Fifth International Scientific Conference
on Recent Advances in Information Technology,
Tourism, Economics, Management and Agriculture

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FIFTH INTERNATIONAL SCIENTIFIC CONFERENCE
ITEMA 2021

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Preface

The purpose of the annual ITEMA conference is to support the power of scientific research and dissemination of the research results with the objective to enhance society by advancing knowledge; policy-making change, lives, and ultimately, the world. Our objective is to continue to be the foremost annual conference on cutting-edge theory and practice of information technology, tourism, economics, management, and agriculture, encouraging advancement via excellence, and interaction.

ITEMA conference aims to bring together the international academic community (experts, scientists, engineers, researchers, students, and others) and enable interactive discussions and other forms of interpersonal exchange of experiences and popularization of science and personal and collective affirmation.

The annual ITEMA conference is committed to the highest standards of publishing integrity and academic honesty as ensuring ethics in all its publications. Conformance to standards of ethical behavior is therefore expected of all parties involved: authors, editors, reviewers, and the publisher. The conference organizer follows the Committee on Publication Ethics (COPE) guidelines on how to deal with potential acts of misconduct.

All received full papers prior peer review process are subject to plagiarism check with iThenticate by Turnitin software. Any identified plagiarism automatically disqualifies a paper. Afterward, all full papers are double-blind peer-reviewed by the reviewers drawn from the editorial committee or external reviewers depending on the topic, title, and the subject matter of the paper. Peer reviewers provide a critical assessment of the paper and may recommend improvements. Although the author may choose not to take this advice, we highly recommend that the author address any issues, explaining why their research process or conclusions are correct.

The conference program of the 5th International Scientific Conference on Recent Advances in Information Technology, Tourism, Economics, Management, and Agriculture - ITEMA 2021 held on October 21, 2021, combined presentations of the latest scientific developments in the field of economic growth, sustainable development, different aspects of globalization, COVID-19 pandemic, business, marketing, human resource management, entrepreneurship, business intelligence, digital technologies, tourism, agricultural production, organic cultivation, and others. The selection of papers for presentation on the conference day was based on quality, originality, and relevance.

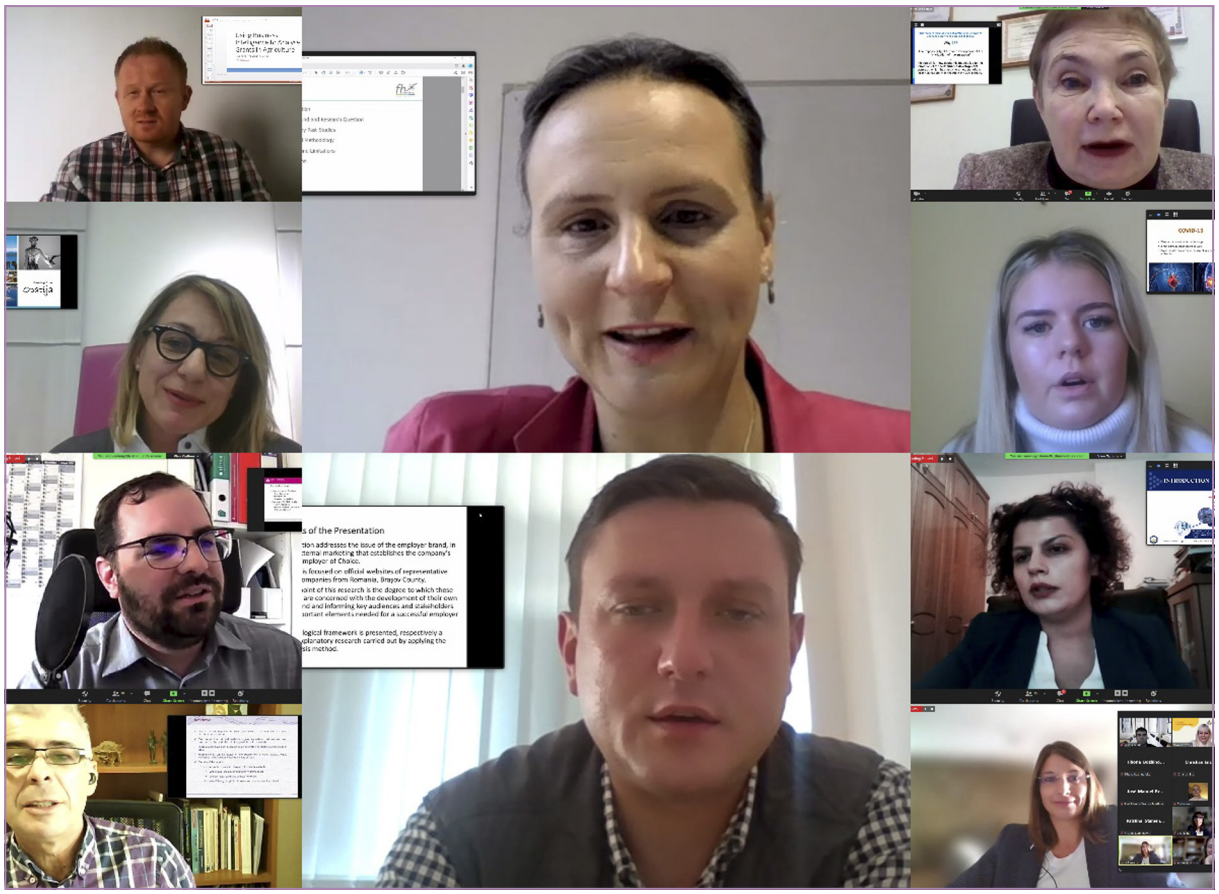
ITEMA 2021 keynote speakers were Professor Alla Z. Bobyleva – DSc (Economics) representing Lomonosov Moscow State University (Moscow, Russian Federation) with the topic "*Designing a sustainable development transformation program for a company"* and associate professor Victor-Alexandru BRICIU from the Transilvania University of Brasov, Faculty of Sociology and Communication, Department of Social Sciences and Communication (Brasov, Romania) with the keynote speech titled "*Employer of choice concept*".

Within publications from the ITEMA 2021 conference:

- 11 double peer-reviewed papers have been published in the **ITEMA 2021 Selected Papers**,
- 27 double peer-reviewed papers have been published in the **ITEMA 2021 Conference Proceedings,**
- 59 abstracts have been published in the **ITEMA 2021 Book of Abstracts**.

Altogether ITEMA 2021 publications have more than 400 pages. All full papers have DOI numbers and ORCID iD integration.

Participation in the conference took **120 researchers** representing **20 different countries** from different universities, eminent faculties, scientific institutes, colleges, various ministries, local governments, public and private enterprises, multinational companies, associations, etc.



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The Impact of Digital Technologies on Tourism Consumption – Case of Croatia

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Keywords:
Tourism;
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Abstract: *Tourism has a tremendous impact on the economy of a country and the realization of tourism consumption is a prerequisite for economic growth. Digital technologies are an important part of modern tourism. Technology is evolving rapidly, and the tourism industry must follow modern trends to remain competitive. Throughout this research, the technologies of the future, which represent a great potential for the change and development of tourism, will be discussed. The purpose of this research is to determine whether digital technologies influence tourism consumption and how they can facilitate information access about the desired destination. The research was conducted on 159 test subjects in the Republic of Croatia using a questionnaire survey. Digital technologies shape the human perception of a particular destination and influence tourists' choice of where to stay. Since most people today use digital technologies to learn about a product – a destination in this case – tourism consumption will be absent or significantly lower in destinations that are not advertised with the help of some sort of technology. It can be concluded that there is a direct relationship between the use and presence of digital technologies and the realization of tourism consumption. These hypotheses have been confirmed throughout this research.*

1. INTRODUCTION

Tourist spending is one of the economic criteria for tourism success. It is defined in various ways, but in the broadest sense, it includes the total tourist consumption of people who buy heterogeneous tourism products. Production and consumption in tourism are closely linked. In this synergy, information, and communication technologies (ICTs) are the most important factors for increasing economic competitiveness. The development of digital technologies has raised the question of how they can be used to improve tourism outcomes, reduce costs, and increase efficiency, customer satisfaction, and local satisfaction. Technology provides faster and more accessible information, it changes the tourists' needs and motivation, it penetrates all the stages of creation, supply, and consumption of a tourist product.

Digital technology's main goal is to make everyday tasks easier and solve many of mankind's problems. The development of new technologies helps save lives, it changes the way of life and communication. Technology benefits work by increasing efficiency. For the developing countries, technology means better infrastructure, better transportation, schools, hospitals, and medical care along with other utilities. The impact of technology in all aspects of life and business is extremely significant.

Digital technologies are changing technological, economic and social norms. They have penetrated all society's sectors and are influencing the dynamics and direction of changing business models in many economic activities. Tourism is one of the activity sectors with a definite inter-

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action with digital technologies. It is an area where digital technologies have penetrated rapidly and strongly, with the testing and implementation in the global tourism market, in line with the accepted Sustainable Development Goals (UN 2020). Research interest is expanding and there is an increasing number of social and economic studies that take a multidisciplinary approach to the study of this phenomenon in the context of sustainable development (Gossling, Hall 2019).

Research in the field of digital technologies and tourism from the period of the beginning of intensive computerization (introduction of computerized reservation systems) and the introduction of boarding schools (Werthener, Klein, 1999) is numerous. Today, this sector is one of the most dynamic ones in the field of tourism research (Buhalis, 2003; Leung et al., 2013). In a meta-study on a range of topics, Ukpabi and Karjaluto (2017) highlighted several key research areas: ICT applications, social media, segmentation based on digital technologies. Most of the research was related to exploring the demand market and consumer needs and satisfaction, but the key is exploring the supply market, without which digital technologies cannot be implemented in the tourism market (Law et al.2019).

What emerges from the analysis of the research, and what is needed in the context of sustainable tourism development, is the fullest possible exploration of the impact of digital technologies on all the key determinants of tourism development: economic, sociological, technological, and environmental impacts (Benckendorff et al. 2014, Goosling, 2017, Nagle, Vidon 2020). In one of his more recent works, Gossling (2021) highlights the changes that digital technologies bring to businesses and business models, as well as new demands on consumers' personal development. There is a phase of change underway. The pervasiveness of these changes depends on several sociological aspects which then depend on a number of variables. These can be the level of education, the level of urbanization, the economic prosperity of society, technological literacy and similar.

The research conducted on tourism demand trends examines the following aspects: the importance of social media in tourism (Zeng, Gerritsen, 2014), the impact of websites (Law, 2010), the impact of marketing activities (Leung, 2015), the relationship between tourism information and tourist behaviour using 413 online questionnaires as an example (Majedd, 2020), and consumer tourism preferences (Cosma, 2012). The impact of digital technologies on the tourism consumption of a particular consumer group indicates which technologies are most effective in communicating and guiding tourism consumption. A study of a group of Millennials using Romania as an example, identified devices, applications used, methods used in planning, booking and during travel, in addition to research on budget levels and payment methods (Padurean, et al., 2016). The research about the influence of modern technologies on travel agencies confirmed the importance of informatization and modern technology when communicating with consumers (Mihajlović, 2013). The survey included 200 agencies, of which 82 questionnaires were collected from employed managers. The results confirmed the importance of digitalization and underlined the need for regular training on the implementation of new technologies.

One of the elements for shaping tourist consumption is tracking the motives for tourists' arrival. The source of information that tourists used to discover about the destination in advance is an important factor in planning and preparing a tourist trip. According to the research results, the most frequently used source of information is the Internet, more than 50% on average in Croatia, which is twice as much as other sources of information. The last place is taken by traditional forms of information such as brochures and printed material, which indicates significant changes in marketing approaches in recent years. The Internet is used mainly by guests from Spain,

and least by those from Bosnia and Herzegovina. Most used are the travel agencies' websites (Booking.com, Expedia, Holidaycheck.co.uk), followed by social media, sites of establishments and, in fourth place, sites of Croatian tourist boards (Marušić, et al., 2019, p. 33).

2. TRAVEL AND TOURISM COMPETITIVENESS & DIGITAL TECHNOLOGY FOR THE EU MEDITERRANEAN ECONOMIES

In recent decades, the tourism industry has become increasingly important. On a global level, tourism is one of the most important economic sectors. In 2019, 1 in 10 people worldwide – or 1 in 4 new jobs – are employed in the tourism sector, while total employment in tourism accounts for 10.6% and total output for 10.4% of GDP (WTTC data).

The role of tourism in the country's GDP is crucial for all countries. In many countries with inbound tourism, the latter accounts for a high percentage of exports in total. Tourism brings several positive as well as negative impacts and there is, therefore, a need to continuously monitor the macroeconomic environmental factors to optimize the impact of tourism on the overall economy. The exponential growth achieved in recent years can be attributed to the impact of improved technology and its availability, the increase in the number of more convenient travel and flight options, and the desire of consumers to travel to new and more distant destinations.

A study was conducted on the relationship between the tourism results achieved in the pre-pandemic year 2019 and competitiveness in tourism with the assessment of the level of tourism infrastructure for the implementation of digital technologies. It is estimated that the level of economic development, the globalization of the economy and the overall economic competitiveness influence the assumptions and the achieved level of digitalization in tourism. The achieved level of digitalization in tourism varies and depends on the national infrastructure, legislation, achieved globalization in tourism and the level of foreign direct investment in tourism. During the analysis, several indicators were observed. They are the following:

Table 1. TTCI indicators - description

Indicator	Description & Source
Arrivals per capita	Arrivals at tourist accommodation establishments (tour_occ_arnat) per capita (Eurostat database, ec.europa.eu/eurostat/web/tourism/overview)
Travel & Tourism Competitiveness Index (TTCI)	Measures travel and tourism competitiveness of 136 economies through 4 subindexes: enabling environment, travel and tourism policy and enabling conditions, infrastructure, natural and cultural resources (1-7 best) (World Economic Forum, www.weforum.org)
Travel & Tourism Competitiveness Index *Subindex A:* Enabling Environment	Enabling environment subindex measures the general conditions necessary for operation in a tourism country and include 5 pillars: Business Environment, Safety and Security, Health and Hygiene, Human Resources and Labour Market and ICT Readiness (1-7 best) (World Economic Forum, www.weforum.org)
Travel & Tourism Competitiveness Index *Subindex A:* Enabling Environment Pillar 5: ICT Readiness	ICT Readiness is pillar 5 in the methodology of TTCI. It measures the existence of hard infrastructure and capacity of businesses to use and provide online services and IT technology (1-7 best) (World Economic Forum, www.weforum.org)

For the comparative analysis of the EU Mediterranean countries, which include Croatia, Cyprus, France, Greece, Italy, Malta, Portugal and Spain, the selected indicators were based on the year 2019. Values were compared by size and range (Table 2).

Table 2. Tourism, TTCI and ICT for Mediterranean EU economies - 2019

Country	Arrivals per capita	Arrivals pc rank	TTCI	TTCI rank	TTCI Subindex A: Enabling Environment	TTCI Subindex A rank	TTCI Pillar 5: ICT Readiness	TTCI ICT Readiness rank
Croatia	4.80	1	4.5	4	5.1	4	5.2	4
Cyprus	3.70	3	4.2	6	5.5	2	5.9	1
France	2.60	7	5.4	1	5.6	1	5.9	1
Greece	3.11	4	4.5	4	5.2	3	5.2	4
Italy	2.20	8	5.1	2	5.2	3	5.5	3
Malta	4.10	2	4.4	5	5.6	1	5.8	2
Portugal	2.71	6	4.9	3	5.5	2	5.5	3
Spain	2.88	5	5.4	1	5.5	2	5.8	2

Source: Eurostat and Weforum database

Based on the data collected and the comparative analysis, the conclusions are summarized in Table 3. The basic conclusion of the analysis is that macroeconomic conditions are a prerequisite for faster and more successful implementation of digital technologies in tourism. Countries that have met the colour conditions of the environment can expect a positive spill-over effect on the faster growth of competitiveness in travel and tourism in the next period.

Table 3. Comparative analysis for TTCI indicators – Mediterranean EU countries – 2019

Variable	**The rank of Mediterranean EU economies (high-low)**	**Conclusion**
Arrivals per capita	Arrivals pc rank: Croatia, Malta, Cyprus, Greece, Spain, Portugal, France, Italy	Small markets (by population) with a higher economic impact of tourism on total GDP, employment, and exports (second TSA method) perform best and rank highest. Larger economies with a diversified structure of economic activities show a lower dependence on tourism and tourism performance.
TTCI	TTCI rank: France, Spain, Italy, Portugal, Greece, Croatia, Malta, Cyprus	According to the TTCI methodology, the highest level of tourism competitiveness in the world was achieved by Spain and France, which share the first place. The top 20 countries in the world continue to include Italy, which is in 8th place, and Portugal in 12th place, followed by Croatia and Greece in the group of Mediterranean EU countries. They are followed by Malta and Cyprus. The countries with the highest total tourism volume, which are among the leading destinations in the world, are ranked as the most competitive.
TTCI Subindex A: Enabling Environment	Subindex A rank: France, Malta Spain, Portugal, Cyprus Greece, Italy, Croatia	The evolution of the index, which provides information on the level of development and competitiveness of the environment for the development of tourism, allows us to conclude that the level of this indicator is higher in all Mediterranean EU countries compared to the overall TTCI, which we can consider positive. Particularly surprising are the high values in Malta and Cyprus, while the lowest values were obtained in Greece and Croatia. This indicator is largely correlated with economic development indicators (e.g., GDP per capita).
TTCI Pillar 5: ICT Readiness	ICT rank: France, Cyprus, Spain, Malta, Italy, Portugal, Croatia	The tourism infrastructure for the introduction of digital technologies has been developed in Cyprus, France, Malta, and Spain. All Mediterranean EU countries have higher ICT index scores than the Enabling Environment Index score as well as the overall TTCI. From this, we can conclude that economic policy makers in the Mediterranean EU countries have recognized the importance of digital technologies and have created the initial conditions for faster and more efficient adoption of digital technologies in tourism.

Source: databases, authors' research

3. RESEARCH DESIGN

This research aims to determine whether digital technologies influence tourism consumption and how digital technologies can further facilitate access to a destination's information, and what it has to offer to have a positive impact on tourism and economic development. A survey was conducted with the following hypotheses:

H1: The level of tourism consumption is related to the use and availability of digital technologies.

H2: H2: The level of tourism consumption is related to the applicability and availability of a particular digital technology at the desired destination.

H3: Digital technologies enable faster and more efficient access to the distant market, generate a greater number of guest arrivals and increase tourist spending, thus having a positive impact on tourism development.

The first hypothesis investigates whether tourism consumption is related to the use of digital technologies. It aims to find out if tourists choose a particular destination based on their use of digital technologies and whether they make a reservation through the accommodation-booking application. In this way, establishments and destinations that are less known can increase their market presence and increase the destination's popularity, in addition to making more profit. Therefore, the use of digital technologies directly contributes to pre-trip and in-destination consumption. The second hypothesis investigates whether tourism consumption depends on the available digital technologies at the destination. The question is, if the destination, facilities, or other tourist attractions are not present on the Internet, will the tourist visit specified destination and how will this affect his/her consumption. The third hypothesis aims to determine whether the presence on the Internet attracts more guests and thus increases the awareness and attractiveness of the destination and generates higher revenues.

The questionnaire contained 15 questions divided into several groups. The first group consisted of socio-demographic questions (respondents' gender and age, completed level of education, employment status and monthly income, which was designed as an optional question). This was followed by two questions related to the tourists' stay and the type of booking:

- When was the last time you visited a destination in Croatia and stayed longer than a day?
- Did you use any of the accommodation booking sites or apps when choosing your destination? (This is an exclusive question. If the answer is negative, the survey concluded here.)

The remaining questions and their analysis should be used to test the research hypotheses.

- How digital technologies affect tourism consumption; whether it increases, decreases, or remains unchanging because of these technologies.
- How and to what extent digital technologies contribute to the choice of a destination and "enable" tourism consumption before the trip, which consequently has a positive impact on tourism consumption at the destination itself.
- Which websites and applications users are most likely to utilize and to what extent can they lead the potential tourist to the final realization and spending?
- To what extent the use of websites or applications has led to greater tourist satisfaction and / or time and financial savings for consumers.

4. FINDINGS

The survey was conducted in August 2021 in the region of "Kontinentalna Croatia". Considering the impact of the COVID -19 pandemic on the decrease in tourism spending, only domestic

guests were included in this study. The questionnaire was distributed in the Facebook group "Putoholičari" (which has 209,000 followers and publishes several posts a day).

The set target for the number of surveys collected was 100-200. 159 questionnaires were successfully collected, of which 25.8% were men and 74.2% were women. As expected, the largest percentage of respondents was in the age group up to 25 years of age (29.6%) and the smallest in the age group of 56 and older. The remaining age groups were evenly represented in the structure of the participants. Most of the participants have a university degree (40.3%), while the fewest respondents only have a primary education (3.8%). The smallest percentage of respondents is retired (0.6%), while the largest group is employed (73.6%). The second place is held by high school and university students (20.1%), who have more time and motivation to travel. By income, the most numerous group has a monthly income ranging from 4,001 to 6,500 kuna (30.7%); followed by the group with a monthly income ranging from 6501 to 9000 kuna (29.4%); the last is a group with an income ranging from 1501 - 4000 kuna (5.2%). We can conclude that the profile of the average participant is a young, highly educated, and active person who travels more frequently and regularly compared to the older population. People with higher purchasing power are a prerequisite for tourist travel and interest in exploring tourist facilities.

Most of the participants (79.9%) have visited a destination in Croatia this year (2021), while the smallest group of respondents (9.4%) have travelled to Croatia 2 or more years ago. The vast majority of respondents, 2/3 of the total, used the internet or applications to book their accommodation, while 1/3 of respondents booked their accommodation through the recommendation of friends, acquaintances or in some other way.

The first question related to the use of digital technologies was related to the reason for traveling to a particular destination. Most participants chose a particular destination based on pictures of the destination on social media (57%), while a few participants chose a destination based on recommendations from influencers on social media. Recommendations from friends and family account for the 39.3% and are still an important factor when deciding on a destination. In conclusion, the presence of the destination on social networks is crucial to attract potential tourists.

The website most used for choosing and booking was Booking.com (83.8%), followed by Airbnb, while a minimal percentage used Sniffer and Black Egg. Booking.com dominates the market in accommodation booking and marketing of various tourist facilities. In this way, lesser-known destinations can be promoted and attract potential guests. Booking.com is well organized and very present on social media.

The majority of the participants (55.1%) said that the applications helped them find their desired goal. The least number of participants indicated that these applications did not help them at all (3.7%). The rest of the participants gave a score of 3 or 4, with positive responses predominating. This leads to the conclusion that the accommodation booking sites are useful in searching for the desired destination and finally booking the accommodation.

The next question was related to the participants' satisfaction with the accommodation found before arriving at the destination. The majority of the participants (94.4%), indicated that they were very satisfied with the accommodation found prior to arrival, awarding scores of 4 and 5. No one indicated that they were dissatisfied with the found accommodation. Thus, the accommodation search and booking apps and websites helped in selecting a satisfactory accommodation.

After having stayed at the chosen accommodation, the majority of participants were very satisfied, 61.6% of them. In comparison to the previous question, the number of participants who are neither satisfied nor dissatisfied (score 3) has increased from 5.6% to 12.1%. No response of marked dissatisfaction was reported. Although there is a slight decrease in grades 4 and 5 from the reported 94.4% to 86.1%, the results show no dissatisfaction with the facility. In conclusion, advertised accommodation facilities match the pictures and descriptions on the websites and applications. In this way, guest satisfaction is established, and arrivals can be repeated. Sometimes fake accommodation is advertised on accommodation booking sites, but the results of this question suggest that this is not common and/or usual.

Most users indicated that reviews from other users were very useful (56.1%). Three participants (2.8%) gave a negative answer to this question. It can be concluded that other users' reviews are one of the most important factors found on accommodation booking sites and applications, as a potential guest can use these reviews to get an impression of a particular accommodation and make a final decision about the arrival and/or stay.

When asked if they made their own choice based on the ratings, 63.6% of the participants answered positively. The remaining participants did not choose their accommodation based on ratings. These answers confirm once again the importance of sharing one's own experience with others.

"Do you feel that you have saved money on accommodation by using digital technologies?" The answers to this question are quite even: 53.3% of participants believe that the use of digital technologies (websites and applications for booking accommodation) has helped them save on accommodation, while the rest of participants, i.e., 46.7%, believe that digital technologies have not helped them save on accommodation. It can be concluded that additional questions need to be asked on this topic to get a more certain answer. Based on this research, websites and various applications can help to save on accommodation, as they provide a comprehensive overview of the available accommodation options in different price ranges and facilitate the proper selection of a tourist product. Moreover, it is possible to find accommodations at lower prices when making first-minute reservations than during the high season or right before the trip. However, price reduction is only possible to a certain extent, as accommodation providers adjust prices according to current occupancy. Although, it is not uncommon for the last-minute offer to be the best deal, especially during disruptions in the tourism market or in unfavourable and unexpected situations. As tourism content websites become more heterogeneous and complex, they increasingly offer lesser-known content and destinations. In this way, networking and related publications have an extremely positive impact, and this advantage is crucial for emerging tourism destinations.

Most participants used mobile applications to self-select a restaurant or other tourist offers at the destination (83.2%). This suggests that the use of digital technologies during a stay in a destination is extremely important for the choice and intensity of tourist spending. The participants who did not use digital technologies at the destination gave the following reasons: 71.4% do not have the habit of using these technologies and some respondents did not have the intention to use additional content because they are familiar with the destination. On a positive note, no one cited unavailability of technology or usage inability. This suggests that applications and websites are available in destinations, but consumers don't have the habit of using them.

Only participants who used digital technologies at their destination answered the question about the specific applications they used. This question was designed as a multiple-choice question

and 146 responses were received from 89 respondents. Most users indicated that they primarily use Google Maps (86.8%). The second most used website is TripAdvisor, used by 50.5% of the respondents. The most popular destination applications are therefore general applications that most respondents already have on their mobile devices and there is no need to install new ones. This shows that local applications which were developed for a specific destination, are not popular or are not sufficiently distributed. One of the main reasons for this is the lack of sustainability of investment in the development of a new application. This is due to strong competition and global applications that have a large market and influence on consumer awareness.

"Do you feel that, by using digital technologies, you have saved money during your stay?" For this question, as with the previous one, the percentage of those who answered positively is similar to those who have not. However, more than half of respondents, 55.1%, believe they saved money during their stay at their destination, and slightly fewer, 44.9%, believe they did not. From these results, it can be concluded that digital technologies certainly help when making the right choice, but this does not necessarily mean at the best price. Taking into account that the tourists' motivation and consumption may change during their stay in the destination compared to the pre-trip planning, digital technologies may promote higher consumption as they allow finding some lesser-known attractions and new tourist facilities.

To the question "Would you choose a holiday destination again?", the majority of participants answered positively (93.5%), while the remaining 6.5% or 7% answered negatively. This conclusion confirms the hypothesis that digital technologies have helped tourists choose the ideal holiday destination to which they would also like to return. These results show how modern digital technologies perfectly connect offer and demand at a distance, which is one of the peculiarities of the tourist market and business in tourism.

5. CONCLUSIVE REMARKS AND FURTHER RESEARCH

Based on the results of the survey, digital technologies are widely used when booking accommodation. Most of the participants use some form of digital technology for their destination selection. This confirms the direct influence of digital technologies on destination choice and the decision to travel. Research has confirmed that booking sites are very helpful in choosing a destination. Reviews left by other users have also been found to be very useful in choosing desired accommodation, and 64% of respondents have chosen their accommodation for this very reason. Based on the above, it is possible to confirm the first hypothesis and conclude that tourism consumption is related to the use and availability of digital technologies.

Only 17% of participants asserted that they do not use digital technologies in connection to restaurants or other tourism services at the destination itself. When justifying their response, no one indicated that digital technologies were not available at the destination, although this response was offered. Respondents did not use digital technologies primarily because they were not in the habit of using them. Most respondents who used digital technologies used Google Maps (87%) because of its popularity. None of the respondents used local applications of the destination itself. The second hypothesis can be confirmed. It states that digital technologies were available and widely used in all destinations visited by the respondents.

Moreover, the revenue and attendance of establishments that can be found on the Internet will increase, as 83% of respondents use digital technologies to find the desired establishment. The

presence of the destination on the Internet facilitates the potential tourist's access to the remote market in a way that allows a brief inspection of the destination before the visit. In this way, tourists are satisfied with the accommodation they found and the destination they chose. 93.5% of them said that they would visit this destination again. It can be concluded that digital technologies have had a direct impact on the influx of guests to a particular destination, making it easier to book and visit all the destination's facilities. Thus, the impact on tourism consumption in a particular destination is directly related to the use of digital technologies.

The researched topic of the importance of digital technologies on tourism consumption behaviour is a crucial area of academic and professional research in tourism and business. This is only the first phase, which confirms the importance of digital technologies in increasing tourists' spending and consumers' willingness to participate in research. Such a positive attitude will lead to high-quality results that will contribute to the overall positive impact of tourism on economic development.

In order to continue the research, further questions should be posed. Considering the importance of tourism, it is necessary to include foreign tourists in the research by inbound markets due to the characteristics and different power in tourism spending, as well as different traditional and marketing activities. It would be interesting to conduct a detailed analysis on individual consumer groups and segments, to include tourism management in the research, i.e., to extend the research to the tourism industry, and the area of Adriatic and continental Croatia. In conclusion, digital technologies are an indispensable element for the development and promotion of the overall competitiveness of the destination, the region, and the economy. Digital technologies have a great impact on the shaping and intensity of tourism consumption and in the future, this impact will be even greater due to new forms of hardware (new devices and products) and software (new applications, social media, artificial intelligence).

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Impact of Pandemic on Tourism in Slovakia

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Abstract: *Tourism is one of the important sectors of the economy in which the effects of the COVID-19 spread have been most noticeable. In Slovakia, signs of coronavirus pandemic began in March 2020 and established travel restrictions with impact on tourism at national, European, and global levels. The main objective of the paper is the evaluation of selected factors of tourism and the impact of the pandemic on them in the Slovak Republic. Empirical data were processed by the method of analysis and synthesis. Accommodation of visitors reached the level of 49.9% in 2020 compared to 2019. A decrease in number of foreign visitors was reflected in a significant decline in sales with liquidation consequences for many accommodation facilities, hotels, restaurants, and related services. The enormous rise in unemployment was mitigated in 2020 by the state's financial support in coordination with European funds. Tourism companies are looking for different ways to manage this problem independently or with the state help.*

1. INTRODUCTION

According to the latest report of the World Travel & Tourism Council (WTTC) (16/9/2021) "Travel & Tourism has been one of the sector's most negatively affected globally due to COVID-19, suffering devastating losses in terms of both GDP and jobs. To achieve recovery and continue spreading socio-economic benefits, the sector will require investment which needs to be supported by an effective enabling environment." Darázs & Šalgovičová (2021) state "Tourism and travelling are among the most affected sectors of national economies worldwide due to the pandemic caused by a disease called COVID-19. Nowadays, we still cannot accurately predict the effects of this negative impact." According to Grančay (2020), "with the arrival of the COVID-19 pandemic in the Central European region in March 2020, one of the hardest-hit economic sectors was the tourism industry which virtually came to a complete standstill." The study by Williams & Kayaoglu (2020) illustrates the impact of an epidemic outbreak on the tourism industry and the supporting sectors to the tourism product and service delivery, as well as employment. According to Gössling et al. (2020), "Tourism is especially susceptible to measures to counteract pandemics because of restricted mobility and social distancing." Kuo (2021) states "The threat of the virus has also caused a change in tourist travel consumption behavior." Based on the research results of Orîndaru et al. (2021) indicate that "the COVID-19 pandemic has influenced travel patterns and habits regarding philological and economic factors. Psychological factors, primarily the fear of contamination, impact travelers' willingness to travel and the conditions and preferences for vacation destinations. At least in the medium term, people will avoid traveling in large groups and being in crowded places." Păcurar et al. (2021) point to "the wariness for future pandemics has brought into the spotlight the issue of overcrowded attractions inside a destination at certain moments." Vaishar & Šťastná (2020) points out that

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"the catastrophic scenarios of the decline in tourism mainly concern urban destinations focused on foreign tourism. In contrast, rural destinations create an alternative." Based on the results of their study, Gössling et al. (2020) caution how a pandemic outbreak can change society, national economies, and the tourism industry. Consequently, the tourism industry and government have an important role to play in the recovery efforts as the tourism industry will look different from post-pandemic (Assaf & Scuderi, 2020). Tomčíková et al. (2021) state "the impact of COVID-19 affects the changes in the performance development of tourism companies operating in Slovakia." Based on the research results of Kvítková & Petrů (2021) "the best situation regarding domestic tourism as a factor of tourism recovery and business survival is in Slovakia and the Czech Republic of the V4 countries. However, even in these counties, it is very unlikely, that domestic tourism will replace outage of the international tourism in full scale." Based on the research results of Machová et al. (2021) pointed out that Slovak respondents will prefer domestic tourism to foreign tourism. Kvítková & Petrů (2021) state "The real results of the tourism industry will be influenced also by the government support, current economic performance, unemployment change, availability of vaccination, etc."

2. RESEARCH DATA AND METHODS

Demonstrating economic effects in tourism is a difficult task because this sector is not organizationally unified and has a cross-cutting and multidisciplinary character. Tourism also acts as an important economic tool for the development of regions in order to increase the living standards of the local population in conditions of sustainability. Slovakia has significant potential for tourism development, especially for the considerable natural, historical and cultural wealth. One of the prerequisites for the development of residential tourism is the capacity of accommodation facilities, their size, and structure.

Empirical data for the research were obtained from the Statistical Office of the Slovak Republic (https://slovak.statistics.sk/). Time series include data in the period of years 2014 to 2020 and were processed by the method of analysis, synthesis and linear regression trends. Analyzed factors were: number of visitors, comparison of domestic and foreign visitors, number of overnight stays, and capacity of accommodation facilities. The gradual growth of mentioned factors was stopped in the year 2020 when the COVID-19 pandemic has started.

3. RESULTS

The decline of tourism occurred not only in Slovakia but also in world-famous tourist locations. In the period before the start of the COVID-19 pandemic, the conditions for tourism in Slovakia enabled the rapid development and permanent growth of this sector. According to Tajtáková (2021), "in the period from 2009 to 2019, the number of visitors to Slovakia almost doubled, while 2019 was a record year in terms of overall attendance". The pandemic year 2020 changed this situation and had an important impact on Slovak tourism.

3.1. Analysis of number of accommodated visitors and overnight stays number by regions in the Slovak Republic in 2020

In Table 1 are summed up data about the number of accommodated visitors in the year 2020 and associated index 2020/2019. Presented values prove that in each region of Slovakia has occurred the decrease in the number of visitors.

Table 1. Number of accommodated visitors according to Slovak regions in 2020

Region	Number of visitors					
	Visitors together		Foreign visitors		Domestic visitors	
	Number of persons	Index 2020/2019	Number of persons	Index 2020/2019	Number of persons	Index 2020/2019
Slovak Republic	3 210 007	49.9	854 011	34.5	2 355 996	59.5
Bratislava Region	500 467	31.5	249 435	24.1	251 032	45.5
Trnava Region	212 772	49.1	65 446	34.7	147 326	60.3
Trenčín Region	200 811	47.8	36 757	33.2	164 054	53.1
Nitra Region	180 460	48.8	48 564	36.3	131 896	55.9
Žilina Region	815 868	62.0	212 021	50.9	603 847	67.1
Banská Bystrica Region	418 553	56.3	43 210	38.6	375 343	59.4
Prešov Region	654 554	59.1	151 002	47.2	503 552	63.9
Košice Region	226 522	49.6	47 576	29.8	178 946	60.2

Source: SO SR, own processing

In the year 2020, 3,210,007 visitors were accommodated in Slovakia, which was 3,222,872 less than in the year 2019 (a decrease of 50.1%). At the same time, the ratio of domestic and foreign visitors to the total number of visitors to Slovakia changed in favour of domestic tourism. The number of domestic visitors accounted for 73.39% of the total. The highest decrease was recorded in the Bratislava region by 68.5%, the second place is occupied by the Trenčín region (less by 52.2%) and followed by the Nitra region, where the number of accommodated visitors decreased by 51.2% compared to 2019. The lowest decrease in accommodated in 2020 was registered in the Žilina region (a decrease of 38% compared to 2019).

The development of the number of overnight stays is closely linked to the previous indicator - the number of accommodated visitors, which is related to the offer of tourism in the particular region. The pandemic had the same impact on the number of overnight stays. In Slovakia, the number of overnight stays decreased by 45% in 2020 compared to 2019 (Table 2). Foreign visitors accounted for 24% of the total number of overnight stays in accommodation establishments, 76% were domestic visitors. Among foreign visitors, it was mainly tourists from Poland, the Czech Republic, Slovenia, Spain, and Hungary.

Table 2. Number of overnight stays according to Slovak regions in 2020

Region	Number of overnight stays					
	Overnight stays together		Foreign visitors		Domestic visitors	
	Number of nights	Index 2020/2019	Number of nights	Index 2020/2019	Number of nights	Index 2020/2019
Slovak Republic	9 790 597	55.3	2 347 568	37.6	7 443 029	47.6
Bratislava Region	1 139 586	34.8	493 996	25.7	645 590	47.6
Trnava Region	795 204	51.4	235 212	32.6	559 992	67.7
Trenčín Region	839 369	53.0	100 857	28.3	738 512	60.2
Nitra Region	560 856	51.8	154 113	36.8	406 743	61.3
Žilina Region	2 425 503	66.8	661 180	53.6	1 764 323	73.5
Banská Bystrica Region	1 335 801	62.4	118 048	41.6	1 217 753	65.5
Prešov Region	2 148 439	63.6	462 462	50.2	1 685 977	68.6
Košice Region	545 839	51.7	121 700	30.8	424 139	64.2

Source: SO SR, own processing

3.2. Selected factors of tourism in the Slovak Republic from a long-term perspective

Next analyzed factors were accommodated visitors, overnight stays and capacity of accommodation facilities in the Slovakia Republic in the period 2014 to 2020.

Data about accommodated visitors in the Slovak Republic in the period from 2014 to 2020 (Fig. 1) approved that by 2019 there were positive conditions for the gradual increase of domestic and foreign tourists. It is evident, that in individual years, domestic tourism was dominant in comparison with foreign visitors. A positive feature in Slovak tourism until March 2020 was the increase in the use of bed capacity. Weekend stays were popular among visitors, which was related to adapting to a fast pace of life with the possibility of fast and direct access to ordering accommodation with related services via digital technologies.

In March 2020, quick changes and travel restrictions have occurred due to the pandemic, which was reflected in a decrease in the total number of accommodated visitors in 2020 by half compared to 2019 (a decrease of 50.24%). In 2020, the number of domestic visitors decreased by 40.47% and foreign visitors by 65.50% compared to the previous year. The biggest problem of the tourism sector was the dramatic drop in the number of foreign visitors. There are significant restrictions on tourism facilities during a pandemic, which limit either the number of visitors or otherwise limit the tourism business.

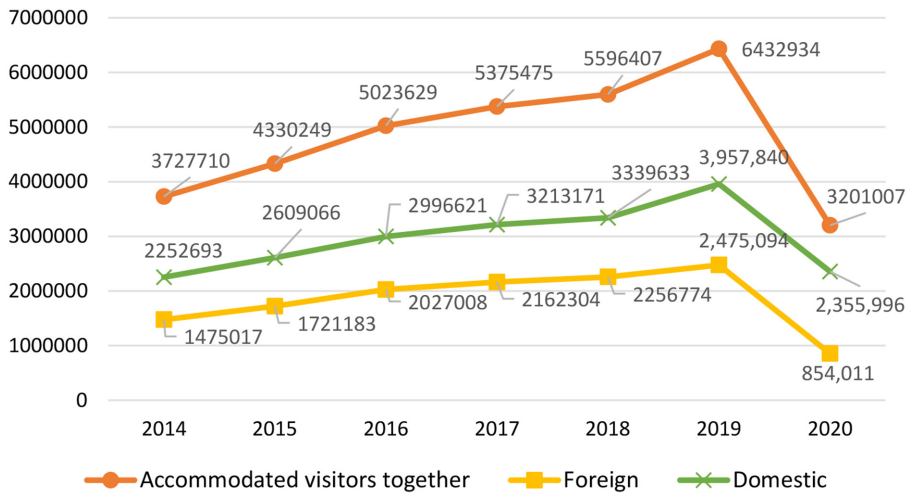

Figure 1. Development of accommodated visitors in the Slovak Republic, 2014 - 2020

Source: SO SR, own processing

The number of overnight stays in accommodation facilities in the Slovak Republic copied the number of accommodated visitors. In the observed period from 2014 to 2020 (Fig. 2), the largest year-on-year increase in the total number of overnight stays occurred in 2019, by 2,188,612 overnight stays compared to 2018, which represents 14.11%. It was recorded a decrease in the total number of overnight stays in accommodation establishments in 2020 by 7,913,098 overnight stays, which is 44.70% compared to the previous year, while it was recorded an enormous decrease in foreign visitors by 62.44%. Overnight stays of domestic visitors were by 35.01% less in 2020 compared to 2019. The reason for the declining number of overnight stays is the population's fear of traveling, the changing pandemic situation in our country and abroad and the rules when arriving in Slovakia.

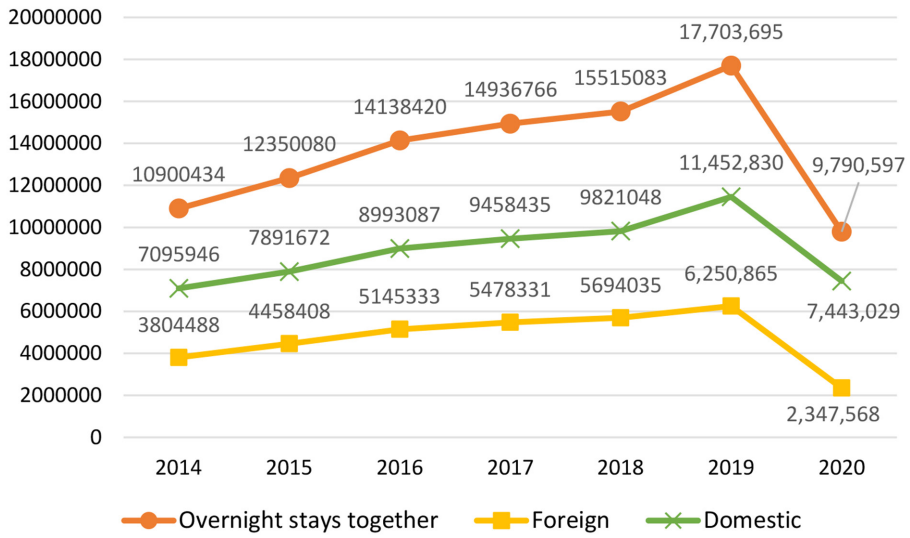

Figure 2. Development of overnight stays in the Slovak Republic, 2014 - 2020

Source: SO SR, own processing

The number of beds in accommodation facilities copies the number of accommodation facilities. The tourism sector in the Slovak Republic has already lost more than 40,000 workers due to the pandemic. The largest year-on-year increase in the total number of beds occurred in 2019, by 16,629 beds compared to 2018, which represents 8.25%. Pensions (13.47%) and hotels (4.73%) accounted for the largest percentage share. In 2020, the number of beds decreased by 8,750 compared to 2019, which means a decrease of 4.01%. In 2020 the decrease was recorded in hotels by 1.95%, in pensions by 8.7% and in campsites by 13.61% compared to the previous year (Fig. 3).

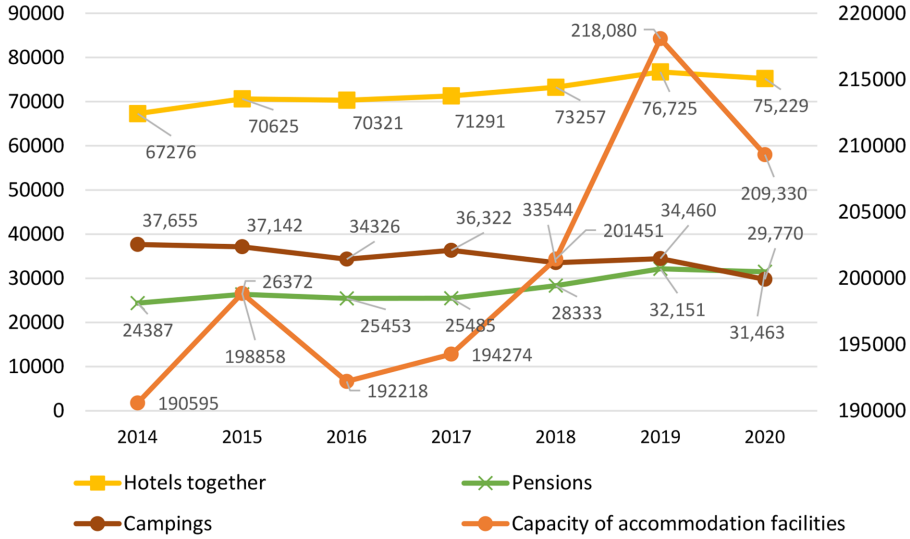

Figure 3. Development of capacity of accommodation facilities, 2014 – 2020

Source: SO SR, own processing

After completing the linear trends for the development of the investigated factors, via tools of MS Excel, it is possible to estimate their future development:

- Domestic accommodated visitor: $y = 119660x + 2{,}000{,}000$, increasing linear trend.
- Foreign accommodated visitor: $y = -4479.6x + 2{,}000{,}000$, decreasing linear trend.
- Overnight stays of domestic visitors: $y = 321126x + 8{,}000{,}000$, increasing linear trend.
- Overnight stays of foreign visitors: $y = -8469.4x + 5{,}000{,}000$, decreasing linear trend.

4. FUTURE RESEARCH DIRECTIONS

In the area of tourism, which is the most affected by the COVID-19 pandemic, there has been a rapid decline in demand and an increase in unemployment. This has devastating consequences for the tourism economy. Addressing the employment and competitiveness of tourism should be a top priority of the government's program statement. The introduced recreational voucher should serve to stimulate the demand for domestic tourism. Marketing activities should encourage domestic tourists to spend holidays and free time in Slovakia. The government should promote tourism by reducing VAT on all tourism services. When renting private rooms in family houses with a specified capacity of beds to prepare tax measures and financial support. The current crisis in tourism is leading to the construction of more resilient tourism, the digital and environmental transformation of the sector and the development of sustainability skills for tourism professionals.

5. CONCLUSION

In the paper authors dealt with the impact of the pandemic on tourism in Slovakia. Based on secondary statistical data, the development of this sector in the years 2014 - 2019 was analysed and compared with the pandemic year 2020. Tourism contributes not only to regional development but also to the improvement of living standards, because create suitable conditions for the extent of new jobs in this sector, and is a source of income for families.

In the year 2021 tourism companies are still in bad conditions and looking for ways to improve the situation caused by the pandemic. Coping with the negative consequences of the pandemic, maintaining employment and competitiveness of tourism are among the main objectives of the program statement of the Government of the Slovak Republic for the period 2020 - 2024. To stimulate the demand for domestic tourism, the government will use the already established financial contribution for the recreation of employees in Slovakia.

The current coronavirus crisis is an opportunity to build a more resilient tourism industry and accelerate its digital and environmental transformation. An important element for the restart of the tourism industry will be marketing activities based on various geographical and localization options of individual regions of Slovakia, which will support economic growth and employment in tourism in the coming period. According to the presented results, domestic tourists are the most likely alternative to maintaining tourism in Slovakia.

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Wine Destination Offered as a Brand – Enotourism in Chile

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Abstract: *Chile is seen as a wine-producing giant from New World Wine, and so its brand as a destination is nowadays mostly associated with nature and then with wine. As a country of wine for incoming tourists, it can offer even more connection to wine due to the superior qualities of its history, culture, and nature. Enotourism is a trend that could explicitly produce the next wine tourism destination, among other things. This paper aims to determine the state of the art on the supply side (wineries) for wine tourism and to find out the extent to which winemakers offer wine services in their winery in a particular wine destination. The field research was conducted in one of Chile´s wine-producing regions: Maule Valley. Semi-structured interviews, followed by the processing of the obtained data, constitute the main source base. This paper also proposes possible recommendations for the wine destination brand of Maule Valley.*

1. INTRODUCTION

Wineries entering the tourism sector must inevitably adapt to the new role of a service provider, although the integration of wine and tourism by combining agricultural values with guest service values is not easy to achieve. However, entering the tourism sector is a demanding challenge for wineries as it constitutes a redirection from the usual way of running a business. Opening the winery to visitors is a marketing tool to increase direct sales, but it also represents a diversification strategy for the winery's activities – the provision of tourism services. Thus, it provides a significant space to promote innovation and boost business growth. At the same time, as a thriving niche tourism business, it can provide an effective way to enrich the (regional) tourism product and respond to the visitors' changing interests. It includes the overall goal of strengthening the attractiveness and competitiveness of the destination (Getz, 2000; Mancino and Lo Presti, 2012) but also the tourists' experience, perspective, and loyalty (Králiková et al., 2021; Zamora and Bravo, 2005). At destinations where grapes are grown for wine, visitors can get acquainted with the cultural and historical heritage of the region. They meet people with similar preferences and interests and participate in other activities related to wine, which are combined into wine tourism (Kubát, 2019).

Enotourism, as wine tourism is often called in Chile, is an important factor in regional development. It contributes not only to the creation of local jobs and the promotion of local goods but also to attracting investment and other forms of tourism at the regional level (Figueroa and Rotarou, 2018; Mitchell and Hall, 2006). The development of enotourism in Chile should also be considered as a direct channel of wine marketing. Even the environment itself remains a challenge for the development of this type of tourism. In general, there is no local culture that values wine tourism activities and the related behavior of the actors in the wine regions. And international promotional activities are not promoted by the wine-producing regions, but only by the wineries themselves, especially the large ones (Kunc, 2010; UNWTO, 2016). Even though wine tourism in Chile has a seasonal disposition (Transforma Turismo, 2016; von Bennewitz and Kubát, 2017),

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there are still winery activities (the wine sector in general) that take place throughout the year, but new services and quality improvements are still needed in the tourism sector (Figueroa and Rotarou, 2018). In addition, the current level must be maintained, which is a prerequisite for further development and concurrently difficult to achieve since the occurrence of COVID-19.

The wine sector (Vini/viticulture and wine production) and tourism sector are perceived as natural partners. From an economic point of view, both sectors face fierce competition (von Bennewitz and Kubát, 2017). As noted by Figueroa and Rotarou (2018) in the currently saturated Chilean wine market, dominated by large producers, smaller wineries are left behind. This is especially true in emerging wine destinations. These regions need local (regional) markets, so-called "cellar door sales", a story they can tell, uniqueness, and other destination differentiators, among other things. These are necessary to build up brand awareness and increase sales (Brunori and Rossi 2000; Tomljenović, 2006). For emerging (wine) tourism destinations blessed with the presence of wine production, the destination wine brand can also be a catalyst for regional economic development. For more established wine-producing regions, on the other hand, it is a tool for improving the image of the destination and diversifying into new market segments (Getz 2000; Tomljenović, 2006). The regional wine brand is especially important to new wineries, as well as new wine destinations, as they need more time to expand their own image and make it recognizable among consumers and other wine producers (Johnson and Bruwer, 2007). As the name of this paper refers, Chilean wineries usually place more importance on the promotion of their wine brands or wineries than their wine regions or even the whole country as a wine destination. Chile presents wine tourism in a different way of thinking than the Old World Wine countries (Kubát, 2019). It could be said that the export of Chilean wine is the main activity after the wine has been produced and prepared for sale. Hence, this paper aims to identify the state of the art on the supply side (wineries) for wine tourism and related activities and to find out the extent to which winemakers themselves offer wine services in their winery. This area of research is in its scarcity in other places than only Chile (Figueroa and Rotarou, 2018; Johnson and Bruwer, 2007). The paper will also propose recommendations for the wine destination in a way of perception as a wine brand.

2. BACKGROUND

Chile having a young history regarding enotourism should be acknowledged when comparing it to other much more developed wine markets in the Old World Wine countries. Enotourism was first officially introduced in Chile in 1996 when the Colchagua Wine Route (la Ruta del Vino de Colchagua) was developed. In 2015, there were over 334 wineries in the country, of which only 64 were able to offer wine tourism services (Aravena, 2015; Figueroa and Rotarou, 2018). Several wineries have stopped offering wine tourism services, partly because of low demand and partly because of the earthquake on 27 February 2010, which destroyed buildings and facilities (i.e., Zareian et al., 2012). The wine sector provides about 300,000 jobs per year and operates 334 wineries, 95% of which are export-oriented and reach 160 countries (Aravena, 2015). The Chilean wine industry is still dominated by a few family-based companies, with the four largest groups accounting for more than 45% of export value, also with the increasing participation of foreign capital in the sector (Cusmano et al., 2010).

In 1994, Act No. 464 was created by the Ministry of Agriculture on wine zoning as well as the standard for its use. This law was amended on 25 September 2015, which divided the country into 6 regions, 17 sub-regions (valleys), 8 zones, and 81 areas (Contreras, 2018; Figueroa and Rotarou, 2018). The main vine-growing valleys are provided in Figure 1. The purpose of these

vine-growing areas is to protect the consumer and manufacturer from imitations. This is done to ensure an authentic and quality product, protecting the reputation of the product to improve its marketing at the national and international level and stimulate manufacturers with innovative ideas (Contreras, 2018).

The origin of wine according to each of the production valleys is recognized by the Denomination of Origin (D.O.)[2] (Mena and Moreno, 2014). Climatic conditions in different areas of Chile vary, so each of the valleys has its own characteristics, allowing the wines to have different organoleptic properties. In the central zone, wine is an indispensable asset for the development of tourism, as it is another product that is processed in Chile over a large area between the valleys of Aconcagua and Bío-Bío (Contreras, 2018). The concept of *terroir* is a complement of the D.O. system and supports the wine culture. Both are an essential component of wine quality with wine tourism. Therefore, it is expected that the commitments to brand names, images, and destinations are consolidated in a wine-producing destination where consumers have gained memorable experiences at vineyards and wineries. Creating such a level of loyalty that the purchasing of a product would remain an even price may have essentially risen. The setting up of significant rural tourism services based upon wine-making is the current paradigm for Chile as a wine exporter (Zamora and Bravo, 2005).

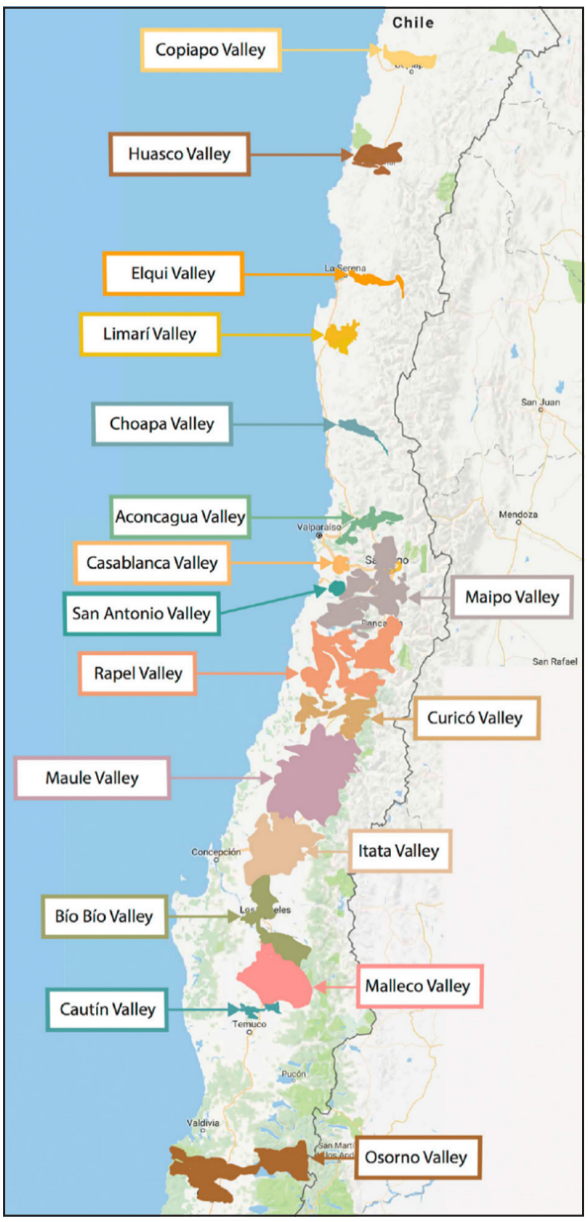

Figure 1. Map of the 17 wine-producing valleys situated in Chile
Source: Figueroa and Rotarou, 2018

The Maule wine region (Región vinícola del Maule or Valle del Maule), or respectively the Maule Valley, is located in central Chile, bordering the Pacific Ocean to the west and Argentina to the east. It is also an area with a higher percentage of the rural population in Chile (35.5%) (Mena and Moreno, 2014; von Bennewitz et al., 2015). The largest Chilean vineyard areas are located in the Maule Valley. There is great variability of characteristics in this region in terms of the size of the producers. On one hand, some particularly small producers cover less than a single hectare, whereas some large producers cultivate extensive vineyards (von Bennewitz and Kubát, 2017). The difference is then noticeable both in the type of wine production and in the type of market they focus on. For small producers, their business is local trade only, while large

[2] The designation of origin or Denominación de Origen (D.O.) gives the identity of the vine-growing region by preserving the origin of the wine. It cannot be assigned to a product that was made in another region (Contreras, 2018).

producers function mainly in terms of export (Mena and Moreno, 2014). The evolution of wine production and the wine export volume of the Maule Valley show a high correlation to what happens at the national level, which is explained by the fact that this region represents 49% of the national wine production (Rojas Aguilera, 2015).

3. MATERIALS AND METHODS

The research was conducted in collaboration with colleagues from the Catholic University of Maule (Universidad Católica del Maule, Chile) in 2018. Suitable locations for data collection within the Maule Valley were processed. The initial intentions of the two parties united in the project led to the strengthening of the collaboration and MOU (Memorandum of Understanding) of both universities. This paper is mainly based on secondary data (Contreras, 2018; Muñoz 2018). The field research and interviews were conducted with eleven wineries (N=11) located in the Maule Valley. Semi-structured interviews with the chosen wineries were conducted. The datasets of the interviewed wineries with their more detailed information can be seen in Table 1.

Table 1. List of interviewed wineries in the Maule Valley

Winery number (n)	City of the winery	Wine valley	Vineyards owned (ha)	Wine production (liters/year)	Primary activity
1	Pencahue	Maule	<50	3,000	enotourism
2	Talca	Maule	50-100	1,500,000	wine production
3	San Rafael	Maule	301-400	4,500,000	wine production
4	San Clemente	Maule	11	n/a	wine production
5	Curicó	Curicó	1030	n/a	wine production
6	Sagrada Familia	Curicó	300	10,000,000	wine production
7	Sagrada Familia	Curicó	64	n/a	wine production
8	San Javier	Maule	300	3,500,000	wine production
9	San Javier	Maule	850	20,000,000	wine production
10	San Javier	Maule	100	40,000	wine production
11	San Javier	Maule	237	2,670,000	enotourism

Source: own collaboration adapted from Contreras, 2018; Muñoz, 2018

In the administrative province of Talca, three wineries were interviewed (n=1, 2, 3), plus one winery (n=4) that, although not associated with the wine route, provides wine tourism services. Another three wineries (n=5, 6, 7) associated with the wine route were surveyed in the administrative province of Curicó. Only two of them provide official tourist services. The third winery also receives tourists as part of the route and has wine sales in its facilities but does not have the infrastructure as such to develop a tourist business. In the administrative division of the province of Linares, the last four wineries (n=8, 9, 10, 11) located in the municipality of San Javier were interviewed. Territorially by administrative divisions, the wineries located in the provinces of Curicó, Talca, and Linares fall under the Maule Region.

4. RESULTS AND DISCUSSION

4.1. Wineries and services extent

This field research was carried out with wineries linked to the wine route (N=7), as an attempt to diversify production and to support wine sales. But also with those not linked to the wine route (N=4) who mainly focus on the sale of the wine itself and the expansion of their business,

with no further complementary products or services. Figure 2 shows the designation of a winery located on a wine route in the Maule Valley as Chile's leading wine-making region. It's run by a small group of local wine producers. The emphasis is on routing their various winery members, wine tasting, and selling the various vintage wines. Local tourism attractions have been gradually added to the route. The wineries interviewed in Table 1 present great wine companies known around the world as well as smaller, family-owned wineries. It seems remarkable that two out of eleven wineries mentioned that their primary activity is enotourism and not wine production. However, in much of the research on motivations to visit a winery or wine region, the wine has not ranked in the top positions either (Carlsen and Charters, 2006; Sekulić et al., 2016), except for the North Carolina wine region (Byrd et al., 2016). All activities are primarily associated with wine, or the presence of wine is the prerequisite and basis for the subsequent development of tourist services leading to the creation of a touristic wine-producing region. The Maule Valley has done so by increasing its investment in wine facilities and promoting individual wineries throughout the region. The case of Margaret River is often cited as a successful example of the development of the region into a wine region (Hall et al., 2000; Kerma, 2018).

Figure 2. Designation of wineries located on the Wine Route in the Maule Valley.
Source: personal photo, 2018

Furthermore, wine tasting in Chile is viewed mainly as an "activity for rich people or foreign tourists" (Figueroa and Rotarou, 2018). In addition, as presented also by Sarturi et al. (2016), the concentration of wineries in the valley is low, which means visitors need to travel greater distances between particular wineries, and thus, disburse more.

This paper aims to find out to what extent winemakers themselves offer wine services in their winery, as was debated in the interviews. Thus, it has been found that service income can represent up to 30% of a winery's total income. However, this is the case for the large winery (n=5). In the case of the smaller wineries with this research, the share of service income is between 10-15%. As mentioned by the interviewed wineries, the involvement of services in the activities of the business is profitable or stagnant for most of them.

4.2. Destination, brand, and its development

As wineries proclaimed, analogously like Kunc (2010), in Chile, small- to medium-sized wineries place great emphasis on production factors such as consistent quality driven by improved wine-making practices and competitive prices. In other words, small to medium Chilean wineries are product-oriented and focus on where the producer or certain standards define the quality of the wine, not the market. This is also confirmed by Hall and Mitchell (2000). In Chile, wine tourism, as well as the wine sector (production), is dominated by large companies that have a larger area of vineyards and produce a larger volume of wine, which puts small producers at a disadvantage. Therefore, Mitchell and Hall (2006) point out that mutual support (between wineries) is necessary to strengthen the wine tourism sector and to achieve the coordination of the different wineries according to the relevant policies that promote areas related to wine tourism, the acquisition of traditions, cultural identity, and the creation of related economic activities. As also confirmed by Correia et al. (2016), there is a need for the wine and tourism industries to join efforts on a common goal, which is to provide unique experiences for the consumer. Aravena (2015) compared Chile with international wineries. In terms of the number of wineries open for tourism, as well as the number of visitors and level of promotion and development, Chile is relatively lower. The low interest of domestic tourists in wine tourism and the lack of wine culture were also confirmed by Inalaf et al. (2012), who analyzed Chilean society, where they found that the average citizen does not show interest in learning about their historical roots and their country/region. Therefore, as claimed by all the interviewed wineries, visitors to the winery are mainly foreigners who appreciate Chile as a quality wine producer and are interested in its origins. As also confirmed by Figueroa and Rotarou (2018), only one out of five tourists who visit wineries is Chilean. Therefore, Chile is the only wine-producing country with a much higher number of foreign visitors.

All wineries see more potential in developing Chilean services and wines to attract (not only) foreign tourists. In fact, this was mentioned by the winery (n=1): "Yes [it has potential], because of the tradition of rural grape cultivation, the quality of Chilean wines, and the large number of varieties that are produced." However, another winery (n=4) adds that "there has been very little exploitation in wine tourism." Chile has more potential to develop wine tourism, but there is a lack of links between wineries to offer more attractive tourism services and make it known to the public with its own identity. This is particularly true for the promotion of rural tourism, where the winemaking roots come from, and vine-growing in Chile in general. All wineries are cooperating or are involved in some way with institutions related to the promotion or development of tourism. The most frequent is a connection to the wine route, followed by the tourist office, Sernatur , the municipalities (Talca, San Clemente), Corporación Activa Talca , Corfo , or Sercotec . However, all wineries mentioned that cooperate in this area exhibit a low level. As contributed by one winery (n=6): "Everything related to wine tourism has the potential to develop."

Several large wineries (n=2, 3, 5, 6, 7, 8) are located in the wine region that mainly focuses on the production of wine and international activities: export, wine competition, and the inflow of foreign tourists. They promote the region at the international level under the auspices of the Maule Valley signed by the wine label of Chile. Nevertheless, as also pointed out by Johnson and Bruwer (2007), there is still an imbalance between the relative strength of the regional wine brand and the producer's own brand. This fact is also pointed out by the question asked in which area wineries recently invested the most money. Seven wineries answered wine production, three wineries answered infrastructure and the last-mentioned new production technologies. Hence, it is evident that the wineries focus on their own business and not on activating marketing on behalf of the destination's image.

Figure 3. Word cloud of the wine development characteristics introduced by winemakers
Source: own collaboration at Wordart.com, 2021

The characteristics of the wineries and its valley, as well as the evolution of the wine destination according to the opinion of the interviewed winemakers, are as follows (graphically represented in Figure 3):

- quality wine,
- variety and quality of offered services,
- history, tradition, and culture of wine (production),
- promotion of their own wine brand,
- uniqueness – wine, brand, Chile,
- wine-producing facilities and conditions.

Referred to by Getz and Brown (2006), the attractiveness of the wine destination was mentioned as a key attraction for the region. In other words, tourists may choose to visit many wine regions. This creates competition with all of the other possible destinations. The popularity and rivalry of two wine-producing neighboring countries, Chile and Argentina, is still on board topic. These countries are located at a relatively short distance from one another. This creates a dilemma for many tourists in deciding which destination to choose for their visit. Is this due to marketing efforts or the general awareness of the wine destination? This question may lead to new research as Getz and Brown (2006) also corroborate. As Zamora and Barril (2007) pointed out regarding the attributes in deciding whether to purchase wine from Chile, the brand accounts for 25%, whereas the winery and wine region only accounts for 4%. This is due to unsuccessful marketing activities and strategies, which should, for instance, focus more on the characteristics mentioned in Figure 3 and not primarily on the production of wine, selling it abroad, and enhancing its own score. There are no doubts about the quality of the wine and its (sometimes overvalued) price. Nevertheless, there should be a higher accent placed on the other attributes of today's wine business, such as the wine services, the connectivity of wineries strengthened by its association to the wine region/country, and the winemaking history. In addition, the focus should be aimed at the so-called "soft skills" connected to wine propagation and tourism. A need exists for a wine branding campaign at a more regional level for wine destinations that aims to introduce the wine destination to the world as well as what distinguishes it from others (Johnson and Bruwer, 2007).

5. FUTURE RESEARCH DIRECTIONS

The growing interest in wine and related services is undoubtedly a new area of tourism definition. This relatively young type of recreation and leisure offers opportunities and potential in which reserves can still be seen. Due to the diversity in the interviewed wineries' strategies and the volume of their wine production, the results show merely a short insight into the situation and cannot be applied for the whole sectors of wine tourism, neither can they be generalized. Hence, as Chile is a huge wine-producing country, wine valleys, in particular, should be researched by the supply side and, for the appearance of the wine destination brand, separately, later to be compared aftward. The demand side also offers a great field for research, mainly in the area of tourists' preferences among wine products and services (primary and complementary) and their association to particular wine destinations as a choice of a wine brand.

6. CONCLUSION

As mentioned in this paper, Chile remains in the rather early stage of development in terms of enotourism. The level of wine production and quality of wine is increasingly high, however, there is a need to further present the product, not only strictly for export abroad but also at a local level. Generally speaking, wineries and wine destinations are quite far apart, and an opportunity exists to connect these places more through additional transport services. There is also the possibility of providing the wines offered by each winery in a single place, for example, at the entrance to the region or its core. The wineries should cooperate more with each other to bridge more than just the geographical distance between them. Development through deeper cooperation and collaboration in the creation of new tourism products is entirely appropriate. Generally, Chile should also focus on combining wine with its natural beauty and cultural diversification to create a genuine (international) wine tourism destination brand.

> *"The climate and soil of Chile are so similar to those of Europe that I see no difference, and in the whole discovery of America, no other region is so similar..."*
>
> Alonso Ovalle, Chilean priest

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Empirical Investigation of the Impact of Globalization on Economic Growth: Any Difference between the de Jure and de Facto Measures of Globalization?

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Abstract: *This paper empirically investigates how globalization impacted economic growth in a broad group of countries covered by the wiiw (the Vienna institute for international economic studies) database covering the period since the 1990s. Whilst theoretical arguments in favor of the positive effects of globalization are predominant, there also exist sound arguments pointing out that the effects might be negative too. Empirical evidence also provides a mixed picture. Given this ambiguity, it seems reasonable to further pursue the empirical effects of globalization on growth. The novelty in this paper is the application of different measures of globalization within the KOF index of globalization introduced by Dreher (2006) and later revisited by Gygli et al. (2019). In particular, this applies to distinguishing between the de jure and de facto measures of globalization and allows a comparison between the findings of these approaches. In its empirical investigation, this study uses the panel data analysis covering the ex-socialist European and Asian countries providing some interesting insights.*

1. INTRODUCTION

This paper empirically investigates the effects of globalization on economic growth in a broad group of countries covered by the wiiw (the Vienna institute for international economic studies) database covering the period since the 1990s. The ex-socialist countries investigated in this study had gone through a very complicated process of transition towards market economy. Following the advice from international institutions most of these countries opened rather quickly to international flows. So, in addition to other questions related to the effects of different reforms that were adopted, there also arises the question of the appropriateness of opening these economies so strongly and quickly. This paper sets to address the question what were the effects of globalization on growth in these economies. Whilst theoretical arguments in favor of the positive effects of globalization are predominant, there also exist sound arguments pointing out that the effects might be negative too. Empirical evidence also provides a mixed picture. Given this ambiguity it seems reasonable to further pursue the empirical effects of globalization on growth. The novelty in this paper is the application of different measures of globalization within the KOF index of globalization introduced by Dreher (2006) and later revisited by Gygli et al. (2019). In particular, this applies to distinguishing between the de jure and de facto measures of globalization and allows a comparison between the findings of these approaches. In its empirical investigation this study uses panel data analysis.

The paper has the following structure. Section 2 presents the paper background providing a short overview of the studies investigating the effects of globalization. Empirical methodology and the main findings are presented in Section 3. Section 4 concludes.

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2. PAPER BACKGROUND

2.1. Related literature

The economic literature is abundant with studies investigating globalization. This comes as no surprise given that almost all activities of humankind have been strongly impacted by the forces of globalization. If one were to picture the importance of globalization and its effects, it might be said that globalization is in general thought of as a benign force bringing prosperity and having mostly positive effects. However, even a slightly deeper investigation of the globalization phenomenon will lead to questioning this benign perspective. With globalization being such a complex phenomenon particular attention should be devoted to the different facets that globalization can have and investigate its consequences with great care. As the present paper is interested primarily in the effects of economic globalization on growth, the rest of this section provides the theoretical rationale and a brief overview of empirical studies focusing on economic globalization. On the theoretical front globalization is expected to affect economic growth positively. As a support to the theoretical case for globalization the following reasons may be listed: international knowledge spillovers, access to larger markets, increased competition, better opportunities to exploit comparative advantages and gains from specialization (see for example Grossman and Helpman, 2015 and Potrafke, 2015). In this sort of context, access to global markets and increased competition are expected to drive an economy's resources toward more productive uses and enhance allocative efficiency (McMillan and Rodrik, 2011). A strong body of empirical evidence seems to support this positive perspective. The bulk of the empirical literature thus points toward the positive effects of economic globalization on economic growth around the world (see for example Dreher, 2006; Potrafke, 2015; Ali and Malik, 2021). However, dissonant views are also present. Das (2004), for example, argues that the average world per capita income tripled in 25 years because of globalization. This author contends that a particularly strong positive impact was observed in emerging economies, but warns that globalization made the growth prospects of the Sub-Saharan countries poorer. McMillan and Rodrik (2011) also contend that, while developing countries have become more integrated with the world economy since the early 1990s, the very diverse outcomes observed among these countries suggest that the consequences of globalization depend on the manner in which countries integrate into the global economy. Thus, as argued by these authors, in several cases, like China and India and some other Asian economies the promise of globalization has been fulfilled, but in many other cases, Latin America and sub-Saharan Africa, globalization appears not to have fostered the desirable kind of structural change and the promise of globalization has not been fulfilled[2]. Ali and Malik (2021) suggest that countries with more productive capabilities get more benefits from economic globalization and find that rich countries managed to take more advantage of globalization as compared with poor countries. Gozgor and Can (2017) also observe that diversification of exports and economic globalization are positively related to economic growth merely in upper-middle economies. Focusing on the South Asian countries Hasan (2019) finds that overall globalization, economic globalization and political globalization accelerate economic growth in the long-run, but the dimensions of globalization have no significant effect in the short-run. In his study investigating the effects of globalization on economic growth in developing countries, Kilic (2015) finds that economic growth levels were positively affected by economic and political globalization, while social globalization affected growth negatively.

[2] While the above arguments usually refer to trade globalization as a particular form of economic globalization, it should be added that it is financial globalization that is usually more controversial. This disagreement in literature is nicely seen between for example Mishkhin (2009) and Rodrik and Subramanian (2009).

Using the recently revised KOF index of globalization Gygli et al. (2019) find that in a broad sample of 123 countries globalization has a positive effect on economic growth. It appears that the empirical literature provides a mixed picture of the effects of globalization on economic growth. This calls for further studies trying to disentangle these important consequences of globalization. In the present paper it is done focusing on the effects of globalization on economic growth in a sample of selected ex-socialist countries.

2.2. Measurement of globalization

Even the brief discussion of the related studies above calls for caution when it comes to measuring globalization and empirically estimating its effects. Different approaches to measuring globalization may be adopted. Thus, older empirical literature had traditionally used the indicator of openness defined as trade (exports plus imports) over GDP as a proxy for globalization. Given the complexities related to globalization new indices have been provided over time, for example, the A.T. Kearney/Foreign Policy Globalization Index (A.T. Kearney/Foreign Policy, 2001), the CSGR Globalization Index (Lookwood and Redoano, 2005), Cultural Globalization Index (Kluver and Fu, 2004), the Maastricht Globalization Index (Figge and Martens, 2014), KOF index of globalization just to name a few. Potrafke (2015) argues that the KOF index has found particularly widespread use in empirical studies on globalization. The present paper adopts the recently revised KOF index of globalization (Gygli et al., 2019) as it provides a comprehensive measure of globalization and has a number of advantages for the present study. In addition to the overall KOF index of globalization which is calculated based on the 43 underlying variables (before the revision it was 23), the particular subcomponents are also reported: economic globalization, social globalization and political globalization. For the purpose of this study which is interested in the effects of economic globalization on growth it becomes particularly handy that the index additionally distinguishes between trade and financial globalization. Another advantage arises from the fact that all the reported indices come additionally in the form of the de facto and de jure versions. All these allow new and interesting aspects of globalization to be investigated and that is what follows in the rest of this paper.

3. EMPIRICAL ANALYSIS

3.1. Modelling strategy and the data

The impact of globalization on economic growth is estimated econometrically by using panel data analysis. A fixed effect model is estimated as outlined below:

$$GDPGROWTH_{it} = \beta_1 KOF_{it} + \beta_2 \log GDP_{it-1} + \beta_3 HC_t + \beta_4 \log LEX_{it} + \beta_5 \log FR_{it} + \beta_6 INV_{it} + \beta_7 GOV_{it} + \beta_8 INF_{it} + \varepsilon_{it} \quad (1)$$

$i = 1..., 17, t = 1990..., 2018$

where i refers to a country and t to a period. The dependent variable $GDPGROWTH_{it}$ represents the growth rate of GDP per capita in country i and period t. KOF_{it} is the main variable of interest measuring the overall globalization, but also accounting for its subcomponents: economic, social, political, trade and financial globalization. A number of additional variables are included as control variables. This is done to evade misspecification and to have the model corresponding to the standard literature on economic growth (see for example Barro, 1997). Thus, the following control variables are included: lagged logGDPpc, human capital (HC), logarithm of life expec-

tancy (log*LEX*), logarithm of fertility rate (log*FR*), share of investment in GDP (*INV*), share of government consumption in GDP (*GOV*), and inflation (*INF)*. The used variables are defined in Table 1 below. All data are annual and cover the period from 1990 to 2018.

Table 1. Description of variables and sources

Variable	Definition	Source
GDPGROWTH	GDP per capita growth rate (%)	World Bank WDI
KOFGI	KOF index of globalization	Gygli et al. (2019)
KOFecGI	KOF index of economic globalization	
KOFsoGI	KOF index of social globalization	
KOFpoGI	KOF index of political globalization	
KOFtrGI	KOF index of trade globalization	
KOFfiGI	KOF index of financial globalization	
log*GDPL*	Logarithm of GDP per capita lagged	-
HC	Human capital	Penn World Table (Feenstra et al., 2015)
log*LEX*	Logarithm of life expectancy	World Bank WDI
logFR	Logarithm of fertility rate	World Bank WDI
INV	Gross fixed capital formation (% of GDP)	World Bank WDI
GOV	General government final consumption expenditure (% of GDP)	World Bank WDI
INF	Annual rate of inflation (%)	World Bank WDI

The sample includes 17 ex-socialist countries from Central and Eastern Europe and Asia (Albania, Bulgaria, Croatia, Czechia, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia and Ukraine). As stated earlier, these countries had gone through very complicated transformation processes towards market economy, with fast and strong openings of their markets to international flows already at the early stages of transition. Not without critique, most of the countries might have opened too soon and too quickly, suggesting that they applied the recopies from international institutions (often hidden under the term "Washington consensus"[3]) and globalized quickly. An insight as to how quickly and how strongly this globalization evolved can be grasped from Figure 1. In what follows the paper investigates the effects of different aspects of globalization on economic growth in 17 ex-socialist countries from Central and Easter Europe and Asia.

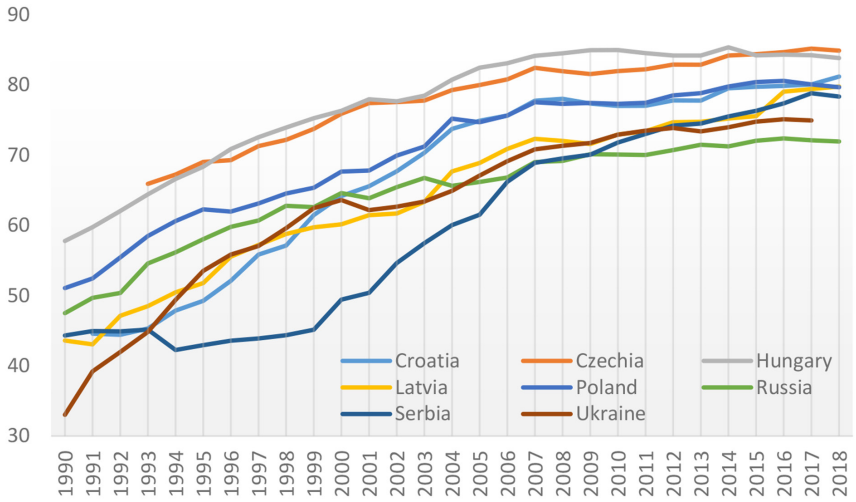

Figure 1. Level of globalization (KOF index of globalization) since 1990 – selected countries

Source: Gygli et al. (2019)

[3] An interested reader may wish to take a deeper look into the Washington consensus and some of its critiques. See for example Williamson (2005) and Rodrik (2006).

3.2. Results of empirical investigation

The empirical investigation conducted in this section reports multiple models that were estimated and the main results are reported across three tables. In order to allow easier traction of the tables and the models being estimated econometrically in these tables, before reporting the results an introductory explanation is provided. As stated above the growth model is set quite broadly, with the determinants of growth included as reported in the standard growth literature and following similar studies investigating the effects of globalization on growth (see for example Barro, 1997; Dreher, 2006; Gygli et al., 2019). Thus, in addition to globalization, which is the main variable of interest, the model includes the following control variables: investment, government consumption, inflation, human capital, fertility rate, life expectancy. The many models (in total 18) that were estimated test econometrically the impact of these variables alongside with different versions of the globalization variable by using the KOF index of globalization and its subcomponents. These subcomponents correspond to economic (both trade and financial globalization), social and political globalization. In addition, econometric estimations were conducted investigating the effects of the de facto and de jure versions of these indices.

Table 2. The effects of globalization on economic growth: KOF globalization index (overall, de facto and de jure)

VARIABLES	(1) Globalization	(2) Globalization de facto	(3) Globalization de jure
KOFGI	0.105		
	(0.074)		
KOFGI de facto		0.160***	
		(0.062)	
KOFGI de jure			-0.008
			(0.065)
LogGDP$_{t-1}$	-7.855***	-8.189***	-6.828***
	(2.064)	(2.007)	(2.063)
Human capital	4.661	3.760	6.701**
	(3.218)	(3.113)	(3.171)
logLifeexpectancy	6.445	-1.587	26.175
	(44.397)	(43.499)	(44.211)
logFertility	-4.393	-5.635	-6.665
	(4.936)	(4.717)	(5.208)
Investment (% of GDP)	0.261***	0.251***	0.279***
	(0.056)	(0.055)	(0.055)
Government (% of GDP)	-0.488***	-0.457***	-0.504***
	(0.126)	(0.126)	(0.125)
Inflation	-0.007***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)
Observations	428	428	428
R-squared	0.298	0.306	0.294

*** significant at 1% level, ** significant at 5% level, * significant at 10% level.
Standard errors in parentheses

Source: Author's calculations

Table 2 reports three different models with the main difference between them depending on the included KOF index of globalization. Model 1 (as presented in Column 1) uses the overall KOF index of globalization with the estimated effect of globalization on economic growth being positive but not statistically significant. The other variables included in the model are mainly of theoretically expected signs but not all of them being statistically significant. Human capital,

life expectancy and fertility are not statistically significant. Investment, as expected, has a positive and statistically significant effect on growth, while government consumption and inflation are also found to be statistically significant but having a negative effect on growth. Logarithm of GDP per capita from the previous period is estimated to have a negative impact and is statistically significant suggesting the presence of strong convergence effects (as expected given the relatively low levels of development in ex-socialist countries). Columns 2 and 3 report similar models with the KOF globalization index included in its de facto and de jure forms. As for the control variables the same general findings can be observed as in model 1 (column 1), with the exception that human capital becomes statistically significant at the 5 percent level of statistical significance in model 3. Of particular importance in columns 2 and 3 is the coefficient related to globalization which in its de facto version (KOF globalization index de facto, column 2) becomes statistically significant having a positive impact on economic growth. The de jure KOF index of globalization (Column 3) is estimated with a negative sign, but this effect appears not to be statistically significant. These are interesting findings, but one should not jump to conclusions too quickly and therefore the paper proceeds with estimating different subcomponents of globalization, particularly testing the difference between their de facto and de jure versions.

Table 3. The effects of globalization on economic growth: KOF index of economic globalization, social globalization and political globalization (overall, de facto and de jure)

VARIABLES	Economic globalization			Social globalization			Political globalization		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
KOFecGI	0.139***								
	(0.042)								
KOFecGI de facto		0.167***							
		(0.031)							
KOFecGI de jure			-0.007						
			(0.036)						
KOFsoGI				0.184**					
				(0.075)					
KOFsoGI de facto					0.217***				
					(0.055)				
KOFsoGI de jure						-0.014			
						(0.067)			
KOFpoGI							-0.083**		
							(0.041)		
KOFpoGI de facto								-0.117***	
								(0.033)	
KOFpoGI de jure									0.006
									(0.038)
$LogGDP_{t-1}$	-7.878***	-8.336***	-6.873***	-10.437***	-12.133***	-6.712***	-6.827***	-7.896***	-6.977***
	(1.957)	(1.914)	(1.970)	(2.416)	(2.340)	(2.181)	(1.951)	(1.951)	(2.000)
Human capital	2.901	1.409	6.695**	4.882*	5.654**	6.745**	8.064***	8.605***	6.428**
	(3.108)	3.005	(3.042)	(2.998)	(2.896)	(3.088)	(3.021)	(2.956)	(3.030)
logLifeexpectancy	9.345	8.205	25.503	-1.383	1.045	27.117	46.653	58.073	23.096
	(42.329)	(41.335)	(42.860)	(43.620)	(42.273)	(44.226)	(43.785)	(43.054)	(43.646)
logFertility	-1.214	-3.118	-6.760	-5.224	-8.107*	-6.679	-7.480	-6.664	-6.236
	(4.941)	(4.630)	(5.141)	(4.734)	(4.679)	4.946)	(4.753)	(4.676)	(4.833)
Investment (% of GDP)	0.278***	0.299***	0.279***	0.245***	0.225***	0.280***	0.302***	0.323***	0.277***
	(0.053)	(0.053)	(0.055)	(0.056)	(0.055)	(0.055)	(0.056)	(0.055)	(0.055)
Government (% of GDP)	-0.538***	-0.470***	-0.500***	-0.501***	-0.489***	-0.504***	-0.560***	-0.577***	-0.500***
	(0.124)	(0.121)	(0.128)	(0.125)	(0.123)	(0.125)	(0.128)	(0.125)	(0.129)
Inflation	-0.007***	-0.006***	-0.007***	-0.007***	-0.007***	-0.007***	-0.008***	-0.008***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	428	428	428	428	428	428	428	428	428
R-squared	0.313	0.340	0.294	0.304	0.320	0.294	0.301	0.315	0.294

*** significant at 1% level, ** significant at 5% level, * significant at 10% level.
Standard errors in parentheses

Source: Author's calculations

Table 4. The effects of globalization on economic growth: KOF index of economic globalization, trade globalization and financial globalization (overall, de facto and de jure)

	Economic globalization			Trade globalization			Financial globalization		
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
KOFecGI	0.139***								
	(0.042)								
KOFecGI de facto		0.167***							
		(0.031)							
KOFecGI de jure			-0.007						
			(0.036)						
KOFtrGI				0.052					
				(0.036)					
KOFtrGI de facto					0.163***				
					(0.032)				
KOFtrGI de jure						-0.051*			
						(0.027)			
KOFfiGI							0.149***		
							(0.035)		
KOFfiGI de facto								0.112***	
								(0.025)	
KOFfiGI de jure									0.061**
									(0.030)
$LogGDP_{t-1}$	-7.878***	-8.336***	-6.873***	-6.901***	-6.059***	-6.663***	-9.030***	-9.394***	-7.315***
	(1.957)	(1.914)	(1.970)	(1.956)	(1.908)	(1.956)	(1.985)	(1.997)	(1.961)
Human capital	2.901	1.409	6.695**	4.910	0.745	7.936***	3.447	3.682	5.652*
	(3.108)	3.005	(3.042)	(3.145)	(3.071)	(3.020)	(2.974)	(2.947)	(2.961)
logLifeexpectancy	9.345	8.205	25.503	15.738	6.416	36.398	17.518	15.254	24.022
	(42.329)	(41.335)	(42.860)	(42.969)	(41.483)	(42.901)	(41.774)	(41.705)	(42.420)
logFertility	-1.214	-3.118	-6.760	-3.523	-0.130	-10.023**	-3.497	-6.324	-4.057
	(4.941)	(4.630)	(5.141)	(5.132)	(4.763)	(5.104)	(4.698)	(4.637)	(4.862)
Investment (% of GDP)	0.278***	0.299***	0.279***	0.271***	0.285***	0.293***	0.299***	0.301***	0.282***
	(0.053)	(0.053)	(0.055)	(0.055)	(0.053)	(0.055)	(0.054)	0.054)	(0.054)
Government (% of GDP)	-0.538***	-0.470***	-0.500***	--0.532***	-0.532***	-0.459***	-0.499***	-0.440***	-0.536***
	(0.124)	(0.121)	(0.128)	(0.127)	(0.122)	0.127)	(0.123)	(0.123)	(0.126)
Inflation	-0.007***	-0.006***	-0.007***	-0.007***	-0.006***	-0.007***	-0.007***	-0.008***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	428	428	428	428	428	428	428	428	428
R-squared	0.313	0.340	0.294	0.298	0.337	0.300	0.323	0.326	0.301

*** significant at 1% level, ** significant at 5% level, * significant at 10% level.
Standard errors in parentheses

Source: Author's calculations

Table 3 reports the effects of economic, social and political globalization on economic growth as measured by KOF indices of economic globalization, social globalization and political globalization (overall, de facto and de jure). In total, nine models were estimated (columns 1-9). As for the control variables, there seems to be consistency in comparison with the results reported earlier in Table 2 with the human capital, investment, government consumption, inflation and lagged GDP level being statistically significant and of the same expected signs as earlier. Again the primary interest is in the coefficients related to globalization, in particular the effects of economic globalization on growth, but as the indices of social and political globalization are readily available, the paper reports these results in passing as well. The first three models (Columns 1 – 3) are related to economic globalization. The estimated coefficients seem to suggest that the KOF index of economic globalization, the overall version (including both the de facto and the de jure measures) as well as the de facto version alone have positive and statistically significant effects on growth. The effect of the de jure KOF index of economic globalization is negative, but the effect lacks statistical significance. As stated earlier, in passing it can be also observed that

social and political globalization also have statistically significant effects, social globalization affecting growth positively and political globalization negatively. It is again interesting to note that the jure version of both indices is of the opposite sign and again not being statistically significant. As this paper is primarily focused on the effects of economic globalization on growth, in the remainder of the text the third set of estimations is devoted to the effects of subcomponents of economic globalization, namely trade and financial globalization.

Table 4 reports the last set of estimated models formally testing the effects of subcomponents of economic globalization, trade and financial globalization on growth. It should be noted that the first three models (Columns 1-3) are the same as those in Table 3 and are included here to enable easier traction and comparison between the effects of overall economic globalization and its subcomponents. Thus, in models 4 - 6 (Columns 4 – 6) the effects of trade globalization (as measured by the KOF index of trade globalization, overall, de facto and de jure) are estimated. It appears that the KOF index of trade globalization, the overall version including both the de facto and de jure indices (Column 4) is not statistically significant. The de facto KOF index of trade globalization (Column 5) is estimated to have a positive and statistically significant effect (at 5 percent level of statistical significance), whilst the de jure index is estimated to have a negative effect. However, this effect is only marginally significant at the ten percent level of statistical significance. It is interesting to note that again it appears that the de facto globalization exerts more important effects. As for the effects of financial globalization on growth (Columns 7 – 9) it appears that all three versions of the KOF index of financial globalization (overall, de facto and de jure) have a positive and statistically significant effect on growth.

4. FUTURE RESEARCH DIRECTIONS

The investigation conducted in this paper provides a comprehensive approach towards estimating the effects of globalization on economic growth. This becomes particularly important with application of the revised KOF index of globalization, due to Gygli et al. (2019). With this index, many aspects of globalization that were not treated in previous studies, because of the obvious reason of not being available, now can be readily used and investigated formally. In this context, it will be interesting to see as to what extent application of this revised index across different country samples and periods will change the usual views on globalization and its effects. In addition, future research might be adding valuable insights on the other effects of globalization, for example on the consequences of globalization on inequality. With the global economy being recently exposed to many shocks and crises, the global financial crisis of 2008 and the most recent COVID-19 pandemics just to name the most important ones, it will be interesting to see how much deglobalization might be taking place, with the first signs increasingly emerging. Relations between deglobalization and economic growth might be particularly interesting avenues for future research.

5. CONCLUSION

The effects of globalization on economic growth were explored in the group of 17 countries from Central and Eastern Europe and Asia. The investigated economies had gone through transformation towards functioning market economy during the 1990s, one important element of this process being the opening of these economies to trade and capital flows. Many elements of the transition to the market economy were investigated in the literature, including also the effects of opening of these countries to international flows. This paper contributes to the empirical lit-

erature by applying the revised KOF index of globalization in this specific group of countries. In addition to the standard effects related to globalization in general, application of the revised KOF index allowed additional aspects to be investigated: economic globalization (in particular trade and financial globalization), social globalization and political globalization.

In the empirical investigation panel data analysis was applied. The main findings of the paper can be summarized as follows. In general, the paper finds a positive impact of globalization on economic growth, with the positive effects also found for economic and social globalization. Political globalization is found to exert a negative influence. In addition, the estimations provide empirical evidence on the importance of both trade and financial globalization, affecting growth positively. The distinction between de facto and de jure measures and the accompanying empirical analysis seems to suggest that it is the de facto globalization that is generating the effects in the above reported results. This distinction between the de facto and de jure measures of globalization and its use in the empirical estimations makes a valuable contribution to the empirical literature calling for further application of the revised version of the KOF index in broader country samples and extending periods under investigation.

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Trends in the Management Accounting Research: A Review of the Literature Published during the COVID-19 Pandemic

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Abstract: *Management accounting theory aims to contribute to managers using accounting reports for supporting their management decisions. During the COVID-19 pandemic, such insights would be essential for supporting decisions during lockdowns and other policy makers' rules imposed by this health crisis. To unveil how academic literature addresses management accounting challenges arising from the COVID-19 specific context, this study conducts an automated computer analysis of the bibliometric data addressing financial issues related to the COVID-19 pandemic.*

1. INTRODUCTION

Management accounting literature and practice have an extensive history (Kaplan, 1984). Some domains include: strategy, planning, performance, reporting and control, technology and analytics. The ecological concerns brought new trends in management accounting, like environmental management accounting and sustainability management accounting domains (Jasch & Stasiškienė, 2005).

New challenges arise with the COVID-19 pandemic that is a time of uncertainty for people and companies. Scholar community may have an important role in supporting people and companies in overcoming challenges, namely in the decision making on topics such as business planning, continuity, and resilience. In this sense, it is expected to see scientific peer-review publications in management accounting addressing COVID-19 pandemic problems, both in profit and nonprofit sectors (Santos & Laureano, 2021).

The massive number of scientific publications in the management accounting field made scholars, in the past, analyse hundreds of documents using computer-assisted techniques (Hesford et al., 2006). In order to contribute to the bibliometric overview of the scientific contributions already published in this field, the present study conducts a literature review of the literature. The themes addressed are systematized through a clustering technique and examples of studies are provided. This mapping of the knowledge supports scholars in identifying future research agendas.

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2. LITERATURE REVIEW

The field of management accounting is characterized by multiple research methods, in which scholars support results and discussion in multidisciplinary theories (Wanderley & Cullen, 2013).

The massive volume of data used by this management accounting practice made it benefit from the advancements in the information technology (IT) area. The use of IT played an important role in accounting change, namely in the convergence with financial accounting (Taipaleenmäki & Ikäheimo, 2013).

During this period management accounting innovations (Haiza & Hoque, 2010) and sustainability (Jasch & Stasiškienė, 2005) became topics addressed by research.

Management accountants faced new challenges as a consequence of political measures imposed during the COVID-19 pandemic, namely the digitalization of procedures traditionally paper-based or remotely sharing data within organization. Management accounting is also called to assist organizations in assessing new costs arising from health care procedures or working from home policies (M. R. C. Santos et al., 2021).

In order to understand how researchers are supporting management accountants and the discipline to respond to these challenges, a literature review on the scientific production published until now is needed.

3. METHODOLOGY

Aiming to analyse the scientific literature covering management accounting themes in the context of the COVID-19 pandemic, a search on the Scopus database was conducted to identify peer-reviewed scientific publications.

This method of data collection was applied in previous studies (Santos et al., 2020), and it allowed to extract of 25 articles by applying the following search query:

(TITLE-ABS-KEY (“2019-nCoV” OR “COVID-19” OR “Coronavirus Disease 2019” OR “Novel Coronavirus Pneumonia” OR “NCP” OR “2019 novel coronavirus” OR “SARS-CoV-2” OR “2019 Novel Coronavirus Diseases” OR “novel coronavirus” OR “pneumonia”) AND TITLE-ABS-KEY (“management accounting” OR “analytical accounting” OR “managerial accounting” OR “cost accounting”)) OR LIMIT-TO (PUBYEAR, 2020 AND 2021)).

Table 1 summarizes the number of documents per type.

Table 1. Absolute frequency of publications per type

Type of publication	Absolute frequency
Article	17
Book Chapter	1
Conference Paper	6
Review	1
Total	**25**

Source: Own research

A total of 57 citations were attributed to this set of publications, but part of these was not yet cited (10 publications).

The majority of the studies were conducted by more than one author, meaning that collective and multidisciplinary teams prevail (84%).

In addition to this bibliometric analysis, a content analysis was conducted using computer-assisted methods. For this purpose, text mining techniques were applied to the title and abstract of the publications. The VOSviewer software is used for clustering the themes addressed by scholars, in which only 60% of most significant terms that occurred more than 3 times appear in the output, following previous studies' methodology (Santos et al., 2020).

4. RESULTS

The text mining analysis returned a total of 6 clusters in the literature addressing management accounting in the context of the COVID-19 pandemic published during the years 2020 and 2021. The network visualization is provided in Figure 1 using the word co-occurrence method.

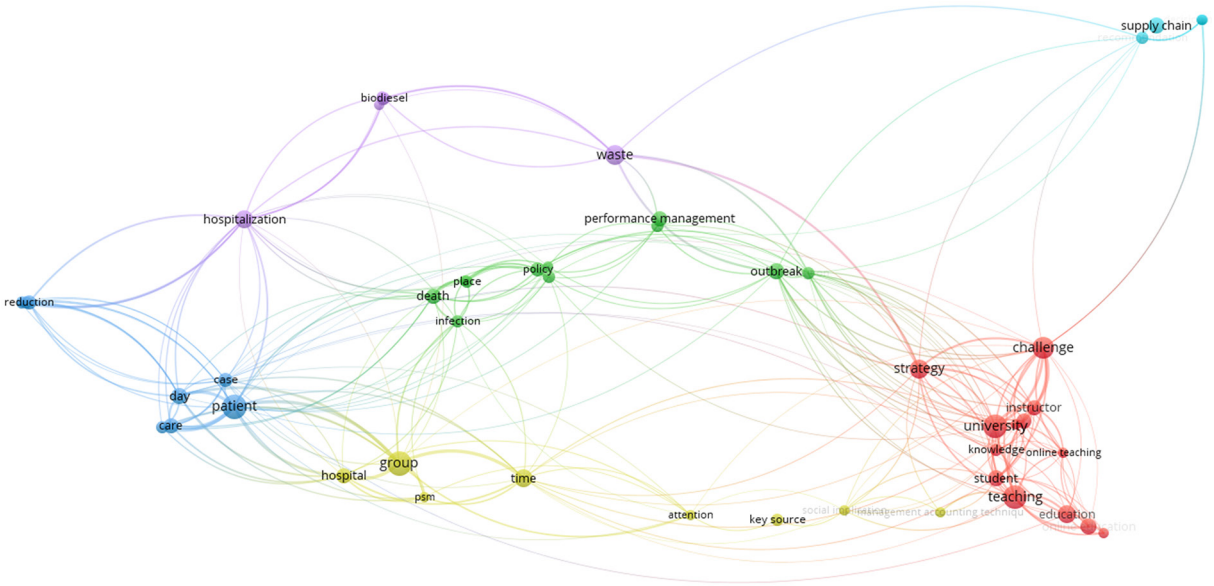

Figure 1. Label view of VOSviewer co-occurrence map

Source: Own research

The 6 clusters are education (Cluster 1), performance management (Cluster 2), patient care (Cluster 3), hospitality time (Cluster 4), waste management (Cluster 5), and supply chain (cluster 6). Table 2 lists the most frequent terms in each cluster and each term's number of occurrences.

In Cluster 1, scholars explore the online teaching and learning tools used during the lockdown in the context of management accounting disciplines. Some authors focused on finding the advantages and disadvantages of accounting management education under online versus traditional education (Yinghui & Lin, 2021). Others make a comprehensive analysis of the textbooks in this discipline and the adequation of their content to online learning (Spraakman, 2020).

In Cluster 2, performance management is addressed in a way that contributes to the management accounting literature. In this cluster, scholars study the system of performance manage-

ment employed by countries for integrating COVID-19 pandemic facts, possibilities, values and communication (Mitchell et al., 2021).

In regards to patient care (Cluster 3), scholars review the financial information produced by hospital cost accounting systems in order to evaluate the outcome of new health care models in cost efficiency (Young et al., 2021). The terms in this cluster are the second most significant, as shown in Figure 2.

Table 2. Cluster's characterization

Cluster	Most frequent terms	Number of occurrences	Cluster	Most frequent terms	Number of occurrences
Cluster #1:	teaching	14	Cluster #4	group	15
	university	14		time	8
	challenge	12		hospital	6
	strategy	9		key source	4
	education	8		attention	3
	student	7		social implication	3
	online education	7			
	learning	6			
Cluster #2	outbreak	7	Cluster #5	waste	10
	death	6		hospitalization	8
	performance manag.	6		biodiesel	4
	policy	5		respiratory dis.	4
	solution	4		hospitalization	3
	order	4		Sao Paulo city	3
	fact	4		total cost	
Cluster #3	patient	15	Cluster #6	supply chain	7
	day	7		recommendation	4
	care	6		decision making	3
	case	5		nonprofit	3
	reduction	5		program operation	3
	surgical procedure	4			

Source: Own research

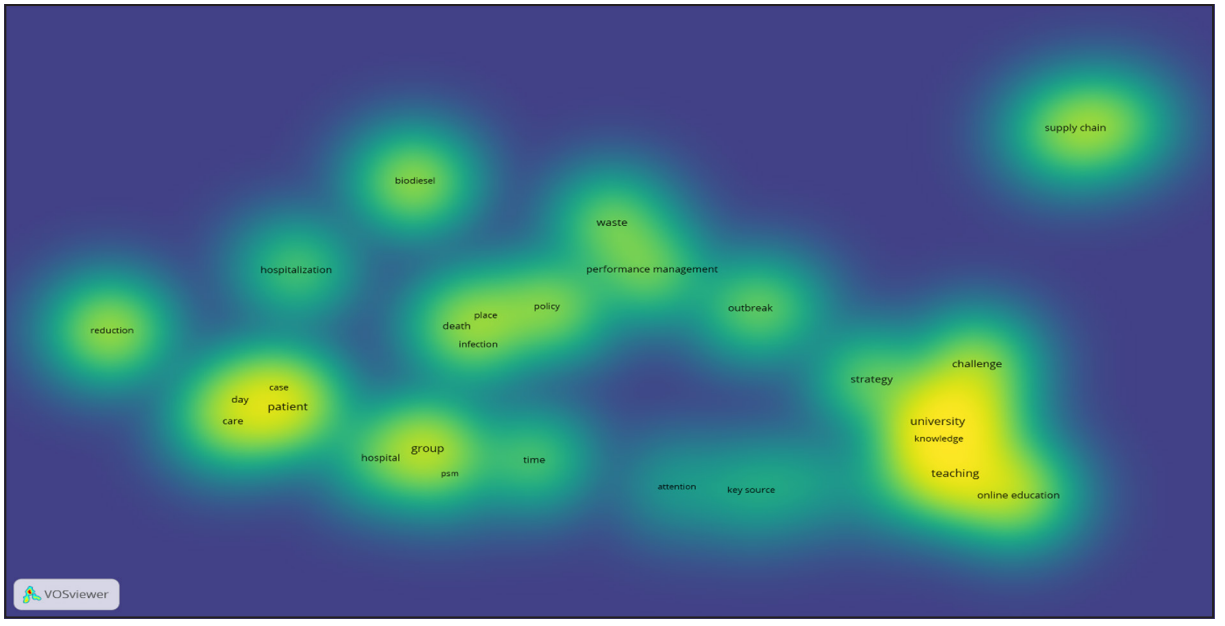

Figure 2. Density visualization on VOSviewer map

Source: Own research

The hospital environment is also addressed in Cluster 4 but from a different perspective. Literature using terms included in this cluster is analysing the economic burden of a specific disease (Zhong et al., 2021).

In respect to Cluster 5, by one side, this literature addresses the waste treatment to reduce respiratory diseases. Santana et al. (2021) use data from environmental cost accounting to conclude on how clean production of biofuel from waste cooking oil can support cities to have sales of excess biodiesel, carbon credits, and glycerine, and fuel acquisition savings. On another side, the solid waste management resulting from the COVID-19 pandemic procedures implemented is analysed. Based on the waste management accounting systems, Ragazzi et al. (2020) concluded that, contrary to expectations, single-use masks and gloves do not have a significant impact on waste management. Instead, the dispersion of abandoned masks and gloves outside indoor environments creates a significant cost on collecting it and environmental costs.

Finally, Cluster 6 respects the discussion on how the measures implemented by States in regards to the COVID-19 pandemic affected the supply chains, and how accounting information can have a role in this problem. Scholars contribute to disseminating the importance of accounting management information as an input to mitigate supply chain uncertainties in times of crisis, in case organizations can align the accounting information flows with the supply chain activity flows (Velayutham et al., 2021).

5. FUTURE RESEARCH DIRECTIONS

The study provides text mining techniques method for reviewing the literature. It could be replicated in the next years in order to identify trends in research in management accounting in respect to COVID-19 pandemic challenges. Based on the identification of the themes addressed in the studies published until 2021, this study allows for concluding on gaps in management accounting issues that should be addressed by scholars in future research.

6. CONCLUSION

The present study unveiled the main clusters of knowledge produced until 2021 in regards to management accounting in the context of the COVID-19 pandemic. Six clusters were identified: education (Cluster 1), performance management (Cluster 2), patient care (Cluster 3), hospitality time (Cluster 4), waste management (Cluster 5), and supply chain (Cluster 6).

The number of publications in 2020 and 2021 is 25, which is a low number. Considering the role that this discipline can play in supporting decisions in an uncertain moment, it was expected that scholars have been producing more contributions to practice. In fact, the decision on the health and protection equipment to use or supply chain can have an important impact on waste to be managed and sustainability of organizations, when delivering products to clients.

Facing this, like many other challenges, this study highlights the need of conducting scientific research in this field to respond to these challenges but also to address other topics not yet published in the literature.

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Trends in the Financial Research: A Critical Analysis and Review of the Literature Published during COVID-19 Pandemic

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Abstract: *Financial theory encompasses several financial domains, as management, budgeting, or investing. Over time, different topics have been addressed in financial policies in different countries, which were followed by academics. During the COVID-19 pandemic, specific crisis-related issues have been addressed to contribute to the financial dimensions of individuals and companies. In order to map the literature addressing financial issues and to locate the research topics in content and time, this study conducts an automated computer analysis of the bibliometric data addressing financial issues related to the COVID-19 pandemic. The analysis provides empirical evidence of the main research channels and the topics receiving the most attention in 2020.*

1. INTRODUCTION

The COVID-19 pandemic has entailed health, economic and social emergency, making companies to be challenged day after day due to uncertainty in public policies in the jurisdictions they operate. Specific markets were especially affected, like tourism or culture (Aburumman, 2020).

Public, nonprofit and for-profit sectors responded to this crisis in different ways, but specially through financial-related decisions (M. R. C. Santos & Dias, 2021). These included, among others, freezing discretionary spending, delaying capital expenditures and routine maintenance, or tapping on endowment (Maher et al., 2020). Those were responses to the decrease of clients, but also the lack of human resources to maintain regular activity. Nonetheless, human resources expenses and other fixed costs are maintained, creating constraints in cash flow.

Thus, financial indicators of companies may have been drastically affected by this pandemic. Additionally, specific financial information may be required by stakeholders, especially investors who have specific interests in the financial indicators of the firm due to their impact on the capital invested, raising risks similar to other sectors (M. Santos & Laureano, 2021; M. R. C. Santos et al., 2021). Considering these challenges, it is relevant to understand how the academy is contributing to the knowledge on financial-related issues to support companies during the COVID-19 pandemic, as well as similar crises. In this sense, the financial field would benefit from mapping the COVID-19 related research conducted in this field.

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2. LITERATURE REVIEW

The review of literature has been made for decades using manual resources. In fact, systematic reviews were time-consuming and costly. The fact that the number of papers is increasing year after year, makes the current volume of data in science too big for traditional systematic literature review. Recent studies show that computer-assisted techniques can strongly support researchers in conducting reviews of a massive number of papers and provide relevant and validated insights in academic literature (Feng et al., 2018).

This technique was already been applied to the financial field (Pejić Bach et al., 2019). Text mining and machine learning algorithms proved to be useful for studying investor sentiment analysis (Wang, n.d.) or for detecting fraud in financial statements (Singh Yadav & Sora, 2021). Those previous studies provide support for applying this technique in reviewing the literature on financial issues covering COVID-19 pandemic-related issues.

3. METHODOLOGY

In order to analyse literature, the Scopus database was used for collecting bibliometric data of literature published by academics, following similar studies' methodology (M. R. C. Santos et al., 2020). The following research query was applied:

(TITLE-ABS-KEY ("2019-nCoV" OR "COVID-19" OR "Coronavirus Disease 2019" OR "Novel Coronavirus Pneumonia" OR "NCP" OR "2019 novel coronavirus" OR "SARS-CoV-2" OR "2019 Novel Coronavirus Diseases" OR "novel coronavirus" OR "pneumonia" AND TITLE-ABS-KEY ("financial")) AND (LIMIT-TO (PUBYEAR , 2020)).

The search returned 1,922 documents indexed in the referred database, which includes the type of documents listed in Table 1.

Table 1. Absolute frequency of data by document type

Document type	Absolute frequency
Article	1230
Review	198
Note	164
Letter	110
Conference Paper	109
Editorial	71
Short Survey	21
Erratum	7
Conference Review	5
Data Paper	3
Book	2
Book Chapter	2

Source: Own research

The data analysis includes qualitative and quantitative methods. On one hand, bibliometric indicators are analysed through descriptive statistics, and content analysis is applied to analyze the text included in the abstract of the articles. The quantitative analysis focused on the typology of

access to the publications and the number of citations per document (Modak et al., 2020). The patterns of the publications during the first year of the COVID-19 pandemic are unveiled.

The text mining technique will be applied to the terms included in the title of the documents in the dataset. VOSviewer algorithm will be used for this purpose, which will allow not only to group terms into clusters but also visualize the co-word map (Santos & Laureano, 2021; van Eck & Waltman, 2010; Verma & Gustafsson, 2020). The mapping provides the view of the network of the terms most cited in the dataset (i.e., in the document's title) and the strength of the links between those terms (Shah et al., 2019). The co-occurrence of the terms applies to the 60% of most significant terms that occurred more than 10 times in the dataset.

4. RESULTS

The publications addressing financial issues were cited 26,174 times, meaning that on average each study was used as a reference in 14 studies, a significant number in a few months. In the dataset, 553 publications received null citations, which is a significant percentage (28%).

The text mining analysis through VOSviewer revealed that the terms applied in research addressing financial issues are grouped in 7 clusters, as shown in Figure 1.

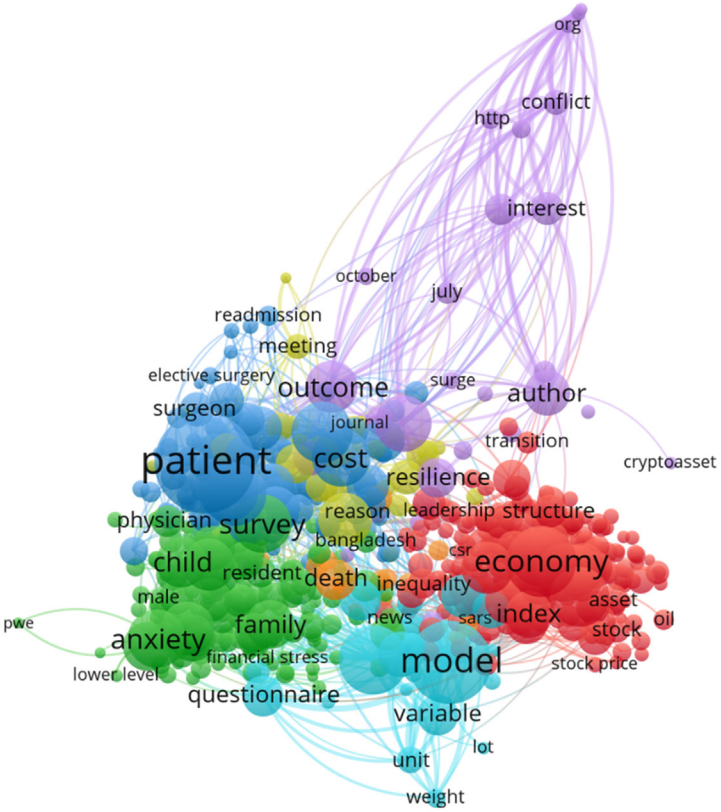

Figure 1. Label view of VOSviewer co-occurrence map

Source: Own research

The data analysis unveils seven clusters within the literature on financial issues: market economy (Cluster 1), health (Cluster 2), treatments (Cluster 3), educational financial burden (Cluster 4), workers resilience (Cluster 5), financial models (cluster 6), and deaths financial (cluster 7). Table 2 lists the most frequent terms in each cluster and each term's number of occurrences.

Table 2. Cluster's characterization

Cluster	Most frequent terms	Number of occurrences	Cluster	Most frequent terms	Number of occurrences
Cluster #1:	Economy	331	Cluster #5	Work	206
	Market	232		Outcome	177
	Industry	225		Author	138
	Sector	221		Resilience	100
	Company	183		May	84
	China	181		Interest	75
	Index	144		Volume	69
	Bank	138		January	56
	Investment	132		Conflict	44
	Value	128		Document	37
Cluster #2	Survey	228	Cluster #6	Model	447
	Anxiety	226		Factor	319
	Stress	193		Organization	141
	Participant	174		Environment	120
	Child	169		Questionnaire	111
	Depression	162		Variable	110
	Family	160		Safety	109
	Mental health	151		Performance	93
	Respondent	133		Unit	49
	Fear	130		Extent	46
Cluster #3	Patient	653	Cluster #7	Death	109
	Care	266		December	47
	Hospital	254		Doctor	32
	Treatment	231		Accuracy	31
	Cost	228		Bed	31
	Sars Cov	147		Hypothesis	31
	Day	144		Dataset	29
	Procedure	132		Prediction	27
	Reduction	123		Algorithm	26
	Review	119		France	23
Cluster #4	Student	192			
	Facility	102			
	University	79			
	Assessment	73			
	Team	66			
	School	65			
	Member	58			
	Face	54			
	Financial burden	52			
	Learning	52			

Source: Own research

Cluster 1 includes studies market-related in which payments and banking operational are analysed in light of the financial market alterations (Korobeynikova et al., 2020; Nguyen, 2020).

Other authors focus on how financial conditions impacted health. These studies are covered by terms in clusters 2, 3, and 7. In this spectrum, authors evaluated the level of resilience, stress, anxiety and depression as a consequence of different factors, namely families fearing experiencing significant financial burden following the pandemic (Barzilay et al., 2020). In this regard, (Nelson & Kaminsky, 2020) proved that threats to the financial security of families have contributed to the intensification of dark emotional conditions.

The financial burden felt by university students is particularly focused on cluster 4, in which academics contribute to demonstrating implications in mental health and performance of university students, and recommend policies to be implemented by State for providing specific support for this community, namely in Bangladesh (Islam et al., 2020), Taiwan (Shyu et al., 2020) and Malaysia (Sundarasen et al., 2020).

The impact of business outcomes is explored in clusters 5 and 6. The authors focus on niches of organizations, like small businesses (Bartik et al., 2020) or local organizations (Akhter-Khan & Wai, 2020).

5. FUTURE RESEARCH DIRECTIONS

Considering that the COVID-19 pandemic will last for years, this literature review should be complemented by papers published during 2021, as well as the following years. The coverage of the contributions on financial issues will provide practitioners and academics with best practices to face a similar crisis in the future.

6. CONCLUSION

This study provides a map of the literature addressing financial issues during the year 2020. The methodology applied allowed to locate the research topics through automated computer analysis to the bibliometric data addressing financial issues related to the COVID-19 pandemic.

The systematic review conducted to examples of the themes addressed by academy contributes for financial dimensions of individuals and companies, namely highlighting in which studies they practitioners can find best practices. For academics, the results of the present study identify gaps in knowledge that should be addressed in future research.

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The Impact of the Pandemic on the Level of Financial Literacy of Technical University Newcomers

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Abstract: *Financial literacy is one of the key competencies for life in modern 21st-century society. Several studies show that education plays an important role in raising the level of financial literacy and economic awareness. It is the consistency and continuity in education that positively influence an individual's financial competence. However, recent years have been influenced by the anti-pandemic measures in connection with the COVID-19 disease. These measures have also had a significant impact on education particularly, in the transition to distance online education. In this paper, the authors focus on the level of financial literacy of university students coming out of long-term distance education. The authors have applied the questionnaire survey method in the research. The research uses the personal finance index as a proxy for measuring financial literacy. The authors compare the results obtained with those from the pre-COVID period using statistical methods. This approach then allows concluding the impact of the move to distance learning on levels of financial literacy.*

1. INTRODUCTION

A sufficient level of financial literacy is becoming an increasingly important part of the competencies of a modern person living in the 21st century. This has been confirmed by the beginning of the new millennium. It brought dynamic development of new technologies and the associated development of new financial instruments on the one hand, but also several financial shocks on the other.

Let us note, for example, the collapse of Enron, which held more than $60 billion in assets, involved one of the biggest bankruptcy filings in the history of the United States. It has ruined many American retirees.

Another major crisis of the early millennium was the insolvency of the investment bank Lehman Brothers. This event escalated to bring the global economy to the brink of collapse. Immediately following the bankruptcy filing, an already distressed financial market began a period of extreme volatility. The fall of Lehman also had a strong effect on small private investors such as bondholders. The ensuing crisis was responsible for the failure of dozens of other banks, a sharp drop in the stock market, and a decline in real estate prices. It hit the car industry, the health sector and the energy industry. Unemployment and homelessness increased both in the US and worldwide.

In the last two years, our lives have been significantly affected by the COVID-19 pandemic. The significant impact of this pandemic can be seen in all areas of life, not just financially. The continuous adoption of new anti-pandemic measures, the repeated long-term lockdowns have

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affected all areas of the economy. They have resulted in a fall in production, and not a few businesses have gone bankrupt. Many people have lost their jobs, especially in the service sector, and insolvency has risen significantly. The governments of the various countries have prepared many support and help programmes for both companies and the population. It is not easy to navigate these programmes and decide on the most appropriate form of assistance.

These events underline the growing need for financial literacy. Without this competence, it is impossible to ensure financial stability throughout life. Many incorrect decisions can have devastating consequences in the long term.

These events underline the growing need for financial literacy. Without this competence, it is impossible to ensure financial stability throughout life. Many incorrect decisions can have devastating consequences in the long term. It should also be mentioned that many financial decisions have to be made at a young age when people do not have enough experience. This places demands on effective financial education and the promotion of financial literacy. The education sector has also been significantly affected by the pandemic. In particular, it brought long-term online distance learning. During the waves of the pandemic so far, schools have been closed for practically a year and a half, with short breaks. Distance education brings with it problems such as the availability of Internet connections, the possibilities of simultaneous connections in large families and, last but not least, the passivity and only formal participation of students in the classroom. Such experiences led us to formulate the research hypothesis:

Hypothesis one: There was a deterioration in the level of financial literacy during distance education.

Thus, this study aimed to verify the state of financial literacy of newly entering students in universities after the COVID period. In doing so, we focused on management students, who can be assumed to be more closely related to the issue mentioned above.

Our observations from previous research, published for example in (Kozubik et al., 2019), have shown unevenness in the level of knowledge in different areas of financial literacy. Thus, it is reasonable to expect that the eventual variation in achievement will not be the same across single functional areas. This leads us to formulate the hypothesis:

Hypothesis two: Changes in financial literacy levels are non-uniformly distributed across functional areas.

2. LITERATURE SURVEY

Financial literacy is generally perceived intuitively as the ability to understand finances. However, there are several more or less complex definitions of financial literacy in the literature. Kim (2001) gives a very simple definition: *Financial literacy is the basic knowledge that people need in order to survive in modern society.* Mandel (2008) provides a more sophisticated definition that incorporates a reference to finance. He defines financial literacy as *The ability to evaluate new and complex financial instruments and make informed judgments about both: choices of instruments and extent of use that would be in their own best long-run interests.* Giesler & Veresiu (2014) define financial literacy as *The ability to understand how money works in the world: how someone manages to earn or make it, how that person manages it, how he/she invests it*

(turn it into more) and how that person donates it to help others. More specifically, it refers to the set of skills and knowledge that allows an individual to make informed and effective decisions through their understanding of finances. Lusardi & Mitchell (2014) gave a more exact definition of financial literacy as the knowledge of basic financial concepts needed to make rational financial decisions regarding saving, investing, taking out loans and insurance. To measure financial literacy among adults, the OECD/INFE developed the definition: *Financial literacy is a combination of awareness, knowledge, skill, attitude, and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well-being. (Atkinson & Messy, 2012).* The PISA Financial Literacy Assessment Framework OECD (2019) refines the definition used for adults to make it relevant for 15-year-old students: *Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life.*

Several international studies confirm the positive impact of financial education on the growth of financial literacy. For example, Fornero & Monticone (2011) confirmed that the most important factor influencing the differences in financial literacy is the level of attained education. Similarly, Lusardi & Mitchell (2007) state: *Worldwide financial education has become an important tool to surmount the growing complexity of financial decisions, especially in the life of the last generation*. The positive impact of financial education on the level of financial literacy was also confirmed by a study (Kozubíková Z., 2017). Moreover, it has been detected that: *An important factor influencing the progress in financial literacy during education is the importance that the respondents attribute to the financial literacy.*

Ansong (2011) pays special attention to the group of university freshmen. The average result in this survey was only 35.7%, and the maximum success rate was 75% correct answers. Similar results were obtained by (Avard et al., 2005). In their sample, first-year college students achieved an average success rate of 34.8%, and the best result was at 80%. Similarly, a study by (Chen & Volpe, 1998) also confirmed lower levels of financial literacy in lower-class rank college students. The level of financial literacy of young people in the V4 countries is the focus of the work (Szafrańska, 2019). In particular, this study showed a difference between the level of financial literacy in large cities and rural settlements.

A study (Kozubík et al., 2017) has shown that the importance of financial literacy perceived by the respondents is a significant factor influencing the level of financial literacy. Therefore, we also focused on changes in the importance students attach to financial literacy. The series of lockdowns brought several existential challenges to many families. In many cases, this involved job loss or forced enterprise closures. Addressing such difficulties has the potential to promote an awareness of the importance of financial literacy and building financial reserves to ensure well-being in the future. Therefore, we formulated a research hypothesis:

Hypothesis three: There was an increased awareness of the importance of financial literacy.

The confirmation of this hypothesis could contribute to some compensation for the shortcomings associated with impersonal distance education, which requires a dose of personal involvement and activity on the part of the learner.

3. METHODOLOGY

Our research is based on data that have been collected through a questionnaire survey. For comparison purposes, we conducted two phases of the survey. The first survey was conducted in autumn 2019, before the onset of the COVID pandemic. The second round of data collection took place in 2021, immediately after the new students started their first year. Both surveys focused on the freshmen at the Faculty of Management and Informatics of the University of Žilina. For maximum objectivity of comparison, an identical questionnaire was used in both rounds of the survey.

The knowledge testing part of the questionnaire consisted of 30 multiple-choice questions. Respondents entered the answers as a choice of four options, one of which was correct, and one option was the "I don't know" option. Besides the knowledge questions, the questionnaire contained questions concerned with socio-demographic data such as age, gender, education, the residence.

We used the personal finance index (P-Fin index) as a measure of financial literacy. Lusardi, Yakoboski, & Oggero (2017) have introduced this measure and they designed the P-Fin index to cover the eight functional areas of financial literacy that an individual commonly encounters in managing personal finances. These areas are:

Functional area 1: Earnings, determinants of wages and income.
Functional area 2: Consuming, budgeting and spending.
Functional area 3: Saving, comprehension the accumulation factors.
Functional area 4: Investing, understanding the types and risks of investments.
Functional area 5: Borrowing and debt management.
Functional area 6: Risk management, comprehension of the uncertain outcomes.
Functional area 7: Insurance and the understanding of coverages.
Functional area 8: Accessing and working with information sources.

For the purpose of our research, we interpret the resulting P-Fin index as the percentage success rate of responses. Similarly, we consider each functional area of financial literacy as the percentage of correct answers from that issue.

An important factor influencing financial literacy is the rating of its importance. In the questionnaire, respondents were asked to rate the importance of financial literacy on a scale of 0 to 10. We then tested the significance of the change using a statistical test.

We will evaluate the obtained data using statistical methods. Namely, we use two-sample tests of statistical hypotheses for the equality of random selection characteristics. All calculations were performed using the statistical programming environment R.

4. RESULTS

In the first round of the survey, we have distributed in total 300 questionnaires. After removing incompletely or maliciously completed questionnaires, we obtained a sample size of 245 respondents. The response rate of the questionnaires corresponds to a level of 81.67%. In the second round, we distributed 180 questionnaires. After removing incomplete answer sheets, we get a sample size of 149 respondents. The corresponding response rate was 82.78%. Due to the

technical focus of the faculty's study programs, our samples are gender imbalanced. However, their structure corresponds to the gender representation among the faculty's students.

The descriptive characteristics of each sample are presented in Table 1. One can observe here a very slight shift towards higher success rates in favour of newly arrived students in the post-COVID period. The calculated characteristics show a greater concentration of results around the mean. However, mentioned shift is not very significant, what is confirmed by the Welsch ttest for equality of means. The result of this test is the content of Table 2. As we can see, one can reject the hypothesis of equality of mean percentages with an insufficient confidence level below 75%.

Table 1. Descriptive statistics of the P-Fin scores of both samples before and after the COVID period separately

	Min.	1st Quartile	Median	Mean	3rd Quartile	Max
Before COVID	0.10	0.40	0.47	0.48	0.56	0.90
Post COVID	0.20	0.40	0.50	0.49	0.57	0.80

Source: Own elaboration

Table 2. Results of the two-sample Welch's t-test for the means of P-Fin indices before and after the COVID pandemic period

	Mean	*t*-statistics	*p*-value
Before COVID	48.01%	-0.60377	0.2732
After COVID	48.81%		

Source: Own elaboration

It is interesting to look at changes in the level of financial literacy by gender. Table 3 presents a statistically significant increase for males. The corresponding p-value shows that we can reject the hypothesis of equality of means at the 95 confidence level. In contrast, we cannot reject such a hypothesis for females, as documented in Table 4.

Table 3. Results of the two-sample Welch's t-test for the means of P-Fin indices before and after COVID pandemic period performed for men

	Mean	*t*-statistics	*p*-value
Before COVID	49.40%	-1.6091	0.05474
After COVID	52.04%		

Source: Own elaboration

Table 4. Results of the two-sample Welch's t-test for the means of P-Fin indices before and after COVID pandemic period performed for women

	Mean	*t*-statistics	*p*-value
Before COVID	44.78%	0.16978	0.4327
After COVID	44.44%		

Source: Own elaboration

Table 5. Results of the two-sample Welch's t-test for the means of percentages in the functional area of earnings, determinants of wages and income

	Mean	*t*-statistics	*p*-value
Before COVID	43.46%	-1.9554	0.02572
After COVID	48.14%		

Source: Own elaboration

To obtain a more detailed look at changes in financial literacy level, we compared percentages rates in each functional area. It turns out that there was an increase in the area of earnings, determinants of wages and income, as illustrated in Table 5. In this case, we reject the hypothesis of equality of the straddles at the 97.5% confidence level.

The second area where there has been an increase in financial literacy is investing, understanding the types and risks of investments. As Table 6 shows, the hypothesis of equality of means can be rejected in this case with a confidence level exceeding 97%.

Table 6. Results of the two-sample Welch's t-test for the means of percentages in the functional area of investing, understanding the types and risks of investments

	Mean	***t*-statistics**	***p*-value**
Before COVID	33.65%	-1.9062	0.02873
After COVID	38.34%		

Source: Own elaboration

For the other functional areas, the resulting average success rates are roughly equal. There was a more significant decline in the knowledge of approximately two percentage points in two functional areas. The first of them is the category of saving, understanding the accumulation factors. The second area is insurance and understanding of coverages. However, these declines allow rejecting the hypotheses only at a confidence level of around 80%.

The results of the assessment of the importance of financial literacy are summarised in Table 7. It is easily visible there is a statistically significant increase in the rating of the importance of financial literacy. We can reject the null hypothesis of equality of average rating with a confidence level exceeding 99%.

Table 7. Results of the two-sample Welch's t-test for the average importance rating of financial literacy.

	Mean	***t*-statistics**	***p*-value**
Before COVID	8.211	-3.4331	0.0003
After COVID	8.757		

Source: Own elaboration

5. DISCUSSION

The survey results of first-year students did not confirm our expectations that there has been a decline in financial literacy under the impact of the pandemic measures and the reduction of face-to-face teaching. On the contrary, the average success rate in answering the survey questions increased slightly. However, this difference is not statistically significant. We can therefore conclude that our hypothesis one has not been confirmed.

Looking more closely at the non-descriptive statistics of the obtained sample, we see an increase in the level of the weakest outcome. The worst performance in the pre-COVID period was only10%, while it increased to 20% for students coming after the COVID waves.

A more detailed analysis we obtained looked in more detail at the individual functional areas of financial literacy. Positive changes in attainment are particularly evident in areas that relate to everyday life. It was reflected particularly in the issues linked to dealing with earnings, wages

and incomes. The second set of questions where there was an increase in attainment was on questions relating to investments. Both of these areas were strongly affected by the crisis triggered by the spread of COVID-19. One can explain this result by the influence of the family environment. As a result of the significant restriction of movement, the young people were in deeper contact with their parents and thus more closely exposed to their approaches to solving financial problems. Here we should emphasise that in many cases, these were difficult decisions and situations, the existence of which they had not previously been familiar.

Compared to this result, we observed a slight decline in those areas of financial literacy that require higher doses of numeracy. Specifically, these are also exponential growth laws when analysing the accumulation factor. The second area is insurance, which in turn requires elements of probabilistic thinking. Thus, the synergistic effect of the shortfall in the education of other disciplines has manifested itself here. These findings confirmed hypothesis two about the uneven and ambiguous impact of the anti-pandemic period on different areas of financial literacy.

The survey outcomes affirmed that students have begun to feel more strongly about the importance of being financially literate after the pandemic crisis. This result is a confirmation of hypothesis three. A shift in the assessment of the importance of financial literacy represents a positive result. Based on the results published in (Kozubik et al., 2017), it is a prerequisite for greater effectiveness in financial education.

The fact that people had to overcome an extraordinary situation can be identified as the reason for the observed developments. They have thus undergone a process that was unimaginable to most of them. Coping with this emergency forced people to give up their desire for immediate welfare. Instead, they had to deal with issues of deferred prosperity. These developments affected almost the entire population, not excluding the younger age groups. Therefore, increased intrinsic motivation of students could be expected as a result of which the effectiveness of education could be enhanced.

6. FUTURE RESEARCH DIRECTIONS

Currently, we can observe the onset of the next wave of COVID-19 diseases. Although most governments declare their willingness not to interrupt teaching in schools, a further shift to distance learning cannot be ruled out. Thus, by continuing the survey, it will be possible to verify the maintenance of the observed trend. Alternatively, it may be possible to identify limits for substitution of systematic education by taking on experience in the family. Further research aims to identify other predictors of financial literacy such as numeracy, measures of cognitive reflection or measures of anxiety and self-efficacy. There is a need to compare these characteristics and analyse their changes in online distance education.

In addition to the newly rising tide of disease, we are also facing the onset of an energy crisis and massive general price rises. The impact of this economic crisis determines the next possible direction of research. It would aim to confirm a deeper awareness of the importance of financial literacy and its consequent increase.

7. CONCLUSION

The article presents the results of the research based on the personal finance index that is recently developed as an innovative measure of knowledge. Our research came to the surprising result

that switching to distance education did not negatively affect the overall level of financial literacy. Overall, however, the results are erratic. While overall performance improved in areas of routine decision making, there was a deterioration in fields that require the interaction of multiple disciplines. The vital role of the family, which continues to play an essential role in education, was demonstrated. Taking on experience from those older and more experienced helped to compensate for gaps in learning. A model built based on the identified predictors makes it possible to find ways to enforce better financial literacy and which interventions, on the other hand, do not have a longer-term effect on improving the level of financial literacy and economic education.

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Bankruptcy Prediction: The Case of the Czech Republic and Slovakia

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Keywords:
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Abstract: *A considerable number of publications accompanies the research topic of bankruptcy prediction. This has been motivated by the massive toll on SMEs caused by the global crisis of 2007-2009, the recent COVID-19 crisis and the resulting need to update indicators of SME failure. This paper focuses on the Czech and Slovak economies, specifically at small and medium-sized enterprises (SMEs).*

This article aims to find if different factors could predict bankruptcy for Czech and Slovak companies. There were investigated 574 Czech companies and 889 Slovak companies for the period 2010 – 2018. The resulting findings confirm conclusions of the last year's literature review. It is most appropriate to construct a financial distress model for a given country or a group of countries with similar characteristics or neighbouring countries. Furthermore, it is advisable to exploit common used financial indicators with a combination of modified indicators to assess the probability of bankruptcy precisely.

1. INTRODUCTION

Predicting bankruptcy and quantifying credit risk is the subject of interest of many studies, scientific articles, and publications. Academics and practitioners have focused their research on improving the performance of existing bankruptcy models, and they are still developing new models and methods to precisely predict business failure. The abundance of bankruptcy prediction models gives rise to the idea that these models are not in compliance with the market's changing business conditions and do not meet the increasing complexity of business tasks.

This article aims to find if different factors could predict bankruptcy for Czech and Slovak companies. This paper focuses on SMEs because they are reasonably considered the most crucial economic segment in many countries. For OECD members, the percentage of SMEs out of the total number of firms is higher than 97%. Thanks to their simple structure, they can respond quickly to changing economic conditions and meet local customers' needs, sometimes growing into large and powerful corporations or failing within a short time of the firm's inception.
Considering the research objective, the following hypothesis was set: H1: Indicators used in the financial distress model for Czech companies differ from Slovak companies.

2. THEORETICAL FRAMEWORK

After performing the scientific literature analysis, it was identified that various scientists who have studied bankruptcy prediction models under different perspectives still could not indicate the most reliable model as a brief preview of the history can observe it. Many authors during the last fifty years have examined several possibilities to predict default or business failure. The seminal works in this field were Beaver in 1967 and Altman in 1968. Altman's model has been applied successfully in many studies worldwide concerning the subjects of capital structure

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and strategic management, investment decisions, asset and credit risk estimation and financial failure of publicly traded companies (Lifschutz and Jacobi, 2010).

For many years after that, MDA was the prevalent method applied to the default prediction models. Many authors used it; for example, very often cited in the research literature is the Taffler model developed in Great Britain in 1977 (Taffler, 1982). Inka Neumaierova and Ivan Neumaier have developed another MDA model in 1995, known as IN95. This model was constructed especially for the Czech market and was updated in the following years. (Neumaierova and Neumaier, 2005). Considering these MDAs' problems, Ohlson (1980), for the first time, applied the conditional logit model to the default prediction's study. The practical benefits of logit methodology are that they do not require the restrictive assumptions of MDA and allow working with disproportional samples. After Ohlson, most of the academic literature used logit models to predict default. Next, a very often cited model, which uses conditional probability, is a model by Mark E. Zmijewski (Zmijewski, 1984). He was the pioneer in applying probit analysis to predict default but, until now, logit analysis has given better results in this field. A probit approach is the same as the logit approach; the difference is only the distribution of random variables.

Nowadays, a prevalent topic is creating a model for a specific country or industry and selecting an appropriate method for creating the model and its comparison with other methods, whether traditional or artificial intelligence methods. The relating theme for the prediction of bankruptcy for a particular country or a particular industry, the authors aim to prove that a model developed for a given macroeconomic environment or a given industry of a specific country has better predictive power than a universal model, which has been proven in many studies. Each country has its specificities, different economic environment, and different stages of economic development, which must be taken into account when developing a model. Research on country-specific bankruptcy prediction or comparison of bankruptcy models of different countries has been published by, for example, Kovacova et al. 2019, Kliestik et al. 2020, Ninh et al. 2018. These studies have shown that it is most appropriate to construct a bankruptcy model for a given country or a group of countries with similar characteristics or neighbouring countries. It is also necessary to consider the affiliation to the specific industry in which the firms under study are located. Studies dealing with industry-specific bankruptcy models in order to build the most accurate model predicting the possibility of bankruptcy within a given industry have been published, e.g. Fedorova et al. 2016, Karas and Reznakova 2017, Alaka et al. 2015.

Another common feature of this research stream is the prediction models constructed for a given country and specifically for a particular segment - the SME segment, or separately for micro-enterprises, small enterprises, and medium-sized enterprises. According to research by Altman et al. 2020 and Gupta et al. 2018, models constructed for a specific enterprise segment increase the accuracy of bankruptcy prediction. Thus, the result of this stream of research is that models built specifically for a given industry, a given country or a given segment exhibit higher predictive power than so-called universal models. Comparisons of the predictive power of traditional bankruptcy prediction methods and so-called modern methods, or artificial intelligence methods, are among the most frequent publications on the topic of bankruptcy prediction. Many authors only compare the predictive ability of selected methods to prove that a particular selected method has a higher predictive ability than another. Traditional methods, i.e. discriminant analysis and logistic regression, are often compared with artificial intelligence (AI) methods. Most authors try to prove that AI methods have better predictive power than traditional methods. The criticism of traditional models is addressed in studies such as Alaka et al., 2018.

Overall, no method is significantly better than the other selected methods concerning the defined criteria. The study of Alaka et al. guides selecting the most appropriate method to best suit the current situation, the size of the data and the outputs expected by the modeller. (Alaka et al., 2018)

3. METHODOLOGY AND DATA

Data for the bankruptcy model creation was obtained from the Orbis database. Separately active companies were downloaded in one file and companies with status – bankruptcy, in liquidation, dissolved, dissolved – in liquidation and liquidation in the other file. For the construction of the 1-year bankruptcy model, only the statements one year before bankruptcy were left. The data has been further adjusted to contain only non-financial companies, and companies with unwanted industry codes have been sorted out. Finally, the dataset consists of 574 Czech SMEs that survived in 2010 – 2018, out of which 283 companies failed in this period and 889 Slovak SMEs that survived 2010 – 2018, out of which 436 failed in this period as shown in Table 1.

Table 1. Database sorting

	Healthy	Bankrupt	Total
Czech Republic	291	283	574
Slovakia	453	436	889

Source: Own processing

Table 2. List of financial indicators

Group	Coding	Formula
Profitability	EBIT/A	EBIT/Assets
	EAT/A	EAT/Assets
	EAT/E	EAT/Equity
	EAT/S	EAT/Sales
	EBIT/S	EBIT/Sales
Activity	S/A	Sales/Assets
	S/CA	Sales/Current Assets
	REC.TURN	Receivables*365/Sales
	PAY.TURN	Payables*365/Sales
Liquidity	CURR.A/ST.DEBT	Current Assets/Short-term Liabilities
	QUICK.R	Current Assets-Stocks/Short-term Liabilities
	CASH.R	Cash resources/Short-term Liabilities
	NCR	Working Capital-Stocks/Daily operating expenses (No Credit Interval)
	WC/A	Working Capital/Assets
	WC/S	Working Capital/Sales
	WC/E	Working Capital/Equity
Indebtedness	L/A	Liabilities/Assets
	L/E	Liabilities/Equity
	E/A	Equity/Assets
	ST.L/A	Short-term Liabilities/Assets
	LT.L/E	Long-term Liabilities/Equity
Others	CURR.A./A	Current Assets/Assets
	CASH/A	Cash resources/Assets
	EQ.R.	Registered Capital/Assets

Source: Own processing

The basis for the selection of indicators for the bankruptcy model are the classic financial indicators analysis supplemented by indicators from the study of Bellovary, Giacomino and Akers (2007). The authors have analysed more than 150 bankruptcy models; among other things, they examined the most commonly used indicators in the known bankruptcy models. Based on this study and knowledge of the financial analysis indicators, it was selected twenty-four financial indicators were divided into profitability, activity, liquidity, indebtedness, and others (see table 2).

4. MODEL SPECIFICATIONS

Logistic regression is the appropriate regression analysis to conduct when the dependent variable is dichotomous (binary). Logistic regression is used to describe data and explain the relationship between one dependent binary variable and one or more nominal, ordinal, interval or ratio-level independent variables. The dependent variable should be dichotomous (e.g. in our case, bankrupt or non-bankrupt companies). There should be no outliers in the data, no high correlations (multicollinearity) among the predictors. Tabachnick et al. (2007) suggest that the assumption is met as long correlation coefficients among independent variables are less than 0.90. The variables with correlations of more than 0,60 were removed. Mathematically, logistic regression estimates a multiple linear regression function, in our case defined as:

$$p = \frac{exp^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots \beta_n X_n)}}{1 + exp^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots \beta_n X_n)}} \quad (1)$$

$$\beta = \beta_1 EBIT/A + \beta_2 EAT/A + \beta_3 EAT/E + \beta_4 EAT/S + \beta_5 EBIT/S + \beta_6 S/A + \beta_7 S/CA + \beta_8 REC.TURN + \beta_9 PAY.TURN + \beta_{10} CURR.A/ST.DEBT + \beta_{11} QUICK.R + \beta_{12} CASH.R + \beta_{13} NCR + \beta_{14} WC/A + \beta_{15} WC/S + \beta_{16} WC/E + \beta_{17} L/A + \beta_{15} L/E + \beta_{19} E/A + \beta_{20} ST.L/A + \beta_{21} LT.L/E + \beta_{22} CURR.A/A + \beta_{23} CASH/A + \beta_{24} REG.C./A \quad (2)$$

$$p = \frac{exp^{(\alpha+\beta)}}{1+exp^{(\alpha+\beta)}} \quad (3)$$

5. RESULTS AND DISCUSSION

Data from Czech and Slovakian companies were tested separately. The dataset for the Czech Republic is named as CZ dataset, and the dataset for Slovakian companies is named the SK dataset. Variables mentioned in Table 2 entered into logistic regression with results mentioned in Table 3.

Table 3. Variables predicting the bankruptcy of manufacturing companies, commercial companies and the whole dataset

Group	Coding	CZ dataset	SK dataset
Profitability	EBIT/A	-1,557***	
	EAT/A		-4,635***
	EAT/E	0,112**	
Activity	S/A		-0,116***
	REC.TURN	0,003**	0,001*
	PAY.TURN	0,004**	0,002***
Liquidity	QUICK.R	0,013***	
	CASH.R		0,060***
	WC/E	0,125**	
Indebtedness	L/A	0,101**	
	LT.L/E	-0,212**	-0,172*
Others	CASH/A		0,731**
	EQ.R.	0,589***	1,537***
Constant		-0,783***	-0,336*
Predictability		**80,1%**	**84,4%**

Note: ***, **, * mean 1%, 5% and 10% level of significance.

Source: Own processing in IBMSPSS

The predictability of the models confirmed it through the ROC curve in the column "predictability" and is very satisfying. Based on the results, although it may seem that firms in each country show very few similar characteristics predictive of bankruptcy, the opposite is true. Looking closer at the indicators that proved to be significant, we find that they are very similar. The ROA indicator is significant for both countries in the CZ dataset is significant with EAT and in SK dataset is significant with EBIT. Liquidity is also significant in both datasets, with the only difference that QUICK.R as the quick ratio is significant in the CZ dataset and CASH. R. as cash ratio is significant in the SK dataset. The differences are in ROE, sales turnover, total indebtedness, and working capital/equity and cash/assets indicators. The significant result is that no significance shows an indicator of total indebtedness which is often used and proves his significance in many scientific studies, for example, in models of prof. Altman, in Ohlson´s model, Zmijewski model, Kováčová et al. 2019, Klieštik et al. 2020 etc., Khadelmoqorani et al. 2015. The same situation is with sales turnover, which shows no importance in the CZ dataset or SK dataset but is used in models of prof. Altman, Taffler´s model, IN 05 model and in scientific studies Fedorova et al. 2016, Kováčová et al. 2019, Klieštik et al. 2020, Khadelmoqorani et al. 2015.

Finally, it is not possible to claim that this result confirms the stated hypothesis. Used indicators are not the same but really do not differ; they are similar. This result can be seen in table 3. It could be caused by the similarity of the nations that have been one country for many years, and results achieved confirm findings of last years literature review. It is appropriate to construct a bankruptcy model for a specific country or a group of countries with similar characteristics or neighbouring countries.

6. CONCLUSION

This study analysed if there are various factors to predict bankruptcy for the Czech and Slovak SME's. The financial data for the years from 2010 to 2018 were investigated. Each dataset was analysed separately to capture different characteristics of companies. Based on the study of Bellovary et al. 2007 and knowledge of the financial analysis indicators, twenty-four financial indicators were divided into profitability, activity, liquidity, indebtedness, and others.

The predictability of the models was confirmed through the ROC curve with 80,1% predictability for the CZ dataset and 84,4% predictability for the SK dataset. A total of thirteen variables were significant, and only five were present in only one of the datasets analysed. Based on the results, although it may seem that firms in each country show very few similar characteristics predictive of bankruptcy, the opposite is true. Looking closer at the indicators that proved to be significant, we find that they are very similar.

The comparison of all models shows the five most important indicators used often when analysing a company's financial situation. They are ROA like indicator EAT/A and EBIT/A, receivable turnover like indicator REC.TURN, payable turnover like indicator PAY.TURN, liquidity like indicator QUICK.R and CASH.R and long-term liabilities/equity-like indicator LT.L/E. These findings can not claim that this result confirms the stated hypothesis. Used indicators are not the same but really do not differ; they are similar. It could be caused by the similarity of the nations that have been one country for many years. It is therefore not possible to confirm or reject the hypothesis. Based on the results obtained, it can be concluded that when a financial distress model is developed, it is necessary to classify companies according to similar criteria and to take into account, for example, the similarity of different nations. It is appropriate to construct a bankruptcy model for a specific country or a group of countries with similar characteristics or neighbouring countries.

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Crowdfunding European Game Campaigns – Evidence from 2017 Kickstarter Projects

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Abstract: *Crowdfunding is widely recognized as an innovative financing form. It is highly popular with companies and individuals who seek financial support from local and global sources with Kickstarter.com being the most popular reward-based crowdfunding platform. In 2017, with 26 percent most of the crowdfunding money was obtained by projects from the game category (where ca. 45 percent of all campaigns were funded). The objective of this study is to determine factors influencing the success of European projects from the game category on the reward-based crowdfunding platform Kickstarter.com in 2017. The findings show that setting a lower, rather than a higher, funding goal increases the probability to receive more funds. Similarly, fundraisers who communicate interactively with the crowd and keep their supporters updated, e.g. about the progress of their campaigns, new developed game features and rewards, face a higher probability to reach the pre-specified funding goal. The most important determinant is, however, represented by (pre-)selling and offering products such as tabletop games, playing cards or video games as rewards. Such initiatives increase the chances for success by up to 18 percent. Our results are relevant for individuals, founders, and innovative companies intending to initiate a game campaign on Kickstarter.com in Europe.*

1. INTRODUCTION

Crowdfunding is recognized as a flexible and useful financing option for companies and individuals to raise money. Founders, innovative companies or start-up firms who seek financial support to implement their campaigns can easily contact potential supporters (the crowd) from around the world through online platforms (Nucciarelli et al., 2017, Galkiewicz & Galkiewicz, 2018; Kromidha & Robson, 2016). Crowdfunding is a particularly interesting financing option in times of crisis where capital supply is limited due to uncertainty or whenever project initiators want to overcome existing business structures to reach their fans, supporters and customers directly as is the case in the game or music industry (Chitsazan & Bagheri, 2019; Nucciarelli et al., 2017, Kuti & Madarász, 2014).

The most prominent reward-based crowdfunding platform in the world is Kickstarter.com. Since its launch in 2009, more than 100,000 campaigns have been successfully funded and approximately $5.5 billion were pledged to project initiators from backers (Kickstarter.com, 2021a). The year 2017 was best for Kickstarter.com, because for the first time 37 percent of all projects were funded, which was 5 percent more than the year before, and the amount of money pledged increased to USD 601 million (Bidaux, 2018). Three categories, namely Design, Games and Technology gained altogether 74 percent of all the money pledged in 2017 (Bidaux, 2018).

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With 26 percent of the amount pledged (over USD 160 million) projects from the game category obtained the highest amount of money (Bidaux, 2018; Jensen & Özkil, 2018; Lolli, 2019). Given the success story of game projects, however, the success factors in this industry are not adequately researched. Thus, this study aims to extend our knowledge about factors influencing the success of European projects from the game category on the reward-based crowdfunding platform Kickstarter.com in 2017 for the first time.

This study investigates 269 successful and unsuccessful game campaigns launched in Europe on Kickstarter.com in the year 2017 and documents drivers making European projects in the game category more successful in obtaining money on a reward-based crowdfunding platform. Irrespective of the sums pledged for projects, still 2 out of 3 campaigns fail to reach the funding goal and do not get any funding as Kickstarter.com follows the All-or-Nothing rule (Chitsazan & Bagheri, 2019; Galkiewicz & Galkiewicz, 2018; Mollick, 2014). There are only a few studies, e.g. Cha, 2017, Lolli, 2019; Szopik-Depczyńska et al., 2020; Tyni, 2020, examining the success factors in the game category, even though this category is one of the most popular ones and has the most money pledged. Therefore, the results of the study may help founders, innovative companies, and individuals to increase the probability of getting a game project funded.

The rest of the article is organized as follows. Section 2 provides the Game category background and a literature overview, while in section 3 the data and methodology are described. The discussion of the empirical results is provided in section 4. Section 5 concludes the study.

2. BACKGROUND AND LITERATURE

Crowdfunding was recognized by scientists before it became an effective way to seek public financial support via online platforms for innovative ideas and projects initiated by firms and individuals. The game category has been growing rapidly over several years (e.g. Szopik-Depczyńska et al., 2020). For example, a crowdfunding campaign launched with the goal to reintroduce the video game series "Shenmue", which was highly unsuccessful until then, ended with a funding of over $6 million in 2017 (Lolli, 2019). This was the highest funding ever realized in the game category until then. Several studies are indicating the success factors of crowdfunding campaigns in general, but only a few studies investigate the game category by focusing on video games (Lolli, 2019; Szopik-Depczyńska et al., 2020; Tyni, 2020). This is why our research aims to clarify: What are the determinants of successful European game campaigns on Kickstarter.com in the year 2017?

In the last decade, several scientists investigated project quality signals from founders that are effectively increasing the probability of crowdfunding success. The goal of project quality signaling is to mitigate the information asymmetry preexisting between campaign initiators/insiders having more information on their projects than potential supporters/outsiders providing external financing (Cosh et al., 2009; Belleflamme et al., 2014). The most common success factors highlighted in the crowdfunding literature are: a lower funding goal level (e.g. Crosetto and Regner, 2014); Frydrych et al., 2014; Cordova and Gianfrate, 2015; Patel and Devaraj, 2016 and Barbi and Bigelli, 2017; Forbes and Schaefer, 2017; a shorter duration of a crowdfunding campaign (e.g. Frydrych et al., 2014), presentation of a video (e.g. Kuppuswamy and Bayus, 2013, Barbi and Bigelli, 2017), the number of rewards and their type/quality (e.g. Kuppuswamy and Bayus, 2013 and Barbi and Bigelli, 2017), and number of backed projects by the entrepreneur (e.g. Zvilichovsky, Inbar and Barzilay, 2013 and Koch and Siering, 2015).

The traditional game industry offering playing cards, tabletop games and puzzles exists for a longer time than the video game industry developing since the 1970s. The latter reached an annual revenue peak in 1982 with USD 8 billion surpassing the size of the pop music and Hollywood movies combined at this time. Nowadays, the game industry has a value of over USD 200 billion and is approaching a mature phase regarding concentration and integration. Traditionally, a developer produces video games, a publisher is responsible for their launch and a retailer for the distribution of games. The digital distribution channels allow creators to circumvent publishers and retailers and sell their products to the end-users or/and to collect money for pre-selling games or for finishing the production of games and distributing them (i.e. reaching the funding goal = success). In reward-based crowdfunding supporters fund projects in exchange for the primary outcome, i.e. a product or service, and each reward level attracts a different group of investors (Kuppuswamy and Bayus (2013) and Barbi and Bigelli (2017)). Furthermore, founders can price discriminate against different groups (Crosetto and Regner (2014). Thus, offering product pre-selling is the key as supporters are incentivized by the product that they will receive. In the case of the Game industry the products are especially attractive for a wide range of individuals and family members, because they mostly consist of tabletop, live, video or mobile games besides playing cards and puzzles.

Ex-ante one would expect visual elements to be more important for a game's presentation as the product is the convincing factor than for an average campaign. For example, a study by Cha (2017) investigating factors that influence successful crowdfunding of video game campaigns shows that teams initiating a game campaign have a higher chance to succeed than individuals. In addition, videos, static images, and a higher number of animated graphics on video games increase the probability of crowdfunding success. Moreover, having a higher number of animated graphics or videos, which are familiar to video games, is more important than having static images or audio recordings (Cha, 2017; Colombo et al., 2015).

3. DATA AND METHODOLOGY

This study focuses on factors increasing the probability of successful funding for projects stemming from the game category on the reward-based crowdfunding platform Kickstarter.com in 2017. For the purposes of the study, a sample of 269 campaigns launched in Europe is analyzed. The game category consists of the subcategories: Video Games, Tabletop Games, Playing Cards, Live Games, Gaming Hardware, Mobile Games, Games, and Puzzles. The investigated campaigns have a starting date beginning on the 05. January 2017 with the 27. December 2017 being the latest starting date of a 3-days campaign. The dependent variable is a dummy variable called successful_dv and takes the value 1, if the funding amount reaches or surpasses the level of the funding goal, or 0 otherwise. In the latter case the campaign is failed, because the funding is smaller than the funding goal and no money will be transferred to the project initiators (All-or-Nothing rule). Various factors might influence a crowdfunding campaign's success, for instance, the duration of the project, the pre-specified funding goal, the type of support such as gift, service or product, the number of rewards, the number of FAQs, the number of comments, the number of updates, the length of text description, the number of campaigns launched or supported by the project initiator beforehand.

All these variables will be added to the model in a stepwise fashion and their economic impact is measured by studying their marginal effects from logit and probit regressions. Studying the coefficients would only allow learning about the direction of the impact. The changes in pseudo

R-squared further indicate whether the explanatory power of the model increased after new factors are added to the regression. The first regression only analyzes the effect of funding goal (ln) on the success of a crowdfunding campaign. The logarithm is taken as the funding goal amounts vary to a high degree, thus, to minimize the impact of outliers. Next, the variables containing the information about pre-set campaign characteristics like duration, the type of rewards, the number of rewards, text description length in words, no. of photos, video inclusion and the length of video are added. The third regression includes variables related to communication during the campaign such as the number of FAQ, project updates and comments. The fourth regression incorporates details about project initiators, for instance, whether the project initiator launched an own campaign beforehand or supported other campaigns and gender (the variable women_dv indicates that the project initiator is a woman) besides whether the project has been launched by a team or individual person (team_dv). The findings are further compared to results obtained from probit regression, i.e. in both cases the margins will be analyzed in order to enable a numeric interpretation of the effect the variables have on the success of a crowdfunding campaign and to further check whether the choice of analysis method impacts the results (Wooldridge, 2013).

According to Figure 1, 83 out of 269 crowdfunding campaigns are successfully funded. In other words, 30.86 percent of all campaigns in the game category reach their funding goal, while 186 (69.14 percent) campaigns fail to do so in 2017. Less than one-third of the prepared campaigns succeeded, hence it remains crucial to study enhancing factors.

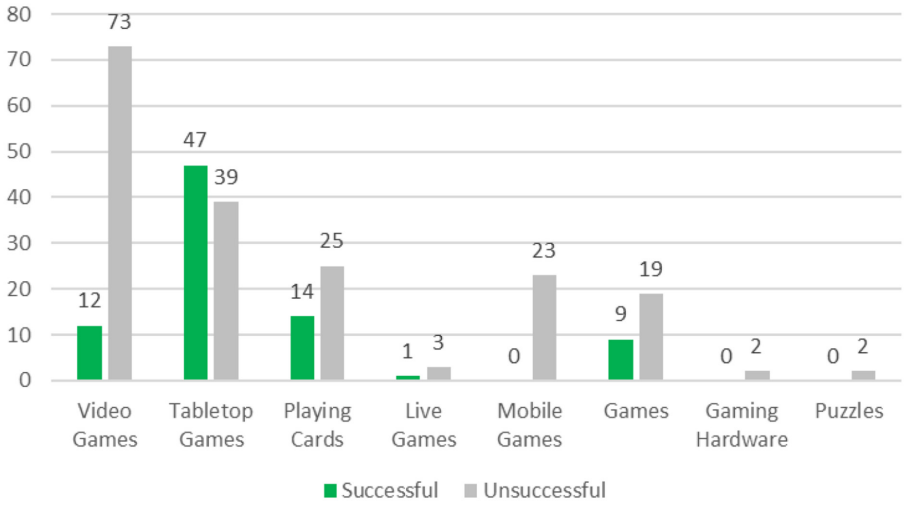

Figure 1. Overview of the Number of Successful vs. Unsuccessful Projects by Subcategory
Source: Own research

Table 1 lists all variables used in the study together with a summary of descriptive statistics (including the number of observations, the mean, the median/p50, the standard deviation of each variable as well as the minimum and the maximum values). The average and median funding goal in the game category equals 20,817.33 EUR and 6,500.00 EUR, respectively, with a minimum amount required of 30.00 EUR and a maximum set to 750,000.00 EUR in the year 2017. The actual funding, however, shows a mean and median of 11,053.00 EUR and 647.00 EUR up to a maximum of 391,228.00 EUR. Especially, when comparing the median amounts of funding goal with the funding in Table 2, a large discrepancy becomes visible indicating that many campaigns fail to reach the required amounts of money to a high degree. For variables that exhibit a high degree of variation the median figures become more important than the mean affected by outlier observations.

Interestingly, the duration variable shows that most of the campaigns have a pre-set collection period of around 30 days, while Kickstarter.com restricts the duration to a maximum of 60 days (the shortest campaign lasted for 3 days). In addition, the project initiators offer to the supporter on average (in median) 8 (7) rewards which coincide with recommendations from McLaughlin, 2016 for at least 8, but less than 12 reward options. As further shown in Table 1, the initiators also regularly update their campaign information, while frequently asked questions (FAQ) only rarely need to be answered.

Table 1. Descriptive Statistics

Variable	N	sd	min	p25	mean	p50	p75	max
Successful (dv)	269	0.4627559	0	0	0.3085502	0	1	1
Funding in EUR	269	38678.98	0	60	11053.18	647	5192	391228
Funding goal in EUR	269	59593.23	30	1800	20817.33	6500	19000	750000
Funding (ln)	269	3.266667	0	4.094345	6.146603	6.472346	8.554874	12.87705
Funding goal (ln)	269	1.840762	3.401197	7.495542	8.536341	8.779557	9.852194	13.52783
Funding per supporter (ln)	269	1.364985	0	2.730029	3.082975	3.459835	3.920558	6.331578
No of rewards	250	4.80306	1	5	8.164	7	11	28
Supporters (number)	269	817.8738	0	3	240.7361	21	118	6427
Supporters (ln)	269	2.238069	0	1.098612	3.063628	3.044523	4.770685	8.768263
Duration in days	269	9.818666	3	30	32.32342	30	33	60
No of FAQ	253	5.607792	0	0	1.454545	0	0	75
No of comments	253	406.8336	0	0	94.66798	3	35	5411
No of team members	233	1.86163	1	1	1.935622	1	2	19
No of photos	249	28.62091	0	3	18.97189	13	27	378
No of updates	253	13.53361	0	0	8.711462	2	11	75
Video (dv)	250	0.4498996	0	0	0.72	1	1	1
Video length in sec.	249	1907.009	0	0	349.6145	88	181	27840
Length of text in words	248	889.2332	1	188.5	810.2056	445	1179.5	3974
Launched own (dv)	231	4.040553	0	0	1.852814	0	2	23
Supported others (dv)	250	32.97653	0	0	12.388	0	5	287
Team (dv)	269	0.4984023	0	0	0.4498141	0	1	1
Women (dv)	269	0.4435635	0	0	0.267658	0	1	1

Source: Own research

4. RESULTS

Table 2 subdivides the sample into campaigns that are successful and marked by 1 versus unsuccessful 0. In the group of successful campaigns, a median funding goal of 4000 EUR to maximally 150,000 EUR can be observed, while unsuccessful projects show a median funding goal of 9574.5 EUR up to 750,000 EUR. In the first group, the final funding amount exhibits a median of 10,000 EUR and a maximum of 391,228 EUR surpassing on average the pre-set funding goals. Unsuccessful projects only reach a median of 141 EUR and a maximum of 108,453 EUR, thus, potentially missing the pre-set funding requirements to a high degree.

Regarding the other variables, the table shows that the number of supporters and potentially interested parties asking questions through the FAQ section or commenting is in median (up to the 3rd quartile) much lower in the group of failed projects. This indicates a lack of interest of the crowd in interaction and communication.

Table 2. Compact Table of Summary Statistics Conditioned by the Success Variable

	Variable	N	sd	min	p25	mean	p50	p75	max
successful dv									
=0	Successful (dv)	186	9216.638	0	20	2210.96	141	1247	108453.8
	Funding in EUR	186	69790.95	50	2000	25356.84	9574.5	20000	750000
	Funding goal in EUR	186	2.921324	0	2.995732	4.818851	4.945708	7.128496	11.59408
	Funding (ln)	186	1.82468	3.912023	7.600903	8.780321	9.166828	9.903487	13.52783
	Funding goal (ln)	186	1.472055	0	2.302585	2.736527	3.14733	3.723305	6.331578
	Funding per supporter (ln)	186	56.85586	0	10	33.65963	23.27385	41.40102	562.0427
	No of rewards	167	4.358493	1	4	7.45509	6	10	21
	Supporters (number)	186	186.634	0	2	45.79032	7	29	2298
	Supporters (ln)	186	1.743302	0	0.6931472	2.082324	1.94591	3.367296	7.739794
	Duration in days	186	10.79737	7	30	33.71505	30	33	60
	No of FAQ	170	1.804045	0	0	0.5529412	0	0	11
	No of comments	170	32.42518	0	0	9.817647	0	4	291
	No of team members	157	1.412451	1	1	1.726115	1	2	7
	No of photos	166	31.50676	0	1	15.60843	10	24	378
	No of updates	170	3.502672	0	0	2.058824	1	2	22
	Video (dv)	167	0.4480839	0	0	0.7245509	1	1	1
	Video length in sec.	166	2179.807	0	0	324.5964	85	161	27840
	Length of text in words	166	831.1905	1	164	752.4819	396	1101	3609
	Launched own (dv)	152	2.63724	0	0	1.157895	0	1	17
	Supported others (dv)	167	24.51899	0	0	6.922156	0	2	163
	Team (dv)	186	0.4929023	0	0	0.4086022	0	1	1
	Women (dv)	186	0.4445413	0	0	0.2688172	0	1	1
successful dv									
=1	Successful (dv)	83	64211.79	115	3348	30868.27	10000	28217	391228
	Funding in EUR	83	21596.77	30	750	10644.46	4000	10000	150000
	Funding goal in EUR	83	1.631689	4.744932	8.116118	9.122048	9.21034	10.24768	12.87705
	Funding (ln)	83	1.767797	3.401197	6.620073	7.989591	8.294049	9.21034	11.91839
	Funding goal (ln)	83	0.5641089	1.832582	3.510265	3.859354	3.844004	4.242328	4.913984
	Funding per supporter (ln)	83	29.72435	6.25	33.45714	54.88658	46.71212	69.56962	136.1809
	No of rewards	83	5.339764	1	6	9.590361	9	11	28
	Supporters (number)	83	1352.128	6	79	677.6024	154	703	6427
	Supporters (ln)	83	1.56047	1.791759	4.369448	5.262694	5.036952	6.555357	8.768263
	Duration in days	83	6.150072	3	29	29.20482	30	31	48
	No of FAQ	83	9.208605	0	0	3.301205	0	3	75
	No of comments	83	678.9605	0	19	268.4578	80	199	5411
	No of team members	76	2.507812	1	1	2.368421	1.5	3	19
	No of photos	83	20.28019	0	11	25.6988	20	38	105
	No of updates	83	16.05955	0	10	22.33735	21	32	75
	Video (dv)	83	0.4561269	0	0	0.7108434	1	1	1
	Video length in sec.	83	1197.452	0	0	399.6506	101	198	8578
	Length of text in words	82	991.5945	1	298	927.061	561.5	1332	3974
	Launched own (dv)	79	5.650223	0	0	3.189873	1	3	23
	Supported others (dv)	83	43.6102	0	0	23.38554	4	30	287
	Team (dv)	83	0.5012473	0	0	0.5421687	1	1	1
	Women (dv)	83	0.4440484	0	0	0.2650602	0	1	1

Source: Own research

The Pearson correlation tests for the existence of a statistically significant relationship of the variables of interest and reaching success in the game category as shown in Table 3. It is used to pre-test the statistical relationship between two variables concerning potential direction and strength. For a perfect negative linear relationship, the coefficient takes on a value of -1 and for a perfect positive linear relationship +1 with zero describing no relationship between two variables. Regarding the strength, we observe either a small correlation with coefficient values between 0.1 to 0.3, a moderate correlation for coefficient values ranging between 0.3 to 0.5, or a strong correlation for coefficient values greater than 0.5 (Pearson, 1985).

Table 3. Pearson Correlation (Statistical Significance Indicated at a 5 Percent Level)

	Successful (dv)			Successful (dv)
Successful (dv)	1		**No of photos**	0.1665*
	269			249
Funding goal in EUR	-0.1142		**Video (dv)**	-0.0144
	269			250
Duration in days	-0.2126*		**Video lengt in sec.**	0.0186
	269			249
No. of rewards	0.2098*		**Length of text in words**	0.0925
	250			248
Product_dv	0.1479*		**No of updates**	0.7049*
	267			253
Supporters (number)	0.2356*		**No of comments**	0.2991*
	250			253
Launched own (dv)	0.2391*		**No of FAQ**	0.2306*
	231			253
Team (dv)	0.1240*		**Women (dv)**	-0.0039
	269			269

Source: Own research

As can be seen in Table 3, most of the variables are statistically significant at the 5 percent confidence level when correlated with the success of a crowdfunding campaign, except for the funding goal amount, inclusion of women, inclusion of a video, its length in seconds and the text length in words. A strong correlation between the success of a campaign and an increasing number of updates is identified.

Table 4 reports the marginal probabilities of logit regressions for successful campaigns (success_dv), evaluating dummy variables when switching from 0 to 1 and all independent variables at their means, which are provided in Table 1. In all five specifications, a higher funding goal (i.e. if the average funding goal (ln) of 6.14 increases by 1 from 2909 EUR to 7883 EUR) decreases the chances for success by around 5 percent across all specifications. The inclusion of additional variables describing project characteristics and communication leads to an increase in pseudo R-squared from 0.0319 to 0.657 in the third specification, thus, almost two-thirds of the variation in the dependent variable can be explained by the included variables.

Even though many variables seem to be correlated with successfully reaching the funding goal by a campaign, our research shows that 4 factors are leading to an increase of the success rate in the game category: a lower logarithm of funding goal and a higher number of updates at 1 percent significance level and a higher number of rewards, and especially offering a product rather than a gift shows statistical significance at a 5 percent level.

The number of rewards offered and especially their type also has a significant impact. Providing two more reward options as compared to the average of 8, increases the probability to succeed by ca. 1.5 percent, which is of rather low economic importance. The type of offered rewards is crucial for the success of the campaign. Offering a product like a tabletop game, playing cards or a video game instead of a service or gift increase the probability of success by ca. 18 percent as shown in specification 4 and 5 explaining more than 65 percent of the variation in the suc-

cess variable. Finally, the number of updates positively influences a crowdfunding campaign's success. Including five more updates as compared to the average update number of 8 increases the success probability by ca. 10 percent. Interacting with the interested crowd through regular updates on new developed features based on feedback from the crowd, the offered rewards and the general progress increases the probability of success considerably. Qualitatively and quantitatively comparable results are also obtained in probit regressions as can be seen in column 5 of Table 4. Hence, an appealing product and interactive communication with the crowd are keys to the success of game projects. Our results are in line with existing research. For example, Forbes & Schaefer (2017) suggest keeping the funding goal to a low amount, where the profit margin is reduced to a minimum because in this way the number of funders and amounts pledged by them can potentially be increased. In addition, to avoid misunderstandings and reach optimal results, the number of reward options should be limited to 12, but not smaller than 8 (Forbes & Schaefer, 2017). Xu et al., 2014 analyzed a sample of 8,529 campaigns from the Kickstarter.com platform and found that keeping the crowd updated on, e.g. the progress of the campaign and offering new rewards, increase the chances for success. Those initiators, who communicate through updates, were in 58.7 percent of the successful campaign launches versus 32.6 percent being successful without using the update mechanism. The communication between campaign owners and potential funders during the campaign increases the probability of successful crowdfunding (Koch & Siering, 2015, Rossi and Vismara (2018)). Finally, the crowdfunding platform offers a digital distribution channel allowing game creators to circumvent publishers and retailers depending on the video game type, thus, (pre-)selling products incentivizes supporters (Kuppuswamy and Bayus, 2013 and Barbi and Bigelli, 2017).

Table 4. Results of the Logit and Probit Regressions Indicating Marginal Effects and Significance at a 1, 5 and 10 Percent Level

Regression Type	**Logit**	**Logit**	**Logit**	**Logit**	**Probit**
Dep. Variable	**Successful (dv)**	**Successful (dv)**	**Successful (dv)**	**Successful (dv)**	**Successful (dv)**
Column	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Funding goal (ln)	-0.0484***	-0.0804***	-0.0451***	-0.0528***	-0.0520***
Duration in days		-0.0117***	-0.0026	-0.003	-0.0029
Product (dv)		0.0818	0.1033	0.1869**	0.1856**
No of rewards		0.0210***	0.0067*	0.0079**	0.0076*
Length of text in words		0	0	0	0
Video (dv)		0.0354	-0.0369	-0.0575	-0.0601
Video lengt in sec.		0	0	0	0
No of photos		0.0022**	-0.0009	-0.001	-0.0013
No of FAQ			0.0022	0.0008	0.0002
No of updates			0.0212***	0.0204***	0.0210***
No of comments			0.0001	0.0002	0.0002
Supported others (dv)				0.0002	0.0003
Launched own (dv)				-0.0052	-0.0052
Women (dv)				0.0089	0.0224
Team (dv)				0.0266	0.0183
N	269	245	245	226	226
Pseudo R2	0.0319	0.1806	0.657	0.6636	0.6603
Legend: * p<.1; ** p<.05 ; *** p<.01					

Source: Own research

Overall, our research shows that out of 83 successful campaigns 47 are tabletop game projects, 14 playing cards ideas and 12 video games projects with the remaining 10 belonging to the category Games and Live Games. Hence, tabletop games have the highest popularity among all offered game types in 2017 and getting them as a reward is most valuable for the crowd. Furthermore, it is crucial for project initiators to constantly interact with the potential supporters through the most direct communication channel of updates. Questions for explanations, feedback on features and further suggestions for the development of a game need to be responded to immediately and new rewards eventually added and communicated. In addition to the type of the offered game as a reward, interactive and involving communication seems to be essential for the success of a game campaign on Kickstarter.com.

5. CONCLUSION

This study aimed to identify factors leading to the success of European game projects on the worlds' most popular reward-based crowdfunding platform Kickstarter.com in the year 2017. Out of four factors, two are the dominant determinants in statistical and economical terms. For example, a highly developed tabletop game, video game, playing cards or other games offered as a product reward increases the probability of a campaign's success the most (by more than 18 percent). Surprisingly, traditional tabletop games and playing cards face a higher demand on this digital platform than video games in 2017. Involving the interested crowd during the campaign through regular updates on new developed features, the offered rewards and the general progress also significantly improves the chances for success. For game creators, reward-based crowdfunding is particularly important for overcoming existing business structures and reaching their customers directly for giving feedback and money provision for purchased games or for finishing the production of games and distributing them. Thus, a sophisticated product and interactive communication with the crowd are key factors for the success of game projects. These findings are relevant for individuals and innovative companies intending to initiate a game project in Europe on the Kickstarter.com platform.

Future research should focus on a longer sample period, more variables accounting for the quality of a project and a larger sample stemming from multiple platforms in order to identify universal funding dynamics.

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Young Consumers' Product Perception and Consumer Motivation Towards Buying Local Products

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Abstract: *An important aspect of sustainable food consumption is the consumption of local food. The concept of local food is often linked to sustainability which is gaining importance in the marketing communication of food brands since it fits in with the conscious consumption intentions of young people. In addition to studying the nature and consumer perception of local products, the study explores consumer motivations of young consumers aged 18-25 using qualitative focus group research method. Based on the results, the products that young consumers are willing and motivated to buy can be identified, and the most important trigger words can also be selected. Qualitative research methods were used to identify the most significant consumer motivation elements among young consumers.*

1. INTRODUCTION

Buying locally produced, traditional, safe, and healthy food products has recently been growing in popularity due to a new consumer trend. The young generations (Millennials and Centennials) are increasingly conscious in terms of the ethical, environmental, social and health impacts of their food (BEUC, 2020; Haugum & Grande, 2017; Kneafsey et al., 2013; Kovacs, 2020; Kovacs et al., 2021; Lendvai et al., 2021; Reich et al., 2018) and they increasingly support the local community (Feldmann & Hamm, 2015). In general, local/regional food systems (LFS) are often associated with sustainable agriculture since the LFS can be profitable, reduce economic uncertainties and increase food supply resilience (economic sustainability). It benefits society by ensuring fairness and trust, promoting well-being (social sustainability), minimising food miles, pollution and wasting (environmental sustainability), and re-socialising and re-spatializing food (Beke, 2020).

2. SUSTAINABLE FOOD PRODUCTION AND CONSUMPTION

There are several definitions of the term 'sustainable food consumption'. In our study, we focus on the definition offered by Pack et al. (2005):

- Food that is produced by lower environmental impact and higher resource efficiency.
- Favouring locally produced food over imported food.
- Diet without meat, or with reduced meat content.
- Reduced consumption of bottled beverages.
- Favouring organic products over traditionally produced foods (Vetőné, 2014, p. 3.).

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Vetőné (2014) suggests that the degree of processing and the packaging of the product can also have a significant impact on the environment. Vetőné (2014) cites the dimensions - that were summarised in a study by Erdmann et al. (1999) - which primarily determines sustainable food consumption. Table 1. summarises these four key dimensions and the related factors.

Table 1. The key dimensions of sustainable food consumption

Economic dimension	Social dimension	Health dimension	Environmental dimension
Global food security	Safe workplace	Human health	Preserving natural resources
Guaranteeing the competitiveness of businesses	International justice	Changing consumer habits	Maintaining ecological resilience
Stable and efficient markets	Strengthening and promoting consumer interests	Joy of eating	Increasing biodiversity

Source: own compilation based on Vetőné (2014) p. 3.

The focus of our research is on local products and the motives for buying local products, therefore in this study, we look at the results of international and Hungarian surveys and compare the findings concerning these focus areas.

3. CONSUMPTION PREFERENCES OF LOCAL FOOD

3.1. International consumers

In October 2018, the market research company IRI published a European Shopper Survey, on geocentric purchases and the attitudes of Millennials. 3334 Shoppers of seven European countries (Germany, France, Greece, Great Britain, Italy, the Netherlands, Spain) were surveyed. The respondents were grouped into three age groups: 18–24 years old (young Millennials), 24–34 years old (Millennials), and those over 34 years old (Generation X).

More than seven out of ten European customers prefer locally produced products. The most important factors in buying local products include support for regional producers, quality, and taste of local products. The importance of buying local products is growing in Europe, but more than half of those surveyed are hesitant to pay more for local or organic products. Generation X prefers buying local products, while young Millennials are less concerned about the product's origin and the environment, however, they are more inclined to buy international brands that they consider innovative (IRI, 2018a).

Locally produced vegetables, meats, and fruits are purchased in the largest quantities. However, Millennials mostly shop online, so the benefits associated with buying local products may be less apparent (IRI, 2018b). In 2021, localization, new supply chains, and transparency appeared among the top 10 trends in food consumption. According to the survey results, 18 per cent of the consumers are willing to pay more for eco-friendly food and beverages (IRI, 2021).

3.2. Hungarian consumers

The quantitative survey was conducted on a sample of 1,500 consumers from Hungary - representative of the population of the country. The domestic product orientation index was established, which expresses the extent to which the customer takes into account or considers it important whether the product is a local or a national product. Women, single parents (most of whom are women), and two-person couples with or without children scored higher. Clusters were also

identified in the survey, and a group of "those who like local specialties" could be identified. One-fifth of the respondents belong to the group that considers the place of origin of the products (be it Hungarian or from a local producer) and the image of the product to be important. Typically, people from the Northern Great Plain or Central Hungary belong to this group, 48 per cent of them live in one-person households, are young people, secondary school graduates, or university graduates, and 58 per cent of them are men (Malota et al., 2018). Based on the results of a survey conducted in Zala and Somogy counties in Hungary, quality and the experience with the product seem to be gaining importance for local producers (Tóth-Kaszás et al., 2017, p. 45).

In 2017/18, a national exploratory survey was conducted on a sample of 504 Hungarian people. 82.9% of the respondents (418 persons) bought local products. The highest proportions of the 'Alternative Diet Followers' respondents who buy local products are those who follow a lactose-free diet (94 people), which is 20.3% of the respondents. More than 15% of them buy high protein, milk protein-free, or vegetarian products (Barna et al., 2018). For the statement 'I buy local products because' the highest average values can be seen in answer 1.' I know where the product comes from.', 2.' I support local producers', 3.' I support local sellers (traders)', 4.' I can reduce the delivery distance of food miles', and 5.' they are natural'. The average values fall into the answer choice 'very important' in the importance scale where the Mean is between 3.7 - 4.2 (Barna et al., 2018).

95% of the 152 young people surveyed in Kaposvár, a town in Hungary, have already heard of the concept of local products, but only 50% of the respondents are fully aware of the exact meaning of the term. The majority of young people have already bought local products, and 15% of the respondents buy local products weekly or even more often. Nearly 20% of the respondents have never bought any local products. A strong proportion of non-buyers are not interested in local brand products, and 20% say it is expensive or unnecessary, respectively, and 16.8% mentioned the difficult availability of such products.

The best places to market local products were supermarkets, local markets, hypermarkets, local product stores, and finally shopping directly at the producer (Sántosi– Böröndi-Fülöp, 2014). Contrary to this result, more than 70% of the 1,000 people (18-75 years old) asked in Szente's 2014 survey considered it important, in part or in full, to be able to buy locally produced food in a specialty store (Szente, 2014). The most important criteria of local products based on the answers include 'ingredients of natural origin, health benefits, chemical and preservative-free, origin, support of local producers and sellers, the reduction of food miles, environmentally-friendly nature of products, previous positive experiences of the buyer, the free choice regarding the quantity to be purchased and the appearance'. The emotional factors include nostalgia for buying local products, having fun, recalling old times, and guilt over neglecting to buy local products.

The survey conducted among the young people of Kaposvár identified the main attitudes related to the local products. Based on the average values of the evaluation scale 1-5, the following order was formed: 1. fresh; 2. evokes homemade flavours, traditional; 3. safe, healthy; 4. increased trust; 5. environmentally-friendly (Sántosi– Böröndi-Fülöp, 2014). In the survey of Bauerné and Szűcs in 2019, the factors influencing food consumption among the students at the University of Debrecen (Hungary) were examined on a sample of 500 people where the local products received the lowest average value (3.092). The results also showed that both students who consider themselves eco-conscious or health-conscious prioritize quality over price in their food purchasing and consumption decisions. The eco-conscious students prefer local products more than the health-conscious students at the university (Bauerné – Szűcs, 2019).

3.3. Consumer beliefs and motivations

Consumer beliefs and motivations about local food can be based on different motivational elements. Former research emphasises the internal product attributes, quality, freshness, good taste (FSA, 2003, 2007; Defra, 2008) as the first place of importance. Sustainability-related motivations are the environmental, societal, economic, and personal motivations (Seyfang, 2008). Community-oriented (De Bernardi et al., 2020; Soltani et al., 2020) and animal welfare, environmental sustainability, supporting local producers (Stedman et al., 2017) are considered for some specific segments. Benefits related to health (Selfa and Qazi, 2005, Moser et al., 2011, Arsil et al., 2013) are relevant mostly for middle-aged and older generations, as well as the emotional value of food products (Choe and Kim, 2018). Hedonic motivation, e.g., culinary tourism (Soltani et al., 2020), the joy of being together, food specialty (Dedeoğlu et al., 2021) are important drivers of young generations. As consumers' purchase intention is greatly influenced not only by product awareness but also by motivations, our research aims to use qualitative research methods to measure the most significant motivational elements among young consumers.

4. METHODS

Our qualitative study was the second stage of a multi-stage research process. In this empirical study, we aim to reveal information that helps to identify the most important motivational elements of local food consumption of young consumers. The goal of our research is to explore qualitative information that helps domestic producers in product development and sales, as well as to find out what are the product associations and product attributes and the main motivators of buying local products.

In the semi-structured focus group interviews, the main topics of the guideline were the following: food consumption habits, the associations and attitudes towards local food, motivational elements of buying local food. 24 focus group interviews involving 126 young consumers were used in the theoretical sampling technique. The following filtering conditions were applied: respondents purchased local products in the past three months, they were 18+ years old, made consumption decisions. Regarding quota sampling, 50 per cent of the buyers of local food make frequent purchases, while 50 per cent buy different local food products several times per month. The ratio of male respondents was 49 per cent, while 51 per cent of the respondents were females. 50 per cent of the respondents belong to the age group 18-21, while 50 per cent of the respondents were 22-25 years old. Regarding the level of education of the respondents: 16 persons completed secondary school but did not graduate, 82 persons graduated from secondary school, and 28 persons graduated from college or university. Data collection was conducted in October 2021, partly online and face-to-face. Research data were analysed by content analysis.

5. RESULTS

5.1. Associations with local food

In the first part of the interview, we asked the participants to list the first associations they had concerning local food. There were significant differences among the participants regarding their type of residence. Over 40 per cent of the first associations were meat products and flowers among the responses of consumers who are living in the countryside. They mentioned some local brands (four local food brands on average) as well. Overall, brand awareness and the

importance of knowing the producer were found to be more important for consumers living in rural areas. The top product associations on the whole sample include fruit, vegetables, honey, sausages, pickled vegetables, eggs, syrup, pasta, and bread. In addition to these, brands that relate to childhood memories or travel-related products were mentioned. The product attribute associations include healthy, handcrafted, rural, traditional, environmental-friendly, and having high intrinsic quality. Most of the respondents have positive attitudes towards local food.

5.2. Motivational elements

Among the motivational elements, the purchase of healthy products is the most significant. Several health-related reasons can be identified, especially in the case of female respondents, who mentioned "natural ingredients" and "free-range animals". The association of fewer artificial additives and fresher ingredients is related to local foods. Local products were mentioned together with the terms "chemical-free" and "special".

More than 50 per cent of consumers living in urban areas buy local products because they find them unique, and their attitude towards local food is influenced by prestige and hedonic value. These consumers think that the concepts of the 'country of origin' and 'local' overlap, so they often use them together with the adjectives "national" and "Hungarian" in the interviews. However, for those living in the countryside, local food means that the product was produced in the vicinity of their place of residence or its narrow catchment area. Accordingly, for respondents living in urban areas, community support means buying national products and supporting the domestic (i.e., Hungarian) economy.

Emotional factors also appeared in the responses. The memories of "grandmother's food" and the atmosphere of the countryside also appeared, mostly for those living in smaller rural towns. Satisfaction also appeared among the emotional factors, especially if the producer is known or got known while making the purchase. The word cloud in Figure 1. shows the words most often mentioned by the respondents in the focus group discussions.

N=126

Figure 1. Word cloud depicting the motivational elements mentioned in the survey

Source: own compilation

High quality, uniqueness and good taste are key motivating factors for the purchase of local food, as well as the possibility of buying unique products that are not available in large stores or anywhere else. There are differences in customer motivations among respondents living in

urban and rural areas. In the case of respondents living in towns or cities, the most common trigger words included experience, nostalgia, or travel. In addition, the words "prestige" - "speciality" - "better quality" can be associated most with local foods. Freshness and healthiness could be identified in all segments as distinctive values. For respondents living in the countryside, saving money and convenient accessibility were the motivational elements, whereas the urban segments mentioned higher prices and good quality. In the case of the examined age groups and settlement types, motivational elements were different, as can be seen in Table 2.).

Table 2. Frequency of mention of main motivational elements in each segment (%)

Motivational elements	Area of residence	Age group: 18-21	Age group: 22-25
Health	Capital city	28	34
	City	24	36
	Small town/village	38	45
Experience (taste and novelty)	Capital city	38	34
	City	42	34
	Small town/village	24	28
Community, support for local producers	Capital city	18	28
	City	28	32
	Small town/village	30	34
Environmental protection	Capital city	20	24
	City	22	24
	Small town/village	18	22
Economic efficiency (favourable price, easy access, availability)	Capital city	22	24
	City	28	24
	Small town/village	42	45

N=126

Source: Own compilation

The most important consumption motivations include internal and external motivations, of which the emotional elements such as curiosity and the experience of family traditions and memories during consumption stand out. Other local product mentions, such as textiles and cosmetics, also appeared among young people who live in rural areas or often visit smaller settlements for tourism purposes. The consumption of local products is mostly related to tourism and visits to relatives who live in rural areas. Local wines might serve as a motivational element for selecting travel destinations, however, culinary tourism did not appear spontaneously in any of the respondents' mentions.

6. CONCLUSION

Our research aimed to understand the associations and consumer motivations of young age groups regarding the consumption of local products. Young respondents associated local foods with freshness. Their product perception and attitude towards local food are generally positive. Local food's freshness or purity may shape consumers' brand evaluation.

Regarding product associations related to local products, the noticeable difference among respondents living in rural and urban areas is the difference in product awareness and brand awareness. In the case of those living in small towns/villages, product awareness and the knowledge of local brands are significantly higher.

Our results have partially confirmed previous research findings: product attributes are more important than the price of the product or other attributes such as availability and the conveni-

ence of purchasing. Focus group interviews identified the experience-related and other hedonic motivational elements in the age group studied. The motivational elements related to the environmental and social aspects of sustainability seem to be only tertiary. Among the older age groups (22-25 years old), Brand love: "passionate connection with local food" was an important factor - in the case of consumers living in rural areas in a significantly higher proportion than in the case of respondents living in the capital city. The motivation for healthiness was significant in the older age groups, which is most typically associated with the naturalness, additive-free and artificial dye-free nature of foods.

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Effects of the Pandemic on the Supply Chain in the Construction Industry

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Abstract: *The present study focuses on digitalization strategies within the realm of supply chain management, wherein the focus is set on the specific economic environment of companies in the supply chain of critical infrastructure providers. Digitalization strategies are within this paper discussed concerning supply chain management and its relevance to the ongoing and influential COVID-19 crisis, where digital strategies of collaboration and management became imperative. To address the research question about the state of implementation of digital strategies within this specific industry, a qualitative empirical study was conducted. Experts from companies acting as suppliers of critical infrastructure were interviewed in an online setting regarding their own experiences with the implementation of digital strategies and according to challenges. Within the analysis of these interviews, it became obvious that digital strategies pre-crisis were only rarely implemented, with only one out of seven experts reporting about more advanced strategies. The COVID-19 crisis is described to be an accelerator regarding digitalization, although specific challenges resulting from unclear legal situations and frameworks are reported.*

1. INTRODUCTION AND SCOPE

The ongoing pandemic had strong effects not only on the overall economic development and social life but also on the management of supply chains (Sarkis, 2020; Swanson & Santamaria, 2021; Nikolopoulos et al., 2021) Especially global supply chains were severely affected by the early stages of the economic and societal lock-down, which proved to be a crucial problem for a wide variety of industries (Armani et al., 2020). The present study lies its focus on the specific field of critical infrastructure and its suppliers, as the description of the relevant state of research will explain. It is argued that, while critical infrastructure itself tends to have according to crisis management in place, the same cannot always be shown for companies within the relevant supply chain.

While new approaches towards supply chain management and supply chain risk management were established (Remko, 2020), even the contemporary environment that is less shaped by the effects of complete lockdowns still sees a variety of COVID-19-specific challenges to the management of supply chains.

The present paper seeks to provide insight towards two distinct perspectives regarding supply chain risk management in the context of the global crisis. The scope of the work is to showcase which specific challenges occur for SMEs in the field of the construction industry throughout the pandemic regarding the management of their (global and local) supply chains. Building on this initial assessment, the work further seeks to address the question, which strategies are employed by companies in this field to combat the challenges described above. Therefore, the paper

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builds on initial findings regarding the COVID-19 pandemic and its above-mentioned impact on the supply chains, while also acknowledging existing research on risk management in the field (Manuj & Mentzer, 2008; McMaster et al., 2020). However, therein rests the leading research gap addressed by the proposed publication: as typical risk management strategies, as they are described by Manhart, Summers and Blackhurst (2020) do not regard global crises with such substantial consequences as the COVID-19-pandemic, but rather crises of individual companies; it seems unclear, in how far they seem applicable to the present context. E.g., the decentralization of supply chains (Aydin et al., 2010) and a strategy aimed at building global supplier networks (Manuj & Mentzer, 2008) – as they are often already in place within the specific industry – seem to face significant limitations in the light of the current crisis. Thus, an empirical approach seems necessary to present the feasibility of different risk management strategies for addressing the contemporary supply chain challenges the construction industry is currently facing in the context of the COVID-19 crisis. Standardized expert interviews with thought and business leaders within the industry will be used to both assess the perceived extent of the crisis and the utilized supply chain risk management strategies as well as their perceived feasibility.

The leading research question of the present paper is derived from the specific challenges regarding suppliers of critical infrastructure providers. As will be shown throughout this publication both from the state of research and an empirical view, companies in this niche suffer from a lack of research: While they are partially responsible for the successful maintenance of critical infrastructure (also during a crisis), the strict frameworks that shape critical infrastructure providers are only partially applied to their supply chain partners, as they are in the focus of the present work. The research question, therefore, is formulated as follows: Which strategies of (digital) supply chain risk and crisis management do companies within the ecosystem of critical infrastructure apply and which challenges arose in this regard throughout the COVID-19 pandemic?

An overview of the state of research both on overall approaches to risk and crisis management – with a focus on digital measures – and on supply chain crisis management in the realm of critical infrastructure forms the foundation of the empirical work. Therein, a qualitative approach is employed, focusing on the expertise of managers and leaders of companies within the ecosystem of supply chain partners of critical infrastructure providers.

2. STATE OF RESEARCH

2.1. Risk and Crisis Management – an Overview

The COVID-19 pandemic not only brought about drastic medical problems and associated social consequences (Ratten, 2020, p. 503), but also lead(s) to an economic crisis (Borio, 2020, p. 2f; Nicola et al., 2020, p. 187f; van der Ploeg, 2020, p. 944), which is compared with that of 2008 in terms of its impact (Yap, 2020, p. 1ff). The crisis of 2008, as summarized by Haron and Nomran (2016, p. 462), for example, emphasized the role of working capital management - its mismanagement by many companies, according to the authors, is described as a contributory aspect of the crisis at that time. Similarly, Ramiah, Zhao, and Moosa (2014, p. 13) also explain that the management of working capital has a special role to play, especially in times of crisis, although a distinction can be made here between resilience-oriented explanations and those focusing on mismanagement or failure. In any case, the key indicators show the degree of COVID-19's impact on the economy. It is evident in the declines of key stock indices such as the Dow Jones by as much as 35%, and the price of oil - as an indicator of economic activity - is at a 21-

year low. Moreover, various countries are expecting recessions of 5% to 10% even for advanced economies (Jones, Palumbo & Brown, 2020, n.d.).

Although the current economic crisis was not triggered by management (mis)decisions, it must be critically questioned to what extent these at least play a supporting role (Cowling, Brown & Rocha, 2020, p. 2 f.). What is clear from this observation is that this crisis also poses significant challenges for many companies and sometimes ensures that bottlenecks occur in the availability of working capital. This represents a reference to two related concepts or approaches - that of risk and crisis management (Burns, Peters & Slovic, 2012, p. 660) and that of research on economic resilience (Wrigley & Dolega, 2011, p. 2337).

It also seems worth mentioning with regard to the crisis triggered by COVID-19 that it not only triggered a general economic impact (which, for example, is particularly evident in the service industry; see Stephany, Stoehr, Darius, Neuhäuser, Teutloff & Braesemann, p. 1ff), but that the management of supply chains, in particular, was threatened and affected by the crisis in many ways. Thus, the concept of resilience is clear in terms of general management. Concerning the supply chain, as Ponomarov and Holcomb (2009, p. 140) argue, the approach seems less clear to many: typically, little is understood about how the idea of resilience can be applied to supply chain management, which poses a threat to companies that rely heavily on these supply chains on the one hand and fail to fully manage them in an appropriately resilient manner on the other. Therefore, supply chain disruptions typically have serious negative impacts on both revenue and cost factors; a problem that can be avoided or at least minimized through more resilient supply chain management. Supply chain management is generally described as complex because it must involve a large majority of stakeholders-mostly, but not limited to the suppliers themselves and logistics partners. Logistics partners form the central theme of this thesis and therefore of this recommendation, but the role of suppliers themselves as potential threats or risks in the supply chain cannot be negated.

The immense relevance of supply chain resilience, especially in times of global (financial) crises, is highlighted by research on the 2008 financial crisis: Companies that were aware of the potential risks and of possible strategies to avoid or minimize them were able to build more resilient supply chains that were not limited to a small number of partners, and were thus able to ensure a secure supplier network both upstream and downstream even in times of crisis (Jüttner & Maklan, 2011, p. 246ff).

The findings addressed here lead to the emergence of new areas of responsibility or objectives for managers, particularly in times of crisis. The resilience of the company must be secured or increased (Tate, Bals & Ellram, 2018; Popa, 2013), which is also reflected in leadership tasks. Also, in order to manage working capital appropriately, appropriate leadership efforts are necessary, which ensure that the workforce is able and willing to act in line with the working capital strategy. However, this seems to be a particular challenge in times of crisis, since - as Wooten and James (2008) argue - leadership is considered particularly difficult in this context.

The context of the COVID-19 crisis also shifted the focus of overall crisis management to digital measures. Digitalization methods can be evaluated via the lens of crisis management, especially in light of the continuing COVID-19 situation.

Taneja, Pryor, Sewell, and Recuero (2014) propose that utilizing the benefits of digital solutions to address the negative consequences of corporate crises is a generally applicable strategy. This

appears to be especially true in the aftermath of the COVID-19 crisis, which witnessed a significant surge in digitization methods across several businesses. Predictions of social and economic changes in the aftermath of the current scenario are still speculative (Bühren & Schüppler, 2020).

Measures implemented by the government to combat the Corona pandemic have created significant problems for a variety of industries, including design and engineering enterprises (Neuhuber, 2020). The current scenario would be far more disastrous if not for the Internet and digital innovations of recent years (Bühren & Schüppler, 2020). Because of technological advancements and the transition to home offices, digitalization can be very beneficial in the long run (Schraml. 2020). Collaborations and meetings conducted across great distances and without face-to-face contact were once deemed troublesome and unsafe in many regions. With the transition, it became obvious that digital work tools can be successfully used and are now a part of regular working life (Bühren & Schüppler, 2013).

Looking at current studies, it is obvious that the digital transformation, in particular, is substantially altering the expectations on businesses, as seen by the introduction of new business models (Frank, Mendes, Ayala & Ghezzi, 2019). This is coupled with shifting expectations for staff competences and skills (Ley & Albert, 2003). This includes the use of digital technology and work tools, new modes of communication and collaboration, and altered, more flexible, and dynamically changing client expectations (Verbeke, Dietz & Verwaal, 2011). Leadership and management must be successful in responding to these changes through suitable measurements and incentives, i.e., enabling people to master these new difficulties and establishing a productive atmosphere to do so.

2.2. Supply Chain Crisis Management – The Perspective of Critical Infrastructure

The research work is located in the environment of the mechanical engineering industry in the German-speaking region, whereby a further restriction is made here, which is presented critically at this point. The restriction is made to those companies or sub-aspects of the mechanical engineering industry which see themselves as part of the supply chain of so-called critical infrastructure. In the following, definitions are presented that describe critical infrastructure: "The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons." (Moteff & Parfomak, 2004, p. CRS-1). This general explanation of what infrastructure means in a national economic context is further qualified when it comes to critical infrastructure. The definition presented by Moteff and Parfomak (2004, p. CRS-4) refers to the U.S. legislative directive E.O. 13010, which provides the following delineation for critical infrastructure: "certain national infrastructures are so vital that their incapacity or destruction would have a debilitating impact on the defense or economic security" (Moteff & Parfomak, 2004, p. CRS-4).

The nature of this specific sector is its great relevance, especially in the context of crises: As the above definition shows, it is the specific characteristic of organizations that can be classified as critical infrastructure that absolutely must be maintained, especially in the context of crises, since a failure would typically have devastating consequences. This research paper focuses on those companies that are part of the ecosystem of this critical infrastructure and act as suppliers for it. The aim is to investigate the extent to which these companies have implemented strategies that take into account the high systemic relevance of such infrastructure.

In this context, reference can again be made to the COVID-19 crisis, where Krebs (2020) points out that critical infrastructure seems to have been partially endangered here, in particular, due to personnel bottlenecks - caused by various lockdowns measures. This is also described by Groenewold et al. (2020) as a central challenge in the context of the pandemic, where it is pointed out that operators of critical infrastructure were consistently endangered by the absences of employees with regard to their operations. Reference can be made in this context to the concept of risk aggregation, which is addressed in the context of the COVID-19 crisis and critical infrastructure by Clark-Ginsberg, Rueda, Monken, Liu, and Chen (2020). In this regard, they refer to the fact that the pandemic itself already represents a crisis for corresponding organizations, but that other incidents or crises can occur independently of it, which must be addressed with sometimes significantly limited resources: "Maintaining critical infrastructure resilience to natural hazards during the novel coronavirus outbreak (COVID-19) is crucial yet challenging." (Clark-Ginsberg et al., 2020, p. 1). Companies in this field, the authors continue, must thus succeed in maintaining resilience even in crises, in order to be able to address even an aggregation of corresponding problem cases appropriately. The concept of resilience thus refers to one of the contemporary ways of looking at the issue: for critical infrastructure, it is assumed here that not only the active management of crises and risks - i.e., an event-driven approach - but the proactive design of a healthy, resilient, and thus resilient environment is of importance (Rød, Lange, Theocaridoi & Pursianen, 2020).

Although the literature identifies challenges especially in the context of medical care (employees are also so-called frontline workers who are particularly exposed to health risks), Galbusera et al. (2021) further explain that other sectors of critical infrastructure must also be considered accordingly: "The global escalation of the crisis forced these systems into unexplored operational conditions. Evidently, in the eye of the storm are hospitals and the healthcare sector, which in many cases are simultaneously facing high patient pressure and issues with critical supplies" (Galbusera et al., 2021, p. 105161).

Accordingly, especially in the context of the resilience of corresponding systems, which the authors also refer to as the nervous system of modern society, the corresponding ecosystem seems to be relevant. This is discussed accordingly by Trump et al. (2017) in general for large-scale incidents, where reference is made to the resilience of the system, which must be ensured not only by designated infrastructure operators themselves but also by their partners (see also Shakou, Wybo, Reniers & Boustras, 2019). Thus, if the strengths and weaknesses of critical infrastructures are to be assessed, it also seems obvious to take into account accordingly the corresponding companies that partly condition or at least can influence them (Linkov, Wenning & Kiker, 2007; Karvetski, Lambert & Linkov, 2011) Suo, Zhang and Sun (2018) further explain in this regard that there is a high degree of interdependence especially in this field: Different types of interdependence seem to be relevant here - for example, these result from the geographical arrangement, which can lead to different critical infrastructures being affected at the same time, especially in the case of (large-scale) damage, which in turn results in corresponding requirements for management. However, the functional interdependence seems to be of particular relevance for the present work: "It is due to exchanges of material and information between CIs. Under normal conditions, this type is fairly stable." (Suo, Zhang & Sun, 2018, p. 693). However, such normal conditions do not seem to exist, especially in the context of the problem to be addressed in this research.

Despite the interdependence of critical infrastructure - both in terms of other operators within this niche and in terms of external actors - research related to the supply chain of this industry seems to present few results. In this regard, reference can be made, for example, to a research paper by

Brown, Carlyle, Salmeron and Wood (2006), where it is also emphasized that the role of critical infrastructure suppliers is also insufficiently considered in practice: "Supply chains are critical to our nation's well-being despite their omission from the Department of Homeland Security (2002) list of critical infrastructure." (Brown, Carlyle, Salmeron & Wood, 2006, p. 541) Accordingly, it is precisely this supply chain that is particularly vulnerable to crises or attacks, since it is considered to be comparatively less secure and also less intensively regulated by law than the critical infrastructure itself. Its high systemic relevance thus seems to make it particularly vulnerable to targeted attacks, as the authors further emphasize (see also Nagurney & Qiang, 2008).

The focus of scientific interest is placed on that aspect of the mechanical engineering industry which is responsible for the critical infrastructure as a supplier. This specific focus is set to illustrate the particular relevance of crisis management in the industry and at the same time to focus on the specificity of the challenges. The German Federal Office of Civil Protection and Disaster Assistance describes critical infrastructure as follows: "Critical infrastructures (CRITIS) are organizations or facilities of vital importance to the state polity, the failure or impairment of which would result in sustained supply shortages, significant disruptions to public safety or other dramatic consequences." This critical infrastructure, according to the basic assumption, must therefore be available and usable without restrictions not only also, but especially in the event of a crisis, as the definition itself makes clear. This high relevance for society as a whole is used here as an opportunity to focus on those companies that are jointly responsible for operating and maintaining this infrastructure: While there seems to be a broad body of research on the preservation, importance and defense of critical infrastructure (Aradau, 2010; Brown, Carlyle, Salmeron & Wood, 2006; Rinaldi, Peerenboom & Kelly, 2001; Murray & Grubesic, 2007), this cannot be confirmed for the corresponding supply chain or the companies operating in the context of critical infrastructure. In this regard, Rinaldi et al. (2001), for example, explain that for the successful management of critical infrastructure, the interdependencies with other undertakings must also be taken into account. In addition, there is another specificity that seems to be of importance in the context of the COVID-19 pandemic and the context of large-scale incidents and (global) crises in general: While this crisis is accompanied by reports of difficulties in the (global) supply chain in many places (Sarkis, 2020; Swanson, 2021; Nikolopoulos et al., 2021), the supply chain in the area of critical infrastructure, in particular, must be established in a crisis-resistant manner or (as called for by Sarkis, 2020) in a sustainable manner even in such situations. This will be the focus of this empirical work, which will examine crisis and risk management in German companies in the environment of suppliers and maintainers of critical infrastructure (basic classification: mechanical engineering) and will address the interdependencies and potential disruptions caused by the pandemic.

3. METHODOLOGY – A QUALITATIVE STUDY

3.1. Approach

A qualitative research approach is used to address the above-mentioned study challenge. While the article builds on early findings about the COVID-19 pandemic and its impact on supply chains, it also acknowledges current risk management research (Chan, Huang, Lo, Hung, Wong & Wong, 2020). The foundation of the empirical work lies in the assumption, that the COVID-19 pandemic strongly influenced the field and the supply chain management within it. Digital measures of supply chain management, as they were briefly described within the previous sections, are considered to be among the potential solutions to addressing the challenges.

The empirical study examines the industry's current concerns in the context of the COVID-19 crisis, focusing on the digitization of supply chain logistics in the context of an ongoing crisis - with the resulting difficulties for field managers. Standardized expert interviews with industry thought and business leaders will be utilized to assess the perceived severity of the problem as well as the current supply chain risk management strategies, as well as their practicality. In general, the technique for conducting the preliminary investigation outlined here is qualitative. As a result, standardized expert interviews are employed to gather the most valid and reliable answers to the research topic posed at the outset.

As a result, the current effort is guided by a research philosophical worldview based on a constructivist understanding of reality. This worldview, which is especially common in the humanities and social sciences, is inspired by the realization that reality, as it may be grasped through scientific inquiry, is shaped not just by objective but also by subjective forces.

Because the assessment or perception of variety in the entrepreneurial and therefore operational environment is of essential (research) interest in the context of this work, it appears that this technique is appropriate for the current study. Subjective impacts are inherent to this topic, both from the standpoint of managers and from the perspective of company personnel.

A constructivist worldview appears to be an advantageous platform for tackling the research topic, following this line of thinking and hence the research philosophical approaches of, for example, Pfadenhauer and Knoblauch (2018). One of the approach tried-and-true methodologies is the expert interview, which focuses on subjective reality judgments.

The key themes of this research paper were digitization initiatives in the company's own business of logistics in the construction sector, as well as the associated and industry-wide repercussions of the COVID-19 problem. Questions posed to the experts, therefore, included – alongside the sociodemographic variables – mostly the search for information regarding their digitalization strategies, both in general – thus as a natural part of business development – and in response to the COVID-19 crisis.

The goal was to see how far the topic of digitalization is being pushed in this setting, as well as how much the COVID-19 situation - which was also examined in the context of the theoretical approach in this thesis - is having a disruptive effect.

3.2. Sampling

A total of $n = 7$ experts from various companies within the sector of the supply chain of critical infrastructure providers were interviewed. This specific industry was chosen in accordance with the specifics of the research question presented above. A strong focus was lied on identifying experts who can speak to the particular situation of supply chain (risk and crisis) management in accordance with the specific challenges of the ecosystem of critical infrastructure. As Bogner, Littig and Menz (2009) argue, it is considered to be among the main challenges of qualitative, empirical research to achieve an optimal fit between the research problem on the one hand and the particular experiences and knowledge contents of the participating individuals on the other. As the descriptive information about the experts (see below) shows, they have strong experience within their specific field and should therefore be able to present meaningful information regarding the state of supply chain crisis management within this environment These

professionals were recruited from the main researcher's professional context, resulting in a so-called convenient sampling strategy — an aspect that should be scrutinized accordingly. The participants' average age was M = 33.57 years (range from 21 to 43 years old), and their average experience in the industry was M = 9.71 years (ranging from 3 to 18 years of experience).

4. RESULTS – DIGITALIZATION IN TIMES OF THE COVID-19 CRISIS

4.1. Overall State of Digitalization

The general state of digitization in the sector was one of the key areas to be addressed in the current study. Participants were asked to evaluate how far their digitization strategies have progressed, which tools are currently being used, and how their stakeholders are reacting to these efforts.

In terms of the overall state of digitalization, four of the seven participants stated that no such strategies or tools are currently in place: they told the interviewer that digitalization efforts are not yet underway within their company, or that these strategies do not go beyond the typical use of office applications in daily workflow. While such generic apps are in use, no digitalization initiatives for supply chain management are made (I1, I4, I6, I7): "Up until now, digitalization was never an issue within our company. Of course, we do use software tools like Microsoft Word or Microsoft Excel to manage our daily business, but – I think, this is outside of the scope of what you are asking. We did not get around to implementing a more strategic approach here, however, it is something we might discuss in the future." (I4, 2021)

Building Information Management (BIM) is becoming increasingly important for his organization, according to one of the participants (I2): "It is not something we can ignore. Building Information Management is what our partners use, it is what our younger employees learned how to use. Thus, there is really no way around it, you know, even if some of our managers would prefer this, it is the future, it is even the present time for many of us." (I2, 2021)

The primary motivation for adopting this modern management technique within the area is regarded as a direct response to increased cost pressures and the hunt for more efficient methods. Here, I2 further explains, that while the general approach to these digital measures might be not very popular within his company, there is still a clear understanding of changing requirements within the ecosystem.

As I4 highlights, efficiency is described as the key force driving the digitalization of the field: "We do notice that our competition is moving fast – some seem to be able to do more with fewer resources, so this is, of course, something, we aim to implement as well." (I4, 2021).

This is also mentioned by I7, who, while not naming any digitalization efforts within his own organization, points out that efficiency might be one of the most significant benefits of a more digitalized supply chain management strategy.

I5 indicates that his organization has implemented several digitalization initiatives, but only the early stages are detailed, with no explicit mention of unique driving reasons: "We did hire outside counsel for improving our digital strategy – it is something we felt we need to drive, even before the onset of the corona, the pandemic – I don't know if this is something that got strongly implemented so far, however, while it is within my field, it is not something we actively

pursue at the moment, it is rather just something, that develops alongside the actual business development" (I5, 2021).

In response to the question of how stakeholders react to digitization initiatives in general, I5 claims that collaboration is primarily defined by legal contracts and frameworks, and that the relationship is not molded by individual reactions to strategies, but rather by a set of rules. According to I2, who informed about BIM-related digitalization activities, stakeholders such as partners largely cooperate with these efforts, but do not appear to play a driving role inside the system. I3 describes the most significant influence of digitalization on the sector, stating that numerous ways are used within his organization to boost overall efficiency. As stated by I3, techniques such as the deployment of digital twins and tracking software are utilized to increase overall efficiency and supply chain transparency: "There is really no way around utilizing these tools and frameworks, especially as our main stakeholders – all within what you labelled *critical infrastructure* at the beginning – expect a certain level of professionalism from our side. They already do use these technologies either way, so it is not fully up to us to decide whether we do as well. Still, it might be one of our USPs here, yes". (I3, 2021).

4.2. State of Digitalization in Crisis Management

The overall COVID-19 crisis is described by multiple interview partners as one of the most pressing challenges of their collaboration with critical infrastructure providers (I1, 2021; I3, 2021; I4, 2021; I5, 2021): "Of course, the situation early in spring of 2020 was a new situation for all of us. The main problem was the overall work situation itself, nobody knew how to react at all. So what did we do? We moved everything online, our whole work became digital" (I4, 2021). This is also pointed out by other interview partners (I1, 2021, I3, 2021) who explain, that at the early onset of the pandemic, there was no clear solution in sight for how to handle the changes. Of course, production and transport of goods had to continue as it did before, while a majority of service department functions moved online (I1, 2021): "It was a general problem here – most of us did not have the right infrastructure, so to speak, we did not have the right tools. Somehow you could call it a grassroots-movement, we as a company did not have the right measures in place, it was some of our younger employees who took – proactively – a leading role here, who said – we need to move this online, there is this app, there is this tool, you all have to log into it, make these accounts, push this" (I1, 2021).

I6 (2021) points out one of the core challenges he and his company encountered during the COVID-19 pandemic and the subsequently implemented government measures: "We are not critical infrastructure, at the bottom of what we do, however, we are: Legally, we are just a regular company, but when you look at our client lists, most of them are critical infrastructure. So what happened here? There were a lot of regulations in place for how to handle the pandemic – especially during the lockdowns. Who was still allowed to come to work, who had to close down? Well, those within the critical infrastructure itself had a very clear picture of all of this, they stayed open, they continued working, of course. But for us it was never specified, so we handled it in […] a grey area, one way or the other: When we got a call saying, guys, we need you to step up and provide this, deliver that, support us here, we just did. But we never really knew if what we were doing in these situations was alright from a legal point of view, so we were mostly acting in optimism". (I6, 2021). I7 (2021) points out a similar situation, explaining that the company used additional legal counsel to evaluate their optimal strategy within the lockdown situation, as some of their services are crucial for critical infrastructure, despite

being conducted by an outside company. He adds, that the situation was even more complicated as they work with freelancers and outside providers (namely, I7 mentions here third party logistics partners), whose situation seemed even more unclear in this particular constellation, he argues. Another legal issue arose from the field of data security and data privacy, I7 (2021) further points out: "It is quite easy with the collaboration of our, I will call them, regular clients – we are bound by the foundation of the current regulation, we comply with them and that is it. Before projects we agree on the software tools, we will use during the project, that's mostly it. Things are harder when we work with our hospital partners, this usually does not work: We are strictly limited regarding which software we can use and how we can handle data. This was never a challenge, we had our infrastructure, our software, all set up in the offices. Now [with the onset of the pandemic, comment of the author] everything changed, we had to use digital tools that we did not even really know about it before. The hospitals, our contact persons there at least, of course, said they would not mind, but they also stated that they cannot guarantee us, that the legal departments will agree with this. That said, we managed to survive all of this without further legal trouble, things were thankfully handled in a throughout positive way by all stakeholders" (I7, 2021). To summarize, all the interview partners agreed that the COVID-19 situation posed an overall threat to their organizational work and presented itself to be a challenge to their core processes.

5. DISCUSSION AND CONCLUSIONS

These findings showcase how practitioners in the field can use contemporary strategies to cope with the current crisis and enable researchers with new insight into a highly complex topic. The specifics of the logistics industry are critically discussed and lead to a description of further research topics that need to be addressed within this context. What became especially evident is the specific constellation of challenges arising from the COVID-19 pandemic regarding the management of supply chain partners of critical infrastructure providers, as they were the focus of the present work. A majority of the interview partners reported only using a minimum set of digital strategies within the management of their supply chain and logistics processes as well as within their internal processes. The onset of the pandemic and the subsequently induced measures of lockdowns and social distancing accentuated the problematic situation: Necessary infrastructure for enabling remote work was only partially in place, which was complicated by an unclear legal environment. In this regard two of the interview partners clearly stated that they considered the legal uncertainty from various perspectives to be among the most pressing issues they were facing within their crisis management. First, it remained unclear, whether these supply chain partners of critical infrastructure providers were considered to be exempt from certain measures, which leads to a legal grey area, in which they had to operate with a pragmatic imperative: As critical infrastructure providers needed their services, they continued to provide them, even during unclear situations. The second challenge arose from data-security and privacy related issues, that complicated the move towards contemporary collaboration tools that enabled the companies to continue their administrative and organizational work during periods of lockdown from remote locations.

This goes in alignment with relevant findings from the state of research, where authors such as He, Zhang and Li (2021) point out, that the necessary conditions often had to be created quite spontaneously during the first stages of lockdown and crisis reaction. However, the present paper also points out, that it often was employees who took on a leading role in enabling organizational change as a reaction to the changing demands of the pandemic environment.

Another main contribution of the present work lies in the focus of suppliers of critical infrastructure providers: As it was described introducing this work, legal and technological frameworks in this regard are typically assessed from the perspective of the providers themselves, only rarely mentioning and acknowledging the relevance of the related ecosystem. This seemed to arise as one of the challenges in tackling the current pandemic as well, where it was revealed that suppliers in this niche suffered from uncertainty regarding their positioning.

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