies around the world, including small and medium-sized enterprises (SMEs), have thus felt the impact of this pandemic. Some of them have been temporarily closed, and others have had to adapt their operations to meet the demands of social isolation. Governments have, of course, put in place a range of measures to help businesses mitigate and overcome the impact of the crisis related to the Covid-19 pandemic. However, the assistance provided was often criticized as insufficient or slow, which not only led to some employees being made redundant but could also have led to the complete liquidation of many SMEs. Although there is a tendency in society to view this crisis as only a negative, after partial adaptation to the situation, it has turned out to have some positive effects as well. The possibility of working at least partly from home has been made available to more employees than ever before, which has increased interest in the introduction of ICT and at the same time confirmed the need to support all other innovative activities.

Methods and Data

The aim of the article is to theoretically define what changes SMEs had to deal with after the spread of the Covid-19 pandemic. As part of the fulfilment of this goal, on the one hand, we decided to monitor several indicators capturing the economic situation in SMEs and, on the other hand, their approach to the modernization of the process. Within this research, we identified how the share of employees working via home office changed during the pandemic period, how SMEs prepared for the possibility of introducing a home office, how added value and employment in SMEs developed during this period, as well as whether the share of innovative SMEs in the Slovak economy changed.

We used several scientific methods when processing the contribution. In the theoretical part of the contribution, we described the development of the situation in the monitored area through the descriptive method. After the theoretical analysis of the issue under study, we focused on quantitative research in the empirical part of the paper. When working with statistical data, we used time series analysis and comparison. The processed indicators were monitored until 2021 or 2020 when the availability of data did not allow to include the year 2021. We drew part of the statistical indicators from Eurostat and the database of the European Commission (European innovation scoreboard), the other part from the website http://monitoringmsp.sk/ operated by the Slovak Business Agency. Where the availability of data allowed us to do so, we used the above-mentioned method of comparison and compared the situation in the Slovak Republic with the situation in other countries, or with the average value of the indicator for the EU. When identifying the rate of home office use, we compared the pre-pandemic year 2019 with the years 2020 and 2021, which were already affected by the pandemic. Following this, we analysed the share of SMEs that in 2020 increased the % of employed persons who have remote access to their e-mail system, as this was one of the prerequisites for the introduction of a home

office. This indicator was created precisely as a response to the pandemic and was not available in other years. For the data taken from http://monitoringmsp.sk/ it was not possible to make international comparisons, therefore for greater objectivity we applied time series analysis and followed the development of selected indicators in the Slovak Republic in 2012-2021. By deduction we tried to apply general scientific conclusions to the individual facts, by induction we in turn tried to draw general conclusions, based on the evaluation of the development of sub-indicators. Finally, we applied the synthesis method when formulating the conclusions.

Theoretical background

The outbreak of the pandemic brought many challenges for all enterprises, which they had to deal with in a short time if they wanted to overcome this unexpected situation. Although from time to time an epidemic has occurred, especially on the Asian or African continent, a pandemic of the current nature has had no parallel in the world since the time of the Spanish flu, which began to spread in 1918. Before the outbreak of the pandemic, studies dealing with the impact of infectious diseases on economic indicators were mostly based on the fact that countries can be divided into 3 groups: countries with almost no incidence of infectious diseases (OECD countries), countries with a relatively low incidence of infectious diseases (developing countries) and poor countries with a frequent incidence of infectious diseases (countries of sub-Saharan Africa) (Goenka, Liu, 2020). However, Covid-19 meant a radical intervention in the economies of all countries, and it was a bigger shock precisely for developed countries that were not used to a similar situation.

Small and medium-sized enterprises are mostly considered to be the main drivers of the economies of individual countries. However, at the time of the Covid-19 pandemic, it was SMEs that were more vulnerable compared to large enterprises, as this type of business is highly dependent on the speed of money turnover, while reduced demand during the corona crisis disrupted the company's cash flows (Winarsih, Indriastuti & Fuad, 2021). In addition, many SMEs operate precisely in those areas that were most affected by the pandemic. Although crises come at regular intervals and businesses anticipate that economic difficulties may arise, the corona crisis was significantly different. In the beginning, the only successful means of combating the highly contagious disease Covid-19 was social isolation. The measures taken by the governments of individual countries led to the fact that many businesses had to be temporarily closed, especially in the field of services such as catering, culture, and tourism. However, restrictive measures are always necessarily accompanied by economic losses, and it was no different, even in this case. Covid-19 had a negative impact on businesses, especially in financial and operational performance, profitability, and access to finance, but e.g., also in customer satisfaction (Xiao, Su, 2022). Lockdowns introduced to prevent the spread of the disease caused logistical problems that affected not only the timeliness of deliveries but also the transfer of labour and marked a significant drop in customer demand (Kharlanov et al., 2022).

Although SMEs were more vulnerable than large companies during the corona crisis, everyone perceived the effects of Covid-19 differently, therefore there were also opinions that financial assistance from governments should consider the individual characteristics of specific companies rather than their size (Wieczorek-Kosmala, Blach & Doś, 2021).

The problem was also the disease itself and its course, which led to numerous outages of the workforce at a certain moment, or the consequences that the disease left in a certain part of the population, which had an impact on their re-entry into the work process. Developments in the past have already shown that the effects of a pandemic on health cannot be separated from its effects on the economy, as the consequences of a pandemic are often a function of economic conditions (Arthi, Parman, 2021). In countries with better access to health care, individuals are more likely to receive timely and adequate treatment, which will speed up their return to work or overall ability to manage the disease.

It is known from the past that every crisis moves humanity forward. For example, even wars, on the one hand, meant huge losses of human life and extensive economic damage, but on the other hand, they were an accelerator of scientific and technical progress. Currently, it is an opportunity primarily to advance in the development of information technology and digitization. Even for SMEs, the pandemic was a challenge to accelerate the process of digital transformation, which was already underway in most advanced economies. Some studies report that, especially in the 21st century, the adoption of digital technologies plays an important role in crisis responses, as digital technologies improve the available resources of firms in terms of both scale and flexibility (Guo et al., 2020). They can e.g., reduce the costs related to the transfer of resources, shorten the time of their transfer, and make it possible to coordinate individual activities more flexibly. Covid-19 has therefore prepared human resources, but also entire labour markets, to be able to adapt quickly and, if necessary, react flexibly to any situation (Dvořák et al., 2020).

To create a safe and reliable situation in enterprises in the uncertain conditions caused by the pandemic, it is necessary to pay attention to the three pillars of reliability, which include human resources, information and communication technologies, and management (Azizi et al., 2021). The structure and interaction of these pillars in the enterprise necessarily changed during the pandemic. The importance of ICT increased rapidly, human resources were forced to overcome resistance to rapid changes. In such a turbulent environment, the role of human resource managers has also increased as an essential pillar in the adaptation of businesses to this pandemic situation (Gonçalves et al., 2021). The pandemic has therefore created many challenges for businesses not only in human resource management. The introduction of the home office, the increased risk of layoffs, the prevention of increased turnover, and the decrease in employee motivation or productivity were all facts that required an adequate opinion. As a result of the isolation, psychological problems began to appear in many employees, and the level of anxiety and stress increased, which affected their performance and quality of work, therefore strategies to improve the physical and mental health of employees, as well as mechanisms of communication with employees, began to be developed (Azizi et al., 2021).

The results in Portuguese companies showed that the main changes occurred in the processes of work organization: an increase in the use of remote work was recorded, and the processes of corporate education, recruitment and selection of employees, and communication processes also underwent changes (Gonçalves et al., 2021). Some areas were directly affected by health risks related to the spread of infectious diseases. Other areas such as communication processes were affected indirectly, by the fact that the introduced changes had to be consistently explained, thus requiring more intensive communication with subordinates from the management. All the above facts related to the pandemic should lead the top management of SMEs to transform their formal and informal structures and increasingly use digital resources, as consumer habits have also changed (Rodrigues et al., 2021).

In developing and newly industrialized countries, SMEs employ the majority of the workforce and are responsible for income generation opportunities in the economy (Singh, Garg & Deshmukh, 2008). Even in the Slovak Republic, the share of SMEs in employment is high - in 2021 it was 74.3%, while this significant share was not seriously disturbed even by the pandemic. Since SMEs play an essential role in the economies of many countries, in today's constantly changing environment, it is necessary to pay attention to their innovative performance, which becomes a prerequisite for ensuring their prosperity in the future. In the area of innovation, SMEs apply an operational rather than a strategic approach, they approach their management and planning mostly unsystematically - according to current market needs and especially considering the availability of quick resources (Brecková, 2017). Although SMEs play the most important role in developing and newly industrialized countries, their innovation performance is also a subject of interest among developed countries, in whose economies they also have an irreplaceable place. The European Commission (2021) monitors the share of SMEs that introduces at least one product innovation per year, as well as the share of SMEs that introduce business process innovations. Product innovation leads to an increase in the competitiveness of SMEs. However, many SMEs do not innovate by introducing new products or improving existing ones, but by improving their business processes. Innovations in this sense then relate to ongoing processes, marketing, or the organization itself. The introduction of process innovations leads to an increase in the productivity of SMEs compared to SMEs that do not introduce any innovations, and the lifetime of this productivity increase lasts for one innovation period (Mañez et al., 2013). Productivity growth can be one of the elements through which SMEs increase their competitiveness, which is very important for them because the competition between companies is still intensifying in the current globalized environment. SMEs are aware of the importance of innovation for overall progress and have been expanding their innovation activities in recent years. When there is a drop in GDP, investments aimed at supporting various activities also drop very often (Sun, Cai & Shen, 2022). Therefore, the Covid-19 pandemic may have been the aspect for SMEs in some countries that disrupted their developing innovation activities, either due to a decrease in SMEs' resources caused by lockdowns or insufficient compensatory measures by governments. However, increasing investment is not the only way to support innovative activity. In addition, an increase in the stock of

various types of human capital leads to an increase in innovative activity (Teslenko, Melnikov & Bazin, 2021). This could be one of the strategies for businesses during the pandemic to maintain the current level of innovation.

Results

On the one hand, the pandemic caused economic problems for SMEs and affected their economic performance, but on the other hand, it was the stimulus that accelerated the pace of digitization in them. It was already clear from the beginning that Covid-19 will not disappear from day to day, but will return in waves, so businesses must urgently adopt a new vision of the future, part of which will include transferring to the virtual environment those activities that can be implemented in it.

Graph 1: Employed persons usually working from home as % of all employed
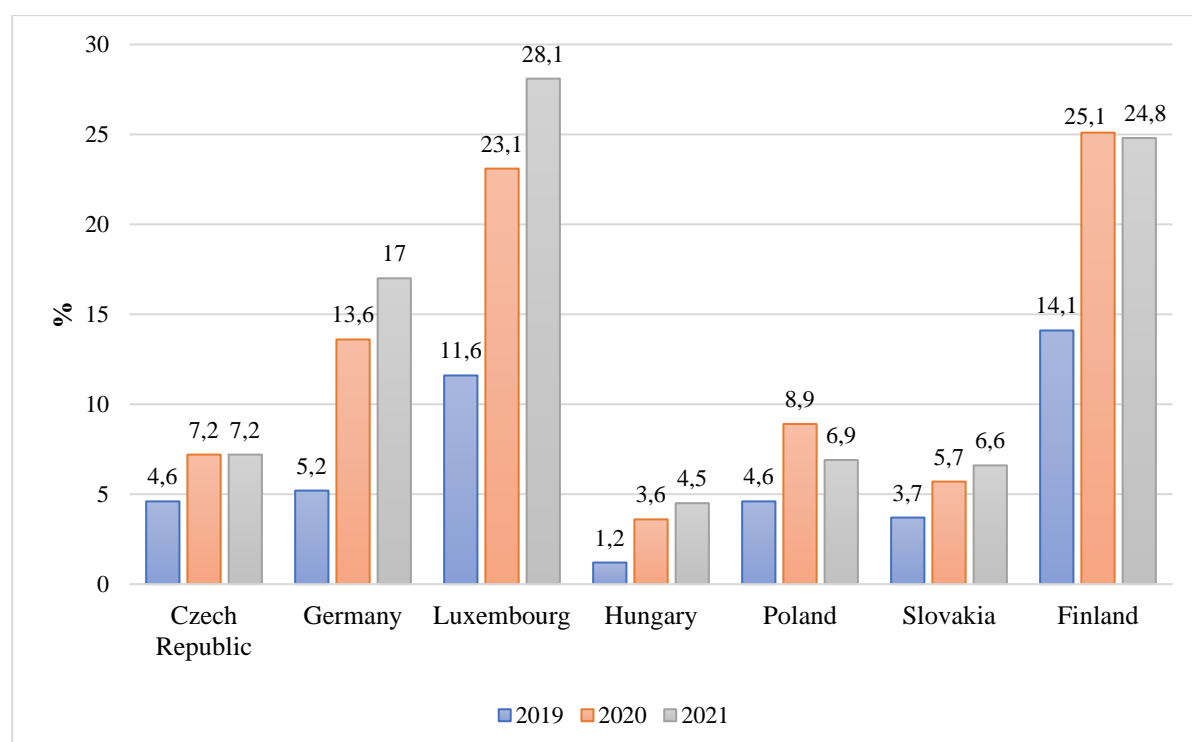
Source: Eurostat, own processing.

Figure 1 captures the changes in the use of working from home that have occurred because of the pandemic. The share of employed home workers increased in all countries. In the V4 countries, there was only a slight increase, since in these countries, despite the gradual reorientation of their economies towards services and more scientifically demanding sectors, industrial production continues to dominate, so the personal participation of employees in the workplace was also necessary during the pandemic. We recorded the smallest proportion of people working from home before the pandemic in Hungary (only 1.2%), while even the pandemic did not cause a significant increase in people employed in this way. Germany, which in 2019 was at approximately the same

level as the V4 countries in terms of the share of workers from home, saw an increase in this share to 17% at the time of the pandemic. In Finland and Luxembourg, the share of workers from home was relatively high even before the pandemic, while during it increased to 24.8%, respectively. 28.1%. The development of the share of people working from home in Poland was interesting, where in 2021 there was a decrease of 2 percentage points. This probably happened because, at a time when social isolation was no longer the only measure of protection against Covid-19, some employers preferred the return of employees to the workplace, or they no longer allowed employees a full home office, but only a combination of working from home and from their usual workplace. However, the initiative to return to the usual workplace did not have to come from the employers, but directly from the employees. For example, even a study carried out in India showed that after the end of the pandemic, up to 29% of the population wants to return to the office (Mukherjee, Narang, 2022).

Graph 2: Share of SMEs that increased the % of employees who have remote access to their email system in 2020
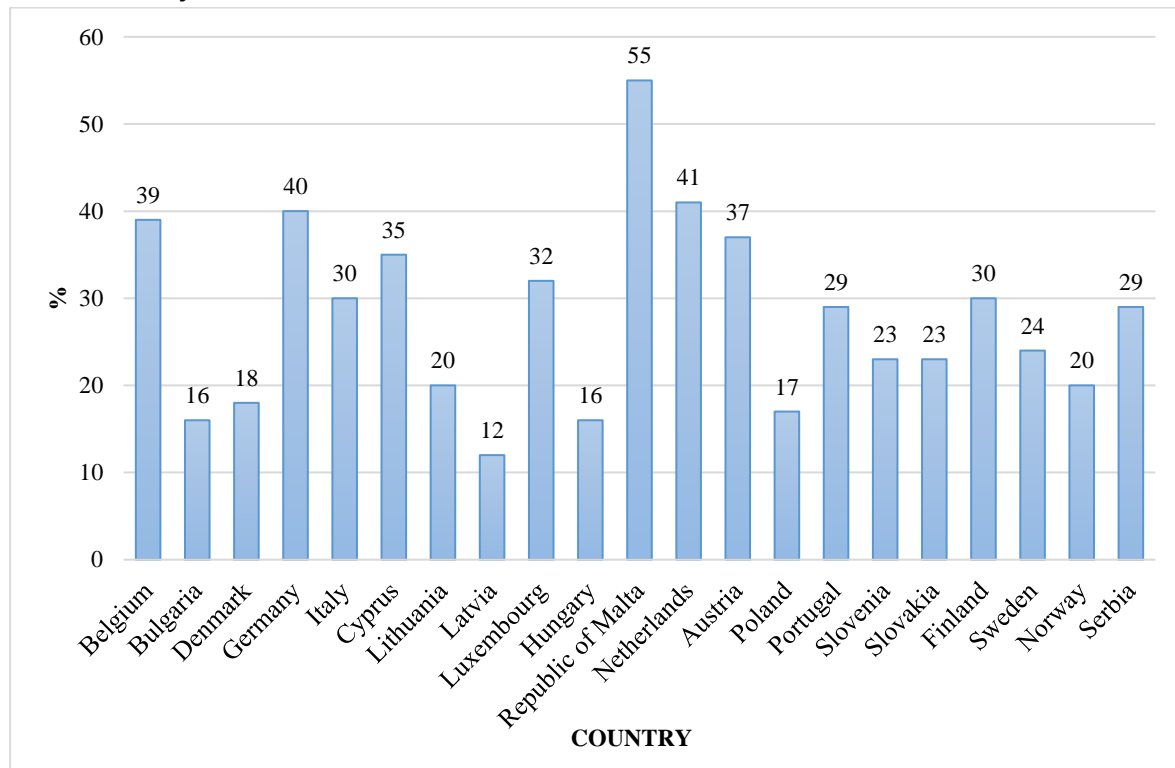
Source: Eurostat, own processing.

If we have already pointed out the increase in the share of workers from home during the pandemic period, it is necessary to look at what changes in connection with this issue have manifested themselves within SMEs. We watched how in 2020 the share of SMEs increased year-on-year, which increased the percentage of employed persons who had remote access to their e-mail system (Figure 2), which was a prerequisite for the introduction of a home office. We monitored the indicated indicator in all EU countries for which data were available. According to Eurostat (2022) in Slovakia, the share of such

businesses increased by 23% in the first year of the pandemic. The smallest increase was recorded in Latvia (12%) and the highest in Malta (55%). However, this indicator only reflects the current response to the pandemic but does not take into account that the share of SMEs in which employees had remote access to their e-mail system was already significantly different in individual countries before the outbreak of the pandemic.

Graph 3: Development of the added value of SMEs in the Slovak Republic
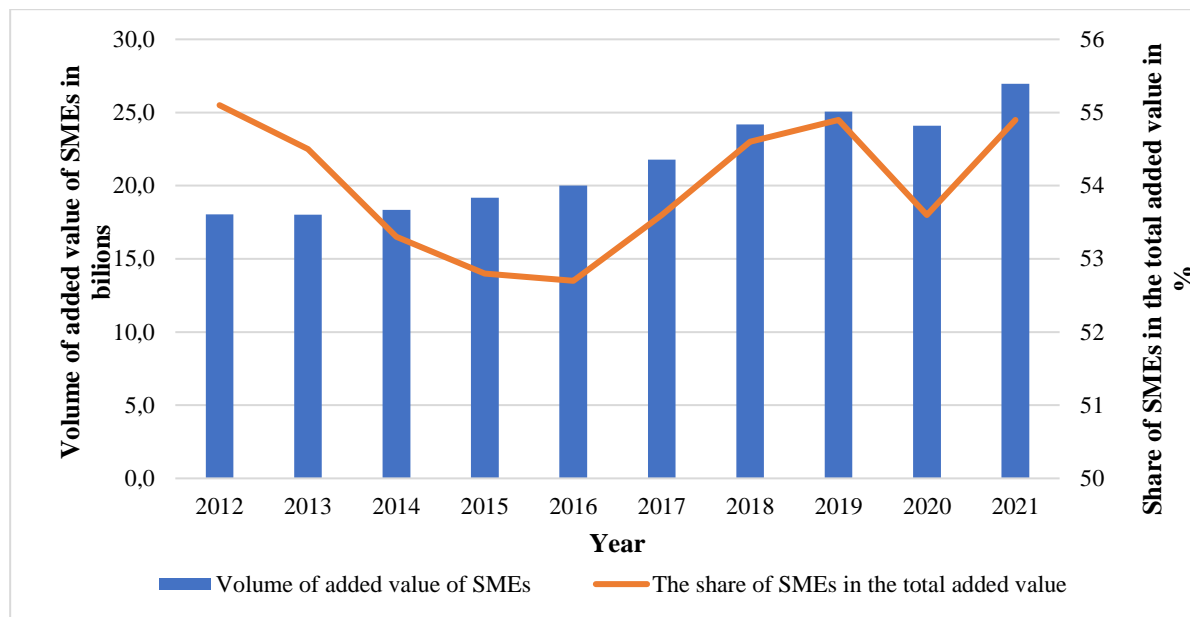
Source: http://monitoringmsp.sk/, own processing.

The added value produced by SMEs (Figure 3) increased every year from 2014 until the arrival of the pandemic, up to 25,1 billion. in 2019. In 2020, in connection with the arrival of the pandemic and the temporary closure of many businesses, the added value of SMEs decreased by approximately one billion to 24,1 billion. and at the same time, in this pandemic year, the share of SMEs in the total added value also decreased from 54.9% in 2019 to 53.6%. Although the pandemic continued in 2021, the volume of added value produced by SMEs increased again, even to a higher level than before the pandemic (27 billion), and the share of SMEs in the total added value returned to the pre-pandemic level. This fact may be a signal that SMEs have adapted relatively well to a previously unimaginable situation.

Graph 4: Annual change in SMEs' employment in Slovakia
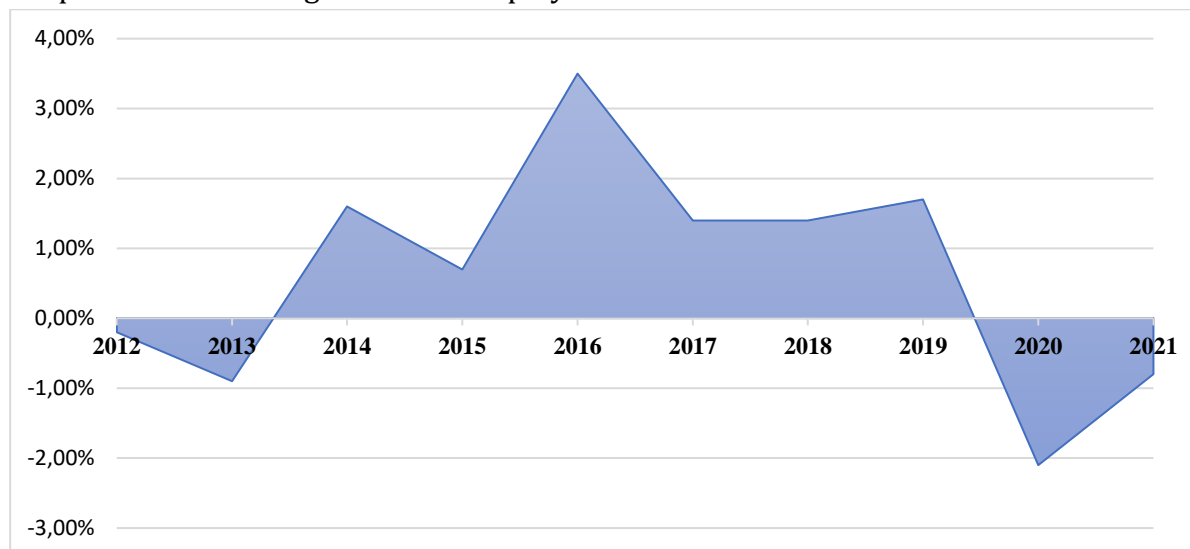
Source: http://monitoringmsp.sk/, own processing.

The share of SMEs in employment in Slovakia is significant. In 2021, it represented 74.3%. After overcoming the consequences of the financial crisis that broke out in 2008, there has been an annual increase in the share of employees in SMEs since 2014 (Figure 4). According to Slovak business agency (2022) the most significant increase in employment was recorded in 2016 – 3.5%. This favorable development was stopped in 2020 by the outbreak of the Covid-19 pandemic when there was an annual decrease in employment in SMEs by 2.1%. In 2021, a decrease was recorded again, but less significant than in the previous year - 0.8%.

Tab.1: Share of innovative SMEs

		2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Share of SMEs introducing product innovations	*SR*	13,1	13,1	13,1	11,2	11,2	12,5	12,5	14,0
	Average EU	22,6	22,6	22,6	22,2	22,2	24,2	24,2	28,7
Share of SMEs introducing business process innovations	*SR*	26,3	26,3	26,3	23,4	23,4	20,5	20,5	21,1
	Average EU	33,8	33,8	33,8	32,3	32,3	35,1	35,1	40,0

Source: https://ec.europa.eu/docsroom/documents/46934.

When comparing the innovation performance of the Slovak Republic, it lags many EU countries, so it is not surprising that the situation in Slovak SMEs is similar. While the average share of SMEs introducing product innovations in 2021 in EU countries was 28.7%, in the Slovak Republic (Tab. 1) this share was only 14%, and since 2014, after a temporary decline, it increased by only 0.9%. However, the development trend was correlated with the development in the EU. A different situation was noted in the

development of the share of SMEs introducing business process innovations. While in the Slovak Republic the share of these SMEs has decreased since 2014, it has increased on average in EU countries. A more significant increase, like the share of SMEs introducing product innovations, was recorded especially in 2021. We assume that this happened because the arrival of the pandemic and the introduction of lockdowns in 2020 was a shock for businesses, from which after a certain period of restrictions on innovation they were able to deal with the activities mainly thanks to their re-start and introduction even in those areas that did not require it to such a great extent before the pandemic arrived. This assumption is also confirmed by a study carried out in Mexico: innovation is a key aspect of business recovery during the ongoing pandemic and in the post-pandemic period (Caballero-Morales, 2021).

Discussion

The pandemic has contributed to an increase in the share of employees working from home in all countries monitored. However, the increments were different. While this increase was more significant in Luxembourg, Germany, and Finland, it was less significant in the V4 countries. We assume that such a situation was caused, among other things, by the different nature of the economies of these countries. Even in the 21st century, the V4 countries remain predominantly industrial economies, with production processes requiring the personal participation of employees at the workplace, which significantly reduces the possibility of introducing a home office. Even during the strongest pandemic wave, manufacturing enterprises had to operate in standard mode. The only way to slow down the spread of the disease, or to deal with missing staff, there were temporary production interruptions. While manufacturing businesses could choose to temporarily suspend their operations, many service businesses were closed due to measures taken by the government. We believe that this very fact contributed to the decrease in the share of SMEs in the total added value. The financial compensation provided by the government was mostly slow and insufficient, because of which many SMEs resorted to laying off part of the workforce. This also reflects the year-on-year decrease in SME employment in 2020-2021. Slovak SMEs lag the EU average in terms of innovation performance, and this trend has not been changed even by the pandemic. On the contrary, it rather contributed to the deepening of differences. While in the EU the share of innovating enterprises has visibly increased, in the Slovak Republic we have seen rather stagnation. This situation can also be linked to the lack of financial assistance for businesses during the pandemic, since if a business has a lack of resources, it is difficult for it to engage in any innovative activities.

Conclusion

SMEs have a dominant place in individual economies, their share in the total number of enterprises is significant and their share in total employment is equally significant. The

pandemic disrupted the economic performance of SMEs, especially in 2020, which was also reflected in the decrease in the added value produced by SMEs or in the decrease in their share of total employment. Even though the pandemic continued into the following year, most SMEs found a way to operate relatively efficiently even during the time of restrictions. Although the pandemic contributed to the temporary deterioration of economic indicators in many SMEs, it also brought new impulses to their functioning. Customer interest in online shopping has increased, and the affected businesses have had to respond to this if they want to remain competitive. As a result, there was a rapid development of the processes of electronification and digitization. Already in the first year of the pandemic, the proportion of employees who had remote access to their e-mail system increased, which can be considered one of the prerequisites for a smooth transition to the home office in areas where work can be done from home. The development of the processes of electronification and digitization contributed to the increase of innovative activities in SMEs, but in the Slovak Republic this increase was not so significant compared to the EU average, and Slovak SMEs continue to lag behind the situation in the most advanced European countries. At a time when it seemed that the world would gradually fully recover from the pandemic and it would no longer be treated as a common disease that would not lead to any restrictions, a new reality disrupted global economic relations – the military conflict in Ukraine. The effects of sanctions, as well as the disruption of global energy security, cause the price of many commodities to rise, which leads to an acceleration of the rate of inflation and creates new risks for the functioning of SMEs. A certain limitation of our research is the fact that we considered only quantitative indicators, while for an objective assessment of the situation in SMEs, it is necessary to deal with qualitative ones as well.

Acknowledgement

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Are they really green minds? Marketing behaviour the customer of two generations Y and Z in the field of organic food

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Abstract

This paper aims to fill the research gap of Generations Y and Z customer preferences in Czech and Slovak Republic market, by identifying the factors determining the purchase of organic food. The research focused on the price influence, trustiness of organic food quality, health impact of organic food, brand motivation and place of purchase preferences. The primary data were collected through two identical survey cycles. The first one was carried among the Generation Y respondents in 2014, the second one among the Generation Z respondents in 2019. Both the survey cycles were distributed in electronically among 1708 respondents in total. The relative frequency testing was used to process the questionnaire data, the hypothesis verification was tested by one variable and two variable tests of frequencies. To analyse the generation Z respondents´ purchase factors relations, the logit model was used. As independent variables were set the factors determining the purchase, as dependent variable was set the realisation of purchase of organic products. The results show that the popularity of organic food is higher for the generation Z than for generation Y. The appearance factor of the organic products does not influence the decision of the Y generation about buying the product, but the factors of availability and quality factors influence the decision the most. The factors determining organic food preferences can allow company management to establish reliable marketing communication and sale strategy tailored to the generation Y and Z customer segment in Central Easter Europe.

Keywords: Generation Y, Generation Z, organics food preference, logit model

Introduction

The report published by the European Commission states that inhabitants of EU member countries consider the health the top important of the 35 main aspect of the decision-making process during purchases of goods (European Commission, 2013). Studies carried in USA and Europe markets, which proving the importance of the intention of consumption in the persuasion of consumers on organic food qualities, including healthiness, reach taste and flavour, as well as the environment protection. (Molinillo, Vidal-Branco and Japutra, 2020) The organic food industry is considered as one of the fastest growing food market shares and is estimated to accelerate further in the developer countries market. According to Silva et al. (2017) the demand for organic food has been growing for past ten years into developed countries, leading in increase of number of organic farms and food producers. The annual global market value for the entire organic trade has been accounted for USD 162,036.6 million in the 2019. Due to the Willer (2020), the countries with the largest organic markets continued to be the United States (40,6 billion Euros), Germany (10,9 billion Euros), and France (9,1 billion Euros). in 2018. However, a new trend is that China is gaining ground fast, due to rising consumer interest and food safety issues (8,1 billion Euros).

The article is structured as follows: the next section provides a literature review and lays the ground for hypotheses development. The Literary review is followed by the research objective, methodology and data part, in which the details regarding the survey and applied methods have been provided. In the discussion sections the results of the study have been deliberated. The research findings theoretical as well as practical implications have been indicated in the conclusion, the last part of article.

Literature review

It is well documented what factors can influence the market behaviour in the sphere of organic food, the product preferences of customers are tracked and analyses from many perspectives of many generation cohorts (Gajanova, Nadanyiova and Lazaroiu, 2020). Much less is known about the youngest customer cohort named Z behaviour regarding organic food.

However, previous research has brought mixed results regarding the organic food customer behaviour. Rana and Paul (2017) and Ladwein and Sánchez Romero (2021) have declared that among main factors impacting demand for organic products into developed countries are ethical commitments, quality, safety, knowledge, and health. The factors impacting demand into developing countries are different, they include the availability, education, health status, marital status and the size of a family. The health has been mentioned into both of these categories. Using factors such as rating, reference groups, family or lifestyle, the consumer also can have influenced opinions and attitudes about the organic product (Gajjar and Nilesh, 2013; Rana and Paul, 2017). Suki (2016) in article assessed consumers' attitude toward green brands, and green brand knowledge

on green product purchase intention.

The role of social status cannot be omitted into the research. As Johnston, Szabo and Rodney (2011) state in their work, the purchase of organic food can serve as a tool for differentiation apart from the common customers (Johnston, Szabo and Rodney, 2011). Gilovich, Kumar and Jampol (2015) have discussed the topic of social status in his study, which divides consumption into experimental, including holiday or diner in restaurants and material, such as food, clothing, or a car. In its research findings, consumers are more likely to benefit from the experimental than the material consumption, where, with higher social status, can be monitored greater benefits than with middle-class status. The price of the organic food follows the perception of social status. Authors Lee and Hwang (2016) have indicated that while the high price of organic food could reduce the perceived value, the focus on expectation of achieving the quality of such food, could encourage consumers to increase their purchases. Milosavljevic at al. (2012) in their study, describe how the visual side of the product influences the consumer's attention and consequently also his or her decision-making process. The product appearance therefore plays an important role into decision making process, and the study further declare that in the short time of decision making, the visual role is growing. Its importance in deciding in the short term is that significant, that consumers in most cases choose the product according to its appearance and not by the product features and characteristics. Similarly, Zhang and Seo (2015) conclude that the key role in consumer decision-making about food purchases plays the neighbourhood of the product and not just the product itself. In connection with this conclusion, providers of organic products should focus their attention on the overall sales process.

Oliveira et al. (2016) confirm that consumers are most interested in information on the packaging, but also recommend regulating the amount of this information. If the consumer follows several areas of interest, his or her attention is divided into more incentives. For food products, in particular, can be recommended to provide an appropriate amount of information on the packaging in order to increase the likelihood of their reading and understanding by the consumer. The BIO or ECO label of organic products have become an important indicator for certified, highly valuable foodstuffs, produced by a considerable land cultivating, plant growing and animal farming, according to welfare (Heimler et al., 2011; Perito, Coderoni and Russo, 2020). According to current observations, the complex value exceeds the valuation of agriculture importance for the society. It involves economic, social, ethic and ecologic target groups of agriculture (Schamp, Heitmann and Katzenstein, 2019).

Generations Y and Z organic food consumption behaviour

The term 'Generation Y' was coined in the journal 'Advertising Age'. This marketing trade magazine has been credited with first using the term in an editorial in August 1993, as a way to distinguish the group from the Generation X (Advertising Age, 1993).

The generation Y, also called as Millennium generation as they were born between 1980 and 1995 (Goldsmith, Flynn and Kim, 2010), pursues status and prestige consumption

lifestyles, which significantly shaping their consumption behaviour in all areas, including the field of organic products (Perito, Coderoni and Russo, 2020).

This generation has been socialized in a materialistic society, heavily consumption oriented, trendsetters seeking for the new concepts of conspicuous products and services (O'Cass and Siahtiri, 2013, Molinillo, Vidal-Branco and Japutra, 2020) and displaying wealth and purchasing power, even though many young adults still rely on parental financial support and limited incomes (Patel, Sharma and Purohit, 2021). As the inseparable part of this desired upper class live style, can be recognised the interest of top quality healthy organic food, premium foodservices and luxury green restaurants or cafés as a means of self-expression or symbols of their preferred lifestyle (Das and Jebarajakirthy, 2020; Giovannini, Xu and Thomas, 2015; Kim and Jang, 2014).

Despite the heterogeneity of Generation Y cohort, it can be stated that with the rise of healthy lifestyle, high gastronomy, promoted importance of consumed food quality and origin, it seems like Generation Y significantly prefers the brand products, especially in segment of organic food, regional products, products from local farmers, and or fair-trade food and drinks (Duffett, 2017; Pacho, 2020).

Table 1 Overview of authors contribution

Authors contribution	Area of contribution
Gajanova, Ladanyiova and Lazaroiu (2020)	Generation market behaviour
Rana and Paul (2017); Ladwein and Sánchez Romero (2021); Gajjar and Nilesh (2013); Suki (2016); Zhang and Seo (2015); Schamp, Heitmann and Katzenstein (2019)	Factors influencing organic products demand
Johnston, Szabo and Rodney (2011); Gilovich, Kumar and Jampol (2015); Lee, and Hwang (2016)	Role of social status and price in organic products purchase
Milosavljevic at al. (2012); Oliveira et al. (2016); Heimler et al. (2011); Perito, Coderoni and Russo (2020)	Role of visual side and package in organic products purchase
O'Cass and Siahtiri (2013); Molinillo, Vidal-Branco and Japutra (2020); Giovannini, Xu and Thomas (2015); Kim and Jang (2014); Duffett (2017); Pacho (2020); Das, Jebarajakirthy (2020)	Generation Y characteristics and shopping behaviour
McCrindle (2014); Schawbel (2014); Haddouche and Salomone (2018); Monaco (2018); Priporas, Stylos and Fotiadis (2017); Törőcsik, Szűcs and Kehl (2015); Chaney, Touzani and Slimane, (2017)	Generation Z characteristics and shopping behaviour

Source: Authors research.

Research and the facts in the area show that Generation Z, born between 1995 and 2010 (McCrindle, 2014; Schawbel, 2014), whereas very concerned with environmental issues seems to be highly critical, frequently changing their opinion, demanding access to the internet, through which they share their opinions, consumption desires and customer feeling (Haddouche and Salomone, 2018; Monaco, 2018; Priporas, Stylos and Fotiadis,

2017). It has been shown that the generations Y and Z have a unique and different approach to the purchase organic food compared to previous generations (Johnson, 2011). Therefore, the data of organic food consumption conducted on different generations might not be generalized to generations Y and Z due to their unique consumption behaviour and preferences (Törőcsik, Szűcs and Kehl, 2015, Chaney, Touzani and Slimane, 2017) and to understand the factors determining their organic food consumption behaviour can be essential and become the key driving force for the current marketing and sale strategies formulation.

Methods and Data

This study aims to identify the factors determining Generation Y and Z intentions in purchasing organic food in Czech a Slovak republic. Therefore, the primary research questions of this study have been formulated:

1) What factors have significant influence on the behavioural intentions of these generations to buy the organic food.

2) What role play the price of organic food on the intentions of Generation Y and Z in purchasing organic food?

3) What is the main reason for refusing purchase of organic food among these generations.

To collect data covering the and Z cohorts, two cycles of electronically distributed surveys have been carried out in the year 2014 for the Generation Y cohort and then repeatedly for the generation Z cohort in the year 2019, among university students and staff, ranged from 16 to 35 years' age in regions of Czech and Slovak Republic.

The generation Y has been represented by 1122 respondents, then, after adjustments of incompleteness in surveys, stayed in 1108 respondents. The questionnaire survey has been answered by 71.21% of women and 28.79% of men. The authors created a second-round survey recognising the development of organic products purchase motivation for the generation Z, where have been anticipated similar motives for buying organic food. Within the questionnaire survey, were received 611 responses, when eliminate incomplete questionnaires, the total amount shows 600 responses. The questionnaire survey has been answered by 78.4% of women and 21.6% of menthe. Due to these characteristics, the selection of respondents was not representative of the population. Both questionnaires were filled by respondents in electronic form.

The relative frequency and then, based on these characteristics the statistical hypothesis has been used for data processing. The combinatorial assortment has been carried out and independence for different question combinations has been tested except for the basic classification according to one symbol. Independence in the chart is being studied.

$$\chi^2 = \sum_{j=1}^{s} \sum_{i=1}^{r} \frac{\left(n_{ij} - n'_{ij}\right)^2}{n'_{ij}} \tag{1}$$

with χ^2 test.

The degree of freedom is calculated by (r-1) (c-1). If the value of criteria is greater than the critical quantil, the hypothesis of independence is being rejected and therefore the correlation is expected. Apart from the χ^2 test in the article, there is also one nominal variable and more nominal variables used in relative frequency testing.

$$U = \frac{p - c}{\sqrt{\dfrac{c(1-c)}{n}}} \tag{2}$$

$$U = \frac{p_1 - p_2}{\sqrt{\dfrac{\left(n_1 \cdot p_1 + n_2 \cdot p_2\right) \cdot \left(n - n_1 \cdot p_1 - n_2 \cdot p_2\right)}{n \cdot n_1 \cdot n_2}}} \tag{3}$$

In both cases the tested criterion has a normal standardized distribution. By testing one-selection ordinal variable we study null hypothesis of the relative frequency unity with the assumption, by testing two variables we study a correlation between more relative frequencies. While processing the questionnaire, the econometric model has been constructed for the generation Z. For the purpose of its formation, the nonlinear model has been used, based on modelling of the alternative data, reached the value of only 0-1. Fundamentals of this logit model, is the expansion of the modified exponential model by the inflection point. Estimated model is shaped as:

$$Y_i = \frac{e^{Z_i}}{e^{Z_i} + 1} = \frac{1}{1 + e^{-Z_i}} \tag{4}$$

where $i = 1, \cdots, n$ and $Z_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_k X_{ki} + \varepsilon_i$

The interpretation of parameters is a chance, relating between probabilities of one variable to another.

Results

The research findings identifying the generation Y preference show that respondents elect two prevailing factors when thinking about organic food purchase, the quality, and the price. The appearance of food has been also marked as a very important factor. Respondents are less likely to address availability, place of origin, and at least the brand of the product. Approximately 70% of the respondents buy organic food frequently or occasionally. The remaining 30% of respondents, do not buy organic food at all, or just do not see if the purchased product is organic food. Of those respondents who do not buy organic food, part of them disagree with products higher price, and part feel the organic

food have no sense. It can be concluded, from the survey open responses, that respondents do not trust traders to offer organic products indeed.

Those respondents belonging to the generation Z, who buy the organic food, buy it mostly because they are convinced that the organic food is healthier and tastier than the extensive conventional agriculture food. Most of their organic food purchases have been made in hypermarkets and supermarkets, they are also frequently visiting specialized stores. There has been found a relatively large group of respondents who covering their need by growing their own food. Despite the Gen Z respondents believe that organic food is healthier and tastier, but a relatively large part of them do not feel that organic food is more appealing them. Of the quality of organic products, only 27% of them believe that it is significantly higher than the quality of the conventional food. The majority of respondents are willing to accept higher price of organic food. The acceptable amount for them is about 10% higher than traditional food product price. Respondents prefer shops where the organic food creates predominant part of the assortment. However, if favourite respondents' shops do not offer organic products, respondents would welcome them in the future. Beliefs about whether organic food is adequately promoted, or not, is exactly in half. And therefore, the respondents which think that organic foods are not sufficiently promoted, present a significant group. It is clear from the combining sorting that respondents do not fully trust organic food because the most frequent answer relating to the quality assessment was the answer that organic food is better in some aspects but worse in others. The distrust, then, seems to lie in the higher volatility of the organic food. From the following combining sorting has been found that respondents did not feel that organic food was more appealing. In other dependencies authors tried to find out whether respondents prefer to buy organic food in the hypermarkets and supermarkets. Research shows that out of a total of 489 respondents who buy organic food regularly or occasionally, the 339 of them probably buy organic products in hypermarkets and supermarkets. There are only 232 respondents who shop for organic food in the specialized stores.

The results answering the question of how each of factors are important for the respondents can be seen at Figure 1. The question of what is decisive for respondents when buying an organic product was answered only by the respondents who stated that they were buying this kind of products (60.8% of the respondents). The biggest difference has been seen in the price indicator, with 89.5% of all the respondents saying that this factor is important to them. If research focuses only on organic food users, the percentage 83% has been obtained. But only 17.5% of the respondents agree that the price is definitely the most important factor. This factor can be thought of as important when deciding whether to buy organic food or a classic food, but it is no longer an important factor for the well-oriented customers of healthy produce.
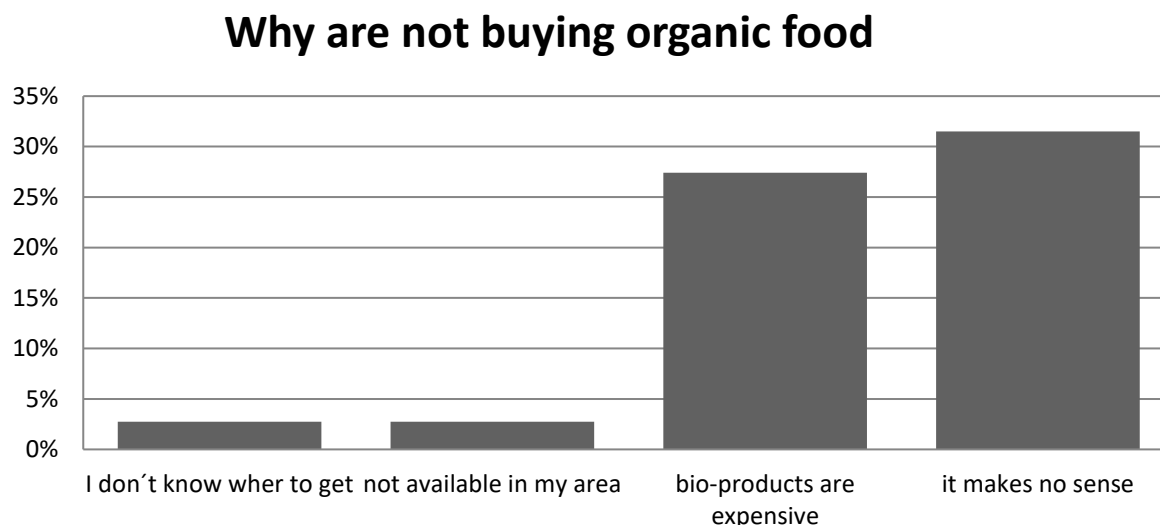
Graph 1: Question: What is decisive for you when buying organic product - relative frequencies?
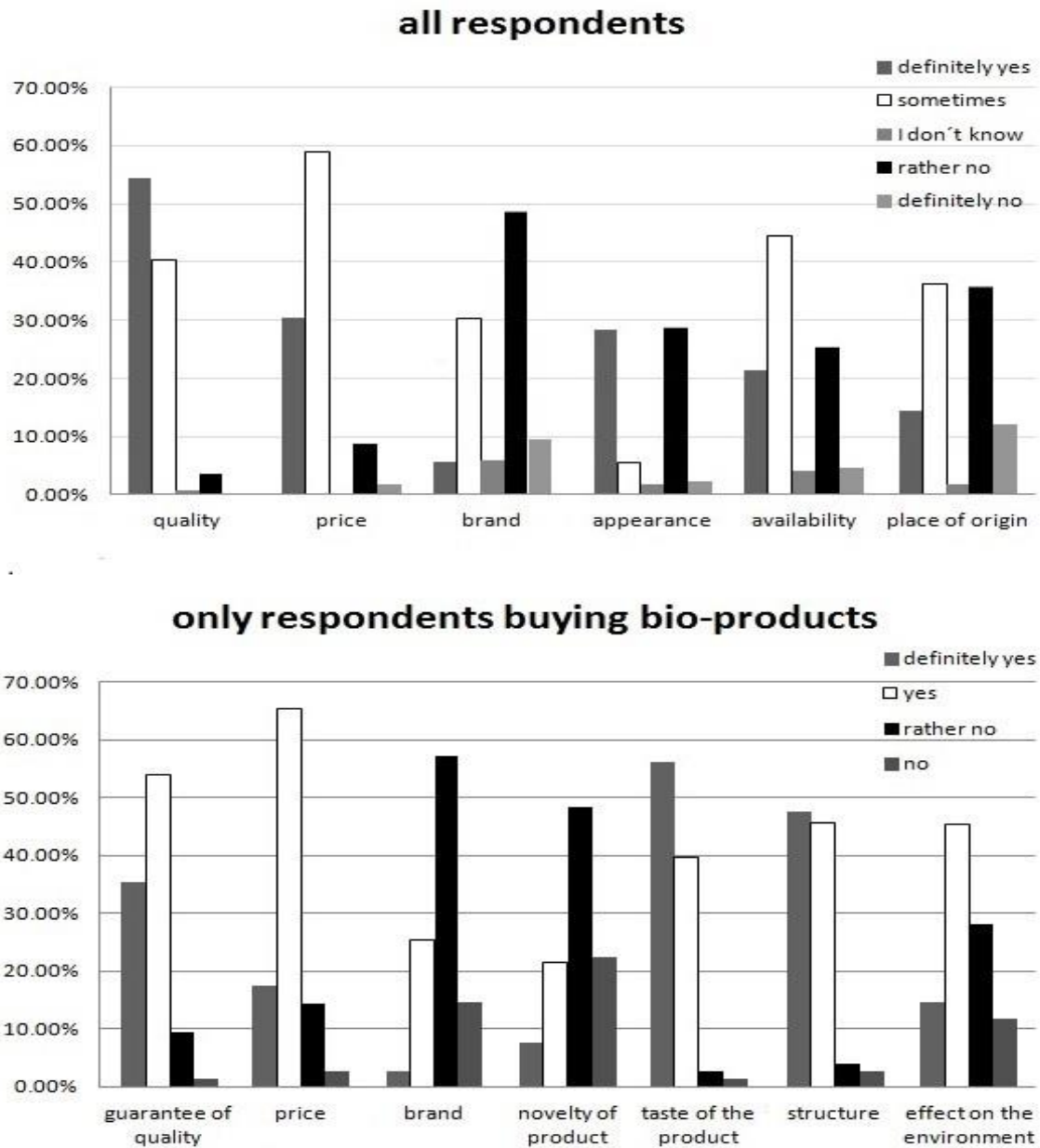
Source: Authors research.

The reasons given by the respondents as the main argument why they do not buy organic products can be seen in Figure 2.

Graph 2: Answers to the question why respondents are not buying organic food

Why are not buying organic food

Source: Authors research.

It can be seen that a large percentage of respondents from generation Z do not trust organic food and do not believe they are healthier than conventional foods. This percentage reach 31.5% of those respondents who do not buy organic food. If we applied this value to all the respondents, it would reach 19.1%. In the questionnaire carried out a similar research (with 1122 respondents) in 2014 (generation Y) within the same age group, where 50% of respondents answered, they do not buy organic products at all. Only the small percentage of this group mentioned the factor of high price, majority (almost 90%) was sceptical towards the organic products and said they do not trust that organic product can be healthier for them than the conventional food. This result supports the thesis, the long-term popularity and credibility of organic products is increasing. It is also caused by the increase of the healthy life style propagation in the last five years where the necessity of the organic-products consumption together with an effort for the increase of the inspection has been emphasized. It has been linked with the trust to the organic product coming from organic farming. Due to this fact of increasing interest for organic farming, more profit goes to a producer.

The organic farming in Czech and Slovak republics has been developing mainly in those locations where the environment protection has been emphasized or where the production conditions have been less favourable. Almost 90% of organic farmed lands can be found in less prosperous area (about the whole acreage of the grassland and nearly 70% of the arable land). The system of the farm land is adequate to these facts and it is very different from traditional agriculture.

We have defined several hypotheses for the research. All of the hypotheses have been verified by statistical testing.

1. The situation is improving, and the organic products popularity is higher with the generation Z than with generation Y.

2. We verified this assumption by testing relative frequency matching (equation 3).

$$FU = \frac{0.608 - 0.445}{\sqrt{\dfrac{(365 + 499) \cdot (1722 - 365 - 499)}{1722 \cdot 600 \cdot 1122}}} = 6.4458 \tag{5}$$

The null hypothesis states the popularity is the same, alternative, and it is also higher with generation Z. P-value was smaller than 0.001 in this test therefore we reject this hypothesis. Based on testing, we have shown that the popularity of organic products is higher among Generation Z than among Generation Y.

3. There can be seen a statistically significant lower percentage of the respondents who do not believe that organic production has a meaning and benefit to an individual's health for the generation Z. The number of respondents keeping this statement has decreased. Respondents who did not trust the organic farming were 241 out of 1122 for the generation Y, and only 115 for generation Z. We will get the value U = 1.1373 (with p-value 0.1277). Based on the test, this assumption has not been confirmed and there cannot be claimed that confidence in organic food has improved.

4. There was found no difference in the gender perspective for generation Z, that organic food is healthier, better, and tastier. This information has been tested using the Independence Test. In the Table 2 below can be seen the test criteria and the p-value.

Table 2: Testing of the independence of opinion on organic food and gender of respondent

	Deviance ratio	p-value
Healthier	0.21726	0.89706
Superior	18.9816	0.00007
More tempting	6.36401	0.04150
Tastier	7.87613	0.04864

Source: Authors research.

The Table 1 shows that men and women did not differ in the view whether organic food is healthier. For the other indicators, the difference was found at 5% significance level. Men have a more pessimistic view of quality; more than women they do not believe in a better quality of organic food. In terms of appetite and delight, women have far more extreme opinions. I. e. The larger percentage expressed the answer yes and definitely not. Men tended to be more likely to answer the variants, maybe and I do not know.

5. The percentage of respondents who are willing to accept the price of more than 10% higher than in traditional production, is higher for generation Z than for generation Y. The price higher more than 10% would be accepted by 47.28% Generation Z respondents. Even 5.34% will accept the price higher by more than 50%. Similarly expressed, the generation Y respondents would accept 10% higher price in amount of 38.16% but the amount increased by more than 50% would accept the amount of 8.5% of

respondents. The tests showed that the null hypothesis of conformity reject (p-value 0.0001) and thus can be said that in generation Y was significantly lower percentage of respondents who are willing to accept the higher price of organic food. However, when examining the extreme supporter from generation Z of organic produce who are willing to accept higher prices for organic food creed, for this group, the situation reversed.

6.   Another research goal was to determine the factors that are important for shoppers and inclines them more influence. This assumption again tests the compliance test using relative frequencies. Test the null hypothesis says that the percentage of respondents who prefer the property is the same as the percentage of the property that is not important. For this test, has been received responses just from respondents which were buying organic food. The summary of testing can be found bellow into the Table 3.

Table 3: The test results of compliance relative frequencies for generation Z

Attribute	Deviance ratio	p-value
Brand	-3.4903	<0.001
Price	10.655	<0.001
Origin	0.4263	0.3349
Quality	13.0757	<0.001
Availability	3.5941	<0.001
Appearance	3.6388	<0.001

Source: Authors research.

Authors do not reject the hypothesis of consistency with the place of origin, so it can be argued that the respondents for whom the organic product's essential place of origin is the same as the percentage of those for whom the place of origin is not.

For the organic-product branding feature, it has been shown that for a higher percentage of respondents the brand is not significant. For the other characteristics such as price, quality, availability and appearance of the organic product, it has been shown that there is a higher percentage of respondents for whom this property has a key value than those for which this property is not that important.

Based on testing our hypotheses, it has been demonstrated that the popularity of organic food is higher for the generation Z than for generation Y and these respondents consider organic food to be beneficial. Opinions on organic food differ considerably for men and women. Based on testing, it was verified that shoppers are heavily influenced by a large number of factors. For a better interpretation, a model was found to find out the common influence of several factors on the idea of purchasing organic food. From the analysis of individual questions, can be found that the motives for buying organic production are different and there are many. Therefore, the authors decided to find for generation Z a

model that would consider all the properties together.

The model has been constructed in Gretl software where the dependent variable was whether organic products are in demand or not and the independent variables were individual factors judged by respondents. We found the pattern by using the logit model, having the important parameters. As a reference value, all the factors out of scale, value of 1 has been chosen. By testing, the appearance factor has come out as the less important factor. Therefore, one can say the look of the product does not influence the purchase of the product. The reality that the other factors are important is apparent from the following Table 4.

Table 4: Accumulated analysis of deviance

	Deviance ratio	p-value
Price	2.98	0.030
Availability	4.94	<0.001
Quality	4.64	<0.001
Origin	2.70	0.029
Brand	2.73	0.027

Source: authors research.

To introduce the logit model closely, can serve the predictions into the following chart. These predictions have been estimated mean proportions, formed on the scale of the response variable, corresponding to one binomial trial, adjusted with respect to some factors as specified below. The link of only one factor has been examined, the others have been stated as constant.

Table 5: The results from logit model

Attribute	brand	quality	availability	Price	origin
1-definitely yes	0.5414	0.7158	0.7549	0.4998	0.5453
2-rather yes	0.4483	0.4882	0.4100	0.5942	0.7498
3-I don´t know	0.4705	0.0137	0.1412	-	0.0098
4- rather no	0.6912	0.3078	0.8076	0.9006	0.4879
5-definitely no	0.7025	0.0721	0.9292	0.9195	0.6121

Source: Authors research.

When analysing data as shown in the Table 5, the respondents who don't find the brand important, are more likely to buy the product (about 70%). Those who look closer for a specific brand, have a smaller chance in buying the product, because they prefer the brand to the fact it is an organic certified product. On the contrary, the quality factor is important for 71.6% of respondents and therefore they would buy the product. Availability factor has two groups of respondents. The first group does not deal with the availability and buy any organic product (almost 90%). The other group extremely follows up the availability

(scale value 1) and looking closely, they are the ones who care about the brand and 75.49 % buy the product. If the respondent finds the price unimportant, there is a 90% of chance that he buys the organic product. Based on the origin, the respondents have been split into a group of those who do not deal with the origin (61.21% of these buy the product) and those who follow up the origin (value scale 2). Based on testing (for the level of importance 5%) has been identified statistically the important differences in prediction. The difference in pair of 2-5 and 2-4 has been proved by the brand factor, then in quality factor it is a pair 1-2 and 1-4, in availability factor, there was no difference in any pair, in price was 1-4 and 2-4 and in origin factor there was 1-2 and 2-4.

It can be stated, based on modelling, that the appearance factor of the organic products does not influence the decision of the Y generation about buying the product. The availability and quality factors influence the decision the most. By analysing these factors closely, it was established that those who found the quality very important, 71.6% buy the organic products and in contrary, those who do not find the quality important, there is only a small percentage of buyers. The quality promotion would be certainly a gain for the improvement in sales of organic products.

Discussion

The results of Hwang, Lee and Diddi (2014) and Patel, Sharma, Purohit (2021) research has confirmed positive effects of moral obligation on Generation Y purchase intentions, towards purchasing products made of organic materials, fair-trade label, or recycled materials, which is in contrast with findings presented research. The so called "green emotional value" can be notice also by Muposhi and Dhurup (2016) while examine the Generation Y selection attributes when purchasing organic products. The submitted research shows that the visual, appearance factor of the organic product has just a limited influence in the decision to buy the organic product. This research findings fully corresponds with the Resnick and Albert (2014) as well as Darke, Ashworth and Main (2010) results about the promotion "blindness" of generation Y. This form of selection arises when consumers are looking for a specific product and are deliberately avoiding advertisements. At that point, they also expect where the advertisements can be, and for that reason they avoid certain areas. In their study, authors recommend inserting advertisements in those places where users are not expecting any adverts and thereby increasing attention to the advertising (Burton et al., 2015), which can support authors own results. The Ranis´ (2014) study further showed that the selective distortion described above has the greatest benefit to large companies and the perception of brands of their products. An experiment in this case has shown that when consumers get to taste the same product, they said they have enjoyed it more when they were told the product were from their favourite brand (Rani, 2014). Different results, according to Wijaya (2012), evaluate the impact of the brand as very important, it is easier to attract the attention of the consumers if they already known the brand or the manufacturer. The research finding shows, that those respondents, who look closer for a specific brand, have a smaller chance in buying the product, because they prefer the brand to the fact it is an organic certified product. Similarly, the study

of the authors Oliveira et al. (2016) confirms the relationship between wealth and brand benefits. That is why consumers who are richer decide on the specific brands that are successful and can represent their social status. As can be seen in our research results, the respondents who don't find the brand important, are more likely to buy the product (about 70%). The results of research Mehra (2018) demonstrates that consumers are divided into a group of customers who are faithful to a brand, which confirms that brands have an impact on consumer benefits and a group of innovators who are not only brand-based, but also based on the latest trends. Therefore, we cannot confirm the conclusions of Chakraborty (2017) in his article, if the key factor in buying organic food is consumer satisfaction with the brand where consumers choose the product just by the popularity of the brand.

Moving away from brand preference towards quality is significantly influenced by age structure of the respondents belonging to Generation Y. Age, as a personal factor, plays an important role in consumer decision-making. Every individual's preferences change over the course of life. The person is changing his personality and his interests throughout his life. Another important role plays a family status in every consumer's life. Shopping behaviour is also influenced by whether a consumer is a single-person household or has a partner and children (Rani, 2014; Wilkie and Moore, 2012; Ahmed, Ahmed and Awad, 2019). Modiliagni (1988) described the importance of lifecycle for The Journal of Economic Perspectives, where he focuses on his importance in terms of consumer wealth. It claims here that the life cycle has an impact on savings, because in the youth the individual consumes more than he saves. In adulthood, on the contrary, he saves more money than consumes and uses reimbursed money in retirement age, thus again exceeding consumption over savings. The life cycle influence towards organic food purchase was not the focus area but can be following continuation of submitted research.

Conclusion

Based on hypothesis 1, we can argue that the popularity of organic production for Generation Z is greater than for Generation Y, despite the fact that in Generation Z there was a significantly lower percentage of respondents who believe the contribution of organic production to the health of the individual.

Based on the research findings, the company management can precisely formulate their marketing communication and sale strategy and tailor their products offer to the targeted consumers Y and Z generation cohort. It can be concluded that to increase the popularity of a product, it is appropriate to put the main emphasis on the quality and on-line availability of the organic product.

When targeting your ad, it's a good idea to differentiate whether you want to increase sales for men or women. Based on the testing of hypothesis 3, it was found that men are much more likely to trust the better quality of organic production. It would therefore certainly be beneficial to convince men of the quality of food and the benefits of consuming these foods on the health of the individual.

The respondents representing Generation Z provide less brand loyalty and are more willing to engage in different distribution models to find food. They are not afraid to purchase food online and to look outside of the traditional grocery store to find what they want. While focused on paying as little as possible for products, these respondents are also much more willing to pay more for specific attributes in food, such as organics, natural, ethnic, fresh and specialty foods, either in shops and online sellers. They are also more aligned with the "food movement" shifting the purchases from large mass market companies and brands to "the little shops" selling online or at the local corner store This shift could change the Central Eastern European market place forever as they will be teaching their children to eat this way too. The theoretical impact lays in better understanding of factors determining generations Y a Z organic food shopping behaviour may have implications for further research and education programs. The findings of the study can serve, as a practical impact to the managers intending to formulate effective green marketing mix strategies, as to gain the competitive advantage at the highly saturated market of food, the detail knowledge of behaviour and preferences of generation Y a Z cohort of customers and respecting its specification such as advertising "blindness" become a crucial.

The Logitech model showed that the greatest influence on the purchase of an organic product is the availability and quality of the product, and a much smaller influence, for example, is the brand of organic product.

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Pro-growth and Limit Parameters of Regional Development of Sustainable Entrepreneurship Tourism in the Region of South Bohemia

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Abstract

The issue discussed in the paper is a response to the requirements of the business entities operating in the field of sustainable tourism in the current crisis period, period of existence for a number of the enterprises. Data collection took place in 603 municipalities in 17 LAGs in the region of South Bohemia. In total, 29 indicators are used to evaluate and find potential in the region of South Bohemia. The stepwise backward analysis method in the ANOVA program is used for the analysis. The existence of strong links between the indicators is proved; the results further show the effect of all the tested parameters on the potential of tourism. The positive influence of tourism potential is proved for the following variables: Unemployment trend; Accessibility of the area by the public transport on weekdays; Accessibility of the area by A and major roads; Primary school facilities; Accessibility of senior care homes; and Share of water areas. The negative influence is proved for The natives; Availability of hospitals and outpatient facilities; Production capacity of the land resources; Trend of arable land; and Landscape fragmentation. The results, their form and content indicate the possibility of their use in spatial and strategic planning and financing of rural areas and the settlements operating in them. The validity and relevance of the results indicates the suitability of the analysis and prediction of the economic regional potential for the development of tourism in the rural areas.

Keywords: tourism, rural area, business potential, business indicators, index of sustainable recreation and tourism, stepwise backward analysis, entrepreneurship

Introduction

Sustainable tourism is a sector significantly affected by the ongoing pandemic crisis. The estimates of the experts discussing the issue speak of a 40 to 70% percentage drop in sales in 2020 alone. It is natural that ways are being sought to stabilize and further strengthen this significant financial source of the state budget. One of the possible ways is related to finding

an appropriate analytical tool for determining the natural potential for tourism with a specification of the direction of development, intensity, including specific location.

Various methods and tools are sought to help the stabilization and sustainable development of tourism; however, in all cases the starting point is considered to be the rural area, which in the Czech Republic occupies more than 70% of the territory. In general, there are several basic functions of the rural area, such as residential, production, environmental, recreational, historical, and social, etc. The basic precondition for their fulfilment is their corresponding degree of development of rural settlements with the appropriate population density. The current reality and the development trend go the opposite direction of gradual degradation of the rural areas, which is in fundamental conflict with the interest of society as a whole.

The depopulation of rural areas, the settlements located in it, is beginning to appear as a significant limit on the development of the national economy and one of the ways to stop this negative trend is to ensure tourism in these areas, mainly with higher scientific value. Tourism might become decisive factors in the revitalization of the countryside, the stabilization of municipalities in terms of their longevity and ensure a gradual transition from the predominant agricultural and forestry activities to the activities of traditional crafts, services and especially tourism. In order to fulfil the goal, it proves necessary to know the potential of the relevant area for the relevant form of tourism. The paper focuses on determining such natural potential.

Literature Review

As the categories of rural region and area are not yet enshrined in legislation clearly, tourism is not defined similarly (Hoggart, 1990; Robinson, 1990; Scharf, 2001, Perlín, Kučerová & Kučera, 2010). There are definitions, defining tourism simply as rural activities (Lane, 1994; Lane, Kastenholz, 2018), together with definitions relate to the economic view of tourism, such as Cloke (1992) speaking of it as the consumption of the means of production, i.e., the rural space. Also, there is the view that it is not appropriate to define tourism as a separate sector (Wilson et al., 2001), as it is only the performance of activities based on the specifics of different rural regions and specific localities, or a municipality, such as in Bramwell (2009). Goeldner, Ritchie (2012), Pike, Rodríguez-Pose & Tomaney (2016) define tourism as a complex social phenomenon, as a summary of activities of tourism participants, a summary of processes of building and operating facilities with services for tourism participants, including a summary of activities of those who offer and ensure activities related to the use, development, and protection of resources for tourism, a set of political and public activities and the response of the local community and ecosystems to such activities.

A number of foreign authors Morley (1992), Olsen, Tse & West (1998), Sharpley, Telfer (2002), Sharpley (2009) define tourism as part of hospitality services, with the hospitality industry being characterized as a combination of accommodation, catering and other services related to travel. The inconsistency in the definition of this category also lies in its importance and role in the national economy.

Diamond (1977), Heng, Low (1990), Batta (2000), Buhalis, Darcy (2011), Goeldner, Ritchie (2012), Mason (2015), noticing the irreplaceable role of tourism in the national, and global economy, define it as a cross-sectional sector with a link to other related areas of the national economy, especially the financial balance of the state.

Many authors point to the fact that in the field of tourism there is an identical and at the same time different effect of market forces, when the laws of supply and demand apply (Horner, Swarbrooke, 2001; Morley, 1992; Middleton et al., 2009), draw attention to the specifics of tourism in terms of market environment, as there are demonstrably psychological and sociological aspects, including the value orientation of the population (Neal, Yusal & Sirgy, 2007; Middleton et al., 2009; Nickson, 2007). There is also a dissenting opinion on the very definition of the enterprises operating in the field of tourism. Some authors classify travel enterprises into a group of commercial services, which are mainly influenced by capital and labour. The decisive factor is the human resource, its quality, assertiveness, and flexibility (Boella, 2003; Horner, Swarbrooke, 2001; Swarbrooke, 2007; Southwick, Bergstrom & Wall, 2009; Nickson, 2007).

In the Rural Development Programme developed in the EU countries, the rural areas are differentiated into suburban, intermediate, and remote. "Suburban area" is defined as the rural municipalities within urban agglomerations, where there is a transfer of housing and economic activities from the towns to rural communities. "Remote area" includes mainly peripheral areas, such as the areas with unfavourable economic and social characteristics, the remaining rural the area is referred to as "Intermediate" (Ministry of Agriculture of the Czech Republic, 2007).

The issue of recreational activities and tourism is currently a very frequent issue, both worldwide, and at the level of national economies. It is both due to the coronavirus pandemic, significantly affecting the area economically, and due to its untapped production potential (Gowreesunkar et al., 2021). In terms of historical development, the tourism industry is a relatively young business area. The beginnings can be anchored in Europe at the interface of 18-19. (Shaw, Williams, 2002; Page, Connell, 2014), intensive development is discussed in the 20th century, both due to the development of the transport sector, especially the automotive industry, and related commodities such as housing, catering, etc. (Page, 2006). There are also different views on the very contribution of tourism to the development of rural areas (Piga, 2003). They range from the unequivocally positive views on the benefits of tourism in terms of both social, economic, and environmental, to the critical evaluation (Robinson, 1990; Bramwell, 2009; Lane, 1994; Hall, Page, 2006; Wall, Mathieson, 2006). The most significant negatives of tourism are the increasing traffic load (Collins, Patmore, 1981), investment construction, disruption of the environmental components (Page, Connell, 2014). Social conflicts between the tourists and the residents also increase (Wall, Mathieson, 2006).

On the contrary, the opinion of most authors working in the field of tourism is found in the mission, importance, and role of tourism in the national, European and world economy. This can be summarized in the following: irreplaceableness and uniqueness. The national authors strongly support the idea, together with the foreign authors such as Heng, Low (1990),

Diamond (1977), Gunn (1997), Horner, Swarbrooke (2001), Neal, Yusal & Sirgy (2007), Middleton et al. (2009), Goeldner, Ritchie (2012), Mason (2015) and Hanson et al. (2017). In this context, some authors point out the differences in the development of tourism in different parts of the world and the need for its balanced development, Glover, Prideaux (2009), Nickson (2007). In this context, the increasing pressure on quality and complexity in the provision of services in the field of tourism is mentioned, with the fact that this trend will be further strengthened (Yeoman, 2012; Mason, 2015).

The specifics of the tourism and its huge development potential are the result of the significant differentiation of the rural areas (Friedmann, 1972; Amin, Thrift, 1995). Rural development potential depends on the occurrence of different development indicators (Frechtling, Horvath, 1998; Frechtling, Smeral, 2010; Bernini, Guizzardi, 2010, Wu, Li & Song, 2012).

When setting the right dimension and intensity of travel activities, it is useful to respect the key development and limit factors of the relevant locality or area, and this article focuses on this issue.

As a part of the solution, two hypotheses are established:

Hypothesis 1 (H1): The resulting linear model expressed by the Recreation and Tourism Index does not show any strong correlations between the factors of all the tested pillars.

Hypothesis 2 (H2): In determining the Index of Recreation and Tourism, the importance and influence of all tested explanatory variables (a total of 11 variables) on the potential of tourism in the analyzed region is proved.

Methods and Data

The analysis and assessment of the recreational potential of tourism within the defined territorial unit are based on the general framework of the methodological procedure for determining the economic potential of the rural areas, classified as the "Summary Economic Model - SEM". It consists of four "Sub-models (indices): Index of Progressivity of Economic Structure (INXPES), Trend Index of Economic Structure (TIES), Business Activity Rate (BAR) and Sustainable Recreation and Tourism Index (INXSRCR). The paper is focused on determining the latter index.

The main data sources are the secondary data of the LAGs of the region of South Bohemia region; divided into four pillars - economic, social, infrastructural-institutional, and environmental. Data collection took place in 2016-2019 in 602 municipalities in 17 LAGs, without the towns with more than 25,000 inhabitants, i.e., in all the municipalities that are allowed to be a part of a regional LAG group.

In total, 29 indicators are used for the analysis and evaluation of the potential in region of the South Bohemian, further consulted with Czech Invest, reducing their number. The following factors are proposed for the Recreation and Tourism Index (INXRCR): The natives; Unemployment trend; Accessibility of the area by the public transport on weekdays; Accessibility of the area by A and major roads; Primary school facilities; Accessibility of senior

care homes; and Share of water areas. The negative influence is proved for The natives; Availability of hospitals and outpatient facilities; Production capacity of the land resources; Share of water areas; Trend of arable land; and Landscape fragmentation.

For the analysis, stepwise backward regression and the ANOVA programme is uses. Such method enables finding the dependence of the test factors. The stepwise regression method is a method of finding the "best" model (the smallest possible number of the independent variables, the best possible prediction). The subject of the analysis is not to determine the order of variables (predictors) from the point of view of their entry into the model; this is part of the algorithm of the program itself. The principle of the regression consists in the fact that the regression model is built step by step so that in each step we examine all predictors and find out which of them best describes the variability of the dependent variable.

The inclusion of the predictor in the model or its exclusion is done using sequential F-tests. The sequential F-test is based on the F statistic, which is the ratio of the increment of the regression sum of squares when the given predictor is included in the model and the residual sum of squares. If this statistic is greater than the value called "F to enter", the predictor is included. If the F statistic is less than the value called "F to remove", the previously included predictor is excluded from the model. After determining the variables in the model, the parameters of the linear regression function are estimated, and the quality of the regression is assessed by the determination index. Additional variables are gradually added to the model as the proportion of explained variability in the values of the quantity increases (Hocking, 1976; Christensen, 2002).

The following procedure is used to analyse the outputs, for all the indices:

1.   Assessment of the value of signification (from the results reported in the summary analytical table, the significance value is classified, the values below 0.05 indicate strong relation between the variables tested).

2.   Intensity of the multiple dependence in the tested model (the aim is to determine the variability of the analysed set of variables for the tested index. The intensity of the multiple dependence is characterized by a multiple correlation coefficient, which is the square root of the R-squared adjusted).

$$r\_B=\sqrt{(\text{R-squared adjusted})} \qquad\qquad (1)$$

3.   Determination of the directions of action of the tested factors (positive-sign + and negative -sign - effect on the test index), Beta column.

4.   Practical (preferably point and financial) expression of the advantage and the disadvantages for the tested factors (Using the data in Tab. 2 - column Model, Beta and Signification - it is possible to perform a point and financial calculation (assuming the determination of the value of one point, the methodology for the issue is in preparation within the proposed method).

5.   Characteristics of the analysed factors in relation to the outputs.

Results

Description of the pillars

Similar to the previous models, 29 indicators are used to calculate the Sustainable Recreation and Tourism Index (INXSRCR), of which four indicators in the economic pillar, seven indicators in the social pillar, eleven indicators in the infrastructural pillar and seven indicators in the environmental pillar.

Tab. 1: Description of the pillars

KOD	Economic pillar
K101	Progressivity Index of the Economic Structure
K102	Trend of Progressivity Index of the Economic Structure
K103	Rate of Business Activity
K104	Natural Presumptions of Recreation
KOD	**Social pillar**
K201	Population Density
K202	Aging of Population (increase of the number of senior citizens) – Aging index trend
K203	Economic load index trend
K204	Natives
K205	Trend in the growth of the population with higher education
K206	Unemployment trend
K207	Czech citizenship
KOD	**Infrastructure–institutional pillar**
K301	Accessibility of the area by the public transport on weekdays
K302	Accessibility of the area by the public transport on Saturday
K303	Accessibility of the area by A and major roads
K304	Accessibility of railway stations
K305	Residents living in permanently occupied dwellings connected to water supply, gas and public sewerage
K306	Nursery school facilities
K307	Primary school facilities
K308	Accessibility of secondary schools with Maturita
K309	Accessibility of senior care homes
K310	Accessibility of a general practitioner
K311	Accessibility of hospitals and outpatient facilities
KOD	**Environmental pillar**
K401	Production capacity of land resources
K402	Landscape fragmentation
K403	Share of water areas
K404	Chemical status of surface water
K405	Trend of arable land
K406	Forest hazard zones
K407	Trend of specific territorial emissions from stationary source

Source: Author.

Calculation of the Index of recreation and tourism (INXSRCR)

Natural condition of the area are the most important localization preconditions for recreation and tourism. Localization assumptions mainly represent protected areas, water areas, potential recreational areas. The region of South Bohemian is a rather geographically closed unit, the core of which is the South Bohemian basin. It is surrounded by the Šumava Mountains in the southwest, parts of the Brdy in the northwest, the Central Bohemian Granite Highlands in the north, the Bohemian-Moravian Highlands in the east and the Novohradské Mountains in the southeast. There are two parts of the South Bohemian basin, Českobudějovická and Třeboňská. The basic classification of the index of natural conditions for recreation (INR) consists of the partial coefficients and their weights: 30% - Ecological stability coefficient 20% - Terrain elevation 20% - Air quality - PM10 dust particles concentration 10% - Watercourse density 10% - Special species protection 10% - Population density. A six-point evaluation of the municipalities is used for the analysis. The resulting value determines the extent to which such conditions affect the localization assumptions of recreation. The South Bohemian Region ranked 6th in the whole of the Czech Republic, i.e., it got rather a good result.

Using the stepwise regression method, it was found that the resulting model Index of Natural Assumptions of Recreation is significantly affected by eleven explanatory variables; see the following formula:

$$\llbracket Mp = \hat{y} = \beta \rrbracket\_0 + \beta\_1 \ X\_1 + \beta\_2 \ X\_2 + \beta\_3 \ X\_3 + \beta\_4 \ X\_4 + \beta\_5 \ X\_5 + \beta\_6 X\_6 + \beta\_7 X\_7 + \beta\_8 X\_8 + \beta\_9 X\_9 + \beta\_{10} X\_{10} + \beta\_{11} X\_{11} \tag{2}$$

$Mp = \hat{y}$ - selective (empirical) regression function - complete model.

Coefficients β are marked as Estimates Beta for each indicator in the table.

$$\hat{y} =\_{129,890} - 0,188 X\_1 + 0,513 X\_2 + 0,040 X\_3 + 0,240 X\_4 + 0,522 X\_5 + 0,279 X\_6 - 0,173 X\_7 - 1,642 X\_8 + 0,184 X\_9 - 0,484 X\_{10} - 11,655 X\_{11} \tag{3}$$

Explanatory notes:

X_1 = K204 The Natives.
X_2 = K 206 Unemployment trend.
X_3 = K 301 Accessibility of the area by the public transport on weekdays.
X_4 = K 303 Accessibility of the area by A and major roads.
X_5 = K 307 Primary school facilities.
X_6 = K 309 Accessibility of senior care homes.
X_7 = K 311 Accessibility of hospitals and outpatient facilities.
X_8 = K 401 Production capacity of land resources.
X_9 = K 403 Share of water areas.
X_10 = K 405 Trend of arable land.
X_11 = K 406 Landscape fragmentation.

Using the regression equation, the input data for the input factors X_1 to X_11 are analysed and the outputs from the analysis are reported by Table 2.

Tab. 2: Index of sustainable recreation and tourism (INXSRCR)

Model Summary					
R	0,638	Root Mean Square Error (RMSE)		10,191	
R-Squared	0,407	Coef. Var		18,542	
Adj. R-Squared	0,396	Mean Square Error (MSE)		103,847	
Pred R-Squared	0,383	Mean Absolute Error (MAE)		8,07	
ANOVA					
	Sum of Squares	DF		Mean Square	F	Sig.
Regression	41979,417	11		3816,311	36,75	0
Residual	61165,625	589		103,847		
Total	103145,042	600				
Parameter Estimates						
model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	129,89	6,277	-	20,693	0	117,562	142,219
K204	-0,188	0,052	-0,118	-3,618	0	-0,29	-0,086
K206	0,513	0,171	0,096	2,993	0,003	0,177	0,85
K301	0,04	0,011	0,134	3,663	0	0,019	0,062
K303	0,24	0,087	0,095	2,765	0,006	0,07	0,411
K307	0,522	0,146	0,125	3,578	0	0,236	0,809
K309	0,279	0,09	0,11	3,108	0,002	0,103	0,456
K311	-0,173	0,082	-0,077	-2,117	0,035	-0,333	-0,012
K401	-1,642	0,601	-0,093	-2,733	0,006	-2,823	-0,462
K403	0,184	0,074	0,082	2,488	0,013	0,039	0,329
K405	-0,484	0,091	-0,17	-5,317	0	-0,662	-0,305
K402	-11,655	0,852	-0,497	-13,686	0	-13,328	-9,983

Source: Author.

As revealed by Table 2, the value of significance is 0.000, i.e., the value is below 0.05 within the sample and it can therefore be concluded that there are strong links between the tested variables. The intensity of the multiple dependence is characterized by a multiple correlation coefficient, which is the square root of the R-squared adjusted, see the Table 2.

$$r\_B=\sqrt{0,407}=0,6379655 \qquad\qquad (4)$$

Based on the value of R-square adjusted (adjusted index of determination), the joint action of all eleven explanatory variables (natives, employment trend, transport service of the area by public transport on weekdays, accessibility of the area from A class roads and major roads, primary school facilities Accessibility of senior care homes, the availability of hospitals and outpatient facilities, the productive capacity of the land resources, the share of water areas, the trend of arable land and Landscape fragmentation) explains 40.7% of the variability of the explained variable, and the sustainable tourism recreation index.

The positive influence of tourism potential is proved for the following variables: Unemployment trend; Accessibility of the area by the public transport on weekdays; Accessibility of the area by A and major roads; Primary school facilities; Accessibility of senior care homes; and Share of water areas. The negative influence is proved for The natives; Availability of hospitals and outpatient facilities; Production capacity of the land

resources; Trend of arable land; and Landscape fragmentation.

Based on the regression model, it is supposed, that increasing Unemployment trend; Accessibility of the area by the public transport on weekdays; Accessibility of the area by A and major roads; Primary school facilities; Accessibility of senior care homes; and Share of water areas by one point (provided that the values of the other variables are unchanged) will increase the Index of sustainable recreation and tourism by 0, 513, 0.040, 0.240, 0.522, 0.279 and 0.184. The greatest advantage of the additional investments is expected in the Unemployment Trend, Primary School Facilities, and the Availability of senior care homes.

On the other hand, increasing the variables of The natives; Availability of hospitals and outpatient facilities; Production capacity of the land resources; Trend of arable land; and Landscape fragmentation by one point will decrease the Index of sustainable recreation and tourism by 0.188, 0.173, 1.642, 0.484 and 11.655. The results revealed that the greatest negative financial impact would be achieved in landscape fragmentation, and production capacity of land resources, meaning its artificial increase with mineral fertilizers and in the trend of arable land.

Conclusions

The strong relations of the variables are proved. The final linear model of the sustainable recreation and tourism index shows multiple correlations on many factors, both from the social, infrastructural, and environmental pillars. Regarding hypothesis 1 as defined in the paper, its rejection is stated with regard to the existence of strong correlation links between the factors of all the tested pillars.

The results show the effect of all eleven explanatory variables on the potential of tourism in the region of South Bohemia (natives, employment trend, transport service of the area by public transport on weekdays, accessibility of the area from A class roads and major roads, primary school facilities Accessibility of senior care homes, the availability of hospitals and outpatient facilities, the productive capacity of the land resources, the share of water areas, the trend of arable land and landscape fragmentation). They explain 40.7% of the variability of the explained variable, and the sustainable tourism recreation index. Such conclusions allow to confirm Hypothesis 2, as the significance and impact of all the tested explanatory variables (a total of 11 variables) are proved.

The positive influence of tourism potential is proved for the following variables: Unemployment trend; Accessibility of the area by the public transport on weekdays; Accessibility of the area by A and major roads; Primary school facilities; Accessibility of senior care homes; and Share of water areas. Such activities should be supported by the development activities of administrative and self-governing, including investment incentives and subsidy programmes.

The factors influencing the development of tourism are identified in The natives; Availability of hospitals and outpatient facilities; Production capacity of the land

resources; Trend of arable land; and Landscape fragmentation. Such factors must also be given increased attention in developing the tourism activities, especially in terms of eliminating their negative impact on the development of tourism.

The result, their form and their content indicate the possibility of their use in spatial and strategic planning and financing of the rural areas and municipalities operating in them, with the help of mathematical modelling to predict the required amount of investment, their location in relevant activities and prediction of the financial benefits.

With regard to the nature of the results, as it is possible to determine the direction of action (either positive or negative) of the variables in terms of the tested index, it is expressed that after their completion they might become an important, and objective, tool in many managements and administrative areas. An example is the issue of regional development at all administrative levels; its usage is expected in municipalities, in the field of spatial planning, in the allocation of funds from the structural funds, including the Rural Development programme.

The results, as presented in the paper are not considered final. They are presented with the aim of opening a scientific discussion on such socially and internationally important issue. Based on the achieved results and assessment of their validity, it is possible to state their relevance and suitability of the chosen procedure in the field of analysis and prediction of the economic regional potential for the development of tourism in rural areas.

The presentation of the paper is also a response to the requirements of the enterprises operating in the field of tourism to ensure accelerated transfer of knowledge from the research base, when their need has grown strongly due to the crisis pandemic, vitally important for tourism in many cases.

Acknowledgement

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