

THE 7TH INTERNATIONAL SCIENTIFIC CONFERENCE
ERAZ 2021

**KNOWLEDGE BASED
SUSTAINABLE DEVELOPMENT**
Selected Papers

Draft version

Online-virtual
May 27, 2021

International Scientific Conference ERAZ – Knowledge Based Sustainable Development

ISSN 2683-5568

Selected Papers (part of ERAZ conference collection)

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Published by:

Association of Economists and Managers of the Balkans,

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Conference partners:

Faculty of Economics and Business, Mediterranean University, Montenegro;

University of National and World Economy – Sofia, Bulgaria;

Faculty of Commercial and Business Studies – Celje, Slovenia;

College of Regional Development and Banking Institute – Ambis, Czech Republic

Faculty of Applied Management, Economics and Finance – Belgrade, Serbia

Printed by: SKRIPTA International, Belgrade, Serbia

Cover image by: Markéta Machová from Pixabay.

Belgrade, 2021

ISBN-978-86-80194-47-9

ISSN 2683-5568

DOI: <https://doi.org/10.31410/ERAZ.S.P.2021>

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Preface

Economic development refers to the improvement of activities in the economy, which leads to progressive changes in the socio-economic structure and the rising of living standards. Given that the objective of sustainable economic development is elimination of poverty, inequality and unemployment – thus leading to social inclusion and improvement of the quality of life; it is necessary in analysis of this important issue apply extremely multidisciplinary approach.

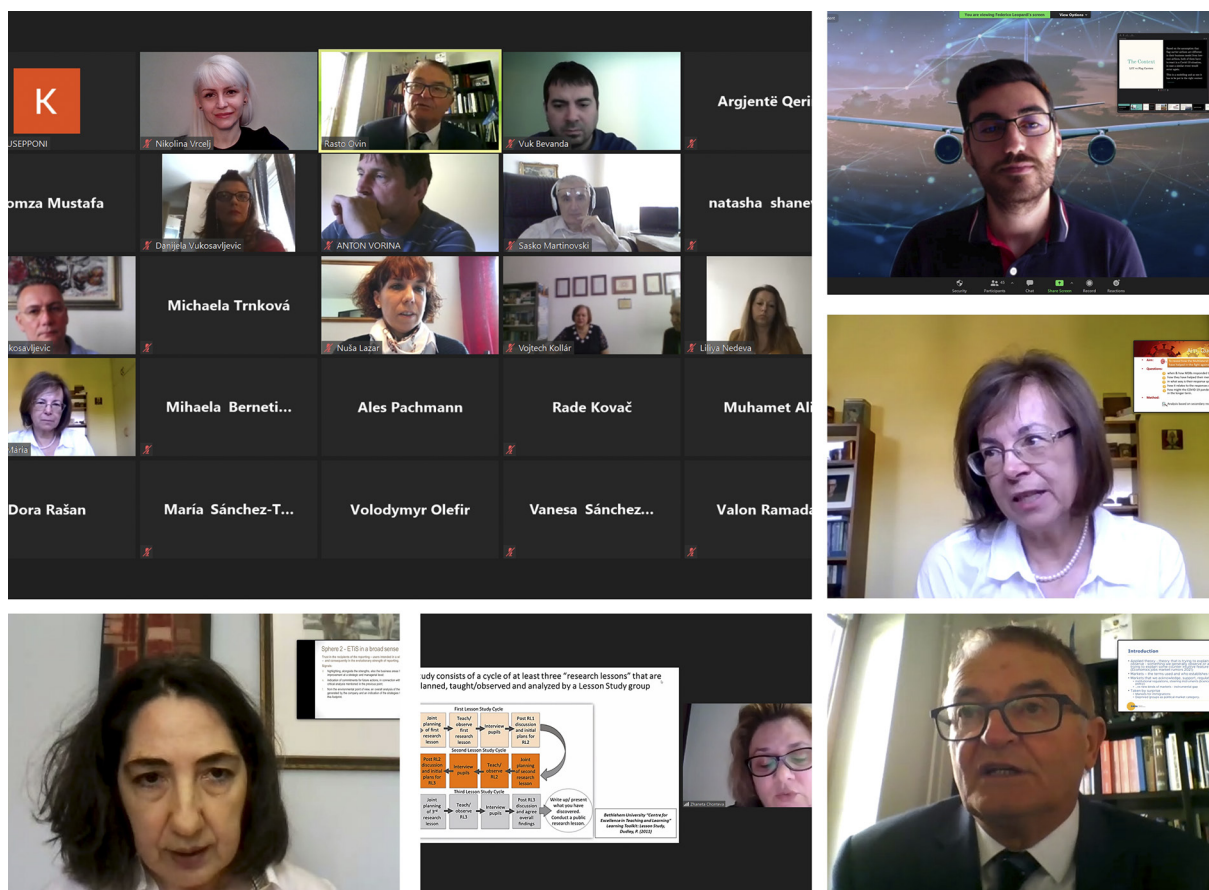
University of National and World Economy – Sofia, Bulgaria; Faculty of Economics and Business, Mediterranean University – Podgorica, Montenegro; Faculty of Commercial and Business Studies – Celje, Slovenia; Faculty of Applied Management, Economics and Finance, Belgrade; Association of Economists and Managers of the Balkans along with the AMBIS University from Prague, Czech Republic have recognized the following issue and organized the 7th International Scientific Conference titled: **Knowledge Based Sustainable Development – ERAZ 2021** online/virtually (due to the COVID-19 pandemic) on May 27, 2021.

The conference objective was to bring together academic community (experts, scientists, engineers, researchers, students and others) and publication of their scientific papers for the purpose of popularization of science and their personal and collective affirmation. The unique program combined interactive discussion and other forms of interpersonal exchange of experiences and presentation of the latest scientific developments in following areas:

- Microeconomics and macroeconomics,
- Economic policy,
- International Economics and Trade,
- International Business,
- Economic diplomacy,
- Lobbying,
- Globalization,
- European business,
- Modern management and innovation,
- Business and Public Finance,
- Fiscal policy,
- Stock exchange and financial markets,
- Risk management,
- Insurance and reinsurance companies,
- Financial Management and Banking,
- Modern forms of entrepreneurship and investment,
- Investment Management,
- Enterprise and Learning,
- Women and Entrepreneurship,
- Corporate entrepreneurship,
- Agribusiness Strategy,
- Marketing and trade,
- Marketing services,
- Marketing of non-profit sector,
- Research in marketing,
- Marketing in education,
- Marketing in sport,
- Marketing in culture,
- Accounting and auditing,
- Quality management,
- Labor law,
- Business law,
- The role of the rule of law in the country's progress,
- Human rights and protection of minorities,
- Legal aspects of EU integration,
- Intellectual Property Law,
- The reform of corporate law in countries in transition,
- CEFTA,
- Ecology and energy,
- Renewable energy,
- Energetic efficiency,
- Information technology and business intelligence,
- The use and integration of new technologies,
- E-society and E-learning,
- Sustainable tourism,
- Hospitality

Within publications from the ERAZ 2021 conference:

- 14 double blind peer reviewed papers have been published in the International Scientific Conference ERAZ 2021 – Knowledge Based Sustainable Development – Selected Papers,
- 47 double blind peer reviewed papers have been published in the International Scientific Conference ERAZ 2021 – Knowledge Based Sustainable Development – Conference Proceedings,
- 97 abstracts have been published in the International Scientific Conference ERAZ 2021 – Knowledge Based Sustainable Development – Book of Abstracts.



ERAZ 2021 publications have more than 680 pages. Besides that, some papers were accepted for publication in the conference partner journals.

Participation in the conference took 165 researchers with the paper representing 18 different countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Italy, Montenegro, North Macedonia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Ukraine) from different universities, eminent faculties, scientific institutes, colleges, and various ministries, local governments, public and private enterprises, multinational companies, associations, etc.



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The Response of the Multilateral Development Banks to the COVID-19 Pandemic

Mária Bábosik¹

Keywords:

Development assistance;
Health and economic crisis;
Pandemic recovery packages;
International development
finance institutions;
Sustainable development



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Abstract: *The purpose of this paper is to present the response of the Multilateral Development Banks (MDBs) to the COVID-19 pandemic from its outbreak in January 2020 to May 2021. It focuses on the assistance they provided to their member countries during the health and economic crisis, the changes in their internal operations in the emergency situation and their vision of the post-pandemic future and future plans. The paper uses an analytical approach based on secondary research. Data is from open access sources through the Web. Findings show that MDBs reacted quickly, adapted and intensified their funding activity, adjusted their internal operation due to the pandemic and they are seeking to “build back better” in the future. It can be concluded, that the pandemic response of the MDBs has strengthened their role in the global development arena.*

1. INTRODUCTION

The COVID-19 pandemic erupted in China in early 2020 and then spread to almost every part of the world without knowing borders. The new coronavirus disease was declared first a Public Health Emergency of International Concern on 30 January 2020 and later a Pandemic on 11 March 2020 by the World Health Organization (WHO). Its rapid spread and devastating effects soon deepened and widened it into a global economic crisis not seen since the Great Depression of 1929-33.

During the past one and a half years the COVID-19 pandemic swept over the world like a tsunami. It made some 170 million people sick, caused the death of more than 3.5 million people worldwide and is still not over. It pushed 100-150 million people into extreme poverty and reversed the steadily improving trend in poverty eradication in recent years. It halted the process of globalization for a while and jeopardized the achievement of the UN Sustainable Development Goals (SDGs) by 2030. According to the WHO (n.d.) estimates, the pandemic causes \$375 billion in losses to the world economy each month.

The fight against the pandemic started immediately worldwide, which required a huge effort and expenditure. The costs were estimated in March 2020 to be at least 10 percent of global GDP (UN, 2020a, p. 1). By the end of April 2021, funding to fight the coronavirus is estimated to be close to \$21.4 trillion (Cornish, n.d.). The global economic crisis and social problems caused by the pandemic will require huge spending in the long term and can only be achieved through international cooperation.

Major international organizations and institutions (WHO, UN, OECD, EU, financial institutions) responded quickly to the health and economic crisis. They provided immediate assistance in procuring equipment and tools to contain the pandemic, providing patient care, developing

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the vaccine, mitigating the direct socio-economic effects of the disease and began to prepare for rethinking the post-crisis period.

The paper aims to reveal how a major group of international development financial institutions, the Multilateral Development Banks (MDBs) help the fight against the COVID-19 pandemic worldwide. This topic is highly relevant today as the pandemic affects all of humanity and calls into question the directions of global development so far. It challenges the MDBs as well, and it is important to learn about their reactions which have an impact on their present and future role in the development arena. Research questions of this paper include when MDBs responded to the pandemic, how much help they provided to their member countries and in what form, what their main focus areas were, how it affected their mode of operation, what their vision about the post-pandemic future is and if they could enhance their impact and influence.

The paper seeks to answer these questions with an analytical approach. The method used is secondary research reviewing the literature, documents of the MDBs and media news. The period of the analysis is from January 2020 to May 2021.

The structure of the paper consists of five parts. After the Introduction, Part 2 reviews related literature. Part 3 provides a conceptual framework, initial hypotheses, scope and data sources. Part 4 presents findings on MDBs response to the pandemic in terms of their commitments, mode of operation and future vision. The paper ends with drawing conclusion.

2. LITERATURE REVIEW

There are four lines of literature reviewed for this paper. The first regards multilateral development banks in general, being major international financial institutions specialized in providing development finance. The idea and necessity of their establishment, their role, characteristics, the funding they provide and their relations to other development institutions as well as to the private sector and the civil society is widely discussed (Babb, 2009). Methods for measuring the links between their actions and the results in development is a research subject for a long time (Vinod & Xubei, 2012). Funding and oversight have an effect on global power relations, so even the US Congress is discussing these issues regularly (Congressional Research Service, 2020).

The second line relates to their countercyclical assistance. Supporting the economy during an economic slowdown or crisis is one of the roles of all public development banks, amongst them of the MDBs (Léon, 2020, p. 6). Galindo and Panizza (2018) prove that government borrowing from MDBs is countercyclical mainly led by the World Bank, while regional development banks tend to be more acyclical, and counter-cyclicity of MDB lending is - in general - weakening. Fleiss (2021, p. 43) draws the attention that „CRAs limit MDBs' counter-cyclicity“ and points out that MDBs could extend their lending during crises if they were ready to risk their highest rating.

The third line of the literature review is concerned with the emergency response of the MDBs. These banks are not aid providers (relief agencies) but development finance institutions. They considered natural disasters, like earthquakes, floods, landslides, storms, etc. to be emergencies to which they responded ex-post. Mukherji (2019) discusses the role of the MDBs in post-disaster recovery in detail. MDBs started to consider natural hazards together with climate change as development concerns only from the early 2010s and provide ex-ante support for building

resilience (The International Bank for Reconstruction and Development, & The World Bank, 2012). Up till now, they were less concerned with human and social disasters except for economic migration and forced displacement where they coordinated efforts (Reliefweb, 2017).

Finally, the fourth line reviews the latest studies on the COVID-19 crisis response given by the MDBs. Assessments on their contribution are mixed. The Oxford Business Group (2020) believes that MDBs play a special role in assisting governments of emerging countries suffering from the crisis „as a source of finance to support struggling industries, invest in necessary infrastructure and pave the way out of a recession“. The OECD (2020) argues that „multilateral development organizations have reacted swiftly to the crisis, launching a timely response to step into the financial vacuum generated by the global pandemic“. However, Humphrey and Prizzon (2020) express an opposite opinion stating that the response given by the MDBs is not commensurate with the scale of the crisis caused by the pandemic. Masood (2020) also holds the view that “It is entirely feasible, and ... necessary, for the MDBs to play a much larger role during this critical time.“ Lee and Aboneaj (2021) note that commitments by the MDBs’ increased considerably during the COVID-19 crisis, but this is much below the increase during the global financial crisis in 2009 and falls far behind the finance needs of the emerging countries.

3. CONCEPTUAL FRAMEWORK, SCOPE AND DATA SOURCES

The premise of this paper is that the COVID-19 pandemic posed challenges for the MDBs being major providers of international development finance. The assumption is that this affected the focus and extent of their activities, mode of operation as well as their vision and strategy for the future. In the light of all this the paper forms and checks three hypotheses:

Hypothesis One: MDBs increased their financing activity, changed its direction and time horizon to help to combat the pandemic.

Hypothesis Two: MDBs introduced innovations in their operation in order to cope with the challenge caused by the pandemic.

Hypothesis Three: MDBs’ vision for the post-pandemic future remains sustainable development.

The scope of the paper covers the response to the COVID-19 pandemic of two global and seven regional MDBs, namely the World Bank (WB), New Development Bank (NDB), African Development Bank (AfDB), Asian Development Bank (ADB), Asian Infrastructure Investment Bank (AIIB), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Inter-American Development Bank (IADB) and Islamic Development Bank (IsDB).

Data is obtained from open sources that are publicly accessible through the Web.

4. FINDINGS: MDBS’ RESPONSE TO THE PANDEMIC

Multilateral Development Banks were established after the Second World War as part of the Bretton Woods system to provide development finance in the forms of concessional loans, grants, guarantees and technical assistance to their member countries. The World Bank is the most well-known of them operating globally, while the others are regional. Their subscribed capital is provided by the governments of their member countries. Typically, their paid-in capital is much smaller than their callable capital which serves as a kind of reserve in case of problems. Up till now, there were no such cases as MDBs manage risks strictly, so they are rated

very high by the Credit Rating Agencies (CRAs). They fund large mid-and long term projects that have long return such as infrastructure development. They assist their eligible member countries, mainly for the governments. They have a countercyclical role. They cooperate and attract private capital for co-financing, so they can increase or even multiply funding resources. Instead of maximizing profit like commercial banks, they aim to maximize development impact. They are also committed to achieving the United Nation's Sustainable Development Goals (UN SDGs) by 2030.

4.1. Speed of the MDBs' response to the pandemic

MDBs mobilized their financial and human resources immediately after the pandemic was declared in order to help their member countries fight the coronavirus and coordinated their efforts to that end. They responded to the pandemic first in spring 2020, at the same time as the major international organizations, almost as soon as the virus began to spread globally. Their further response initiatives followed the waves of the pandemic later that year and were even extended to 2021. Their reaction was flexible and selective, taking into account the urgent needs and the pandemic situation in their member countries. Some MDBs provided help even to non-members to cope with the dramatic situation which is exceptional.

The rapid response has been facilitated by the fact that the MDBs have recently gradually restructured and supplemented their disaster response policies. Originally these policies were limited to natural disasters and, rarely, to post-conflict situations. They primarily aimed at physical reconstruction programs for restoring assets and production, but were not suitable for humanitarian and social assistance. In such cases, MDBs had to apply for exemptions and make procedural adjustments on a case-by-case basis. However, as demand grew, MDBs broadened their disaster response policies and practices. They included anthropogenic disasters and epidemics in disasters and supported temporary measures aimed at protecting human, institutional and social capital. They speeded up the assessment and disbursement of aid and simplified their procurement procedures. As a result, their redefined disaster response policies could be used as a basis to help the fight against the COVID-19 pandemic (New Development Bank, 2020, June 10, p. 3).

4.2. Size and focus of the response packages of the MDBs

After COVID-19 was declared a pandemic, MDBs developed their initial response packages, which they expanded later. The World Bank announced a \$160 billion emergency response and crisis management package for 15 months, and the regional MDBs pledged an additional \$80 billion in funding. These together amount to a total of \$240 billion to combat the coronavirus and mitigate the effects of the economic crisis as a result (Wilson, 2020). Besides the World Bank's package that is exceptional in size, the regional MDBs offered initial funding worth \$10-25 billion each for COVID-19 response in spring 2020 and later they provided additional resources, too.

- The World Bank committed \$21 billion in 105 countries until July 2020. In October 2020 it approved a \$12 billion program for developing countries to buy vaccines, tests, and treat patients, that will allow 1 billion people to be vaccinated. With the help of its private sector development institution (the International Finance Corporation - IFC) the World Bank set up a \$4 billion Global Health Platform to support vaccine manufacturing (World Bank, 2020).
- The African Development Bank (AfDB) launched a three-year Fight COVID-19 Social Bond in the amount of \$3 billion in March 2020 targeting the economic and social impact of the pandemic (AfDB. 2020a). A few days later it approved a \$2 billion emergency as-

- sistance package to the WHO for its fight against the pandemic in Africa (AfDB 2020b). AfDB created a \$10 billion COVID-19 Response Facility for sovereign and regional operations and helped the private sector, too (AfDB 2020c).
- The Inter-American Development Bank (IADB) initiated a \$2 billion COVID-19 response but raised it sixfold soon to \$12 billion. Additionally, IADB allowed member countries to ask for redirecting resources from ongoing projects to the fight against the pandemic. IADB offered its members technical advice too, in designing effective policies to combat the pandemic (Dwyer, 2020).
 - The Asian Development Bank (ADB) announced an initial package worth \$6.5 billion in March 2020 and tripled it to \$20 billion in April. The Bank created its COVID-19 Pandemic Response Option consisting of policy-based loans and anticyclical support (ADB, 2020a). In December 2020, ADB set up a new facility (APVAX) worth \$9 billion to supply vaccines to developing countries and prepared country-specific financing proposals (ADB, 2020b).
 - The Asian Infrastructure Investment Bank (AIIB) created a COVID-19 Crisis Recovery Facility in March 2020, doubled it after a month and later raised it to \$13 billion. AIIB provided funding both to the public and the private sectors in its member countries to fight against the pandemic, for meeting health needs, increase economic resilience and bridge liquidity problems (AIIB, n.d.).
 - The New Development Bank (NDB) created a \$10 billion Fast Track COVID-19 Emergency Assistance Response Facility in April 2020, of which \$5 billion aimed at covering the most urgent expenditures, primarily related to the health and social safety net, and an additional \$5 billion at restarting the economy. These amounts were equally distributed for the five BRICS member countries in two waivers (NDB, 2020), (NDB, n.d.).
 - The European Bank for Reconstruction and Development (EBRD) put together a €1 billion financing package to tackle the economic impact of the virus in its member countries as a start (Williams, 2020). This package was then significantly expanded to a total of €11 billion by the end of 2020 (Reiserer, 2021).
 - The European Investment Bank (EIB) provided €6 billion for financing health to EU countries. As part of the EU's comprehensive COVID-19 response package, the EIB set up a €25 billion guarantee fund for EU countries in May 2020 as well, which enabled additional funding of around €200 billion, mainly for the small and medium sized enterprises in the EU. EIB provided an additional €6.54 billion to more than 100 non-EU countries around the world to support their health infrastructure and finance their small and medium sized enterprises (EIB, n.d.).
 - The Islamic Development Bank (IsDB) created a new instrument in March 2020 worth \$730 million to mitigate the negative health and socio-economic impacts of the pandemic and increase resilience to the crisis (IsDB, 2020a). At the end of March 2020, IsDB put together a \$2.3 billion integrated package called „The 3 Rs” (Respond, Restore, and Restart), which includes immediate, medium and long-term elements (IsDB, 2020b).
- The size and composition of the MDBs' response packages can be assessed in comparison with the assistance provided by some of the major international organizations, like the WHO, the UN and the EU.
- The World Health Organization (WHO), a specialized agency of the United Nations, initially dedicated \$675 million for the immediate and direct response to the COVID-19 for the three months from February to April 2020 (WHO 2020). Later it revised and increased this amount to \$1.5 billion till the end of 2020 (WHO 2021). One year later the WHO dedicated a new \$1.96 billion for the fight against the pandemic, out of which \$1.2 billion

was planned to be spent on providing diagnostic tools, vaccines and medicine, while \$643 million on humanitarian aid (UN News, 2021).

- The United Nations (UN) estimated about \$2 billion as needed for supporting the local health systems for nine months from April to December 2020, especially in countries with insufficient health institutions (UN, 2020b). In order to cope with the socio-economic effects of the pandemic, it planned to modify and redirect most of its \$17.8 billion development portfolio, too (UN, 2020c). In addition to it, the UN created a fund in the amount of \$2 billion to support the fight against the pandemic in the least developed and most vulnerable countries (UN, 2020d).
- The emergency response of the European Union (EU) to the pandemic included a €540 billion support package for jobs and workers, businesses and member states. Out of it €100 billion was devoted to mitigating unemployment risks, €200 billion to guarantee funds for loans to companies and €240 billion to pandemic crisis support for member states. The EU promoted research for treatments and vaccines with €384 million, too. For the period 2021-2027, the overall EU budget is €1,824 billion. It is planned to help the EU to rebuild after the COVID-19 pandemic (European Council, & Council of the European Union, n.d.).

4.3. Adjusting MDBs' internal operation to the emergency

The pandemic made MDBs adjust their internal operation to the emergency situation. This had an effect on their procedures, tools and projects.

As for their procedures, speed and flexibility became particularly important during the emergency response period. To this end, MDBs set up pandemic and crisis management teams, speeded up their decision making procedure and the delivery of their assistance. In the beginning, they let their Board of Directors decide on a case-by-case basis and endorsed waivers of specific features of the emergency response that did not fit in the existing policies. Later they adopted new, simplified fast-track procedures for the processing, approval, procurement and disbursement of their assistance. It enabled a loan to be disbursed even within a month of approval, allowed pre-payment and covered expenditure occurred before the loan approval but arose as a direct consequence of the pandemic. They offered simplified methods of selecting suppliers, provided the borrowers with interactive georeferencing and supply chain maps. Due to travel restrictions, they outsourced some of the tasks that needed to be executed on the spot at distant locations. Since emergency assistance needs are different from country to country, these fast-track and innovative procedures allowed the response to be flexible and country specific.

Regarding tools, MDBs developed and started to use new tools and launched new initiatives. These included emergency assistance, crisis response and recovery facilities and frameworks, support programmes, solidarity packages, special windows, emergency program loans and pandemic response options, just to name a few. MDBs also utilized their disaster financing instruments and provided trade finance for the short run for the first time - being entirely atypical for MDBs earlier.

As far as projects are concerned, MDBs launched many new projects as well as restructured and redirected ongoing ones. They started to exploit reserves that were built in the projects but usually were not used before. Some of the projects were labelled as catastrophe financing that enabled them to use fast-track procedures. The time-frame of the projects also shifted from the mid and long-term to mainly short and medium-term due to the emergency situation.

4.4. MDBs' vision of the post-pandemic future

After the immediate response to combat the pandemic and the global crisis, MDBs started to think about and work on „shaping the future“. Their vision of recovery is quite similar, best expressed by the slogan „Building back better“. It conveys two very important messages. One of them is that they want to „build back“, instead of creating something new. The other message is that MDBs envisages a „better“ future than they did before. This combination of wording suggests that the financing activity of the MDBs will be modified but will not take a completely different direction after the pandemic.

However, it is worth exploring the expected shifts in their financing activity based on their vision. The analysis of their ideas about the „better future“ shows that MDBs envisage a green, resilient, inclusive, well-governed, competitive and digital future. Taking this into account, it is most likely that in the post-pandemic era these will be the preferred areas where they will fund development projects and attract co-financing from the private sector. At the same time, MDBs expressed, that they remain committed to the UN Sustainable Development Goals and are ready to increase their efforts to help to achieve them.

5. FUTURE RESEARCH DIRECTIONS

The current state of knowledge on the response of the MDBs to the pandemic suggests that they play a very important role globally to help their member countries to combat the coronavirus and recover from the crisis. In order to do that they adapted to the new challenges quickly and reacted effectively. However, since the pandemic is still not over, it is too early to give a final summary. Further research might add value to a deeper understanding, especially in three areas.

First, current modifications regarding the focus, timeframe, tools, internal processes and funding capacity of the MDBs will certainly have an effect on their ordinary post-pandemic mode of operation. Longer lasting operational innovations due to the coronavirus and the crisis is a subject worth further studying.

Secondly, MDBs could extend resources for development through cooperating with international organizations, co-financing with the private sector and involving the civil sphere. Research is also needed on how MDBs could further enlarge and intensify cooperation in order to increase funding capacity and development impact.

Finally, MDBs are still committed to achieving the UN Sustainable Development Goals but the pandemic made it more difficult than it was before. Further work might be required to understand how MDBs can best support it, what changes might be necessary on their side in order to make SDGs realize in due course.

6. CONCLUSION

The analysis of the response of the MDBs to the COVID-19 pandemic and the economic crisis confirms all of the three hypotheses of the paper.

Regarding Hypothesis One, MDBs reacted quickly to the emergency situation. Their pandemic response packages were huge, even compared to the support provided by large international

organizations like the WHO, the UN and the EU. In the emergency situation they focused on health (medical infrastructure, direct health expenditure, vaccine research and development, production, distribution and purchase) and social-economic protection (small and medium sized enterprises, banks, state budgets and trade finance), and provided immediate and short-term help as well. This confirms that they increased their financing activity, changed its direction and time horizon, to help to combat the pandemic.

As for Hypothesis Two, MDBs' response was flexible and innovative. They adjusted their procedures to the emergency situation introducing fast-track processes, developed new facilities, programmes, options and launched not only new projects but reshaped ongoing ones. Some of them provided support outside their member countries to other countries in need, which goes beyond the regular cases. This proves, that MDBs introduced innovations in their operation.

As far as Hypothesis Three is concerned, MDBs seek to „build back better“ after the destruction caused by the pandemic. According to their vision, the future is green, resilient, inclusive, well-governed, competitive, digital. Their firm commitment to realizing the UN Sustainable Development Goals certifies, that MDBs' vision for the post-pandemic future remains sustainable development.

In addition to all of this, it might be stated, that MDBs have a unique impact on the survival and recovery worldwide and their pandemic response has made their role stronger in the global development arena.

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The 2020 Oil Price War Has Increased Integration Between G7 Stock Markets and Crude Oil WTI

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Keywords:

Crude Oil WTI Spot;
G7 markets;
Integration;
Diversification of portfolios



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Abstract: *This paper aims to examine whether the oil price war between Saudi Arabia and Russia has increased integration between the Crude Oil WTI Spot oil index and the G7 stock markets, namely France (CAC 40), Germany (DAX 30), USA (DOW JONES), UK (FTSE 100), Italy (FTSE MID), Japan (Nikkei 225), Canada (S&P TSX), from January 2018 to January 2021. The results show that in the period before the oil price war, the G7 stock markets and the WTI index had 29 integrations (out of 56 possible). The WTI index is integrated with the UK stock markets (FTSE 100), and Japan (NIKKEI 225), and is integrated into the Japanese market. In the period of the oil price war, the G7's stock markets and the Crude Oil WTI Spot index had 43 integrations (out of 56 possible), namely the WTI, Dow Jones, and Nikkei 225 indexes, with all their peers (7 out of 7 possible). When comparing the period before and during the 2020 oil crash, we found that integrations increased significantly from 29 to 43 (out of 56 possible); we also found that the Crude Oil WTI Spot index is no longer a safe haven for portfolio diversification in G7 stock markets. These findings validate our research issue, i.e., the oil price war between Saudi Arabia and Russia had increased integrations, and this evidence could question portfolio diversification.*

1. INTRODUCTION

The determination of the price of oil as a commodity is characterized by fluctuations based on the market supply and demand. However, variations in the price of oil are extremely sensitive to factors outside the market, such as strategic movements by major global producers, political events, and speculations to cause imbalances in markets (Kaufmann and Connelly, 2020).

In March 2020, in Saudi Arabia, OPEC's main producing member was involved in a trade war with Russia over the value of the oil barrel. This "war" over the price of oil originated from the worsening global pandemic (COVID-19) and as a consequence - social isolation, which led to a decrease in demand for this fossil fuel, with values much lower than those presented in the past in relevant historical crises such as the great depression of 1929 and the global financial crisis of 2008 (Hanieh, 2020). In order to stabilize the price and control the levels of this commodity in the market, Saudi Arabia decided to lower production levels by reducing global supply. In turn,

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Russia did not accept this measure and the lack of agreement between the world's largest oil producers caused Saudi Arabia to increase production by generating more supply, which led to international price drops hurting several markets, including the Russian market (Ajami, 2020).

In recent decades, the phenomenon of globalization has shown that the correlation between international financial markets has increased, particularly among developed markets. Links between international stock markets can be strong during quiet periods, as well as in times of crisis, which may hinder portfolio diversification. The integration of global stock markets has been a highly analyzed topic in recent decades, especially after the events on the stock markets during the global financial crisis. Investors buying stocks in domestic and foreign markets seek to reduce risk through international diversification. Risk reduction occurs if the various markets are not perfectly correlated. The growing correlation between markets during and after crises has restricted the possibilities for international diversification. From the investor's point of view, knowledge of the form and intensity of interdependence between the different financial markets is vital for making efficient hedging decisions, to minimize the adverse effect of uncertainty on the expected profitability of investments. Likewise, understanding the interdependence relations between international stock markets facilitates the identification of opportunities for diversification. The extinction of barriers to investment in recent years has led many countries to go through the process of integration, both financially and economically. This leads to the benefits of international diversification, brought into question mainly due to the various financial crises that have devastated financial markets around the world (Alexandre, Dias, and Heliodoro, 2020a, 2020b; Alexandre, Heliodoro, and Dias, 2019; Dias et al., 2020; Dias and Carvalho, 2020; Dias, da Silva, and Dionísio, 2019; Dias, Heliodoro, and Alexandre, 2020, 2019; Dias, Heliodoro, Alexandre, Santos, and Farinha, 2021; Dias, Heliodoro, Alexandre, and Vasco, 2020; Dias, Heliodoro, Teixeira, and Godinho, 2020; Dias, Pardal, Teixeira, and Machová, 2020; Dias and Pereira, 2021; Heliodoro, P., Dias, R., Alexandre, P., and Vasco, 2020; Heliodoro, P., Dias, R. and Alexandre, 2020; Heliodoro, Dias, and Alexandre, 2020; Pardal, P., Dias, R., Šuleř, P., Teixeira, N., and Krulický, 2020; Santos and Dias, 2020).

This paper aims to analyze the synchronizations between the stock indexes of France (CAC 40), Germany (DAX 30), USA (DOW JONES), UK (FTSE 100), Italy (FTSE MID), Japan (Nikkei 225) and Canada (TSX 300), and the WTI index, from January 1, 2018, to January 11, 2021. The sample was partitioned into two subperiods: the first subperiod comprises the days of January 1, 2018 to September 30, 2019, which corresponds to the period before the oil price war; while the second comprises the period from October 1, 2019 to January 11, 2021, which incorporates the oil price war between Saudi Arabia and Russia. The results show that in the period before the oil price war, the G7 stock markets and the WTI index had 29 integrations (out of 56 possible). In the period of the oil price war, the G7 stock markets and the Crude Oil WTI Spot index had 43 integrations. When we compared the period before and during the 2020 oil crash, we found that integrations increased significantly from 29 to 43. In conclusion, we found that the Crude Oil WTI Spot index is no longer a safe haven for portfolio diversification in the G7 stock markets.

This research adds two main contributions to the literature. Given the importance of these markets (G7), in the global competitive context, as well as the need to develop further empirical studies, especially confirmatory on the financial dynamics in these markets, it was considered extremely relevant to study the stock markets of the seven most advanced economies in the context of the oil price war in March 2020, this being the first contribution. The second contribution is econometric, due to the comparative results between econometric methods and mathematical models that have the possibility of evaluating correlations in a context of non-stationarity.

In terms of structure, this paper is organized into 5 sections. In addition to the current introduction, section 2 presents an analysis of the State of the Art with articles related to the integration of international financial markets, in section 3 the methodology is described, and section 4 contains the data and results. Section 5 presents the general conclusions of the work.

2. LITERATURE REVIEW

Since the mid-2000s, international financial markets have been subject to many significant financial crises, notably the subprime crisis in the US in 2008, and the sovereign debt crisis in Europe in 2010, which originated in developed economies. These events significantly infected developed economies; however, this significance was not dense in emerging economies (Wong and Li, 2010).

The assessment of the current state of financial integration and market shocks is also relevant from a cost versus benefit analysis point of view. The literature commonly agrees that financial integration brings benefits in good times. However, in times of crisis, high financial integration increases the likelihood of contagion due to the close interrelationship between financial markets through the proximity of markets. Overall, in the long run, the benefits of financial integration are expected to outweigh costs (Babečký, Komarek, and Komárková, 2017)

Gulzar et al. (2019) , Moagar-Poladian, Clichici, and Stanciu (2019), Jawadi, Chlibi, and Cheffou (2019), Salisu, Ndako, Adediran, and Swaray (2020) analyzed the integration into the financial markets and tested the hypothesis of portfolio diversification. Gulzar et al. (2019) examined the financial markets of India, China, Pakistan, Malaysia, Russia, South Korea, and the US, and highlighted the long-term integration between the US market and emerging stock markets in the post CFG. Moagar-Poladian, Clichici, and Stanciu (2019) show that central and eastern European markets show a significant level of integration during the European financial crisis. However, the authors Jawadi, Chlibi, and Cheffou (2019) show that the MENA and BRIC's markets are segmented with the North American market, while the G6 markets show integration. Salisu, Ndako, Adediran, and Swaray (2020) analyzed integration into Islamic markets, and show that markets are integrated and that this behavior can be influenced by global economic conditions.

Tiwari, Trabelsi, Alqahtani, and Raheem (2020), Hussain Shahzad, Bouri, Roubaud and Kristoufek (2020), Bhatia, Das, and Kumar (2020), examined whether commodity markets are a safe haven, to the detriment of investments in the G7 stock markets. Tiwari et al. (2020) suggest that the crude oil market may be a diversified asset for investors in the markets of Japan and France, but investors operating in the remaining G7 markets should exercise caution. Hussain Shahzad et al. (2020) found that the benefits of diversification offered by gold to equity investments in the G7 markets are comparatively much higher and more stable than those of Bitcoin. Bhatia et al. (2020) examined the dynamic relationship between precious metals and G7 stock exchanges and emerging markets (BRIC's). The G7 and BRIC's markets exhibit different dynamics with precious metals during the study period (2000 to 2017). The dynamics between precious metals and G7 stock exchanges have similar patterns, which represents an aggregation behavior; however, the same does not apply to BRIC's countries. In contrast to existing literature, this study found that silver offers better coverage capacity than other precious metals, both in the short and long term. To build an ideal portfolio of two precious metals assets and the stock index, silver emerges as the most favorable option for both the short and long term.

3. METHODOLOGY

3.1. Data

The data to be analyzed are the prices index of the stock markets France (CAC 40), Germany (DAX 30), USA (DOW JONES), United Kingdom (FTSE 100), Italy (FTSE MID), Japan (Nikkei 225), Canada (S&P TSX), and Crude Oil WTI Spot, in the period from January 1, 2018 to January 11, 2021. The sample was partitioned into two subperiods: the first subperiod comprises the days of January 1, 2018 to September 30, 2019, which corresponds to the period before the oil price war; while the second comprises the period from October 1, 2019 to January 11, 2021, which incorporates the oil price war between Saudi Arabia and Russia. The sample took into account the impact of financial market crashes resulting from the oil price war between Saudi Arabia and Russia in March 2020. Quotes are daily and obtained through the *DataStream* platform and are in local currency in order to avoid exchange-related distortions.

Table 1. The name of countries and their indexes used in this paper

Country	Index
France	CAC 40
Germany	DAX 30
USA	DOW JONES
United Kingdom	FTSE 100
Italy	FTSE MID
Japan	NIKKEI 225
Canada	S&P TSX
USA	Crude Oil WTI Spot

Source: Own elaboration.

To analyze the behavior of financial markets, Tsay (2005) proposes the use of profitability series to the detriment of the price series, because investors are primarily interested in knowing the profitability of an asset or a portfolio. In addition, the profitability series show statistical characteristics that simplify analytical treatment, namely the characteristic of stationarity, which is not usually present in price series. For the reasons above, the series of price indexes were modified in growth rates or series in the differences of neperian logarithms of current and previous profitability, of logarithmic yields, instantaneous or continuously composed r_t , by the following expression:

$$r_t = \ln P_t - \ln P_{t-1} \quad (1)$$

where r_t is the rate of return, on the day t , and P_t and P_{t-1} are the closing prices of the series, at the moment t and $t-1$ respectively.

3.2. Methodology

The methodology used to answer the research questions is structured as follows – in the first phase we performed descriptive statistics (mean, standard deviation, asymmetry and kurtosis); to validate the distributions of the time series we used the Jarque and Bera test (1980). To validate the assumptions of time series stationarity, we used the data panel unit root tests; the Levin, Lin, and Chu (2002) test postulates unitary roots in the null hypothesis, while the Hadri test (2000) presents the stationery in the null hypothesis, the intersection of the tests will give robustness to the estimated models. To answer the research question, we used a Gregory and Hansen model (1996) that considers regime changes. This methodology is robust in very trou-

bled periods in the financial markets as the authors generalize the usual cointegration tests when considering that the cointegration vector changes at an unknown date. The authors analyzed four models of cointegration. The first model incorporates a level change:

$$y_t = \mu_1 + \mu_2 D_t + \beta' x_t + \mu_t \quad t = 1, \dots, T \quad (2)$$

In which x_t is a vector $I(1)$ of dimension k , μ_t is $I(0)$, μ_1 is the independent term before the change μ_2 , is the change in the independent term after the break D_t , and is a dummy variable.

The second model includes a temporal trend (Trend):

$$y_t = \mu_1 + \mu_2 D_t + \alpha t + \beta' x_t \quad t = 1, \dots, T \quad (3)$$

In this model, the μ_1 is the independent term before the structure change and μ_2 is the change in the independent term after the break. This model, compared to the previous one, introduces a regime change. (4)

$$y_t = \mu_1 + \mu_2 D_t + \alpha_1 t + \beta'_1 x_t + \beta'_2 x_t D_t + \mu_t \quad t = 1, \dots, T \quad (4)$$

A possible change in structure admits that the slope vector also changes. This allows the balance ratio to move in parallel with the level. The authors call this third model, the regime change model.

Finally, the fourth model is presented, which emerges to complement the previous ones; the authors add the possibility of changing structure in a model with a segmented temporal tendency (Regime and Trend):

$$y_t = \mu_1 + \mu_2 D_t + \alpha_1 t + \alpha_2 t + \beta'_1 x_t + \beta'_2 x_t D_t + \mu_t \quad t = 1, \dots, T \quad (5)$$

In this case, both the terms μ_1 and μ_2 are already presented in the previous models. The α_1 represents the cointegration of the slope coefficients and α_2 represents the change in the slope of the coefficients.

4. RESULTS

Figure 1 shows the evolution in levels of the Crude Oil WTI Spot index and the G7 stock markets, including the Stock Indexes of France (CAC 40), Germany (DAX 30), the US (DOW JONES), the United Kingdom (FTSE 100), Italy (FTSE MID), Japan (Nikkei 225), Canada (S&P TSX), from January 2018 to January 2021. The charts show that stock markets display significant structural declines in the first quarter of 2020, and this period is coincident with the oil price war between Saudi Arabia and Russia.

Tables 2 and 3 show the main descriptive statistics for the G7 stock markets and the Crude Oil WTI Spot index; through the analysis, we were able to assess that average yields are positive, except for the UK stock market (FTSE 100). The Crude Oil WTI Spot index shows the sharpest standard deviation (0.038871), while the Italian stock market (FTSE MID) presents asymmetry (-2.776471) and the most significant kurtosis (36.09117), which is contrary to the hypothesis that the data follow a normal distribution (asymmetry = 0, kurtosis = 3). To validate the evidence of the distributions, we performed the Jarque-Bera adherence test, which allows us to corroborate that the data series does not follow a normal distribution.

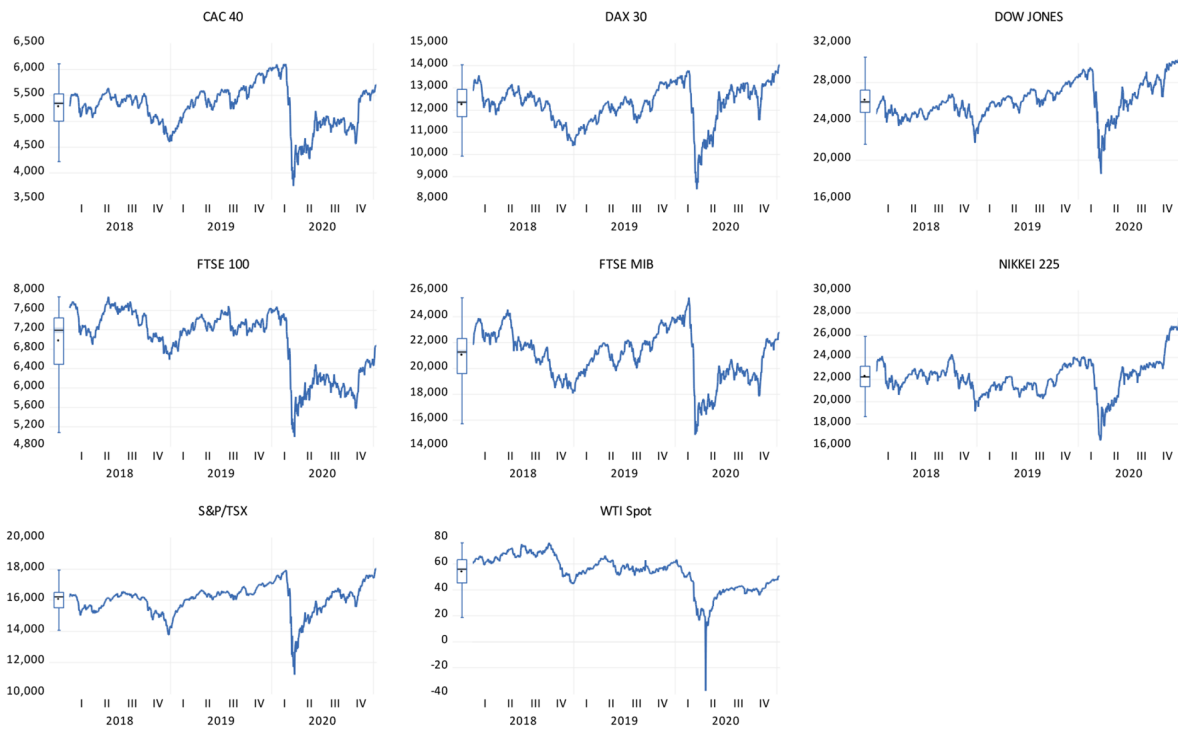


Figure 1. Evolution, in levels, of the G7 stock markets and the WTI index, from January 1, 2018 to January 11, 2021.

Source: Own elaboration.

Note: DataStream: January 1, 2018, 790-point data.

Table 2. Descriptive statistics, return, of the G7 stock markets and the WTI index, from January 1, 2018 to January 11, 2021.

	FTSE MIB	NIKKEI 225	S&P TSX	WTI SPOT
Mean	9.92E-05	0.000309	0.000173	0.000688
Std. Dev.	0.015317	0.012314	0.012689	0.038871
Skewness	-2.776471	-0.125247	-2.026456	-0.292986
Kurtosis	36.09117	8.917285	43.36274	33.32185
Jarque-Bera	37012.67***	1153.157***	54098.33***	30237.05***
Observations	789	789	789	789

Source: Own elaboration.

Notes: ***, **, * represent significance at 1%, 5% and 10%, respectively.

Table 3. Descriptive statistics, return, of the G7 stock markets and the WTI index, from January 1, 2018 to January 11, 2021.

	CAC 40	DAX 30	DOW JONES	FTSE 100
Mean	0.000131	0.000152	0.000357	-0.000110
Std. Dev.	0.013539	0.013946	0.015273	0.012244
Skewness	-1.395302	-0.993695	-1.050123	-1.214132
Kurtosis	20.11454	19.18929	21.70243	19.14127
Jarque-Bera	9885.351***	8746.156***	11644.05***	8759.120***
Observations	789	789	789	789

Source: Own elaboration.

Notes: ***, **, * represent significance at 1%, 5% and 10%, respectively.

As we are estimating time series, we should examine the stationary nature of the Crude Oil WTI Spot index and the G7 stock markets, namely the stock indexes of France (CAC 40), Germany (DAX 30), THE US (DOW JONES), THE UNITED KINGDOM (FTSE 100), Italy (FTSE MID), Japan (Nikkei 225) and Canada (S&P TSX). The Levin, Lin, and Chu (2002) test postulates that the null hypothesis has unitary roots, while the Hadri test (2000) postulates stationarity in the null hypothesis. In tables 4 and 5 we can assess that the time series in both tests are stationarity, which validates an essential assumption to estimate models with time data.

Table 4. Levin, Lin, and Chu 's parking test (2002), applied to the G7 stock markets and the WTI index from January 1, 2018 to January 11, 2021.

Method	Statistic					Prob.***	
Levin, Lin & Chu t*	-31.3116					0.0000	
Series	2nd stage Coefficient	Variance Of Reg	HAC of Dep.	Lag	max Lag	Band-Width	Note
CAC 40	-0.87385	0.0002	8.E-06	7	20	49.0	783
DAX 30	-0.81924	0.0002	8.E-06	8	20	51.0	782
DOW JONES	-0.91077	0.0002	1.E-05	8	20	44.0	782
FTSE 100	-0.95160	0.0001	6.E-06	7	20	47.0	783
FTSE MIB	-0.89432	0.0002	8.E-06	1	20	57.0	789
NIKKEI 225	-0.96573	0.0002	4.E-06	0	20	77.0	790
S&P TSX	-0.76488	0.0001	7.E-06	6	20	43.0	784
WTI SPOT	-0.77187	0.0010	0.0002	9	18	57.0	769
	Coefficient	T-Stat	Reg SE	mu*	sig*		Note
Pooled	-0.90600	-39.063	1.001	-0.500	0.707		6262

Source: Own elaboration.

Notes: * Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality. ***, **, * represent significance at 1%, 5% and 10%, respectively.

Table 5. Hadri panel parking test (2000), applied to the G7 stock markets and the WTI index, from January 1, 2018 to January 11, 2021.

Null Hypothesis: Stationarity				
Method	Statistic			Prob.**
Hadri Z-stat	-1.43136			0.9238
Heteroscedastic Consistent Z-stat	-1.55778			0.9404
Series	Lm	Variance Hac	Bandwidth	Note
CAC 40	0.0565	0.000215	3.0	791
DAX 30	0.0962	0.000210	2.0	791
DOW JONES	0.0600	0.000179	26.0	791
FTSE 100	0.0632	0.000162	9.0	791
FTSE MIB	0.0575	0.000308	9.0	791
NIKKEI 225	0.1824	0.000167	2.0	791
S&P TSX	0.0609	0.000175	10.0	791
SPOT WTI	0.0999	0.001964	10.0	789

Source: Own elaboration.

Notes: ***, **, * represent significance at 1%, 5% and 10%, respectively.

Figure 2 shows the stability tests performed on G7 stock market residues and the Crude Oil WTI Spot index. Through the graphical analysis we were able to perceive the existence of disturbances in variance. Additionally, when examining the graphs and the probability limits of 95% we verified the existence of violation of probability limits; therefore, the time-series evidence an unstable behavior, that is, the existence of structural breaks.

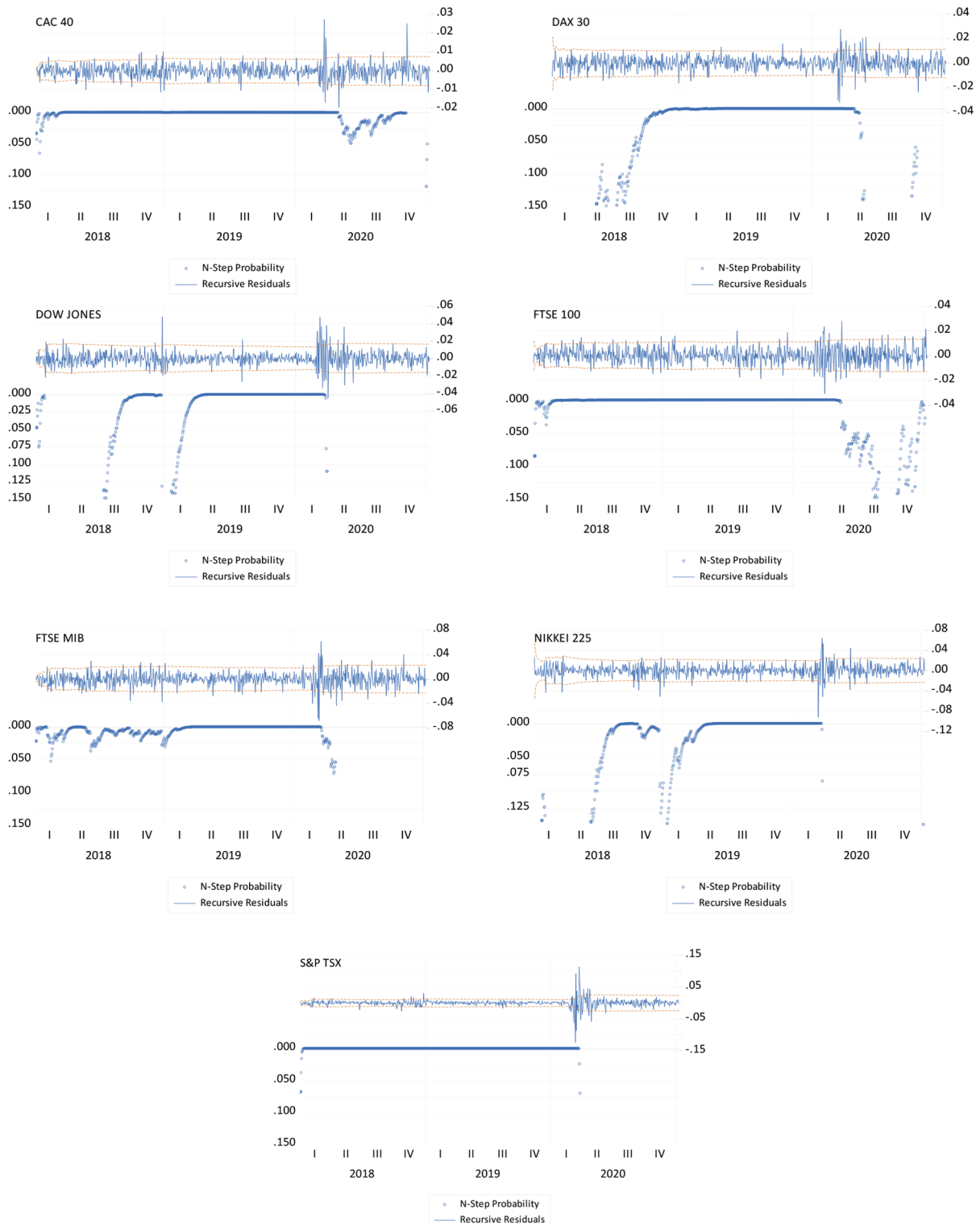


Figure 2. Stability tests carried out on the residues of the G7 stock markets, from January 1, 2018 to January 11, 2021.

Source: Own elaboration.

Table 6 shows the results of the Gregory-Hansen test, related to the stock markets of France (CAC 40), Germany (DAX 30), USA (DOW JONES), United Kingdom (FTSE 100), Italy (FTSE MID), Japan (Nikkei 225), Canada (S&P TSX), and the US Crude Oil WTI Spot index, in the period from January 1, 2018 to September 30, 2019 which corresponds to the period before the oil price war.

The G7 stock markets and the Crude Oil WTI Spot index had 29 integrations (out of 56 possible), including the Dow Jones, Nikkei 225 indices, that are part of 6 markets (out of 7 possible), while the FTSE 100 and DAX 30 stock indices had 5 integrations with their peers. The French market (CAC 40) integrates with 4 of its peers, while the S&P TSX index had 1 integration, and the FTSE MID does not integrate with any market. The WTI index is integrated with the UK stock markets (FTSE100) and Japan (NIKKEI225), and is integrated by the NIKKEI 225 / Crude Oil WTI pair. These findings show that in this subperiod the U.S. oil index does not show marked synchronizations with the G7 stock markets, showing that it may be a safe haven for portfolio diversification.

Table 6. Gregory-Hansen tests, pre-Crash period (January 1, 2018 to September 30, 2019)

Markets	T-statistic	Method	Lags	Break Date	Results
Crude Oil WTI / FTSE 100	-4.48*	regime	0	14/11/2018	Integration
Crude Oil WTI / NIKKEI 225	-43.67*	Trend	0	05/11/2018	Integration
CAC 40 / FTSE 100	-5.00**	regime	0	28/09/2018	Integration
CAC 40 / DOW JONES	-45.98*	Trend	0	20/08/2018	Integration
CAC 40 / NIKKEI 225	-45.60*	Trend	2	27/08/2018	Integration
CAC 40 / S&P TSX	-5.16**	Trend	1	13/06/2018	Integration
FTSE 100 / CAC 40	-5.70***	regime	1	21/09/2018	Integration
FTSE 100 / FTSE MID	-5.66***	Trend	0	22/05/2018	Integration
FTSE 100 / DAX 30	-5.88***	regime	1	02/05/2018	Integration
FTSE 100 / NIKKEI 225	-5.16**	Trend	1	31/08/2018	Integration
FTSE 100 / S&P TSX	-5.18**	Trend	0	12/04/2018	Integration
DAX 30 / CAC 40	-4.89*	Trend	0	26/04/2019	Integration
DAX 30 / FTSE 100	-5.77***	Trend	1	19/04/2019	Integration
DAX 30 / NIKKEI 225	-5.16**	Trend	0	31/08/2018	Integration
DAX 30 / DOW JONES	-5.21**	Trend	0	20/08/2018	Integration
DAX 30 / S&P TSX	-5.18**	Trend	0	12/04/2018	Integration
DOW JONES / CAC 40	-5.08**	Trend	2	21/08/2018	Integration
DOW JONES / FTSE 100	-5.63***	regime	0	28/08/2018	Integration
DOW JONES / FTSE MID	-4.98**	regime	0	07/08/2018	Integration
DOW JONES / DAX 30	-5.42**	regime	0	28/08/2018	Integration
DOW JONES / NIKKEI 225	-5.70***	Trend	3	16/04/2018	Integration
DOW JONES / S&P TSX	-4.75*	regime	0	21/08/2018	Integration
NIKKEI 225 / Crude Oil WTI	-4.81*	regime	4	31/12/2018	Integration
NIKKEI 225 / CAC 40	-49.49**	Trend	3	27/08/2018	Integration
NIKKEI 225 / FTSE 100	-5.13**	Trend	3	31/08/2018	Integration
NIKKEI 225 / DAX 30	-50.79**	Trend	1	17/08/2018	Integration
NIKKEI 225 / DOW JONES	-5.60***	Trend	5	16/04/2018	Integration
NIKKEI 225 / S&P TSX	-45.03*	Trend	4	05/09/2018	Integration
S&P TSX / CAC 40	-5.07**	Trend	1	31/05/2018	Integration

Source: Own elaboration.

Notes: The AIC information criterion was chosen. The critical values are found in Gregory and Hansen (1996). The critical values for the ADF and Z_t parameters are: -5.45 (1%); -4.99 (5%); -4.72 (10%). For the Z_a parameter, the critical values are: -57.28 (1%); -47.96 (5%); -43.22 (10%). The asterisks ***, **, * indicate statistical significance at 1%, 5% and 10%, respectively.

Gregory-Hansen's integration tests on G7 stock markets and the Crude Oil WTI Spot index can be seen in table 7 - from October 1, 2019, to January 11, 2021, which incorporates the oil price war between Saudi Arabia and Russia. The G7 stock markets and the Crude Oil WTI Spot index had 43 integrations (out of 56 possible), namely the WTI, Dow Jones, and Nikkei 225 indexes that integrate with all their peers (7 out of 7 possible). FTSE 100, DAX 30 stock markets are five-times, while stock indexes CAC 40, FTSE MID, S&P TSX had four integrations with their peers. When

we compared the period before and during the 2020 oil crash, we found that integrations increased significantly from 29 to 43 (out of 56 possible); we also found the U.S. crude oil index (Crude Oil WTI Spot) is no longer a safe haven for portfolio diversification in G7 stock markets. These findings validate our research question, i.e. the oil price war between Saudi Arabia and Russia has led to the need for integration, which calls into question the possibility of implementing efficient portfolios.

Table 7. Gregory-Hansen tests, Crash period (October 1, 2019 to January 11, 2021)

Markets	T-statistic	Method	Lags	Break Date	Results
Crude Oil WTI / CAC 40	-7.44***	Trend	1	14/05/2020	Integration
Crude Oil WTI / FTSE 100	-7.26***	Trend	1	15/06/2020	Integration
Crude Oil WTI / FTSE MID	-7.41***	Trend	1	14/05/2020	Integration
Crude Oil WTI / DAX 30	-8.06***	Trend	1	24/03/2020	Integration
Crude Oil WTI / DOW JONES	-6.97***	Trend	1	11/06/2020	Integration
Crude Oil WTI / NIKKEI 225	-7.47***	Trend	1	15/06/2020	Integration
Crude Oil WTI / S&P TSX	-6.89***	Trend	3	20/01/2020	Integration
CAC 40 / Crude Oil WTI	-6.51***	Trend	0	14/05/2020	Integration
CAC 40 / MID FTSE	-6.81***	Trend	4	30/01/2020	Integration
CAC 40 / DOW JONES	-52.02**	Trend	1	27/07/2020	Integration
CAC 40 / NIKKEI 225	-7.51***	Trend	1	24/12/2019	Integration
FTSE 100 / Crude Oil WTI	-6.50***	regime	1	15/06/2020	Integration
FTSE 100 / FTSE MID	-4.78*	regime	1	28/02/2020	Integration
FTSE 100 / DOW JONES	-5.33**	Trend	1	27/07/2020	Integration
FTSE 100 / NIKKEI 225	-7.55***	Trend	2	23/12/2019	Integration
FTSE 100 / S&P TSX	-4.72*	regime	1	02/03/2020	Integration
FTSE MID / Crude Oil WTI	-5.79***	regime	1	14/05/2020	Integration
MID FTSE / CAC 40	-6.07***	regime	4	30/01/2020	Integration
MID FTSE / DOW JONES	-42.12*	regime	3	08/04/2020	Integration
FTSE MID / NIKKEI 225	-5.62***	regime	2	08/04/2020	Integration
DAX 30 / Crude Oil WTI	-6.92***	Trend	1	07/04/2020	Integration
DAX 30 / FTSE 100	-4.89*	regime	2	28/05/2020	Integration
DAX 30 / DOW JONES	-5.58***	Trend	1	28/05/2020	Integration
DAX 30 / NIKKEI 225	-7.23***	Trend	2	2/10/2020	Integration
DAX 30 / S&P TSX	-5.59***	Trend	5	28/05/2020	Integration
DOW JONES / Crude Oil WTI	-6.70***	Trend	2	28/02/2020	Integration
DOW JONES / CAC 40	-5.00**	Trend	1	27/07/2020	Integration
DOW JONES / FTSE 100	-5.75***	Trend	1	27/07/2020	Integration
DOW JONES / FTSE MID	-53.70**	Trend	3	19/02/2020	Integration
DOW JONES / DAX 30	-6.25***	Trend	3	09/03/2020	Integration
DOW JONES / NIKKEI 225	-6.49***	Trend	3	02/11/2020	Integration
DOW JONES / S&P TSX	-6.46***	Trend	1	19/02/2020	Integration
NIKKEI 225 / Crude Oil WTI	-6.57***	Trend	0	02/11/2020	Integration
NIKKEI 225 / CAC 40	-7.57***	Trend	1	24/12/2019	Integration
NIKKEI 225 / FTSE 100	-7.62***	Trend	2	23/12/2019	Integration
NIKKEI 225 / FTSE MIB	-6.34***	Trend	2	21/01/2020	Integration
NIKKEI 225 / DAX 30	-7.32***	Trend	2	2/10/2020	Integration
NIKKEI 225 / DOW JONES	-6.40***	Trend	1	02/11/2020	Integration
NIKKEI 225 / S&P TSX	-49.14**	Trend	1	02/11/2020	Integration
S&P TSX / Crude Oil WTI	-5.78***	Trend	1	18/05/2020	Integration
S&P TSX / DAX 30	-5.34**	Trend	5	09/03/2020	Integration
S&P TSX / DOW JONES	-5.64***	Trend	1	19/02/2020	Integration
S&P TSX / NIKKEI 225	-49.04**	Trend	5	12/03/2020	Integration

Source: Own elaboration.

Notes: The AIC information criterion was chosen. The critical values are found in Gregory and Hansen (1996). The critical values for the ADF and Zt parameters are: -5.45 (1%); -4.99 (5%); -4.72 (10%). For the Za parameter, the critical values are: -57.28 (1%); -47.96 (5%); -43.22 (10%). The asterisks ***, **, * indicate statistical significance at 1%, 5% and 10%, respectively.

5. CONCLUSION

In this paper, we tested whether the oil price war between Saudi Arabia and Russia increased the integration between the Crude Oil WTI Spot index and the G7 stock markets, the stock indexes of France (CAC 40), Germany (DAX 30), THE US (DOW JONES), the United Kingdom (FTSE 100), Italy (FTSE MID), Japan (Nikkei 225) and Canada (S&P TSX), from January 2018 to January 2021. The results show that integrations increased significantly, between subperiods before and during the oil price war, from 29 to 43 (out of 56 possible), which validates our research question.

The general conclusion sustained in the results obtained, through tests carried out with econometric models, shows that the oil price war has significantly increased the integration between the G7 stock markets and the Crude Oil WTI Spot index; we also found that the WTI index is no longer a safe haven for portfolio diversification in the G7 stock markets. These findings are of interest to investors looking for portfolio diversification opportunities in the G7 stock markets.

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Draft version



Long-range Dependencies of Euronext Capital Markets: A Dynamic Detrended Analysis

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Keywords:

Euronext stock markets;
Long memories;
Arbitrage;
Portfolio diversification



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Abstract: This paper aims to test efficiency, in its weak form, in the capital markets of the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20), in the period from April 4, 2019 to April 1, 2021. The sample was partitioned into two sub-periods, the first and second wave of the global pandemic: April 4, 2019 to April 30, 2020; May 4, 2020 to April 1, 2021. To carry out this analysis, different approaches were undertaken to analyze whether: (i) Euronext's stock markets have more significant long memories in the first or second wave of the global pandemic? The results show the presence of sharp long memories during the first wave of the global pandemic, particularly in the stock indices OSEBX (0.67), PSI 20 (0.67), AEX (0.66), BEL 20 (0.64), CAC 40 (0.62), ISEQ 20 (0.61), which implies that the yields are autocorrelated in time and, there is a reversal of the average, in all indexes. Regarding the second wave of the global pandemic, we found that most Euronext stock markets don't reject the random walk hypothesis, with the exception of the Norwegian (0.56) and Portugal (0.55) stock markets. These findings show that the impact of the Covid-19 pandemic was accentuated during the first wave, but from May 2020 the markets adjusted and showed balance. The authors believe that the results achieved will be a benefit to international investors seeking efficient diversification into their portfolios.

1. INTRODUCTION

International financial markets have seen a succession of major setbacks in recent months triggered by Covid-19, followed by a series of collapses, the oil war, and currency fluctuations. The economic turbulence associated with the coronavirus pandemic in 2019-2020 had serious repercussions on financial markets, notably in the stock, bond and commodity markets (including crude oil and gold). The main events were an oil price war between Russia and Saudi Arabia after an OPEC agreement wasn't reached, which led to the collapse of oil prices, and a significant drop in stock markets in March 2020 (G.Sudha and V.Sornaganesh, 2020).

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A market is designated as efficient when all relevant information about the stock price is reflected in the market price. The lack of consensus among economists and financial analysts regarding market efficiency requires the study of the efficient market hypothesis (HME). Another significant reason to study market efficiency is the role of stock markets acting as financial intermediaries between the saver and the borrower in the distribution of scarce resources via the price mechanism (Jain, 2020; Karasiński, 2020).

Given these events, it's appropriate to study the predictability of Euronext's capital markets, in particular, the Netherlands stock markets (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20), from April 4, 2019 to April 1, 2021. The results show the presence of sharp long memories during the first wave of the global pandemic, particularly in the stock indexes OSEBX (0.67), PSI 20 (0.67), AEX (0.66), BEL 20 (0.64), CAC 40 (0.62), ISEQ 20 (0.61), which implies that the yields are autocorrelated in time and that the price series aren't independent and identically distributed. Regarding the second wave of the global pandemic, we found that most Euronext stock markets don't reject the random walk hypothesis, except for the Norwegian (0.56) and Portugal (0.55) stock markets. These findings show that the capital markets analyzed were able to rebalance in the second wave, allowing international investors to diversify their portfolios more efficiently.

This research adds contributions to the literature, in particular the study on market efficiency, in its weak form, in Euronext stock indices, from April 4, 2019 to April 1, 2021. As far as we know this is the first study that analyzes the presence of long memories in these Euronext markets, having the first and second waves of the global pandemic as partitioned samples. In addition, we identified studies that investigated the impact of the 2020 global pandemic on financial markets, namely the authors Dias, Pardal, Teixeira, and Machová, (2020), Dias, Heliodoro, and Alexandre (2020), Alexandre, Dias, and Heliodoro (2020), Dias et al. (2020), Pardal, P., Dias, R., Šuleř, P., Teixeira, N., and Krulický (2020), but the approach was quite different from the one followed in this paper.

In terms of structure, this paper is organized into 5 sections. Section 2 presents a Literature Review regarding articles on the efficient market hypothesis in international financial markets. Section 3 describes the methodology and data. Section 4 contains the results. Section 5 concludes.

2. LITERATURE REVIEW

Different studies have addressed the issue of market efficiency, analyzing the hypothesis of predictability of profitability, through the analysis of patterns of reversal of stock prices average, inspired by the seminal works of Poterba and Summers (1988), Fama and French (1988), which documented reversal to the average in the stock markets, in time horizons of more than one year.

Dias, da Silva, and Dionísio (2019), Dias and Carvalho (2020), Pardal, P., Dias, R., Šuleř, P., Teixeira, N., and Krulický (2020), Heliodoro, P., Dias, R., Alexandre, P., and Vasco (2020), Dias, Heliodoro, Alexandre, and Vasco (2020b), have tested whether portfolio rebalancing is feasible in international capital markets. Dias, da Silva, and Dionísio (2019) analyzed financial integration in emerging markets in Latin America during the Dot-com and subprime financial crises, showing that markets are partially integrated. Furthermore, the financial series doesn't present significant long memories arising from the subprime crisis, i.e. these markets show that the implementation of portfolio diversification strategies could be beneficial for investors operating in these regional markets. Dias and

Carvalho (2020) analyzed if whether gold (Gold Bullion: Zurich) and silver (Silver Paris Spot E/KG) will be a safe haven to diversify portfolios in Latin American stock markets, indices of the stock exchanges of Argentina (S&P Merval), Brazil (Ibovespa), Chile (S&P/CLX IGPA), Peru (S&P/BVL General IGBL), Mexico (IPC), USA (Dow Jones), gold (Gold Bullion: Zurich), and silver (Silver Paris Spot E/KG), from December 31, 2019 to September 2, 2020. The authors show that gold and silver don't function as safe havens for portfolio diversification in Latin American stock markets. Pardal, P., Dias, R., Šuleř, P., Teixeira, N., and Krulický (2020) analyzed financial integration in the capital markets of Austria (ATX), Slovenia (SBITOP), Hungary (BUDAPEST SE), Lithuania (OMX VILNIUS), Poland (WIG), the Czech Republic (PX PRAGUE), Russia (MOEX) and Serbia (BEL-EX 15), in the context of the global pandemic (Covid-19). The authors show very significant levels of integration, which decreases the chances of diversification in the long term. Heliodoro, P., Dias, R., Alexandre, P., and Vasco C. (2020) tested financial integration in the Brazilian, China, India and Russia (BRIC's) stock markets from July 2015 to June 2020. The results suggest very significant levels of integration in the global pandemic period of 2020; these findings bring into question the implementation of portfolio diversification strategies. Dias, Heliodoro, Alexandre, and Vasco (2020b) show that the WTI oil index causes the stock markets of Russia and India, while China does not cause any markets and Brazil is not caused by any market analyzed. On the other hand, short-term market shocks are relevant and create some arbitrage opportunities; these findings could also bring into question the implementation of portfolio diversification.

Dias, Heliodoro, Teixeira, and Godinho (2020), Dias, Teixeira, Machova, et al. (2020), Heliodoro, Dias, and Alexandre (2020), analyzed the persistence of profitability in international capital markets. Dias, Heliodoro, Teixeira, and Godinho (2020) tested the hypothesis of an efficient market, in its weak form, in sixteen international capital markets, from January 2002 to July 2019. The authors show that the global financial crisis has intensified the level of integration of international financial markets. Concerning the random walk hypothesis, the results suggest the existence of a reversal of the average, showing that the price series are not independent and identically distributed in the developed and emerging markets, European and non-European. Dias, Teixeira, Machova, et al. (2020) analyzed capital market efficiency, in its weak form, using the Stock Indexes of Belgium (BEL 20 index), France (CAC 40 index), Germany (DAX 30 index), USA (DOW JONES index), Greece (FTSE Athex 20 index), Spain (IBEX 35 index), Ireland (ISEQ index), Portugal (PSI 20 index) and China (SSE index) in the period from December 2019 to May 2020. The authors suggest mixed evidence, i.e., the random walk hypothesis is rejected for the Dow Jones, SSE and PSI 20 capital markets, partially rejected in the BEL 20, CAC 40, Athex 20 and DAX 30 stock markets, while in the IBEX 35 and ISEQ stock markets the random walk hypothesis is not rejected showing the balance of these capital markets. Heliodoro, Dias, and Alexandre (2020) analyzed the six main markets in Latin America (Argentina, Brazil, Chile, Colombia, Mexico and Peru) and the USA in the period 2015-2020. The results of the autocorrelation tests are totally coincident with those obtained by the BDS test. The rejection of the null hypothesis, i.i.d. can be explained, among other factors, by the existence of autocorrelation or by the existence of heteroscedasticity in the series of stock indices, in which case the rejection of the null hypothesis is explained by the nonlinear dependence of the data, except the Argentine market. The authors show that these regional markets demonstrate persistence in their profitability, which could be beneficial for investors.

Dias and Pereira (2021), Dias, Heliodoro, Alexandre, Santos, and Farinha (2021) analyzed the impact of the 2020 global pandemic on the memory properties of European stock markets. Dias and Pereira (2021) analyzed whether the evolution of Covid-19 (confirmed cases and deaths) caused shocks in 8 European markets, from December 31, 2019 to July 23, 2020. The authors

show that the Covid-19 time series don't cause shocks in the stock markets analyzed, but the capital markets of Europe show the presence of long memories (0.61-0.73), i.e. profitability shows autocorrelation over time. Dias, Heliodoro, Alexandre, Santos, and Farinha (2021) analyzed the impact of the 2020 global pandemic on the memory properties of Eastern European stock markets, from January 1, 2016 to September 2, 2020; the sample was divided into two subperiods: January 1, 2016 to August 30, 2019 (before Covid-19) and September 2, 2019 to September 2, 2020 (after Covid-19). The authors show that daily returns don't have normal distributions, they have negative asymmetries, leptokurtic and also present conditional heteroscedasticity. DFA exponents, during the Covid-19 period, range from 0.64 to 0.75, showing significant long memories, with the exception of the capital market of Slovakia (0.45).

In summary, this work aims to contribute to the provision of information to investors and regulators in international stock markets, where individual and institutional investors seek diversification benefits, as well as to help to promote the implementation of policies that contribute to the efficiency of domestic markets. Therefore, the context of this work is to examine predictability in Euronext's stock markets during the first and second waves of the global pandemic Covid-19).

3. METHODOLOGY

3.1. Data

The data analyzed are the prices index of the stock markets of the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20), in the period from April 4, 2019 to April 1, 2021. The sample was partitioned into two sub-periods, the first and second wave of the global pandemic: April 4, 2019 to April 30, 2020; May 4, 2020 to April 1, 2021. The quotes are daily and were obtained from the Thomson Reuters platform.

Table 1. The name of countries and their indexes used in this paper

Country	Index
Holland	AEX
Belgium	BEL 20
France	CAC 40
Ireland	ISEQ 20
Norway	OSEBX
Portugal	PSI 20

Source: Own elaboration.

3.2. Methodology

The research will develop throughout several stages. Market graphs were carried out, at levels, to estimate the evolution of Euronext's stock markets. The characterization of the sample will be performed using descriptive statistics, to verify whether if the data follow a normal distribution. In order to assess if the time series follows a white noise (mean = 0; constant variance), we'll use the unit root tests as Hadri panel (2000) and Im, Pesaran, and Shin (2003) that postulate opposite null hypotheses. To measure the structure breaks, we'll estimate the test of Clemente et al (1998) which will determine the date of the main structural break in Euronext's capital markets. To answer the research question, we'll apply the methodology of the Detrended Fluctuation Analysis (DFA). DFA is an analysis method that examines temporal dependence on non-stationary data series. This technique assumes that time series are non-stationary to avoid spurious

results when the analysis focuses on the relationships of the data series in the long term. This methodology was developed by Peng et al. (1994) and it has origin in the study of the behavior of DNA. Later this method was used to examine the behavior of financial series. DFA has the following interpretation: $0 < \alpha < 0,5$: anti-persistent series; $\alpha = 0.5$ series features random walk; $0.5 < \alpha < 1$ persistent series.

The function of this technique is to examine the relationship between values x_k and x_{k+t} in different moments (Sukpitak and Hengpunya,2016).Considering a dataset x_k ,with equidistant observations $k = 1, \dots, t$. DFA's first step is the construction of a new series:

$$x(t) = \sum_{k=1}^t x_k \quad (1)$$

The second step is to obtain the trend $z(t)$ of each fraction, through the least-squares method, obtaining the subtracted series from the trend (detrended), i.e.

$$x_s(t) = x(t) - z(t) \quad (2)$$

The original application assumes that the trend present in each of the boxes is a linear trend,i.e. subsequent applications indicate that it's likely to contain other polynomial tendencies, (Kantelhardt, Koscielny-Bunde, Rego, Havlin, and Bunde, 2001). For each box, the value of the trend equation is obtained by the least squares method and later the root of the mean square deviation between the series is estimated, the *DFA* function being given by:

The original application assumes that the trend present in each of the boxes is a linear trend, $Z(t) = at + b$ i.e.subsequent applications indicate that it's likely to contain other polynomial tendencies,(Kantelhardt,Koscielny-Bunde,Rego,Havlin,and Bunde,2001).For each box,the value of the trend equation is obtained by the least squares method and later the root of the mean square deviation between the series $x(t)$ and $Z(t)$ is estimated, the DFA function being given by:

$$F(s) = \sqrt{\frac{1}{2N} \sum_{t=1}^{2N} [x_s(t)]^2} \quad (3)$$

Estimating the average $F(s)$ for all centralized boxes in s generates the value of fluctuations $\langle F(s) \rangle$, depending on s . This estimation will be repeated for all distinct values of s , expecting a process of a power-law, i.e.,

$$\langle F(s) \rangle \sim s\alpha^a \quad (4)$$

This technique, by assuming that time series are non-stationary, avoids spurious results when the analysis focuses on the relationships of the data series in the long term. The Detrended Fluctuation Analysis (*DFA*) presents the following interpretation:

Table 2. Detrended Fluctuation Analysis (DFA)

Exponent	Type of Signal
$\alpha_{DFA} < 0.5$	anti-persistent long-range
$\alpha_{DFA} = 0.5$	uncorrelated, white noise
$\alpha_{DFA} > 0.5$	persistent long-range

Source: Own elaboration.

For a better analysis of this methodology see the articles of the authors Dias, da Silva, and Dionísio (2019), Dias, Heliodoro, Alexandre, and Vasco (2020), Dias, Heliodoro, and Alexandre (2020), Alexandre, Dias, and Heliodoro (2020), Santos and Dias (2020).

4. RESULTS

Figure 1 shows the evolution, in levels, of the stock markets of the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20). The sample comprises the time lapse from April 4, 2019 to April 1, 2021, which is a period of great complexity, due to the outbreak of the global pandemic (Covid-19). Profitability clearly shows volatility in February, March and April 2020. These results are in line with the findings of the authors Dias, Heliodoro, Alexandre, and Vasco (2020), Dias, Heliodoro, and Alexandre (2020), Dias and Carvalho (2020) which show the existence of extreme volatility in the financial markets resulting from the global pandemic of 2020.

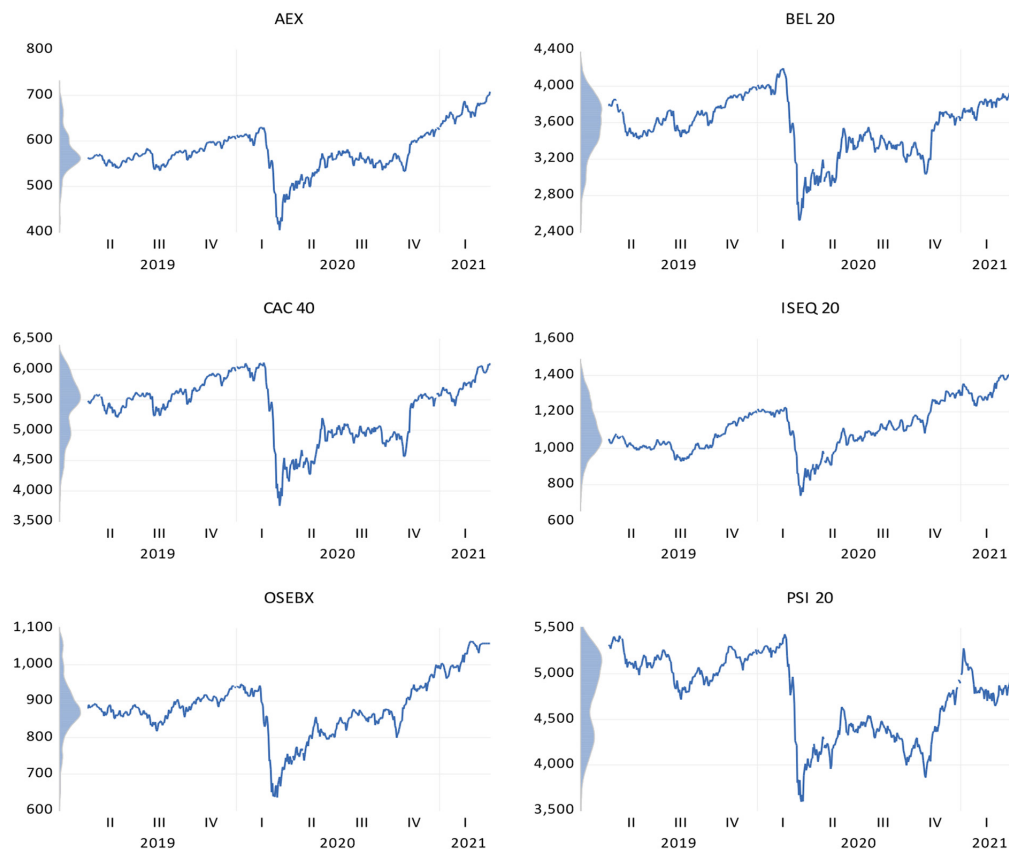


Figure 1. Evolution, in levels, of Euronext's 6 stock markets from April 6, 2019 to April 1, 2021.

Source: Own elaboration.

Notes: *DataStream*: April 4, 2019, 511-point data.

Table 3 shows the main descriptive statistics of Euronext's markets, namely the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20) stock markets. The markets under analysis show positive average yields with the exception of the PSI 20 stock index (-0.000130). The Belgian stock market has the standard deviation (0.016373), the asymmetry (-1.956358), and the sharpest shortness (20.78319). Additionally, the coefficients of asymmetry and kurtosis are statistically different from those of a normal distri-

bution; these indices are corroborated with the Jarque and Bera test (1980), where the chance that the data follow a normal distribution is rejected at the level of meaning of 1%.

Table 3: Descriptive statistics, return, of Euronext's 6 stock markets, from April 4, 2019 to April 1, 2021.

	AEX	BEL 20	CAC 40	ISEQ 20	OSEBX	PSI 20
Mean	0.000456	7.95E-05	0.000217	0.000593	0.000363	-0.000130
Std. Dev.	0.013901	0.016373	0.015735	0.016197	0.013429	0.013529
Skewness	-1.291213	-1.956358	-1.383687	-0.851653	-1.429240	-1.186823
Kurtosis	16.74827	20.78319	16.98572	10.58902	12.01404	15.14440
Jarque-Bera	4158.284***	7045.461***	4319.250***	1285.506***	1900.256***	3253.816***
Observations	510	510	510	510	510	510

Source: Own elaboration.

Notes: ***. **. *. represent significance at 1%. 5% and 10%, respectively.

As we are in the presence of time successions, we should study the stationary nature of the time series relating to Euronext markets, namely the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20) stock markets. For this, we used the tests of unitary roots in a panel of Im, Pesaran, and Shin (2003) that postulates unitary roots in the null hypothesis, while the Hadri test (2000) presents the stationarity in the null hypothesis. The intersection of the tests shows the time series are stationary, in the first differences; this means that we are facing a white noise (mean = 0; constant variance) (see tables 4 and 5).

Table 4. Panel Unit Root Test by Im, Pesaran, and Shin (2003), applied from Euronext's 6 stock markets, from April 4, 2019 to April 1, 2021.

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-57.7538	0.0000
Im, Pesaran and Shin t-bar	-21.7458	
T-bar critical values ***:	1% level	-2.33500
	5% level	-2.10000
	10% level	-1.97500

Source: Own elaboration.

Note: ** Probabilities are computed assuming asymptotic normality.

*** Critical values from original paper.

Table 5. Panel Unit Root Test by Hadri (2000), applied to Euronext's 6 stock markets from April 4, 2019 to April 1, 2021.

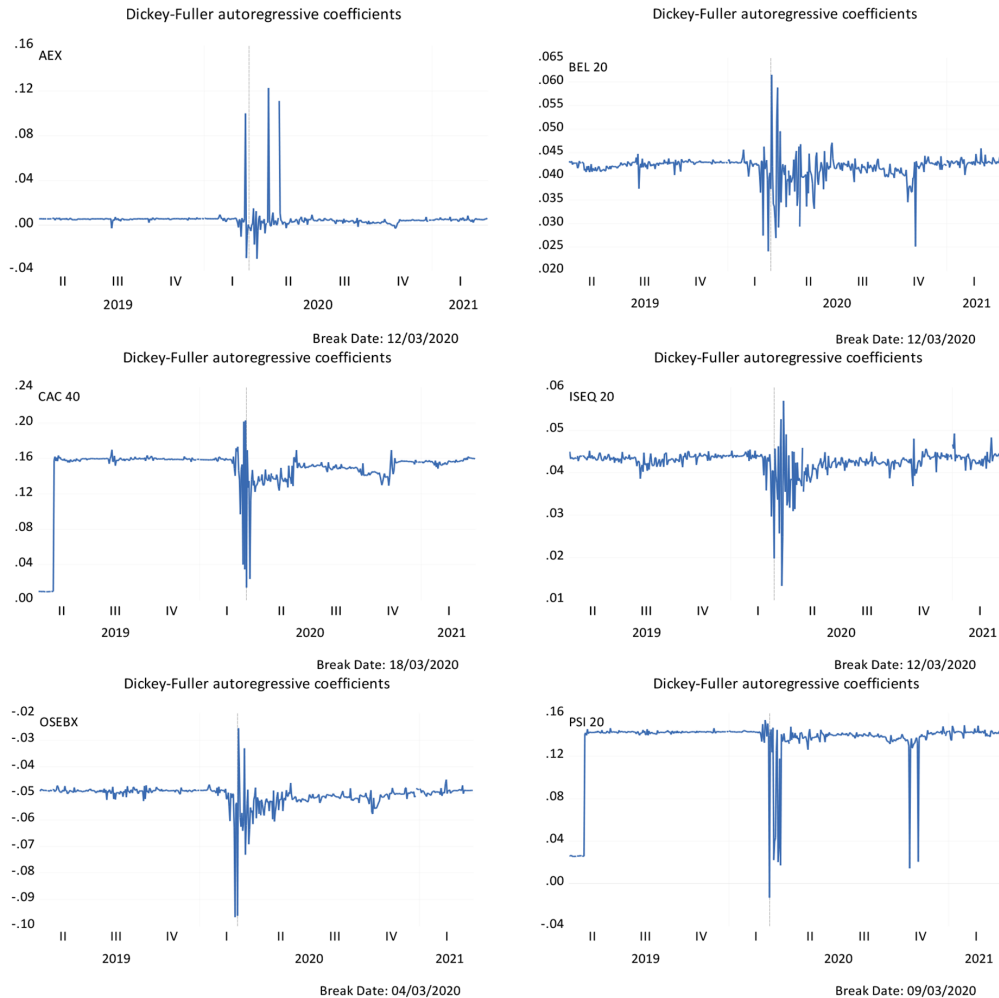
Method	Statistic	Prob.**			
Hadri Z-stat	-0.83509	0.7982			
Heteroscedastic Consistent Z-stat	-0.49851	0.6909			
Series	Lm	Hac	Variance	Bandwidth	Note
D(AEX)	0.1637	69.63054		9.0	509
D(BEL 20)	0.0979	3871.401		9.0	509
D(CAC 40)	0.1231	7846.040		9.0	509
D(ISEQ 20)	0.1461	331.8674		6.0	509
D(OSEBX)	0.1732	154.5611		10.0	509
D(PSI 20)	0.1140	5285.594		9.0	509

Source: Own elaboration.

Note: ** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Figure 2 shows the results of unitary root tests, with structural breaks, by Clemente et al. (1998), relating to Euronext’s stock markets. The stock indexes OSEBX (04/03/2020), PSI 20 (09/03/2020), AEX (12/03/2020), ISEQ 20 (12/03/2020), BEL 20 (12/03/2020), CAC 40 (18/03/2020) show significant declines in March 2020, which was expected due to the evolution of the global pandemic (Covid-19). These findings are corroborated by the authors Dias and Carvalho (2020), Dias and Pereira (2021), Dias, Heliodoro, Alexandre, Santos, and Farinha (2021) which show structural breakdowns in international financial markets.

Figure 2. Stationary tests with structural breaks by Clemente et al. (1998), relating to Euronext’s 6 stock markets, from April 4, 2019 to April 1, 2021.



Source: Own elaboration.

Notes: *DataStream:* April 4, 2019, 510-point data.

Table 6 shows the results of the detrended fluctuation analysis (DFA) exponents for the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20) stock markets. When we look at the first wave of the global pandemic, i.e. from April 4, 2019 to April 30, 2020, the results show that the stock indexes OSEBX (0.67), PSI 20 (0.67), AEX (0.66), BEL 20 (0.64), CAC 40 (0.62), ISEQ 20 (0.61) have long memories and persistence in profitability, which implies that profitability is auto-correlated over time, that prices don’t fully reflect the information available, and that changes in prices are not i.i.d. When we looked at the second wave of the pandemic, from May 4, 2020 to April 1, 2021, we found that the persistence decreased significantly,

i.e., the stock markets of the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20) don't reject the random walk hypothesis, i.e., these markets adjusted from May 2020. In the case of the stock markets of Norway (OSEBX), Portugal (PSI 20) we found that they present some persistence, but it's lower when compared to the first wave of the global pandemic (0.56-0.55). These findings show that the capital markets analyzed show balance during the second wave of the pandemic, i.e., investors will not be able to achieve above-average yields without incurring additional risk.

Table 6. DFA exponent for index and return. The values of the linear adjustments for α_{DFA} always had $R_2 > 0.99$.

Stock market	Exponent DFA (1 Vacancy)	Exponent DFA (2 Vacancy)
AEX	0.66 \cong 0.0017***	0.44 \cong 0.0318
BEL 20	0.64 \cong 0.0011***	0.53 \cong 0.0124
CAC 40	0.62 \cong 0.0016***	0.54 \cong 0.0128
ISEQ 20	0.61 \cong 0.0012***	0.46 \cong 0.0365
OSEBX	0.67 \cong 0.0013***	0.56 \cong 0.0018**
PSI 20	0.67 \cong 0.0014***	0.55 \cong 0.0011**

Source: Own elaboration.

Note: The hypotheses are: $H_0\alpha = 0.5$ and: $H_1\alpha \neq 0.5$. ***, **, *. represents significance at 1%, 5% and 10%, respectively.

5. CONCLUSION

The general conclusion to be withheld and sustained in the results obtained, through tests carried out with econometric and econophysical models, show that during the first wave of the global pandemic the stock markets of the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20), Norway (OSEBX), Portugal (PSI 20) have some challenges. These results bring into question the hypothesis of market efficiency, in its weak form, showing that investors can obtain advantages without incurring additional risk. In the second wave, we found that the persistence decreased significantly, that is, the stock markets of the Netherlands (AEX), Belgium (BEL 20), France (CAC 40), Ireland (ISEQ 20) don't reject the random walk hypothesis, that is, these markets adjusted from May 2020. In the case of the stock markets of Norway (OSEBX), Portugal (PSI 20) we found that they present some persistence, but it is lower when compared to the first wave of the global pandemic (0.56-0.55). These findings show that the capital markets analyzed show balance during the second wave of the pandemic, that is, investors will not be able to achieve above-average yields without incurring additional risk.

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Analysis of the Number of European Union Citizens Working in the Regions of Slovakia in the Period 2013-2019

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Keywords:

Number of working EU citizens;
Contribution method;
Suslov's coefficient



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Abstract: *The paper aims to analyse the regions of Slovakia based on the number of working citizens of the European Union. The contribution method is used to find out in which region the number of working foreigners increased the most, and in which the least. Suslov's coefficient of similarity of structures is used to analyse changes in the structure of the analysed indicator. From the results of the realized analysis we found out that the number of working foreigners in Slovakia increased the most in the year 2014 compared to 2013, by 63.40%. Bratislava Region (16.92%), Žilina Region (11.37%) and Prešov Region (9.63%) contributed the most to this increase, while Košice Region (0.91%) and Trenčín Region (1.07%) contributed the least. In the year 2019 compared to 2018 was recorded an increase of only 6.10%. Suslov's coefficient of similarity of structures acquires the value 0.0230, which means a high degree of similarity of structures of the number of working foreigners in the years 2013 and 2019.*

1. INTRODUCTION

Migration has been around the world since time immemorial, with people traveling to other countries for better work or better living conditions. It is part of the life cycle and effects, on the one hand, the countries from which people leave, but also the countries that are attractive to people traveling for a better life.

In this paper, we deal with the topic of employment of citizens of the member states of the European Union in Slovakia. In the past, our country was not very popular for foreigners, more people left Slovakia going abroad than they arrived. From the point of view of migration, it was rather a transit country. Slovakia's accession to the European Union has changed many things. We have become a more stable country in all directions. Foreigners who took us as a transit station began to perceive us as an opportunity to work in better conditions compared to the home country. If migration is reasonably regulated, it is good for the economy. Foreigners working in another state contribute to its state budget in the form of taxes, support domestic consumption and create pressure to increase competitiveness in the labour market. However, higher added value is primarily brought by highly qualified employees performing more sophisticated activities.

The coronary crisis reduces the number of foreigners working in Slovakia. While at the end of February last year 78.2 thousand citizens from other countries worked for us, at the end of last year their number gradually decreased to 69 thousand (SITA, 2021).

The aim of the paper is to analyse the regions of Slovakia based on the number of working citizens of the member states of the European Union in the years 2013 – 2019.

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2. METHODOLOGY

We will use the contribution method to find out which region contributed the most to total increase in the number of working citizens of the EU Member States. We will use Suslov's coefficient of similarity of structures to analyse changes in the structure of the given indicator.

2.1. The contribution method

The contribution method is used for the analysis of additive indicators (Y_t), which are the sum of individual components (y_t^i), while (Hindls, Kaňoková, Novák, 1997):

$$Y_t = \sum_{i=1}^n y_t^i \quad (1)$$

We use this method when we want to find out to what extent the changes of its individual components contributed to the change of the additive indicator.

The procedure of the contribution method is as follows. First, we calculate the relative increase of the additive indicator:

$$k_{\Delta t} = \frac{Y_t - Y_{t-1}}{Y_{t-1}} \quad (2)$$

and relative increases of its individual components:

$$k_{\Delta t}^i = \frac{y_t^i - y_{t-1}^i}{y_{t-1}^i} \quad (3)$$

Then we calculate the structural number in the period $t-1$:

$$s_{t-1}^i = \frac{y_{t-1}^i}{Y_{t-1}} \quad (4)$$

Contributions for individual components are calculated according to the relationship:

$$k_{\Delta t}^i \cdot s_{t-1}^i \quad (5)$$

The contributions for the individual components are then interpreted as the value in percent that the i -th component contributed to total change in the additive indicator Y_t (Hurbánková, Sivašová, 2018).

The relative increase of the additive indicator is equal to the sum of the relative contributions of the individual components (Hindls, Hronová, 1997):

$$\sum_{i=1}^n \left(\frac{y_t^i - y_{t-1}^i}{y_{t-1}^i} \right) * \frac{y_{t-1}^i}{Y_{t-1}} = \frac{1}{Y_{t-1}} \sum_{i=1}^n (y_t^i - y_{t-1}^i) = \frac{1}{Y_{t-1}} \left(\sum_{i=1}^n y_t^i - \sum_{i=1}^n y_{t-1}^i \right) = \frac{Y_t - Y_{t-1}}{Y_{t-1}} \quad (6)$$

2.2. The Suslov's coefficient of similarity of structures

The Suslov's coefficient is one of the measures for the analysis of the similarity of structures. We proceed as follows to calculate it. We find out how many and what components z_i has the analysed additive indicator and define the compared situations t and $t-1$. We quantify the share of each

component in the total value of the aggregate (we calculate the structural numbers x_i and y_i). We verify whether

$$\sum_{i=1}^n x_i = 1 \text{ and } \sum_{i=1}^n y_i = 1 \quad (\text{Kahounová, 1994}).$$

We calculate the absolute differences of the paired structural numbers belonging to the i -th component in the situations t and $t-1$:

$$|x_i - y_i| \quad (7)$$

We calculate the Suslov's coefficient of similarity of structures according to the expression:

$$d_{sus} = \frac{1}{n} \sum_{i=1}^n |x_i - y_i| \quad (8)$$

The values of the Suslov's coefficient are in the interval $\langle 0; 2/n \rangle$. If the value of the coefficient is near to 0, the similarity of the compared structures increases. If the value of the coefficient is near to $2/n$, the similarity of the compared structures decreases, resp. their difference increases. If the coefficient is equal to 0, it means the equality of the analysed structures and the value $2/n$ means the complete difference of the structures (Karpov, 2007).

Suslov's coefficient expresses by how many percentage points on average one part (component) of the structure in situation t differs from situation $t-1$, resp. what is the deviation in percentage points on average per one component of the given additive n -component indicator (Pozdniaková, 1981).

3. RESULTS AND DISCUSSION

The numbers of citizens of EU Member States working in the regions of the Slovak Republic (excluding Slovak citizens) are shown in Table 1. In the observed period, the number of citizens of European Union member states working in Slovakia increased more than fourfold. In absolute expression, it increased the most in the Bratislava region by more than 11,000, the least in Prešov region by less than 900. In that period, the number of working foreigners from EU countries increased almost every year in each region, with the exception of the year 2019, when it (in Trnava, Trenčín and Prešov regions) slightly decreased.

The relative increases (calculated according to Kotlebová et al., 2017) of EU citizens working in individual regions of the Slovak Republic in the years 2013 – 2019 can be seen in Table 2. The highest year-on-year growth in the number of EU citizens working in Slovakia occurred in the year 2014, when their number increased by more than 60% compared to the previous year. The working population of the EU member states in Žilina region increased the most in that year, where their number increased 3.5 times compared to the previous year. The number of working citizens of EU member states increased by more than 100% in Banská Bystrica and Prešov regions; the slowest increase occurred in the year 2019, when this indicator increased by only 6%; in three regions (Trnava, Trenčín and Prešov) it even decreased.

Using the contribution method, we will find out how the individual regions of the Slovak Republic participated in the change in the number of working citizens of the EU member states. The calculations are shown in Table 3 (contributions are in percentages).

Table 1. Number of citizens of EU member states (except Slovak citizens) working in individual regions of the Slovak Republic in the years 2013 – 2019

Regions of Slovakia	2013	2014	2015	2016	2017	2018	2019
Bratislava region (BA)	3 165	4 525	6 298	8 267	9 867	12 958	14 260
Trnava region (TT)	1 530	2 214	2 492	3 312	4 382	5 047	5 032
Trenčín region (TN)	770	856	975	1 253	1 789	2 354	2 251
Nitra region (NR)	1 077	1 723	2 310	3 157	4 058	4 730	5 056
Žilina region (ZA)	257	1 171	1 724	1 896	2 032	1 526	1 910
Banská Bystrica region (BB)	376	936	1 350	1 398	1 355	1 479	1 501
Prešov region (PO)	509	1 283	1 745	1 942	1 686	1 710	1 394
Košice region (KE)	357	430	619	1 010	1 418	1 748	2 073
Slovakia total	8 040	13 137	17 513	22 234	26 586	31 553	33 477

Source: Labour, Social Affairs and Family Office, 2021

Table 2. Relative increases of citizens from EU member states working in individual regions of the Slovak Republic in the years 2014 – 2019

Regions of Slovakia	2014	2015	2016	2017	2018	2019
BA	0,4297	0,3918	0,3126	0,1935	0,3133	0,1005
TT	0,4471	0,1256	0,3291	0,3231	0,1518	-0,0030
TN	0,1117	0,1390	0,2851	0,4278	0,3158	-0,0438
NR	0,5998	0,3407	0,3667	0,2854	0,1656	0,0689
ZA	3,5564	0,4722	0,0998	0,0717	-0,2490	0,2516
BB	1,4894	0,4423	0,0356	-0,0308	0,0915	0,0149
PO	1,5206	0,3601	0,1129	-0,1318	0,0142	-0,1848
KE	0,2045	0,4395	0,6317	0,4040	0,2327	0,1859
Slovakia total	0,6340	0,3331	0,2696	0,1957	0,1868	0,0610

Source: Own calculations according to Hindls & Hronová (1997) and Hurbánková & Sivašová (2018)

Table 3. Calculation of the contribution method for the number of EU citizens working in individual regions of the Slovak Republic in the years 2014 - 2019

Regions of Slovakia	2014	2015	2016	2017	2018	2019
BA	16,92	13,50	11,24	7,20	11,63	4,13
TT	8,51	2,12	4,68	4,81	2,50	-0,05
TN	1,07	0,91	1,59	2,41	2,13	-0,33
NR	8,03	4,47	4,84	4,05	2,53	1,03
ZA	11,37	4,21	0,98	0,61	-1,90	1,22
BB	6,97	3,15	0,27	-0,19	0,47	0,07
PO	9,63	3,52	1,12	-1,15	0,09	-1,00
KE	0,91	1,44	2,23	1,84	1,24	1,03
Slovakia total	63,40	33,31	26,96	19,57	18,68	6,10

Source: Own calculations according to Karpov (2007)

Bratislava region contributed most significantly to the growth in the number of citizens of the member states of the European Union working in the Slovak Republic. This applies to each of these years and it results from the fact that more than a third of all citizens of EU member states working in Slovakia live in Bratislava region. The analysed indicator increased the most in the year 2014 compared to 2013 by 63.40%. Bratislava region (16.92%), Žilina region (11.67%) and Prešov region (9.63%) contributed the most to this increase. Košice region (0.91%) and Trenčín region (1.07%) contributed the least. The number of working EU citizens increased the least in the year 2019 compared to 2018, by only 6.10%.

In terms of the structure of the distribution of workers in individual regions, there were slight changes in the analysed period. The percentage of working citizens of EU member states living in individual regions of Slovakia is shown in Table 4.

Despite the fact that there are slight changes in the structure in the observed period, we can state that the situation is relatively stable. The highest number of citizens of EU member states works in Bratislava region, although in the year 2014 it dropped more significantly to the level of 34.44%, but from the year 2017 it started to grow to the level of 42.6% in 2019. We can expect this situation, because in the main city is the highest concentration of headquarters of international companies. Many of them sent their employees to Slovakia, working mainly at various levels of management.

Table 4. Percentage representation of citizens of EU member states working in individual regions of the Slovak Republic in the years 2013 – 2019

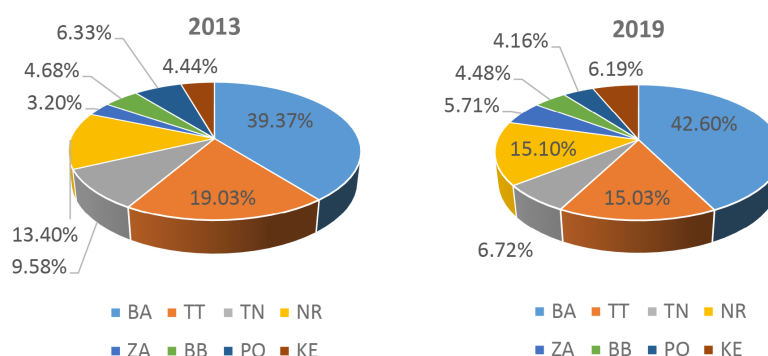
Regions of Slovakia	2013	2014	2015	2016	2017	2018	2019
BA	39,37	34,44	35,96	37,18	37,11	41,07	42,60
TT	19,03	16,85	14,23	14,90	16,48	16,00	15,03
TN	9,58	6,52	5,57	5,64	6,73	7,46	6,72
NR	13,40	13,12	13,19	14,20	15,26	14,99	15,10
ZA	3,20	8,91	9,84	8,53	7,64	4,84	5,71
BB	4,68	7,12	7,71	6,29	5,10	4,69	4,48
PO	6,33	9,77	9,96	8,73	6,34	5,42	4,16
KE	4,44	3,27	3,53	4,54	5,33	5,54	6,19

Source: Own calculations according to Kahounová (1994)

The largest decrease in the level of representation of working citizens of EU member states occurred in Trenčín region (from 9.58% in the year 2013 it decreased to 6.72% in the year 2019), the lowest share (5.57%) reached in the year 2015. There was a slight decrease in Prešov region (from 6.33% in the year 2013 to 4.16% in the year 2019). The share increased in Nitra region (from 13.40% in the year 2013 to 15.10% in the year 2019), which may be due to the arrival of the Jaguar carmaker.

In other regions, the structure of EU citizens working in the Slovak Republic is developing steadily and there are no significant fluctuations in them.

For better illustration, we will display the data for the first and last year using a pie chart (Graph 1).



Graph 1. Percentage share of citizens of EU member states working in individual regions of the Slovak Republic in 2013 and 2019

Source: Own processing

Changes in the structure of the distribution of working foreigners from EU countries will be further analysed using the Suslov's coefficient of similarity of structures. We examine the similarity in the structure in the years 2013 and 2019. The value of this coefficient in the 8-component aggregate can take values from the interval $\langle 0, 0.25 \rangle$. The calculation is given in Table 5.

Table 5. Calculation of the Suslov's coefficient of similarity of structures for the number of EU citizens working in individual regions of the Slovak Republic in the years 2013 and 2019

Regions of Slovakia	x_i	y_i	$ x_i - y_i $
BA	0,3937	0,4260	0,0323
TT	0,1903	0,1503	0,0400
TN	0,0958	0,0672	0,0285
NR	0,1340	0,1510	0,0171
ZA	0,0320	0,0571	0,0251
BB	0,0468	0,0448	0,0019
PO	0,0633	0,0416	0,0217
KE	0,0444	0,0619	0,0175
Slovakia total	1,0000	1,0000	0,1841
d_{sus}	x	x	0,0230

Source: Own calculations according to SME (2021)

The Suslov's coefficient has a value of 0.0230, which means a high degree of similarity in the structures of the number of EU citizens working in individual regions of the Slovak Republic in the years 2013 and 2019.

4. CONCLUSION

From the realized analysis, we can draw the following conclusions:

- In the observed period, the number of citizens of European Union member states working in Slovakia increased more than fourfold. Their number increased almost every year in each region, with the exception of the year 2019, when it (in Trnava, Trenčín and Prešov) regions slightly decreased.
- The most of EU citizens work in Bratislava region (up to 42.60% in 2019).
- The working population of the EU member states in Žilina region increased the most in the year 2014, where their number increased 3.5 times compared to the previous year. The number of working citizens of EU member states increased by more than 100% in Banská Bystrica and Prešov regions. In the year 2019, that indicator decreased in three regions (Trnava, Trenčín and Prešov).
- The number of working foreigners in Slovakia increased the most in the year 2014 compared to 2013, by 63.40%. Bratislava region (16.92%), Žilina region (11.37%) and Prešov region (9.63%) contributed the most to this increase. Košice region (0.91%) and Trenčín region (1.07%) contributed the least. In the year 2019 compared to 2018 was recorded an increase of this indicator of only 6.10%.
- The Suslov's coefficient of similarity of structures has a value of 0.0230, which means a high degree of similarity of structures of the number of working foreigners in the years 2013 and 2019.

Despite the fact that based on available data in the years 2013 – 2019, the growing trend of the number of working EU citizens in Slovakia seemed to be unambiguous, the crisis caused by the global pandemic of the covid-19 virus may bring significant changes. The measures taken to

prevent the spread of the virus are mainly based on reduced mobility. Therefore, we expect that the growth in the number of working EU citizens in Slovakia will slow down in the near future. Another factor that negatively affects changes in the number of working citizens of European Union in Slovakia may be the expected economic effects of the crisis, which are likely to lead to a reduction in the number of jobs and thus the number of foreigners. In the long term, we expect that the growing trend in the number of working EU citizens in Slovakia will continue. One of the reasons is that Slovakia is one of the countries with the lowest number of working foreigners.

ACKNOWLEDGMENT

This research was supported by the Grant Agency of Slovak Republic [KEGA grant number 007EU-4/2020 Interactive and interdisciplinary teaching of Services and Tourism Innovation subjects using information technology].

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Draft version



Foreign Direct Investment (FDI) or Remittances? Which Contributes the Most to the Albanian Economy?

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Keywords:

Foreign direct investments;
Gross domestic product;
Multifactorial econometric
model;
Economy;
Albania



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Abstract: *Foreign direct investment (FDI) and remittances entering an economy often play a very important role in the development and growth of economies year after year. Especially for economies with similar typologies and characteristics like that of Albania, both of these elements promote economic development and serve as financial incentives. This paper aims to assess the contribution of remittances and foreign direct investment in the Albanian economy in the last three decades, through a multifactorial econometric model. The model uses three endogenous variables, the value of remittances, the value of a foreign direct investment and the value of gross domestic product for the time series 1992 - 2019. As it results from the analysis of the econometric model, both remittances and foreign direct investment payments have a positive impact on economic growth and the value of gross domestic product. It is also evident that remittances are the ones that affect the gross domestic product more compared to foreign direct investment.*

1. INTRODUCTION

In the early 1990s, the change in economic structure occurred as a result of the transformation of Albania's political, economic and social system. Focusing on the free market economy, two of the factors that began to gain increasing importance were remittances and foreign direct investment. The overwhelming wave of emigration of those years began to produce remittances that were brought to the economy of the time. These incomes continued to grow from year to year. At the same time, the opening of the market and the recovery of trade relations with other economies brought about the arrival of foreign investors who mostly profited from the empty space in the markets where investment was needed.

For the effects of economic analysis, it is probably almost impossible to draw an accurate conclusion as to which were the sectors where remittances had their effect. This is for several reasons. Firstly, the lack of an accurate statistical database complicates the analysis. Secondly, remittances have affected almost all sectors of the economy since they began to come as financial flows since the end of 1991. Thirdly, from decade to decade, the orientation and focus of remittances have changed. The first decade of the arrival of remittances met the urgent needs of Albanian households for goods and capital materials that "covered" those needs by remittances. In the second decade remittances contributed mostly to the construction and reconstruction of houses and properties owned by individuals and families. While afterwards, remittances were directed at creating new businesses and supporting existing businesses. In parallel, part of the remittances has been the income base for the education of children, keeping small economies alive, etc.

Even for the assessment of foreign direct investment, there may be some questions about which have been the most important sectors where they have contributed. However, the picture is a little bit clearer given that incoming investments generally coincide with large values that were

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oriented towards large, visible and measurable investments. The paper contains four main parts: the first part presents a literature review that emphasizes the theoretical and empirical framework of previous studies. The second part presents the performance over 27 years of the value of remittances and FDI in relation to gross domestic product, as well as explanations of fluctuations in values. The third part presents the multifactorial econometric model together with the relevant analyzes and interpretations of the model. The last part summarizes the conclusions reached in this paper.

2. LITERATURE REVIEW

There are a lot of authors who have studied the links between remittances, foreign direct investment and gross domestic product. Some studies have seen remittances and foreign direct investment as separate models for their contribution to the economy. Similar studies have been conducted in the countries of Central and Eastern Europe, which for the sake of truth in some cases seem contradictory for different countries. Especially in terms of the correlation between the value of foreign direct investment and gross domestic product, there is much discussion. Some authors acknowledge that there is a positive connection between them. Other authors claim that the ratio between them is inversely proportional, as in some periods FDI has almost no effect on GDP.

Borenzstein and De Gregorio (Borenzstein & Gregorio, 1998) have argued in their study that the level of impact of foreign direct investment on the economy depends substantially on the intellectual level of the workforce. Understandably, the more educated the employees are, the realized investments are “absorbed” faster by individuals and the economy as a whole, having a more visible impact. Not only the workforce but also technology has an important role to play in the impact that FDI has on gross domestic product. *“Technology transfer can be done either through a workforce that was active in foreign companies, or through the introduction of new products in the market of the beneficiary country by making foreign direct investments.”* (Caves, 1996) In many cases, FDI brings new technologies to the place where it is invested. Caves argues that to a considerable extent, the implementation of investments in the field of technology also requires the assistance of foreign employees if domestic employees do not have the necessary specialization.

The impact of FDI on economic growth also depends heavily on the level of intensity of trade relations. Nair - Reichert and Weinhold argue that the more open an economy is [versus other economies], the greater the impact of FDI on the economy. (Nair-Reichert & Weinhold, 2001). Logically, if an economy tends to be open in trade and financial relations with other countries, a higher flow of capital is expected, which directly or indirectly translates into FDI. In contrast, Carkovic believes that the level of economic development of the country is not important to see how much FDI will affect GDP and economic growth. (Carkovic & Levine, 2002). Other authors have found that foreign direct investment has a greater impact on the economy if the country in which it is invested is rich. Being rich and prosperous, these two indicators accelerate the impact of these investments on the economy. (Blomstrom, Lipsey, & Zejan, 1992). In the same line of thought are some other British scholars such as Balasubramanian, Salisu and Stanford, who argue that the greater the economic development, the greater the impact of FDI on the economy (Bramasublamanyan, Salisu, & Sapsford, 1996). To reinforce this conclusion, Alfaro has demonstrated that the impact of FDI is greatest in economies with well-developed financial markets. (Alfaro & Chanda, 2004).

Numerous studies have also been conducted to study the impact of remittances not only on economic growth, but also to explain how the arrival of remittances is related to other macroeconomic factors such as unemployment, labor force, intellectual and human development, etc. Linking to the thirty-year-old Albanian reality and context, Posso and Chami have argued that in countries taken into analysis, the increase in remittances in one country causes a decrease in the active labor force willing to work. (Posso, 2012) (Chami, Fullenkamp, & Jahjah, 2003) This phenomenon has commonly occurred in Albania, as in a very large part of families benefiting from remittances, one or several family members tend not to work, because the provision of income is secure from another source and not from their work. Another study, which for the sake of truth does not coincide with Albania, states that there is no significant link between remittances and the impact it has on economic development. (Barajas, 2009).

Ratha claims in his studies that the growth of remittances has a strong positive impact on the growth and economic development of a country. (Ratha, 2013). The author goes even further, arguing that remittances not only have an impact on economic growth, but also directly affect poverty reduction. Other authors have conducted studies on a broader basis, in longer time series and for developing countries, with typologies somewhat similar to the Albanian economy. The authors Giuliano and Luis-Arranz have studied for about 27 years (1975 - 2002) 100 developing countries and have proven that there is a strong link between remittances and economic growth. The impact was even greater in countries with less developed financial structures and a financial system without much volume. (Giuliano & Ruiz-Arranz, 2009).

Another impact that remittances have is related to the exchange rate and the value of the local currency as a result of the cash flows that enter the country from remittances. Lartey and other coauthors (Lartey & Mendelman, 2012) have shown that a large value of remittances is a factor of direct impact on the exchange rate between the currency in which remittances are sent and the local currency. If this continues regularly, it could also bring about the Dutch disease phenomenon in the domestic economy.

3. PERFORMANCE OF REMITTANCES, FDI AND GDP IN ALBANIA

In the last thirty years, the value of gross domestic product and economic growth expressed in relative terms has often been marked by fluctuations and strong shocks from internal and external factors. In macroeconomic terms, the value of gross domestic product and economic growth is intended to be studied in the case of Albania, being also the focus of fiscal and monetary policies. Only through a quick look at the trend of indicators we can understand the connections between the indicators.

The first five years taken in the study (1992-1997) refer to the growth for the first time of all three indicators, because Albania had just emerged from the system of centralized economy. The first wave of emigration began to give its effects after the first one or two years of emigration. At the same time, the opening up of the economy began to bring in the first foreign direct investment. Following a break in the year 1997, the clearest, most visible and most stable trend of economic growth, remittances and FDI has started. The years 1998 - 2008 coincide with the great momentum of remittances and FDI, which give their impact on the economy. For all three indicators it is clear that they have the same movement cycle.

Meanwhile, from 2009 onwards, GDP has fluctuated with ups and downs reflecting the economic crisis, the change of governments in Albania and other important effects on the economy.

Meanwhile, the value of foreign direct investment and remittances begins to decline creating a steady downward trend. The financial crisis of 2009 is best reflected in remittances, translating into lower remittances. Crises in large international businesses also led to declining FDI in the country. What is worth noting is that the value of remittances in 28 years has always been higher than the value of foreign direct investments.

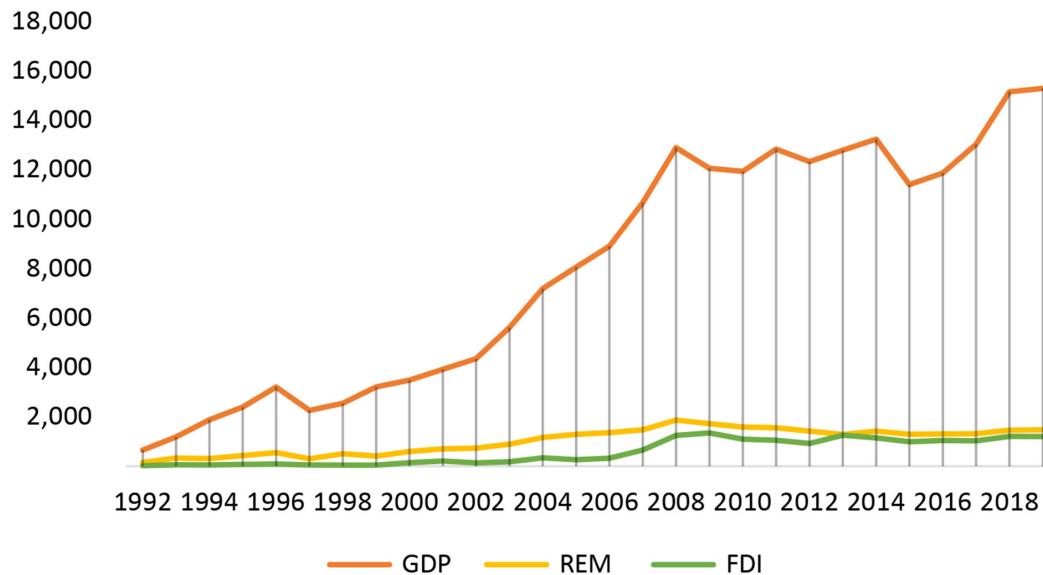


Figure 1. Trend of GDP, Remittances and FDI in Albania

Source: Author's calculations

4. RESEARCH METHODOLOGY

In regressive and autoregressive models that create time series, econometric tests are tests that assess the relationship of variables to each other and correlational relationships. However, even the econometric tests used should be evaluated from the moment of receiving the data, judging their validity and effectiveness of the data in use. The time series stationarity test is the first and most important test in the preparation and validity of the data form. The stationarity of time series is estimated as follows.

Augmented Dickey - Fuller (ADF) is the most common and important test for assessing the stationarity of time series. A variable is non-stationary if it is a function of time. A time series variable is stationary, i.e., stable if its mean and variance are constant over time and the covariance between the two values depends only on the length of the period that separates them and not on the time moments when they occur. The first technical element that needs to be implemented is the conversion of data we receive from time series into stationary data. Once time series data have been converted to stationary data, they can be used in econometric models. It often happens that most of the data for the examined variables are stationary. Even in cases where the data is not stationary, it can be converted to stationary by means of the unit root test.

To explain the relationship that exists between the economic variables of remittance and FDI by gross domestic product value, a simple multifactorial [in our case two-factorial] model of linear regression can be used. Considering the value of GDP as a dependent variable, the equation would be presented as follows:

$$GDP = \alpha + \beta REM_i + \gamma FDI_i + \varepsilon_i \quad (1)$$

where:

GDP – gross domestic product

REM – remittances

FDI – foreign direct investment

Some authors think that economic phenomena should be explained in logarithmic forms in order to make their interpretation simpler through elasticity. But in cases when we want to express the strength of the connection as well as the importance of the independent variables in relation to the endogenous variable studied, the use of the simple linear form is deemed more appropriate [according to equation (1)]. Based again on the suggestions given by the literature, multifactorial linear regression models should be used to study the relationships. Therefore, even in the case of Albania, for the data of the time series 1992 - 2019, this format of the econometric model will be applied, but after the data have been turned into stationary series.

Table 1. Stationarity of variables

Variable	Level		First difference	
	F stat.	Probability	F stat.	Probability
GDP	-0.5001	0.8765	-4.3783	0.002
REM	-1.5443	0.4969	-5.4462	0.0001
FDI	-0.7684	0.812	-4.1461	0.0036

Source: Author's calculations on EViews 10

The analysis of the data showed that the time series of the three variables are not stationary, but we turned them into stationary series. Specifically, GDP, remittances and FDI are stationary series in the first margin ($p < 0.05$). Now that the series has passed the stationarity test, the data can be used to construct the regression model. Since the data are returned stationary to the first difference, the model regression equation would be given according to the equation:

$$\Delta GDP = \alpha + \beta \Delta REM_i + \gamma \Delta FDI + \Delta \varepsilon_i \quad (2)$$

The analysis and econometric study of the model present the statistical data as follows:

Table 2. Statistical data of econometric model

Dependent Variable: D(GDP)				
Method: Least Squares				
Sample (adjusted): 1993 2019				
Included observations: 27 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	305.4376	121.7000	2.509758	0.0192
D(REM)	3.207711	0.900387	3.562593	0.0016
D(FDI)	1.813702	0.794512	2.282788	0.0316
R-squared	0.590483	Mean dependent var.		541.7343
Adjusted R-squared	0.556356	S.D. dependent var.		895.8958
S.E. of regression	596.7256	Akaike info criterion		15.72523
Sum squared resid.	8545955.	Schwarz criterion		15.86921
Log likelihood	-209.2906	Hannan-Quinn criter.		15.76804
F-statistic	17.30279	Durbin-Watson stat		1.925987
Prob(F-statistic)	0.000022			

Source: Author's calculations on EViews 10

As it can be seen from the data, we note that the model is statistically significant, referring to the almost zero probability value of the statistic t (Prob <0.05). At the same time, we notice that the corrected coefficient of determinability is over 0.5 (55.6%), thus being a relatively considerable coefficient. We should not worry about its value, as it is enough that the model as a whole is statistically significant. Continuing to interpret the statistical significance of the variables, we assert that both remittances and foreign direct investment are statistically significant, as the probability is again below 0.05 [specifically: prob (rem) = 0.0016 and prob (fdi) = 0.0316].

What is noticeable is that the remittance ratio is almost double the value of the foreign direct investment ratio, which we will argue below. Using this model, the equation is converted to values as in equation (3):

$$\Delta GDP = 305.44 + 3.21\Delta REM_i + 1.81\Delta FDI_i + \Delta \varepsilon_i \quad (3)$$

Realizing the qualitative interpretation of the variables we can say that:

1. If remittances change by \$1 million, gross domestic product is expected to change by \$3.21 million
2. If foreign direct investment changes by \$1 million, gross domestic product is expected to change by \$1.81 million.
3. Both variables have a positive correlation with GDP.
4. Remittances affect GDP almost twice as much as FDI.

For the model to be considered for more robust forecasts and analyzes, its parameters must also be tested in terms of multicollinearity between variables, heteroscedasticity, autocorrelation of residues, normal waste distribution, and long-term relevance. These tests are briefly analyzed below.

Table 3. Multicollinearity analysis

Variance Inflation Factors			
Sample: 1992 2019			
Included observations: 27			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	14810.89	1.123041	NA
D(REM)	0.810696	1.477679	1.330488
D(IHD)	0.631249	1.422065	1.330488

Source: Author's calculations on EViews 10

Analyzing the values of the centered and non-centered factor of variance, we assert that the model does not suffer from multicollinearity, as for all three variables (including the term constant) the value of VIF is less than the value 5.

Table 4. Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.446960	Prob. F(2,22)	0.2568
Obs*R-squared	3.138752	Prob. Chi-Square(2)	0.2082

Source: Author's calculations on EViews 10

It also turns out that our model does not suffer from autocorrelation, being a suitable model to be used in the future. This is confirmed by the probability of the Fischer test which results above 0.05, indicating the lack of autocorrelation in the model. [0.2568 > 0.05]

Table 5. Heteroscedasticity

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.504271	Prob. F(2,24)	0.6102
Obs*R-squared	1.088854	Prob. Chi-Square(2)	0.5802
Scaled explained SS	0.847609	Prob. Chi-Square(2)	0.6546

Source: Author's calculations on EViews 10

Also, the constructed model does not suffer from the phenomenon of heteroscedasticity, proving that the model residues have homoscedastic distribution. This is observed by the square Chi distribution probability which results greater than 0.05 [$\text{Prob}_{802} > 0.05$]

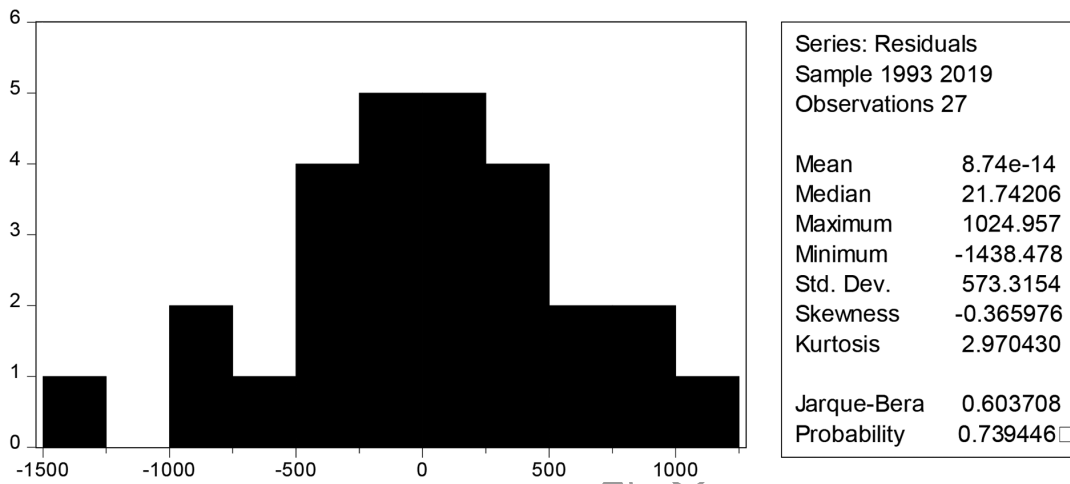


Figure 2. Normal distribution test

Source: Author's calculations on EViews 10

As it can be seen, the waste also has a normal distribution, making the model important and trouble-free to use. Normal waste distribution is a very important test that makes us think that the model can also be used for future predictions. However, to be even more convinced, we also use the CUSUM test.

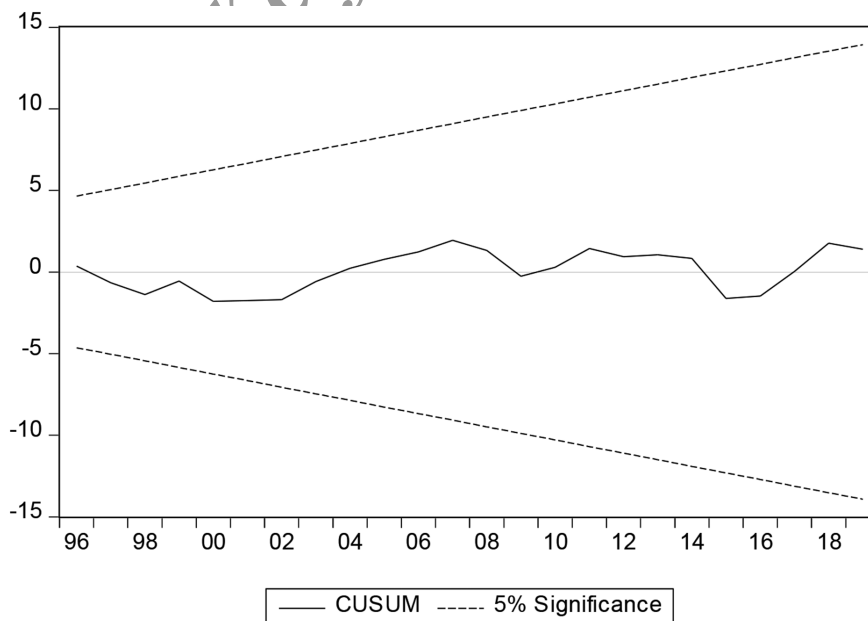


Figure 3. CUSUM Test

Source: Author's calculations on EViews 10

Analyzing the above graph, with a statistical significance level of error of 5%, we can confirm that waste will have the same form of behavior in the long run. This is because the waste does not come out of the red lines with a significance of 5% error. We are now firmly convinced that the model is also important in long-term forecasts.

5. CONCLUSION

Referring to the numerous studies that have been done in this field, but also the studies cited in the literature review, it was expected that in developing countries (especially for Central and Eastern European countries) both remittances and foreign direct investment had a positive impact on economic growth. Even indirectly, by delving deeper into the fact which of the two indicators had the most impact, it is claimed that remittances are the ones that have the most impact. The same conclusions have resulted for Albania from the study and analysis made during the paper.

If we rely on the result of the study in this paper, it is noticed that both variables, both remittances and foreign direct investment have a positive relationship with the value of gross domestic product. Both remittances and FDI have had a significant impact on the value of GDP and economic growth in Albania over the last three decades. If remittances change by \$1 million, gross domestic product is expected to change by \$3.21 million. If foreign direct investment changes by \$1 million, gross domestic product is expected to change by \$1.81 million. Judging also by the coefficients of the model, *we consider that remittances are those that affect almost twice as much as foreign direct investment on the value of gross domestic product.*

It is more than normal that remittances were expected to be the factor that contributed the most to economic growth. This is because for more than 30 years, remittances have strongly and significantly impacted household finances, small business performance and investment concepts within the household. Remittances have been the ones that have dictated the way of doing business, affecting the sectors from agriculture to other service sectors.

In this context, we recommend that:

- Remittances continue to inflow Albania as they serve as an important source of development and economic growth
- Albanian households should start orienting them in a more profitable way towards businesses and profit generation
- Governments can also build programs to encourage investment in remittances in sectors that are considered as priority sectors
- Foreign direct investment, although not as large as remittances, is an important contribution that should continue to contribute to the economy
- Clear programs should be built by the Albanian government to attract as much foreign direct investment as possible in order to provide the most positive long-term effects in the Albanian economy.

This paper aimed to create a simple analysis and quick overview of the economic indicators studied and the relationship that exists between them. Although this study covered the last thirty years (1992 - 2020), it would be preferable for other details to serve as the object of study for the future. Further analysis about calculating the real impact of regular remittances and criminal remittances (immigrant income coming from illegal or underground economies) could

also be studied in other papers. At the same time, future studies can be analyzed the constituent structure of FDI in the Albanian economy and the contribution coming from each of the sectors, etc. These new challenges are also the subject of further studies for the authors themselves. We also invite other researchers, specialists in the field or other experts to contribute to the fullest possible summary of all elements that touch on these issues that are so sensitive and significant for the Albanian economy. Finally, in the future, comparative panels can be built between Albanian data and the countries of the region with similar economic components on the problems of remittances and foreign direct investment.

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Draft version



Financial Life Cycle of Kosovo SMEs: Results of an Enterprise Survey

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Keywords:

Financial growth cycle;
Small business finance;
SMEs;
Kosovo



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Abstract: *This article empirically examined how Kosovan SMEs finance their working capital and their investments through their growth life cycle. Using the financial growth cycle paradigm to test the financial growth cycle based on a sample of 100 Kosovan SMEs' reporting data since their inception of business. Findings show that Kosovan SMEs use various sources to finance their working capital and investments throughout their life cycle. To finance their working capital needs, during the first two years of operation, Kosovan SMEs rely more on insider capital sources such as personal savings, financing offered from 3F connection - friends, family, fools, retained earnings, and also trade credit takes a significant place. Over time, as businesses evolve through age, the proportion of retained earnings and business debt financing in total capital injection volume increases significantly. As firms grow older, financing from trade credit marks a decline, so the SMEs replace it with using more overdraft. During the first years of operation, to finance their investments, Kosovan SMEs rely primarily on owner's personal savings, financing from 3F connection - friends, family, and fools, retained earnings, but as the company grows older and becomes more extensive, they rely mainly on two sources; retained earnings and bank loans. In general, concerning debt, Kosovan SMEs use more trade credit and overdraft to finance their working capital and bank loans to finance their investments. Funding from 3F is mainly used during the initial phase of operation. However, the most used resource by Kosovan SMEs in all stages of operation remains retained earnings, while external equity raised from angels and venture capitalists and other alternative financing are almost inexistent.*

1. INTRODUCTION

Small and medium enterprises (SMEs) are crucial for stable and thriving market economy, because they are an essential component of the economic and social development of the economy, contributing to employment and income generation (Bondareva & Zatrochová, 2014; Hashi & Krasniqi, 2011; Krasniqi & Desai, 2016). SMEs contribution to employment generation and economic growth has led to the growing interest in small firm finance, considering the critical role of firm's access to external finance for the survival and growth of small firms.

Considering the vital role of SMEs, it is an interest of both practitioners and policymakers about factors that enable or inhibit the growth. Funding sources are an essential factor that affects the growth of SMEs. The financing sources of SMEs, overall, depend on numerous financial decisions. They depend on many factors, such as type of enterprise, type of activity, the choice made by its executives for investments, financing structure, nature of management, - among others. These financial decisions are highly dependent and conditional on each other (Bundo, 2012). Initially, financing of small firms was not treated separately from large firms because it has been considered that there

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was no significant difference between small and large firms. However, it is a general finding in the empirical corporate finance literature that external funding sources available to SMEs are different from those generally used by larger firms or corporations. While the latter can issue corporate debt or equity onto capital markets (López-Gracia & Sogorb-Mira, 2008), external financing sources for small firms are almost exclusively reduced to seeking debt from lending institutions.

Most authors widely accept that the most prominent feature distinguishing small firms from large ones is information asymmetry. Unlike large firms, small firms do not enter into publicly accessible contracts, audits, and published financial statements. Doing small businesses is characterised by an asymmetry of information, making it impossible for the borrower to have the same information that the company management possesses. Small firms remain credit-rationed as a result of information asymmetry (Stiglitz & Weiss, 1981). Another issue that makes SMEs different from large firms has to do with decisions on capital structure. Relying only on private markets limits the financing of SMEs. Barriers such as information asymmetry, high transaction costs, and low levels of business owners' financial ability explain why SMEs have more difficulty accessing finance than large firms. Credit markets in both developed and developing countries are considered imperfect and deliberately limited, making the market mechanism unable to address small business financing needs (Bakhtiari et al., 2020; Beck, 2007; Bridge et al., 1998; Getter, 2020; Krasniqi, 2010; Star, 1983).

Small firms use different sources for financing. Entrepreneurs usually have insufficient resources to fund their new ventures from internal sources and seek external sources. Information asymmetry, lack of trading history, and high risk of failure influence small firms in its initial stage to rely more on internal sources of financing (Cassar, 2004; Huyghebaert & Van De Gucht, 2007; N. Berger & F. Udell, 1998; Stiglitz & Weiss, 1981). This has led to a lack of adequate funding sources for small firms leading to their failure (Coleman, 2000; Gaskill et al., 1993; Huyghebaert & Van De Gucht, 2007; Jones, 1979; Welsh & White, 1991). In addition to the owners' savings and family and friends, they also obtain financing from suppliers and advances from customers (Ang, 1992). Furthermore, how entrepreneurial firms receive external funding is one of the most fundamental questions for research on entrepreneurship in emerging economies (Cassar, 2004). As a result of their organisational features and business strategies that are rarely publicly disclosed, SMEs are usually not as transparent as large enterprises. This informational opacity limits their access to standardised public markets for equity and debt. Capital investment of firms is critical for productivity and growth of the private sector and an economy's overall growth. The firm's investment may be limited because of the firm's inability to obtain external finance despite the investment growth opportunities. If firms face limited access to external finance, they may be unable to invest, despite their willingness to do so unless internal finance sources are available. In these circumstances, larger firms that can obtain resources may not find a profitable use for them; on the other hand, small firms that can find the opportunities may not find the financial resources. This leads to the situation where the economy is losing some of the potential benefits of potentially good projects that will not be implemented because of the lack of funds. In addition to the general financial problems of SMEs in any economy, small firm financing in transition economies is impeded by the low-level development of the banking systems and capital markets and shortage of available capital, creating adverse supply-side effects leading to unfavourable conditions for the growth of the SMEs (Krasniqi, 2010).

The lack of studies investigating the extent and type of financing employed at various growth stages is a vital omission (Hussain & Matlay, 2007), especially in transition context (Krasniqi, 2012).

There is a scarcity of studies that have talked about the relationship between life cycle and financial policy (Mabrouk & Boubaker, 2019). A firm's funding requirements vary significantly throughout its life cycle and access to various financing sources. Thus, facilitating the identification of potential funding gaps at various points in a firm's development, and providing suggestions how firm can take advantage of using various sources at different stages of development contributes to the small firm financing literature in general, and in transition literature in particular.

To address these issues, this paper empirically examines the financial life cycle model of the 100 Kosovan firms, since the beginning of the operations. We categorise, capital structures of firms in the sample by sources of equity and sources of debt, and we analyse it across four age groups. Furthermore, we compare sources of finance employed at start-up with those employed at present, illustrating how firms' capital structures evolved. This paper tries to answer the following questions: What type of funding do SMEs use to finance their working capital and their investments during their growth life cycle, and how do they vary over time.

The paper is structured as follows. Firstly, the life cycle theory of small firms and an overview of small firm finance in Kosovo are outlined. The data research method is then described. In the following sections, empirical results are presented and discussed. The conclusion is followed by suggestions for further research and policy implications.

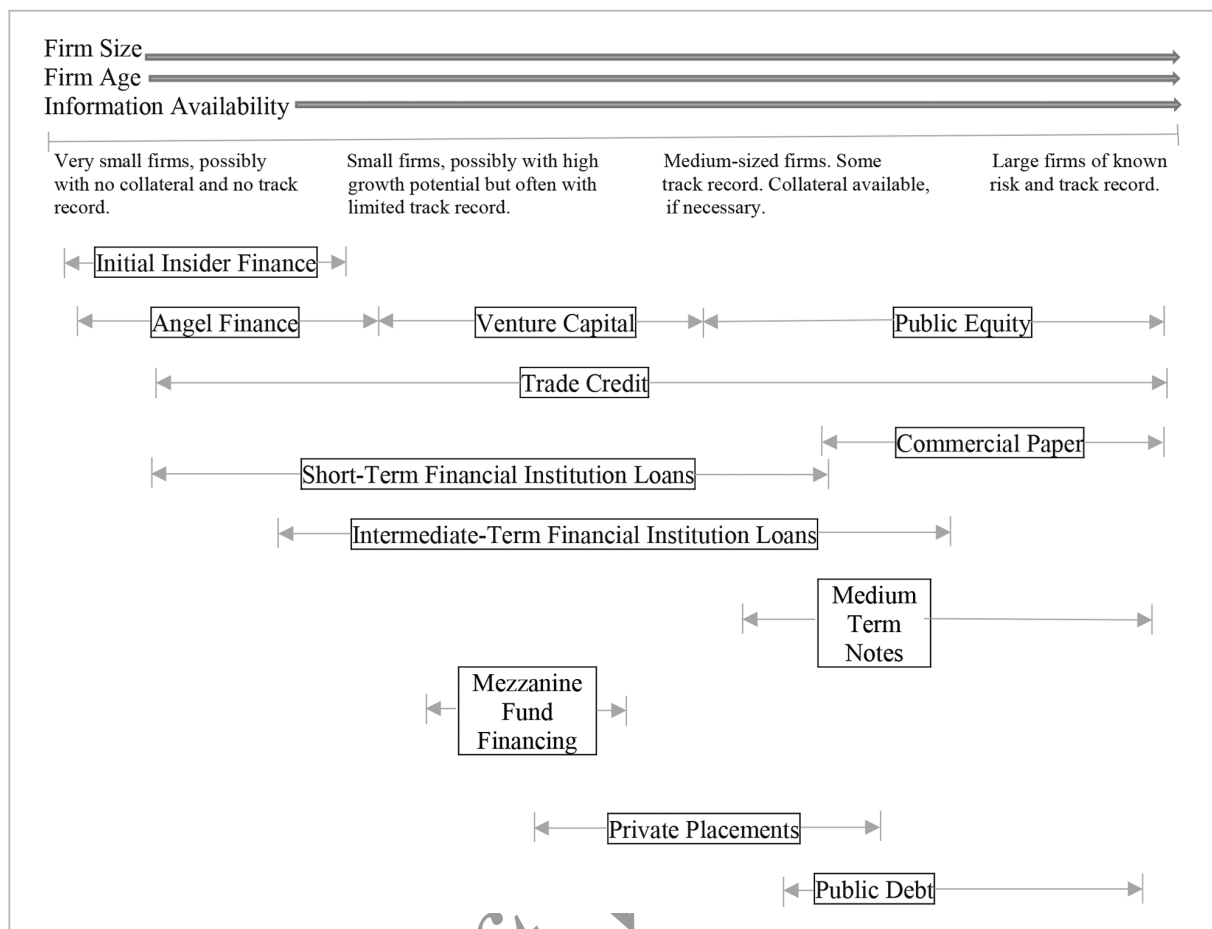
2. LITERATURE REVIEW

2.1. The financial growth cycle of SMEs

A small firm undergoes different stages of development from the initial stage through maturity, and a specific theory is necessary for each stage (Ang, 1992). Several enterprise growth models have been developed, while a unique growth model characterizes SMEs. The life cycle of firm has an important role in the dynamic of capital structure of a firm. It will have different funding decision in every life cycle because the characteristics of a firm affecting the capital structure will adjust to the development of life cycle occurring (Cempakasari et al., 2019). Berger and Udell (1998) are at the origin of the financial growth cycle model. According to this model, financial needs and the financing options available for SMEs change throughout the various phases of a firm's life-cycle. Reproduced in figure 1, the model incorporates changes in the availability of information and collateral in describing sources of finance available to firms over time (Figure 1).

According to Berger and Udell (1998), different financing strategies are required at different stages of the firm's growth cycle. In the context of a company's life cycle, asymmetric information problems are more severe among young growth firms compared to firms that have reached maturity (Mabrouk & Boubaker, 2019). In general, because of the unique features that characterise SMEs during the start-up phase, such as informational opacity (Berger & Udell, 1998) and the lack of trading history (Cassar, 2004), SMEs in this stage depend heavily on insider funding sources. As SMEs advance through their business life-cycle, they begin to gradually adjust their capital structure (la Rocca et al., 2011). During subsequent growth stages, as SMEs mature, they start to establish a track record in addition to the ability to provide collateral. This serves to improve the firm's creditworthiness and thereby attracts the attention of investors who willingly inject money into the business.

Figure 1. Sources of financing during firm continuum



Source: Berger and Udell, 1998, p. 623

As a consequence, firms begin substituting internal with external financing sources. In the more advanced stages of their growth cycle, SMEs become more informationally transparent, they may develop access to securitised debt and publicly listed equity markets (Berger & Udell, 1998). However, Berger and Udell (1998) concede that the life-cycle paradigm does not apply to all SMEs operating in different industries, implying that firm size, age, and information availability intended to constitute the backbone of this particular paradigm, are not perfectly correlated. Several empirical studies, including those (Kimhi, 1997) and (Barton & Gordon, 1987), use the life-cycle model as their chosen approach to understand SMEs' financial behaviour. In line with these studies, (la Rocca et al., 2011) found that the financial behaviour of SMEs can be, to a large extent, attributed to the life-cycle pattern, which was found consistent over time and quite similar across different industries and institutional contexts.

La Rocca et al. (2011) studied financing choices of SMEs through the lens of the business life cycle; the findings show that in the bank-oriented country, firms tend to adopt specific financing strategies and a different hierarchy of financial decision-making as they progress through the phases of their business life cycle. Debt is shown to be fundamental business activity in the early stages, representing the first choice. In the maturity stage they gradually substitute debt for internal capital. A study of small business financing using a sample of 60 SMEs across three cities in China (Wu et al., 2008) found evidence supporting the business life cycle model. Access to external finance improves with size and age, supporting the idea of a financial growth life-cycle (Chit-

tenden et al., 1996). A study tested firms' financing behaviour of French companies in the period of 2005-2014, over life cycle stages in the context of the pecking order theory, and found that the pecking order explains the debt in French companies that are in growth phase, maturity or decline (Mabrouk & Boubaker, 2019). The source of finance most appropriate to fund SME growth and development varies according to the firm's stage of development, as depicted in table 1.

Table 1. Financing sources of SMEs by stage of development

Phase in SME lifecycle	Type of financing required
Seed stage	Informal equity and loans from founder and associates. Bank loan if available and needed
Start-up stage	Informal equity and loans from founder, associates and contacts. Bank loan if available. Leasing for equipment
Expansion stage	Equity from original sources, plus trade investments or venture capital. Loans from bank. Other sources of finance including leasing and factoring. Retained profits

Source: European Commission, 2009 (Cyclical of SME Finance)

2.2. Context of study: an overview of small business finance in Kosovo

SMEs form the backbone of the most national economies worldwide (OECD, 2020). The SME sector's contribution to the economy has attracted the attention of academics and policymakers in both developed and transition economies. Particularly in transition countries, their fundamental ability to resolve some of the economic problems arising from the transformation process from a centrally-planned to a market economy, has become an important role for them. In the European Union, in 2018, SMEs accounted for 99.8% of all enterprises in the EU-28 non-financial business sector (NFBS), generating 56.4% of value-added or slightly less than three-fifths of value-added, and two-thirds of total EU-28 NFBS employment, or 66.6%. There were somewhat more than 25 million SMEs in the EU-28, of which 93% were micro-SMEs, whereas only 0.2% or 47,299 were registered as large enterprises (Table 2).

Table 2. Number of SMEs in the EU-28 NFBS in 2018 and their value-added and employment

Enterprises	Micro SMEs	Small SMEs	Medium SMEs	All SMEs
Number of Enterprises	23,323,938	1,472,402	235,668	25,032,008
% of Enterprises	93.0%	5.9%	0.9%	99.8%
Value added in €(million)	1,610,134	1,358,496	1,388,416	4,357,046
% of Value added	20.8%	17.6%	18.0%	56.4%
Number of Employment	43,527,668	29,541,260	24,670,024	97,738,952
% of Employment	29.7%	20.1%	16.8%	66.6%

Source: European Commission, 2019

It is argued that small and medium-sized enterprises have the great potential to generate new jobs and income and respond to the systemic shock rapidly, which are some of the reasons why their role has become increasingly vital for transition economies (TEs). Despite the growing importance of SMEs in all transition economies, they still face many institutional barriers, which have prevented them from making a greater contribution (Hashi & Krasniqi, 2011). Since the beginning of economic liberalisation, the SME sector has gone through a very dynamic development. Small private businesses have gained considerable weight in the national economies of all transition countries. Undoubtedly, transitional countries have gone through profound institutional reforms to facilitate the development of the private sector. However, further institutional reforms are necessary for most of them to improve the policy environment for small businesses.

Despite their essential role, relatively little attention has been paid to the SME business environment, which is necessary to stimulate SMEs' development (Krasniqi, 2007). To create the basic structure of the market economy's functioning, Kosovo has gone through many challenges (Mustafa et al., 2018).

Classifications of Enterprises in Kosovo are based on the European Commission recommendation on the definition of micro, small and medium-sized enterprises. According to the Law. No. 06/L-032 on Accounting, Financial Reporting and Auditing which entered into force in 2018, for the purposes of preparing the financial statements, micro-enterprises, small and medium-sized enterprises are considered SMEs if they meet two of the three following criteria. Micro enterprises are enterprises that do not exceed the limits of at least two of three criteria: average number of employees during the financial year 10, the total assets less than EUR 350 thousand and annual revenue less than EUR 700 thousand. The enterprise is classified as a small enterprise if the average number of employees is 50, the total assets less than EUR 4 mil. or annual revenue less than EUR 8 mil. Medium-sized enterprises are enterprises that met at least two of the following criteria: average number of employees during the financial year 250, the total assets less than EUR 20 mil. and annual revenue less than EUR 40 mil. Kosovo's classification of SMEs is defined for the investment purposes also by the Law on foreign investment, which entered into force in 2014. The only criterion is employment size.⁴

SMEs in Kosovo play, in particular, an important role in the development of the local economy. Their contribution is primarily evident in job creation and income growth. The increase in their number also contributes to creating a more competitive business environment (Krasniqi, 2007). During 2016 around 38 000 registered enterprises were operating in Kosovo, 93.1% of which are micro-enterprises. During 2016, they accounted for 99.9% of all enterprises, generating 81.0% of value-added and accounted for 76.2% of total employment (European union, 2020). Services are the largest sector in the economy, with a share of value-added of 54% of GDP over 2009-17.

Table 3. Percentage of SMEs in Kosovo, employment, their value-added, and exports during 2016

Enterprises	Number	Employment	Value added	Exports
Micro	93.1%	34.9%	13.2%	54.9%
Small	5.9%	22.8%	20.3%	33.5%
Medium sized	0.9%	18.5%	47.5%	8.9%

Source: OECD/ETF/EU/EBRD, 2019-SME policy index: Western Balkans and Turkey 2019

The financing of these firms is an issue of great significance and a subject to care for. Kosovo is characterised by a typical traditional financial system, dominated by commercial banks and with the Central Bank of Kosovo acting as a regulator. Most of the financing for small and medium enterprises in Kosovo is provided through banks.

Table 4. Number of financial institutions over years 2010-2019 in Kosovo

Description	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Commercial banks	8	8	9	9	10	10	10	10	10	10
Insurance companies	12	13	13	13	14	15	15	15	14	13
Pension funds	2	2	2	2	2	2	2	2	2	2
Micro-financial and non-bank financial institutions	17	20	17	17	18	18	16	18	22	20
Financial intermediaries	28	34	38	39	42	44	48	52	51	51

Source: bqk-kos.org, Financial Stability Report, Number 16

⁴ For the purpose of this study, the only criteria used for the classification of SMEs is employment size.

The total number of financial institutions in Kosovo during 2019 includes 10 commercial banks, 13 insurance companies, 2 pension funds, 20 micro-financial, and non-bank financial institutions, and 51 financial intermediaries (CBK, 2020). Hutchinson & Xavier (2006) examined that SMEs in transition countries operate under internal financing because the financial system in these countries is underdeveloped and faces problems accessing external finance. Although Kosovo's financial system's architecture is almost entirely bank-based, the non-availability of external finance becomes one of the main constraints to small business investment and hampers their growth potential.

Early-stage entrepreneurs in their first two years face especial barriers as they do not have the trading records for banks to lend against and face the challenge of posting significant collateral against a loan. As a result, many small businesses with high growth potential cannot provide the funding they need to expand and increase employment. Finance start-up support has been limited mainly to the provision of grants, equipment, and machinery, co-financing grants. In contrast, alternative finance in Kosovo, such as angel investors, equity financing, and venture capitalist funds, are almost non-existent (Krasniqi, 2010). Starting a business or getting a loan for potential female entrepreneurs is difficult because they face particular challenges, as only 8% of assets are officially run by women (Culkin & Simmons, 2018).

Kosovan banks continue to have very conservative lending policies, including broad collateral requirements for real estate and movable assets to support most of the loans. An empirical investigation of Kosovan SMEs has shown that commercial banks in Kosovo base their decision on credit firms based on collateral. Well-performing firms are more likely to ask for credit because of better business prospects in the future. Still, profitability as a measure of firm performance does not seem as a sufficient signal for banks to allocate credits. According to Hauser et al., 47.1% of Kosovo firms identify access to finance as a major constraint, even though the availability of loans is sufficient (Hauser et al., 2016). The main obstacle for SME borrowing is the banks' conservatism around collateral requirements; sometimes, the requested collateral goes to the tune of 300% of the loan value. High collateral requirements present a major barrier to access to finance. Banks seem to prefer more to secure themselves from likely opportunistic behaviour of potentially "bad borrowers" with the use of collateral.

Findings are in line with theoretical and empirical arguments that systematic use of collateral can mitigate the adverse selection by banks in choosing whom to allocate the credit, especially in a country with a turbulent political environment and weak property right system (Krasniqi, 2010). Despite continued progress in effectively implementing legislative and regulatory requirements reforms, it has contributed to reducing barriers to accessing credit. However, numerous obstacles remain, which hinder business performance and access to finance. High levels of informality, poor contract enforcement, lack of cadastral data, along with a lack of financial transparency and low-quality financial reporting, continue to be barriers to access to finance for firms (CBK, 2020). A study undertaken by Moder and Bonifai (2017), aimed to analyse the limitations in access to finance for the Western Balkans countries, suggests that financing conditions improved considerably for Kosovo, which was the most constrained in 2008 for Western Balkans at the level of more than 70%. The constraint percent was declined at 45 %; the most pessimistic perception in the latest survey was recorded in Kosovo at 60%.

Financial institutions view SMEs as risky and expensive to lend to and often impose rather heavy collateral criteria on borrowing SMEs partly due to the risk and difficulties in executing

credit contracts and sufficient return of funds. Non-performing loans to SMEs are higher than those to corporations and individual consumer borrowers. Although most SMEs have little or no real estate collateral, the value required by financial institutions to provide credit was almost double the amount of the loan provided (Table 5).

Table 5. Lending Environment in Kosovo

Lending Environment	Firms perceive financing constraints	Firms facing finance constraint	Not favourable - Interest rate	Collateral greater than	Loan Rejected
Kosovo	60%	45%	95.7%	200%	4.3%

Source: Moder & Bonifai, 2017

Progress in the scope of private bailiffs and Amendments to the Law on Enforcement Procedure relating to the seizure of a bank account and the accelerated procedure for the sale of collateral, have had a positive impact on the credit offer and have made to ease collateral requirements and reduce interest rates. Borrowing of small and medium enterprises from 2016 is also supported by the Kosovo Credit Guarantee Fund (KGF), the use of which has marked a continuous growth trend. The KCGF is established in January 2016 under the Law on the Kosovo Credit Guarantee Fund's Establishment. The KCGF aims to support the private sector in Kosovo by increased access to finance for SMEs, thereby creating jobs, increasing local production, improving the trade balance, and enhancing opportunities for underserved economic sectors. Until very recently, the number of bank loans guaranteed by KCGF was more than 6224, while the approved number of guarantees amounted to more than 234 million euros (fondikgk.org).

Contract Enforcement Procedures in The Kosovo Credit Guarantee Fund facilitates SMEs' access to finance, including collateral seizure, which has also been inefficient, time-consuming, and expensive. However, there have been improvements in implementing the system of Private Bailiffs from mid-2014 (Kosovo Banking Association, 2016). In 2019, research was done by Lajqi et al. 2019 in Kosovo to assess the current support packages available to start-ups in Kosovo at various stages of business development, also to identify potential needs such as infrastructure, services, and access to finance. Several conclusions are made: In finance, there is a need for alternative financial instruments to support start-up creation and growth. There is an emergent need to design support programs for start-ups operating in a promising sector based on Kosovo's competitive advantage. Currently, the majority of local start-ups and SMEs are unaware of crowdfunding. There is a need to promote the business angel culture by supporting the creation of business angel networks ("Mapping Business Start-up Ecosystem in Kosovo," 2019).

3. METHODOLOGY, SAMPLE AND DATA COLLECTION

Unlike the developed countries, the feature of small business finance in Kosovo is under-researched. The lack of detailed data on Kosovan SMEs' makes it difficult and one of the most challenging fields to conduct empirical research. Until recently, Kosovan small businesses, in particular, micro-enterprises, weren't required to release financial information. However, this situation is improving, as data sets have very recently become available. Under Law no. 06/L-032, which entered into force on 01 January of 2019 and Kosovo Financial Reporting Council, all micro-companies whose annual turnover exceeds 50,000.00 € are obliged to disclose the balance sheet and income statement. This makes it much easier to describe the state of small business finance and test the extant theories of financial intermediation and informational opacity.

This study is based on primary data, collected using surveys from 100 SMEs' financial data from their establishment until the end of 2020, chosen randomly operating in different sectors. The study is designed using the framework developed by Berger and Udell in article "The economics of small business finance: The roles of private equity and debt markets", where firms are viewed through a financial growth cycle. The survey is designed in that way that firms were asked to answer the questions of their financing options by dividing the company's age into four periods of time. Infant firms from 0-2 years, adolescent firms from 3-4 years of operations, middle-aged firms with 5-24 years of operation, and old were considered all firms with more than 25 years of operation. However, in the research, no firm has reached the old age of operation. The interviews were conducted through the face-to-face method with the key people in each enterprise. They also provided more information about years in the business, the size of the company in terms of employment, sector activity, and others characteristics. Surveys were pre-tested and improved before conducting the survey. Questionnaires were analysed through the SPSS statistical program.

4. RESULTS AND DISCUSSION

The paper's main objective was to test the financing of Kosovan SMEs empirically during their growth cycle. Among others, two main questions are compiled in a survey. Participants were asked to answer the following questions on "Which were the main sources to finance the working capital of your firm during the firm's growth cycle?", and "Which were the main sources to finance investments of your firm during the firm's growth cycle?" Findings show that Kosovan SMEs employ different sources of finances for working capital and different for investment. Table 6 shows that Kosovan SMEs, finance their working capital depending on private equity and debt types. They rely on equity (57.8%) and debt (42.2%). Sources of equity consist of the owner's personal savings and retained earnings. Debts are divided into seven categories, including friends, family and fools, deferred payment of taxes and contributions, grants and subsidies, trade credit, microfinance institutions, overdrafts and bank loans (Table 6).

In the study conducted by Krasniqi 2010, according to which finance start-up support has been limited mainly to provision of grants, equipment and machinery, co-financing grants, whereas angel investors, equity financing and venture capitalist funds are almost non-existent (Krasniqi, 2010). However, in this study, findings show that firms during the initial phase tend to rely more on owner's personal savings, borrowing from 3F connections, retained earnings and use more trade credit; except for a small percentage of overdrafts, other sources of funding are almost non-existent. After growing older, retained earnings are the first fund that they prefer to use, followed by a high percentage of overdrafts, marking a drastic decline of other funding sources. The findings are in line with pecking order paradigm according to which financing of the firms follow an order from safer to riskier, by giving advantages to internal financing compared to external financing (Myer, 1984). The asymmetry of information between managers and investors is what leads to a pecking order.

Findings reported in Table 7 show how Kosovan SMEs finance their investments. Sources of equity are divided into two categories, including owner's personal savings and retained earnings. Debts are divided into four categories: friends, family and fools, grants and subsidies, microfinance institutions, bank loans and overdrafts. To finance their investments during their life cycle, Kosovan SMEs depend on equity (64.4 %) and debt (35.6%).

Table 6. Kosovan SME financing during their life cycle for working capital

Sources of Financing	Sources of Debt										Total Debt + Equity	
	Sources of Equity			Individuals, Non-financial Institutions and Government			Financial Institutions					
	Owner's Personal Savings	Retained Earnings	Total Equity	3 F: Friends, Family, Fools	Deferred payment of taxes and contributions	Grants and Subsidies	Trade Credit	Micro finance Institutions	Overdrafts	Bank Loans		Total Debt
"Infant" (0-2 years)	32.2%	19.7%	51.9%	26.2%	0.4%	0.4%	13.8%	1.6%	5.8%	0.0%	48.1%	100.0%
"Adolescent" (3-4 years)	10.3%	50.1%	60.4%	7.9%	0.7%	0.4%	9.8%	0.2%	20.3%	0.3%	39.6%	100.0%
"Middle-aged" (5-24 years)	3.7%	57.4%	61.1%	3.6%	0.1%	1.4%	5.0%	0.3%	28.4%	0.0%	38.9%	100.0%
Financing over years	15.4%	42.4%	57.8%	12.6%	0.4%	0.7%	9.5%	0.7%	18.1%	0.1%	42.2%	100.0%

• There were no firms in the sample that belonged to the fourth stage of years classified as Old Aged, with more than 25 years of operation. Among others, one of the reasons could be that, based on survey from MTI, only 7.33% of all active enterprises were registered before the year 1989. After 1999 Kosovo marked an impressive increase in the number of registered enterprises. Therefore, most enterprises are considered young, and very few of them have overcome the fourth stage of operation: The Old Aged.

Source: Author's calculation

Table 7. Kosovan SME financing during life cycle for investments

Sources of Financing	Sources of Equity						Sources of Debt					Total Debt + Equity
	Sources of Equity			Individuals, Non-financial Institutions and Government			Financial Institutions					
	Owner's Personal Savings	Retained Earnings	Total Equity	3 F: Friends, Family, Fools	Grants and Subsidies	Micro finance Institutions	Bank Loans and Overdrafts	Total Debt				
"Infant" (0-2 years)	38.7%	24.9%	63.6%	30.2%	0.0%	1.6%	4.6%	36.4%	100.0%			
"Adolescent" (3-4 years)	9.6%	56.7%	66.3%	6.3%	0.4%	1.2%	25.8%	33.7%	100.0%			
"Middle-aged" (5-24 years)	0.1%	63.2%	63.3%	3.9%	0.5%	0.4%	32.1%	36.7%	100.0%			
Financing over years	16.1%	48.3%	64.4%	13.5%	0.3%	1.1%	20.8%	35.6%	100.0%			

• None of enterprises did not use Leasing Finance, Angel Finance, Venture Capital, Factoring, Non-refundable funds from external donors (NGOs), Foreign direct investment, Initial public offer- among other types of financing to finance their operating activities during their financial cycle.

Source: Author's calculation

Owners' personal Savings, 3F connections and Retained Earnings are the main funding to finance investments for Kosovan SMEs during their infant phase. In their middle age their capital structure tends to change, where retained earnings are the main source to fund their investments followed by bank loans and overdrafts, while other sources are almost inexistent. These findings suggest that in Kosovo, there is an emerging need to develop alternative forms of financing, especially for start-ups and innovative companies aiming to growth. For example, the angel investors' network is growing in Kosovo, but it is still in its infant stage. There are only a few business angels' networks in Kosovo, mostly not in operation. In this vein, the government of Kosovo have an important role to play in designing new instruments for supporting SME development.

CONCLUSION

In line with literature review, during the start-up phase, the unique features that characterise SMEs, such as informational opacity, the lack of trading history, and inability to secure collateral, tend to lead Kosovan SMEs to depend heavily on insider funding sources, such as owner's personal savings, 3F connections, retained earnings, and trade credit. The relatively high percentage from informal sources such as 3F connections, may be the evidence for the informal economy. Relying of Kosovo SMEs, during their first years of operation, mostly on insider financing shows that young firms are more credit constrained. Difficult bank's requirements and inadequate terms and conditions for loans impede SME investments and consequently constrain their growth. As SMEs advance through their business life-cycle, they begin to gradually adjust their capital structure. The age of the firm is likely to be associated with probability of getting a loan. During subsequent growth stages, as SMEs mature, they start to establish a track record in addition to the ability to provide collateral. As a consequence, firms begin to use more external financing sources such as bank loans and overdrafts. Findings are in line with pecking order theory which suggests the preference of internal funds to external funds, debt over equity.

Unlike the financial cycle theory, according to which with the growth and aging of the company, financial resources increase, research has shown that with the aging of Kosovan SMEs, financial sources become limited mainly into two main types of financing: retained earnings and bank loans and overdrafts. That's because Kosovo's financial system is almost entirely bank-based, and alternative financing is in its initial phase of development. An important issue that was noticed during the research is that alternative sources of funding are almost non-existent. There is a necessity to find creative solutions to fill this funding gap for start-ups and SMEs, for which the access to traditional banking system has been almost impossible.

Although, in developed countries, alternative finance instruments such as factoring, renting and alternative online finance have shown steady growth in recent years, in Kosovo this type of financing still remains in the initial stage of development.

None of enterprises did not use Leasing Finance, Angel Finance, Venture Capital, Factoring, Non-refundable funds from external donors (NGOs), foreign direct investment, and Initial public offer- among other types of financing to finance their operating activities during their financial cycle. Meanwhile, microfinance institutions, grants and subsidies support and deferred payment of taxes and contributions are used in an extremely small percentage.

SMEs in Kosovo play, in particular, an important role in the development of the local economy. Their success and survival, employment, growth strategies, productivity and innovation largely

depend on access to financial resources. Small firms, especially young firms, generally face tight funding constraints. This is particularly true when financial markets are unfavourable.

The results of the study emphasize the need for alternative funding sources to support the creation and growth of Kosovo SMEs. There is a need to design new instruments for start-up and post start-up phase of development. An online office, where SMEs, in particular start-ups can get advice on public instruments and funds could be a good start. In addition to SME dependence only on bank debt, policymakers need to address the support of SMEs through new financing instruments that would be more appropriate to their needs at different stages of their cycle. Equity financing should become a key focus of SME financing support policies.

Even though the angel investors' network is growing in Kosovo, it is still in its infant stage. There are only a few business angels' networks in Kosovo. However, investments by business angels can fill the gap between venture capital and debt finance, especially for start-ups becoming a promising way of financing of start-ups in Kosovo (Lajqi et al., 2019). Government has important role to play in designing new instruments for supporting SME development, or alternatively could support the development of these instruments through the innovation and start-up centres. This emerges the need of the issue that policymakers should address to ease the SME access to more favourable financing conditions.

Limitation of the study is qualitative nature of the data, based on the company responses rather than the accounting data from financial statements. As in similar studies the key limitation of our empirical investigation arises from the qualitative nature of the survey data, because some of our variables of interest are self-reported (Lajqi & Krasniqi, 2017). The study points to further research on an empirical investigation of the using qualitative interviews in order to have a deeper understanding of the phenomenon and how entrepreneurs make financing choices decisions. Future studies should also make use of panel data considering the long-term perspective of life cycle model.

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Do Negativities Also Influence Entrepreneurship?

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Keywords:

Hopelessness;
Helplessness;
Haplessness;
Nepotism;
Entrepreneurial Intention



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Abstract: *Entrepreneurship is seen as the main factor of development and growth in all countries. Therefore, numerous studies related to entrepreneurship are performed. The studies aimed at the factors that affect entrepreneurship usually pursued the way that the occurrence of entrepreneurial intention is explained by positive premises. This study was carried out by starting from the idea that there can be negative factors influencing the entrepreneurial intention such as hopelessness, helplessness, haplessness, and nepotism. In this context, a survey was conducted with the students from universities located in the provinces in eastern Turkey. According to the results of the study, the feeling of hopelessness and haplessness has no influence over entrepreneurial intention. It is concluded that the feeling of helplessness affects the entrepreneurial intention adversely while nepotism influences it positively. In light of the findings, some recommendations were made to decision makers.*

1. INTRODUCTION

Entrepreneurship, which takes a pioneer role in the development level of countries, makes contributions to the solution of issues such as the fight against unemployment and equitable distribution of income and by ensuring technological innovation, rise in export and personal and territorial enrichment. Entrepreneurship has been shown to be a basic resource for social and political activity and economic progress of countries (Ceyhan, Yıltay & Batga, 2020), provided that numerous studies on this concept are conducted (Landström Landström, Harirchi & Åström 2012). In entrepreneurship research, they have stated that the term has several dimensions (Güven, 2019) and cannot be explained by a few simple factors (Toma, Grigore & Marinescu). In researching the concept, an attempt is made to determine why individuals become entrepreneurs, or what features entrepreneurs have (Demir, Yıldız & Fırat, 2020), and what are the factors influencing the intention of entrepreneurship (Filizöz & Yaraş, 2020). It was asserted that demographic factors have the influence over entrepreneurship (Çakın, 2019). Çiçek and Karakaş, (2020) stated that the factors influencing entrepreneurship are internal factors (the need for achievement, locus of control and self-sustainability) and external factors (access to capital, business and sector knowledge, social network and environment and entrepreneurship education). They however, ignored that some negative emotions such as hopelessness, helplessness, haplessness and nepotism can be between the factors influencing entrepreneurship.

Hopelessness is a negative state of emotion that expresses the negative perspective, unwillingness and decreased expectation on the future (Açıkgöz, 2019) and it can cause state of emotions such as helplessness (Tetik & Yurtsever, 2018). In individuals who feel helpless, the feeling of haplessness which is the opinion of being not able to utilize some significant advantages by the impact of bad experiences undergone in the past (McMahan, 1996) can arouse as well. Nepotism which is identified as favoritism and can appear in promotion, the process of the execution of work, pricing and moreover recruitment (Altıntaş, 2020), is subjected to more research day by

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day in the organizational field which is encountered in the individuals at the age of employment (Demirel & Savaş, 2017).

Although university education facilitates the access of individuals to a profession, being the number of university graduates is higher than the opportunities of employment can cause individuals to be unemployed even if they have a good education. Negative emotions such as hopelessness, helplessness, haplessness, and nepotism can arouse in the students who are aware of this negative situation due to the apprehension about being unemployed. Within the scope of this study, the students who receive education in the universities located in the provinces Mus, Bitlis, Van and Hakkari, in the eastern Turkey, were accessed. The detection of whether the negative opinions caused by the apprehensions about being unemployed have influence on entrepreneurial intention was studied. Unlike the studies which focus on the positive factors affecting entrepreneurial intention, due to the opinion that some negative factors can also be effective in entrepreneurial intention, it is expected that this study will contribute to literature.

2. ENTREPRENEURIAL INTENTION

Setting up a business, providing employment, creating social and economic enrichment are seen as a key factor in country economies' and are supported (Wong, Ho & Autio, 2005). Therefore, individuals decide to become an entrepreneur by pursuing their dreams instead of working for others' dreams (Bilgiseven & Kasımoğlu, 2020). Entrepreneurship, identified as the conversion of ideas into an action (Cengiz, 2018), is the result of a collection of factors (Raijman, 2001) and there are still uncertainties as to which components this term consists of (Landström et al., 2012). However, for entrepreneurship, without indulging in such as desperation, a definition can be made; "to aim at offering a product or service by combining production factors, and to create an organization by taking the possible risks as a result of all these activities" (Çiçek, 2016; Çiçek, 2018). In an entrepreneurial activity managed by external factors; family history, the position of the individual in a family, the professions of parents, his/her education and training can be the key determinant of entrepreneurial activity (Bird & Jelinek, 1989). As internal factors caused by an individual, elements such as the level of consciousness and anxiety, openness towards experience, extroversion, being compromising, the need for success, locus of control, tolerance against uncertainties, tendency to take a risk, creativeness and innovativeness, self-confidence and practical intelligence are counted (Derindağ, 2018). Intentions, on the other hand, are admitted as a key element in the decision of setting up a new business (Bird, 1988; Liñán & Chen, 2009).

Intention was defined as the movement intended for an individual's aims, the way of reaching a target and the focal point of mind (Bird, 1988) and accepted as the best predictor of planned behavior (Krueger & Carsrud, 1993). Entrepreneurial intention, on the other hand, states the will and determination of an individual to do a business belonging to the individual itself (Sönmez, 2019). Entrepreneurial intention determines the birth, direction, shape and goal of an enterprise. It influences the survival, development, growth and change of an enterprise (Bird, 1988). Although entrepreneurship is composed of many complex factors and cannot be explained solely by intention (Orbell, Hodgkins & Sheeran vd., 1997), it is admitted that the decision of entrepreneurial behavior is possible with the emergence of entrepreneurial intention (Douglas, 2013) and the level of entrepreneurial intention enhances the possibility of behavior (Liñán & Santos, 2007). The Theory of Planned Behaviour (Ajzen, 1991) and The Entrepreneurial Event Model (Shapero, 1984) are conceptual frameworks which are used to model the premises and

consequences of entrepreneurial intention. Although these theories uphold their validity, they may not be sufficient in explaining the entrepreneurial intention (Meoli et al., 2020). The recent considerable alterations in the labor market gave rise to the transformation of traditional organization structures and work environments and caused individuals to reconsider their career goals (Sullivan & Baruch, 2009). That entrepreneurship became a popular career option (Edelman, Manolova, Shirokova & Tsukanova, 2016) can be seen as the inadequacy of these theories in explaining entrepreneurial intention.

Entrepreneurship as a career choice brings an obligation to be creative and have an excellent problem-solving ability along as well (Abdulwahab & Al-Damen, 2015). That an individual chooses entrepreneurship instead of working in a corporate structure despite these difficulties has some reasons (Bilgiseven & Kasımoğlu, 2020). The biggest reason for an entrepreneurial event is a change in an individual's life. For example, an individual's loss of job, midlife crisis or the intention of taking a risk after his/her financial situation becomes safer and past experiences can be counted (Elfving, Brännback & Carsrud, 2009; Albert Shapero & Sokol, 1982). In addition to these, reasons such as providing self-employment (Souitaris, Zerbinati & Al-Laham, 2007), the desire for profit and income, the idea of social reputation, the desire for pursuing dreams, the unreliability of current profession or job dissatisfaction, the mission to realize an opinion or a goal, having a high self-confidence, providing employment for family members, the desire for doing business independently or that there is no other option can be a prerequisite for entrepreneurship (Kılınc & Kanayıran, 2020). Although there is a considerable interest towards the specification of entrepreneurial intention (Dohse & Walter, 2012), that there is no consensus on what can the positive and negative premises affecting the entrepreneurship be (Duran, 2018) makes the research on the premises of entrepreneurial intention significant (Douglas, 2013).

3. THE NEGATIVE FACTORS WHICH CAN INFLUENCE ENTREPRENEURIAL INTENTION

3.1. Hopelessness

The individuals trying to catch up with the radical changes in social life can face some psychological issues while exerting more effort (Barutçu & Çöllü, 2020). One of the negative states of emotion that this changing environment brings along is the feeling of hopelessness (Bayrak Ayaş, 2016). Hopelessness, which is a perspective towards life, is defined as the negative expectation in achieving a goal (Melges, 1969), the degree of pessimism about the future (O'Connor, Connery & Cheyne, 2000) and the loss of motivation (Gençöz, Vatan & Lester, 2006). Fundamentally, hopelessness is the belief that the future will be unpleasant due to the experiences gained in the past. For this reason, purposelessness about the future and negative opinions can appear in an individual (Özmen, Çoşman & Kökçü, 2016). Hopelessness can influence the life of an individual adversely (Bayrak Ayaş, 2016) and raise issues such as depression and mental breakdown (Aydın, Erdoğan, Yurdakul & Eker 2013). The rise in the level of an individual's hopelessness may adversely affect achievement, creativeness, problem-solving and the ability of transferring experiences into life, along with individuals, it may constitute dangers that can influence the society as well (Gökçe & Dilmaç, 2020).

Knowing the individuals' hopelessness level, expectations towards the labor market and hope for employment assumes a significance (Ergüt, 2020). Hope is the vitality of an individual and is necessary in every condition since the individuals with hope devise plans related to the fu-

ture by dreaming (Tetik & Yurtsever, 2018). However, individuals cannot always cling to their hopes and the apprehension about being not able to find a job can carry an individual into hopelessness and the lack of options (Tekin Tayfun & Korkmaz, 2016). One of the prerequisites of entrepreneurship may arise in the individuals considering that there is no other option (Kılınç & Kanayiran, 2020). Starting from this situation, we posited following hypothesis:

H₁: The emotional state of hopelessness influences entrepreneurial intention positively.

3.2. Helplessness

Helplessness is one of the commonalities in life, starting from infancy and up to our indispensable awareness which is death, and it is the most unbearable one among all emotions that people experience (Hoffer & Buie, 2016). Up to now, there is no consensus on helplessness, which is defined as feeling, emotion, state of mind, situation and syndrome as a sign of behavioral disorder and a certain personal trait, in terms of psychological conceptualization (Nosenko & Sokur, 2016). The hopelessness that appears in business and social life (Üstün, 2001) is being able not to defend an individual itself, able to do nothing to help itself, being powerful or weak (Arieli & Ataria, 2018), the emotion, thought and behaviors' complexity syndrome (Carlson & Blackwell, 1978). Despite knowing that he/she possesses an ability to do it, an individual may feel helpless when he/she intends to do something due to his/her deficiency in practice (Arieli & Ataria, 2018). Those who feel helpless may not always be the individuals whose knowledge, skill and capabilities show less competence in accordance with the others (Strømme, 2012). By asking for help from other people or learning novel information related to fields in which they lack, they can compensate for the absence of their abilities (Heckhausen & Heckhausen, 2018). The individuals with the feeling of helplessness are able to develop new skills with the support gained by others. Starting from this situation, the second hypothesis we formed is as follows:

H₂: The emotional state of helplessness influences entrepreneurial intention positively.

3.3. Haplessness

Haplessness, which is a situation influencing not only individuals' everyday lives, but also their career choices (İlgaz Yıldırım & Toker, 2017), can also bring some adverse emotions along (Dodes, 1990). It is most likely that one of these emotions is haplessness. Haplessness, which is the reflection of the adverse situations faced in the past (Murayama & Miura, 2016), is the idea that life and the events taking place are controlled by chance and destiny (Lester, 2001). It comes out with the idea that individuals are deprived of some advantages (Mcmahan, 1996) and the question that is "Why me?" (Janoff-Bulman, 1998).

The impacts of the opinion of haplessness which is considerably prevalent in a society (Jalan, Sinha & Ulus, 2014) are required to get evaluated in all aspects (Kaufman, 1998). Individuals desiring to gain a respectable status in a society (İnce, 2018) and get rid of the negative situations such as haplessness and those who consider themselves as hapless in terms of finding a job are able to apply for distinct ways of employment in business life. Starting from this situation, the hypothesis we posited is as follows:

H₃: The emotional state of haplessness influences entrepreneurial intention positively.

3.4. Nepotism

Individuals may resort to some unethical practices that can make their opponents fall behind with the consideration of finding a job and moreover getting employed with better opportunities (Erkekli & Yavuz, 2020). Nepotism, which is defined as an administrative disease (Tunçbilek & Akkuş, 2017) and encountered frequently in everyday life, is one of these practices (Dilek, Özdirek & Kesgingöz, 2019). Nepotism, that can be seen in different forms and levels in societies and organizations (Yücel & Özkalan, 2014), is a management practice in which without considering qualification and merit (İşçi, Taştan & Kozal, 2013), status such as kith and kin, friendship, partisanship, political affinity and being a compatriot are taken into account (Akar, 2020) in an individual's employment, promotion or the determination of working conditions (Çalık & Naktiyok, 2018), and it does not comport with professionalism (Uncu & Şalvarcı Türeli, 2017).

In nepotism that is usually defined as favoritism and is in fact a corruption (Dilek et al., 2019), a gratitude-obedience relationship forms between the individual who implements the nepotism and who benefits from it. While the latter gets employed or makes several acquisitions in his/her working environment, the former strengthens his/her administrative hierarchy level (Yazıcı & Can, 2020). Along with its many adverse aspects, nepotism that is considered to be implemented intensely in recruitment (Avcı & Sür, 2019) has some positive aspects as well (Özkanan & Erdem, 2014). That it orients the individuals at the age of employment towards distinct fields can be one of these possible consequences. In that context, the hypothesis we formed is as follows:

H₄: The perception of nepotism influences entrepreneurial intention positively.

4. METHOD

4.1. Procedure and Participants

The main purpose of this research is revealing the effect of negative perceptions such as hopelessness, helplessness, haplessness, and nepotism on entrepreneurial intention. We gathered data from four public universities students. The study adopted quantitative approach. In this context we conducted a survey study. We employed a cross-sectional design for examining the aforementioned relationship.

The data was collected via Google forms data collection platform. We have sent the survey's link to approximately 800 students' e-mail addresses. 391 students have participated the surveys. However, after the data screening procedure we excluded 16 surveys because these surveys constitute outliers. Thus, we obtained 375 remarkable surveys with a response rate of 46,88%.

The demographic characteristic of participants is as follows. 60,3% of participants (n = 226) are female, and 39,7% are male (n = 149). 40,5% of the participants are first year students (n = 152), 37,9% are second year students (n = 142), 6,7% are third year students (n = 25), and 14,9% are fourth year students (n = 56). The mean age of participants is 21,46 and the mean GPA of participants is 3,01 out of 4.

4.2. Measures

We measured hopelessness, helplessness and, haplessness with Gençöz, Vatan, and Lester's (2006) 30-item scale. The items were measured along a 6-point scale (1 = strongly disagree, 6 = strongly agree). The main reason for choosing the scale is, it has been developed specifically for university students.

We utilized 3-item scale developed by Uncu and Şalvarcı Türeli, (2017) to measure nepotism perception. We adapted 6-item the scale developed by Çetin and Taşdemir (2017) to measure entrepreneurial intention. Each item was followed by a 5-point Likert-type response format (1- Strongly Disagree to 5- Strongly Agree) for both scales.

For testing common method variance, we used Harman's (1967) single-factor test. Accordingly, we measured all the items from measurement model under one factor without using rotation method. The single factor's explanation of variance amount was 23,44%. Since this amount is below the cut-off point of 50% (Kline, 2005), we can say that there is no common method error for this study.

4.3. Validity and Reliability Tests

We analyzed the data by SPSS 24 programme. Initially we run data screening procedure. In this context firstly, we assigned mean values for missing replies. Next, we checked if the data has normal distribution. We observed skewness ranged from -2,43 to 1,55 and kurtosis ranged from -1,20 to 1,40. The results are in the acceptable range by the cut-off criteria suggested by Kline (2005). Afterwards Exploratory Factor Analysis (EFA) was executed through the Promax rotation method to control factor composition of variables. KMO (Kaiser-Meyer-Olkin) value was found as 0,879 at the executed EFA and the Bartlett test was significant ($\chi^2 = 6208,291$; $df = 435$; $p < 0.001$). According to the composition of the pattern matrix, we identified that scales illustrate an appropriate distribution to the original form. However, we removed some items since these items' factor loadings were below acceptable range of 0,50 (Fornell & Larcker, 1981). The final results of factor analysis can be seen in Table 1.

Table 1. Results of validity and reliability tests

Items	1	2	3	4	5	Variance	α
Hopelessness1		,547					
Hopelessness2		,798					
Hopelessness3		,775					
Hopelessness4		,694				14,944	0,888
Hopelessness5		,824					
Hopelessness7		,740					
Hopelessness9		,806					
Helplessness2				,550			
Helplessness3				,682			
Helplessness4				,841			
Helplessness5				,651		6,160	0,828
Helplessness6				,562			
Helplessness7				,568			
Helplessness10				,547			

Items	1	2	3	4	5	Variance	α
Haplessness1			,539				
Haplessness3			,558				
Haplessness6			,537				
Haplessness7			,582			9,487	0,819
Haplessness8			,776				
Haplessness9			,868				
Haplessness10			,780				
Nepotism1					,605		
Nepotism2					,598	4,892	0,730
Nepotism3					,593		
EntrIntention1	,653						
EntrIntention2	,741						
EntrIntention3	,774						
EntrIntention4	,947					24,039	0,934
EntrIntention5	,931						
EntrIntention6	,925						

Total Variance Explained: 60,52%; Iterations: 6; Rotation Method: Promax; KMO: 0,879; Bartlett: 6208,291(435); Sig. $p = ,000$; Goodness of Fit: $\chi^2 = 712,127(295)$; $p < 0,001$.

Source: Authors' calculations

As can be seen in Table 1, items have factor loadings ranged from 0,537 to 0,947. The total variance explanation percentage of all scales is 60.52%. Cronbach's α values are respectively 0,888; 0,828; 0,819; 0,730 and 0,934 for Hopelessness, Helplessness, Haplessness, Nepotism and Entrepreneurial Intention scales. The correlation among variables, means and standard deviations of constructs can be seen in Table 2.

Table 2. Descriptive Statistics

Variables	Mean	SD	1	2	3	4	5
1. Hopelessness	4,597	1,136	-				
2. Helplessness	2,415	1,032	-,413**	-			
3. Haplessness	2,235	1,035	-,379**	,598**	-		
4. Nepotism	3,994	,997	,015	,066	,115*	-	
5. Entrepreneurial Intention	3,719	1,166	,112*	-,115*	-,014	-,052	-

Notes: **Significant at the 0,01 level. *Significant at the 0,05 level.

Source: Authors' calculations

According to the analysis results, it was concluded that the scales did not pose any problems in terms of validity and reliability. Therefore, we took the average of the scales over the structures confirmed in factor analysis and performed the hypothesis tests.

4.4. Hypotheses Tests

We performed a multiple linear regression analysis to test the hypotheses which were established within the scope of the research. The results are given in Table 3.

We performed linear multiple regression analysis to test if the hopelessness, helplessness, haplessness, and nepotism variables significantly predict entrepreneurial intention. A significant regression equation was found ($F(4, 370) = 2,708$, $p < 0,001$), with an adjusted R^2 of ,169. Accordingly, while helplessness ($\beta = -,156$, $t(370) = -2,092$, $p < 0,05$) has a significant and nega-

tive effect on entrepreneurial intention, nepotism ($\beta = -.267, t(370) = 3,117, p < 0,01$) predict it positively. Hence, “**H₂**: The emotional state of helplessness influences entrepreneurial intention positively” and “**H₄**: The perception of nepotism influences entrepreneurial intention positively” hypotheses are **accepted**. In spite of that we found that hopelessness ($\beta = ,101, t(370) = -1,721, p > 0,05$) and haplessness ($\beta = ,27, t(370) = 1,723, p > 0,05$) are not a significant predictor of entrepreneurial intention. Therefore, “**H₁**: The emotional state of hopelessness influences entrepreneurial intention positively” and “**H₃**: The emotional state of haplessness influences entrepreneurial intention positively” hypotheses are **rejected**.

Table 3. Results of regression analysis

Variables	β	p	t	F	df	p	adj. R^2
Entrepreneurial Intention				2,708	4, 370	,030	,169
(Constant)	3,617	,000	8,369				
Hopelessness	,101	,086	1,721				
Helplessness	-,156	,037	-2,092				
Haplessness	,127	,086	1,723				
Nepotism	,267	,003	3,117				

Source: Authors' calculations

5. CONCLUSION

Entrepreneurship is admitted as one of the main elements of economic growth and development all over the world. Entrepreneurship is not a concept that has merely individual benefits. It can contribute to a society as a whole because the capital gained as a result of this action is integrated into the economy of a country and new employments are provided in these businesses (Candan, 2011). Due to this prominence, entrepreneurship is tried to be encouraged by many different instruments in our country and many other countries, and attempts are being made to increase the number of new entrepreneurs. Along with these studies, the presence of some other factors can enable the number of new entrepreneurs to increase as well. In addition to that, some negative state of emotions can have an influence over entrepreneurial intention. The negative state of emotions which are observed in the vast majority of a society (Duman, İmre & Mısırlı, 2019) and the consequences of which are still not known precisely cannot take individuals' imagination away from them completely, and can enable them to perform very powerful behaviors in appropriate conditions (Hyroop, 1953). Such apprehensions as finding a job in the future can ensure the emergence of intentions related to entrepreneurship which will reverse the existing situation and provide the acquisition of a significant status in a society.

Instead of the positive premises affecting entrepreneurial intention, this study concentrates on the possible negative premises which are not dealt with eminently in the literature, and which therefore we consider to be a gap. Within this context, a survey was conducted with the students who receive education in the universities located in the provinces Mus, Bitlis, Van and Hakkari which are placed in the eastern Turkey. According to the results of the study, it was concluded that the emotional state of hopelessness does not influence entrepreneurial intention. Likewise, in those feeling themselves hapless, it was concluded that this emotion has no impact on entrepreneurial intention as well. The consequence we obtained is an expected result since expecting an individual who identifies himself/herself as hopeless and hapless to be an entrepreneur will be an extremely optimistic expectation.

Another conclusion that we reached within the scope of our study is that the feeling of helplessness influences entrepreneurial intention in a negative way. This result means that the individuals feel-

ing helpless will refrain from being an entrepreneur. In other words, they will stay away from being an entrepreneur. Although our study practices to measure entrepreneurial intention (why participants consider themselves to be helpless) is a significant point that is required to be emphasized. It is a meaningful conclusion that the individuals who deserve to receive a university education by attending an exam and achieving success among many candidates and who continue their education, experience the feeling of helplessness, and which policy makers are required to emphasize.

Another finding of our study is that the perception of nepotism influences entrepreneurial intention positively. In other words, it came out that the students, who have the opinion that there is favoritism in recruitment, contemplate being an entrepreneur in order to get employed in the future. In previous studies, the internal factors affecting entrepreneurship, such as the need for achievement (Perry, Macarthur, Meredith & Cunnington 1986), locus of control (Luthje & Franke, 2003) and self-sustainability (Chowdhury, Endres & Frye 2019) are included. Likewise, it is stated that the external factors such as access to capital (Steel, 1994), knowledge as to business and sector (Kristiansen & Indarti, 2004), social network and environment (Tyszka, Cieřlik, Domurat & Macko, 2011), entrepreneurship education, influence entrepreneurship (Çiçek & Karakař, 2020). As a result of our study, in addition to these factors it is determined that nepotism orients individuals towards entrepreneurship as well. At the same time, this situation can cause countries to draw away from the innovative and courageous entrepreneurial profiles which they desire. Nepotism is an undesirable situation. Another significant conclusion required to get evaluated by authorities is that the participants are university students, and they believe there is nepotism in getting a job. Starting from all the information, some suggestions were developed.

- As a result of our research, it was determined that the participants studying at university have the feeling of helplessness. For the detection of that emotion developing in students, measurements can be performed at regular intervals and these individuals can be provided with psychological counseling services.
- Since universities are the institutions assuming important roles in preparing students for life, they can lead in the development of students' career plans. Within this scope, the training that can orient students towards entrepreneurship and career days with successful entrepreneurs can be organized.
- Due to the significance of entrepreneurship, considerable support is provided for young and woman entrepreneurs in many countries. The updated information about the support should be shared by the seminars organized by establishments which provide support for entrepreneurs. With the actions such as training, career days and entrepreneurship support, the emergence of an entrepreneurial ecosystem at university can be provided
- The feeling of nepotism is not an emotion that emerges by itself. Therefore, the exams and interview techniques implemented in recruitment in the public or private sector should be reconsidered. The public should bring the regulations aimed at sorting out the problems regarding itself into action and try to assure that the regulations are made in the private sector as well.

As in all studies, there are some constraints in this study as well. Primarily, the information is received from students online via a survey. Therefore, there is a possibility that participants may not make their responses objectively. Besides, the study was conducted within a specific period and in four provinces. It is contemplated that with the participation of those actively working, conducting successive studies observing the negative states of emotions that can have influence over entrepreneurial intention within a longer period and in many provinces, and moreover in countries, will be beneficial.

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Human Resource Management with the Support of Management Information Systems

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Keywords:

Accounting profit/loss;
Employee training;
Enterprise competitiveness;
Labour productivity;
Software



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Abstract: *At present, new technologies are crucial in maintaining the competitiveness of businesses. In recent years, the application of management information systems has also increased in the field of human resource management, where they support many decisions concerning human resources. Emphasis is placed on employee training and the use of information systems in terms of achieving a competitive advantage. The practical part is focused on finding the dependence between employee training, the use of information systems and the competitiveness of the selected enterprise, where regression and correlation analysis is applied. Regarding the performed analysis, we confirm the significant impact between the costs spent on employee training, the costs spent on information systems and the accounting profit/loss, labour productivity in the selected enterprise. Based on the results of the research, generalized findings and suggestions are presented.*

1. INTRODUCTION

Competitiveness is a concept that has attracted the attention of economic theorists for decades (Šegota, Tomljanović, Hudek, 2017). The dynamics of the business environment creates pressure on the competitiveness of each enterprise (Lorincova, Vetrakova, Lizbetinova, 2018). The current business environment is characterized by globalization, open markets, an enormous amount of information and easy communication. These features make it a more difficult competitive environment (Marwan, 2014).

Human Resource Management (HRM) is one of the basic attributes of the success of any organization (Potgieter, Mokomane, 2020). The HRM function is considered by top managers as a significant source of competitive advantage, as it significantly contributes to the overall productivity and strength of the organization. It helps to build a more stable workforce through better system of recruitment, training and care of employees (Memeti, Azizi, Luma-Osmani, 2019). Human capital, as one of the internal resources, incorporates the knowledge and skills of employees, and in the new market environment is a great driving force for increasing the competitiveness of enterprises (Ma, 2018). The need to improve and update expertise requires lifelong education and training of professionals, as well as certification of qualifications. In particular, employee training of small and micro-enterprises is a key issue in conditions of crisis and constant change, as it leads to the implementation of innovative measures, the use of modern technologies, the offer of quality services and finally increased competitiveness (Tzamalīs, 2015). Training is considered to be one of the main values, without which it is not possible to form a workforce in the current economy (Kapustina, Martynová, 2020). HRM has become a critical source for gaining a competitive advantage (Chahar, Hatwal, Sen, 2019). Increasing employee productivity and reducing human resource costs are two useful ways for an HRM manager to increase profits. The cost of human resources forms the maximum part of the total costs of organizations, and therefore it is necessary to pay increased attention to the implementation of information technologies in HRM (Begum et al., 2016).

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Over the last decades, advanced information technologies have become increasingly ubiquitous demands (Casalino et al., 2019). They are a direct source of increasing an enterprise's competitiveness and are therefore particularly important for its long-term survival and development (Li, Wang, 2015). The introduction of information systems can help enterprises achieve greater efficiency and effectiveness (Loonam et al., 2014). They support sound business decision-making processes through the use of analytical tools (Antoniadis, Tsiakiris, Tsopogloy, 2015). Visual information has contributed to improving the information needs of managers, to more effective decision-making, and more effective control activities (Zhan et al., 2019).

Information technologies represent a benefit for every organization in increasing its productivity, which is exhibited through effective HRM, where information systems play a major role (Kushwaha, Yadav, Prasad, 2018). HRIS (Human Resources Information System – HRIS) has become a crucial tool for integrating human resource information into an organization's business strategy (Gedam, 2011). HRIS is an integrated system used to collect, store, and analyse data related to an organization's human resources, consisting of databases, computer applications, hardware, and software. The use of HRIS in organizations has many advantages for managers, especially in decision-making processes (Bal, Bozkurt, Ertemsir, 2012).

Investments in the new information system should be made by following the strategic management. The profitability of an information system depends on its usefulness in managing and improving key strategic areas of business. Not only the quality of the information system itself but also the strategy of introduction and implementation of the information system has a positive impact on the enterprise's financial results (Pérez-Méndez, Machado-Cabezas, 2015). The successful implementation of the information system for HRM depends on various factors, including corporate culture, managerial skills, as well as the suitability of the technology concerning business processes (Memeti, Azizi, Luma-Osmeni, 2019). The key factor is the support of top management. Top managers who support a positive approach to information systems can build a strong coalition and create a vision that is consistent with the enterprise's strategy (Loonam et al., 2014). Many enterprises are unable to successfully implement new technologies due to disinterest and resistance to change (Memeti, Azizi, Luma-Osmeni, 2019). The main obstacles to the implementation of the information system for HRM include insufficient financial support from the enterprise (Ramírez, Tejada, 2020).

Businesses that transfer as much HRM activity as possible to information systems are becoming more efficient. This is especially true for larger enterprises operating in larger markets that are in a phase of growth or stagnation (Barišić, Poór, Bach, 2019).

2. DATA AND METHODS

A large number of different factors affect the competitiveness of enterprises. One of them is the Human Resource Management (HRM) area. The main aim of the paper is to point out the relevance of employee training, management information systems and the competitiveness of enterprises.

The object of research is the area of HRM in the selected enterprise. It is a large enterprise operating in the field of industrial production. Due to the sensitivity of economic data, we call it with the fictitious name ABC. The enterprise's management has expressed interest in improving its current state of management processes and information systems, from which they expect to

strengthen its competitiveness in the market. A substantial part of the HRM budget is the cost of employee training, so we have set the following sub-objectives to meet the main goal:

1. find out the dependence between employee training and the competitiveness of the selected enterprise,
2. find out the dependence between the use of information systems and the competitiveness of the selected enterprise.

In this paper, we applied regression and correlation analysis. For statistical evaluation, we set the following research hypotheses:

Hypothesis One: The costs of employee training have an impact on the growth of accounting profit/loss and labour productivity.

Hypothesis Two: The costs of information systems have an impact on the growth of accounting profit/loss and labour productivity.

An important indicator for assessing an enterprise's competitiveness is the accounting profit/loss, which is used in the calculation of financial indicators related to competitiveness. An important indicator is also labour productivity, which we measured through added value (Majdúchová, Neumannová, 2008):

$$PP = (\text{added value} / \text{average number of employees}) \quad (1)$$

The research is carried out for the period 2009 – 2019. The basis for the calculations was data on the accounting profit/loss, labour productivity, costs of employee training and costs of IS/IT for all centres. The enterprise monitors the costs incurred in the analytical accounts (518300 – Training, 013100 – Software, 518100 - IT and software, 518200 - IT leasing of devices). We performed the analysis using MS Excel and Gretl programs. For the final output, we determined a linear model for multiple dependencies (Matejková, Pietriková, Poláková, 2018):

$$y_j = b_0 + b_1 x_j + b_2 x_j + b_n x_j \quad (2)$$

where:

y_j – jth value of the dependent variable (accounting profit/loss, labour productivity)

x_j – jth value of the independent variable (Training, Software, IT and software, IT leasing of devices)

b_0 – locating constant

b_1, b_2, \dots, b_n – regression coefficient

As part of the statistical research, we combined several options and gradually eliminated insignificant variables, we worked our way to the final model. Subsequently, after selecting the most suitable model of the regression function, we dealt with its quality - the strength of dependence. We verified the explanatory power of the model by calculating numerical characteristics. The linear model had to meet several assumptions, based on which the least-squares estimation of the model was unbiased and efficient. These assumptions that we verified in GRETL include heteroscedasticity, autocorrelation and multicollinearity.

3. RESULTS

The field of HRM is very important, as human resources are involved in creating value that affects the competitiveness of the enterprise. The requirements for the information system in the field of HRM depend on the number of employees and the requirements for their training.

Employee training as an important agenda within HRM is becoming a lifelong need in the current business environment. This is a relatively wide area, which includes many activities. Employee training represents a significant part of the HRM budget. For effective management, it becomes important to implement a suitable MIS, which will allow:

- improvement of the employee training processes,
- reduction of HRM costs.

As a part of the statistical survey, we combined several options for determining the dependence of accounting profit/loss and labour productivity on the employee training costs and the information systems costs in the selected enterprise.

For the final output, we determined the most suitable model and transformed the general equation of the linear model according to the output as follows:

$$VH = b_0 - b_1 \cdot 10,51 + b_2 \cdot 109,98 + b_3 \cdot 10,74$$

Based on the statistical survey using regression and correlation analysis, we came to the results listed in Table 1.

Table 1. Regression and correlation analysis – accounting profit/loss

Regression statistics							
	R-squared						0.9948
	Adjusted R-squared						0.9917
	S.E. of regression						1.1093
	Observations						9

	Coefficient	Standard Err.	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-1.1936 3e+06	345148	-3.46	0.0181	-2.0808 6e+06	-306399
Software	-10.5125	2.06094	-5.10	0.0038	-15.8103	-5.2147
IT a software	109.9810	5.96908	18.43	<0.0001	94.6370	125.3250
Training	10.7386	3.85153	2.79	0.0385	0.8380	20.6393

Source: own calculation, internal data ABC's enterprise

The value of the coefficient of determination is 0.9948. The chosen regression function explains the accounting profit/loss variability to approximately 99.48 %. The remainder represents unexplained variability, the influence of other random factors, and unspecified influences. The number of observations represents a period of 9 years.

Based on the P value < 0,05, we claim that all coefficients are statistically significant. The biggest positive impact on accounting profit/loss and labour productivity has the costs of IT and software, which are charged to a separate analytical account 518100. This account monitors intangible assets with a value equal to or less than 2.400 euro, as well as services related to information systems in the researched enterprise - consultations, updates, configurations, repairs and maintenance, Internet services.

If the cost of IT and software increases by 1 euro, we can expect the accounting profit/loss to increase by an average of 109.98 euro. If the cost of IT and software increases by 1 euro, then with a 95 % probability we can expect the accounting profit/loss to increase from 94.64 to 125.33 euro. We interpret training similarly.

As part of the statistical survey, we also combined several options for determining the dependence of the employee training costs and the information systems costs on labour productivity. For the final output, we determined the most suitable model and transformed the general equation of the linear model according to the output as follows:

$$PP = b_0 + b_1 \cdot 0,83 + b_2 \cdot 0,14$$

Table 2 contains the results of regression and correlation analysis between costs on information systems and labour productivity, as well as between costs on employee training and labour productivity.

Table 2. Regression and correlation analysis – labour productivity

Regression statistics							
R-squared							0,9887
Adjusted R-squared							0,9842
S.E. of regression							1,7575
Observations							8

	Coefficient	Standard Err.	t Stat	P-value	Lower 95%	Upper 95%
Intercept	5905,45	2257,23	2,62	0,0473	103,06	11707,80
IT a software	0,8287	0,0521	15,90	<0,0001	0,6948	0,9627
Training	0,1364	0,0535	2,55	0,0512	0,0010	0,2738

Source: own calculation, internal data ABC's enterprise

The value of the coefficient of determination is 0.9887. The selected regression function explains the accounting profit/loss variability of approximately 98.87 %. The remainder represents unexplained variability, the influence of other random factors, and unspecified influences. The number of observations represents a period of 8 years.

Based on the P value <0,05, we claim that all coefficients are statistically significant. As with accounting profit/loss, IT and software costs have the greatest positive impact on labour productivity too. If the cost of IT and software increases by 1 euro, then we can expect that labour productivity will increase by an average of 0.83 euro. If the cost of IT and software increases by 1 euro, then with a 95 % probability we can expect the labour productivity to increase from 0.69 euro to 0.96 euro. We interpret training similarly.

Based on the performed regression and correlation analysis in the examined enterprise ABC, we accept the established hypotheses:

1. IT and software costs and employee training costs have a significant impact on accounting profit/loss growth,
2. IT and software costs and employee training costs have a significant impact on labour productivity growth.

Accounting profit/loss and labour productivity are indicators that are significantly used in assessing the competitiveness of enterprises.

4. FUTURE RESEARCH DIRECTIONS

In recent years, there has been an increase in the implementation of MIS in the field of HRM (HRIS), where it supports many human resource decisions, such as staff information gathering, recruitment and selection, staff training and development, evaluation and rewarding of employees. Human resources costs form a significant part of the total costs of companies, and therefore it is necessary to pay special attention to the implementation of IS/IT in the field of HRM, which help increase employee productivity and reduce human resources costs. Technology has an increasingly significant impact on HRM. As technology evolves, it will also force HRM to take on new contours in its processes and procedures. HRIS was created in response to the need to make this change in the most fruitful way possible, taking into account increased accuracy, fast access to information, increased competitiveness and efficiency, and the redesign of the HR function. However, its role in HRM allows us to respond more quickly to changes and needs in human resource management, such as budget control, monitoring and screening, skills allocation, evaluation, feedback, workforce planning, succession planning, skills monitoring, analysis training needs and global analysis. In the light of these trends, it is important to conduct future research.

5. CONCLUSION

In today's business environment, there is an increasing emphasis on the availability of fast, high-quality and accurate data for managers. The timely provision of the right data, and the information obtained from them for the subsequent decision-making of managers, can greatly affect the enterprise's position in the market, its financial situation, as well as its competitiveness. It is therefore important that the enterprise has an effective database and a suitable MIS in place. The information system for HRM also has an important position within the MIS. Employee training costs usually forms the largest part of the HRM budget and with the help of a comprehensive information system, it can be one of the factors in maintaining and increasing the competitiveness of enterprises.

In determining the research issues, we based our analysis on the real requirements of the enterprise and we pointed to the relevance of education, management information systems and competitiveness.

To find out the dependence between employee training and the use of information systems on the competitiveness of enterprises, we applied regression and correlation analysis in the paper. Based on the results of the analysis, we can say that there is a statistical dependence between accounting profit/loss and costs on employee training, costs on information systems, as well as between labour productivity and costs on employee training, costs on information systems. Costs on information systems – IT and software significantly affect accounting profit/loss and labour productivity, and thus ultimately the competitiveness of the selected enterprise.

The veracity of the results of our regression and correlation analysis is also confirmed by the results of research by other authors. Ramírez and Tejada (2020); Siengthai and Udomphol (2016) in their researches accept a hypothesis of positive correlation between the use of HRIS and operating cost and time savings. Begum et al. (2016) also confirm in their research that the use of HRIS brings higher efficiency in terms of employee productivity and reduced human resources costs. They further state that the use of IS/IT in HRM related activities may allow managers and employees to focus more on strategically important activities than on HRM-related administrative activities. Similarly,

Barišić, Poór, Bach (2019) state from the results of their research that enterprises that have HRIS are generally more productive, more innovative and have a better quality of services, which results in an overall higher profitability. In addition, Chiu (2015) leads to the relationship between education and innovation. He states that investing in employee training has a positive impact on innovation.

A large number of different factors affect the competitiveness of enterprises. According to the results of our research, as well as the statements of several authors mentioned in this paper, the field of HRM is one of the important areas where the enterprise can achieve a long-term competitive advantage by using IS/IT. Based on the generalization of the results, we recommend enterprises to invest in the areas of employee training. In order to spend training costs effectively, it is necessary to have a suitable information system that will improve the operation of the HRM department. As we showed in the analysis, the above facts have a positive effect on accounting profit/loss and labour productivity. At the same time, we can consider employee training as increasing the skills of employees, their performance and providing them with space for new ideas. This can be another factor for business prosperity and maintaining competitiveness.

ACKNOWLEDGMENT

The paper was prepared in connection with the project VEGA 1/0489/15 "Increasing the effectiveness of managers' decision-making with the support of information systems and accounting".

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Do Employers Have Control Over the Collection and Distribution of Tips?

Case Study: Slovenia and Montenegro

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Keywords:

Tipping;
Employers;
Tip sharing;
Slovenia;
Montenegro

Abstract:

Objective: The purpose of this paper was to determine whether tipping could reduce labor costs in the service sector. This research aims to better understand whether employees are more motivated to work because of the tip they receive.

Methodology: We will achieve these goals based on the findings of the research from Slovenian and Montenegrin companies in 2019 and 2020. A quantitative survey was implemented on a convenience sample of 107 Slovenian, and 59 Montenegrin companies, using the non-probability sampling technique. Statistical data analysis was carried out with the help of IBM Statistical Package for Social Science (SPSS) software version 20. We investigated the area of tips from the point of view of the orderliness of the distribution of tips, what are the relations in Slovenia and Montenegro and whether the tip as a motivational activity is sufficiently used in these two countries.

Originality: Tipping has received little attention in rewarding and motivating employees. Furthermore, there is no good, national source of guidance to help managers make decisions about tipping policies. This paper addresses these voids in Slovenia and Montenegro. Only a comprehensive discussion will be able to bridge this gap.

Results: According to employees, the overall satisfaction with tips is better in Montenegro. Most employees allow the collection of tips, which is more present in Montenegro. In Slovenia, there is a regulated system of distribution of tips, while in Montenegro this system is not clearly defined. Moreover, in Slovenia, there is also an orderly system for the collection and sharing of tips. Due to this fact, in Slovenia, the distribution of tips includes both, the employees who are directly involved in providing services as well as their colleagues. By contract, in Montenegro, only employees directly involved in providing services are entitled to a tip.

Practical implications: In order to decrease labor costs, we propose that the management takes control of tipping and integrates tips into the reward system. Also, the employees should be made aware of how tipping improves service and increases their income.

Limitations: The sample was formed by the questionnaire that was distributed to various companies in the service sector as a non-probability method based on referrals from initial subjects to get another subject. The questionnaire was sent by e-mail directly. The data were obtained by the Chamber of Commerce of Slovenia and the Chamber of Commerce of Montenegro. The main problem with small samples is the interpretation of results. Therefore, the results cannot be fully generalized. This issue should be addressed in future tipping studies.



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1. INTRODUCTION

Most of the previous researches on tipping have focused on restaurant tipping (Herzberg, 1959; Lynn, Mynier, 1993; Parrett, 2003; Raspor, 2007) or customers' perspectives (Call, Lynn, 2009; Barnes, 2003; Raspor, 2018) and what influences tipping (Lynn, Sturman, 2010; Fernandez, 2004; Raspor, 2015). There is little study on restaurant staff' tipping preferences (Namasivayam, Upneja, 2007; Lin, Namasivayam, 2011; Raspor, 2013). Restaurant tipping is still a controversial topic that needs to be investigated further. Namasivayam and Upneja used a student-oriented sample in a previous study. Much less research has been done on the regulated system of collecting and sharing tips, largely because no comprehensive research has been done among employers. The aim of this research is therefore to find out what influence do Slovenian and Montenegrin employers have on tip distribution and if they use tips as motivational activity, as well as a tool to reach more flexibility on the part of employees. This research was conducted based on previous research studies (Raspor, 2015; Raspor, 2013).

Based on the defined problem, subject and goal of the research, the following research hypotheses were formulated:

- H1:** The orderliness of distribution of tips is not yet satisfactory.
 - H1.1:** Most companies allow employees to receive and collect tips.
 - H1.2:** In Slovenia, a regulated system of collecting and sharing tips is more present than in Montenegro.
 - H1.3:** In Montenegro, the tip itself is left to employees, who share it with colleagues more often than in Slovenia.
- H2:** The tip as a motivational activity is not yet sufficiently used.
 - H2.1:** Employees are even more motivated by a good salary in Montenegro.
 - H2.2:** In Montenegro, the motivational aspect of the tip is more pronounced.

2. LITERATURE REVIEW

The tip is an important area in the tourism and hospitality industry because it is directly related to the lives of all employees. The available literature abounds with a wealth of evidence to support this claim. Most authors agree that the tip is directly dependent on the quality of service provided (Ineson & Martin, 1999) and that it directly affects employee benefits (Raspor, 2002). In the world, the term tip is synonymous with the award for quality service or effort and engagement of employees in the hospitality industry. In America, there has long been a custom of giving tips (Whaley, Douglas and O'Neill, 2014), that is, tips are so present in people's lives that they represent a very important industry and a direct source of income for millions of people today (Azar, 2011). The issue of tips in the hospitality industry is associated by many authors with motives as internal factors that drive an individual to achieve a certain goal (DuBrin, 2002). Other authors believe that due to the lack of certain things, there is a need for it, which in fact is the basis of motivation (Kim, 1996). Needs can be physiological (Boone & Kurtz, 1992) or independent organic requirements that are defined in the literature as impulses (Robbins & Coulter, 2009). When a person has a need, there is an instinct to satisfy or resolve the situation through certain elements or the situation in which the person is. Such elements and situations that can be used to meet certain needs are explained by the authors as goals (Johnson, 1999). There are situations when a person is not aware of certain activities or actions, but this can only be noticed by another person who observes and analyzes his behavior. Such behavior is called unconscious motivational activity that leads to the achievement of certain goals or the satisfaction of certain needs (Garrity,

Degelman, 1990; Armstrong, 2003; Arnold, Randall & Patterson, 2010). All the above analyzes point out that motives cannot be equated with the notions of incentives and necessities. However, the most common incentive is money with which it is possible to realize specific needs (Nikić, 2012). It is in this segment that the tip can be identified as the main motivating influence. Certain authors have been researching the impact of motivation in the field of catering for a long time, especially in the part of guest satisfaction and getting tips. Factors such as education, age, type of job, opportunities for advancement, reputation at work and others have been identified (Sarwar, Abugre, 2013). Certain empirical research indicates that the time of receiving a tip directly affects the commitment and effort of service employees (An-Tien, Der-Huang Wu, 2007). Similar research on service speed and tip quantity has yielded quantitative results that confirm the assumption that tip level decreases with increasing service time (Kerr, Domazlicky, 2009). On the other hand, the absence of tips directly affects human resource management, social economy and labor discrimination by gender and makes it difficult for managers to do business in terms of finding alternative ways to motivate employees (Clotildah, Charity, Felistas, Tatenda, 2014). The issue of tips is very complex and can not only be analyzed from an economic and social point of view but also requires socio-psychological considerations, especially when it comes to tips left by tourists (Shamir, 1984). Tips are very often associated with a business strategy in the field of tourism and hospitality, that is, giving tips is directly related to the company's profit (Azar, 2011). There is a wealth of research dealing with the problem of tips from the point of view of service users. Some recent research suggests that tipping is more common when paying in cash than paying by credit card (Kakkar, Li, 2021). Also, research has shown that the tip is tied to the status position and individuals who have great power. Such individuals are more likely to tip when the amount of the tip is visible than when the amount of the tip is not visible, and that there are differences in social pressure when it comes to giving tips by individuals of low status power compared to those of high-status power (Lee, Rafieian, Aggarwal, Korschun, 2017). The tip can also vary in cases when poor service occurs due to clumsiness or incompetence of the caterer or technical failures in the organization of the catering business. The results of such research indicate that experienced catering workers, who know how to cope with the newly created awkward situation in relation to those inexperienced catering workers, succeed (Bujisic, Parsa, Bilgihan, Galloway, Hern, 2014). All of the above indicates that the issue of tips is very complex and that in the future it will continue to be more deeply researched as social norms and the way of life of people in the world change.

The continuation of the paper gives an overview of the methodology and discussion related to the obtained research results, after which the concluding remarks are presented.

3. METHOD

The conducted research was empirical and realized through a structured closed-ended survey which contained a five-point Likert rating scale from 1 (Completely dissatisfied/strongly disagree) to 5 (Very satisfied/strongly agree) which sought to quantify the level of employee satisfaction, work environment, as well as the level of influence of the tip on their satisfaction and desire to work. The main goal was to analyze the issues defined in the introduction to the work, i.e., how employees in the service sector collect and distribute tips, and how the tip affects the work of employees. The questionnaire was distributed by e-mail to a sample formed based on a database submitted by the Chambers of Commerce of Slovenia and Montenegro. The research was conducted in the period from 2019 and 2020 on a sample of 108 Slovenian and 60 Montenegrin companies that operate mainly in the field of hospitality, using the sampling technique without probability. The obtained data were processed using IBM Statistic Package for Social Science (SPSS) version 20 software.

Respondents were asked to complete the survey electronically. The answers to the presented survey were collected in the period from February to October 2019. The questionnaire was composed of questions related to job satisfaction, as well as the impact of the tip on the motivation for work of employees in these areas. In addition, the mandatory part of the survey contained questions related to socio-demographic characteristics aimed at profiling respondents. All the obtained data were analyzed using the IBM Statistic Package for Social Science (SPSS) version 20. Statistical analysis included determination of the mean value, chi-square test, t-test for an independent sample and Eta Square. The following table provides an overview of the demographic and socioeconomic profiles of the surveyed participants that form the sample of the empirical research.

Table 1. Demographic and socioeconomic sample profile

		Slovenia		Montenegro	
		Frequency	Valid Percent	Frequency	Valid Percent
Organizational structure	Public limited company (PLC)	30	28.0	1	1.7
	Private Limited Liability Company (LTD)	36	33.6	43	72.9
	Sole proprietorship (PC)	41	38.3	15	25.4
	Total	107	100.0	59	100.0
Number of employees	Micro companies (up to 10 employees)	25	23.4	43	71.7
	Small companies (up to 50 employees)	4	3.7	7	11.7
	Middle companies (up to 250 employees)	13	12.1	2	3.3
	Large companies (more than 250 employees)	65	60.7	8	13.3
	Total	107	100.0	60	100.0
Business	Hospitality	66	61.7	39	66.1
	Gambling	15	14.0	7	11.9
	Hair & beauty salon	6	5.6	2	3.4
	Service station	7	6.5	11	18.6
	Other (specify):	13	12.1		
	Total	107	100.0	59	100.0
Ownership of the company	Private	68	64.8	52	86.7
	State-owned	25	23.8	6	10.0
	Mixed	12	11.4	2	3.3
	Total	105	100.0	60	100.0
Region	Posavska regija	6	5.6%		
	Osrednjeslovenska regija	44	40.7%		
	Gorenjska regija	4	3.7%		
	Goriška regija	51	47.2%		
	Total	108	100.0%		
	Kotor			11	18.3
	Tivat			5	8.3
	Budva			3	5.0
	Ulcinj			14	23.3
	Podgorica			6	10.0
	Bar			18	30.0
	Sutomore			3	5.0
	Total			60	100.0

Source: Authors' research results

4. RESULTS

The basic idea of the research conducted on a sample of 108 Slovenian and 60 Montenegrin companies, of which in Slovenia were mostly large companies (65) with over 250 employees that are privately owned (64.8%), while in Montenegro micro companies (43) with up to 10 employees, also privately owned (86.7%). Respondents were interviewed regarding the manner of collection and distribution of tips, through the results included in the three statements (Table 2). Also, respondents were interviewed about the impact of tips on the work of employees through six different statements (Table 3). According to the hypotheses formulated at the beginning of this paper and the obtained results of empirical research, the following findings related to tips can be discussed.

The majority of employees in Slovenia did not want to comment on whether they allow their employees to collect tips (47.4%), which indicates that there may be certain prohibitions when it comes to the distribution of tips, or there are alternative ways. On the other hand, the vast majority of restaurant owners in Montenegro allow their employees to collect tips (71.2%). Regarding the question related to the regulated system of collection and distribution of tips in Slovenia, the majority of respondents stated that there is a clearly regulated system of distribution of tips (77.9%) while almost half of respondents in Montenegro stated that there is no clearly defined system of collection and distribution of tips (43.1%). The majority of respondents in Slovenia who were surveyed and asked whether in addition to employees who are directly involved in the provision of services, someone else is entitled to a tip, answered negatively (59.6%), i.e., in Montenegro almost half of the respondents did not want to answer to that question (46.9%). The obtained results indicate the fact that in Montenegro, due to the lack of a clearly defined (legal) framework for the distribution of tips, its collection is allowed by the owners, but the distribution very likely does not include only employees directly involved in providing services.

Table 2. How employees collect and share tips

		Slovenia		Montenegro	
		Frequency	Valid Percent	Frequency	Valid Percent
Do you allow your employees to collect tips?	Yes	45	46.4	47	71.2
	No	6	6.2	5	7.6
	I do not want to answer.	46	47.4	14	21.2
	Total	97	100.0	66	100.0
Do you have a regulated system of collecting and sharing tips?	Yes	74	77.9	17	26.2
	No	16	16.8	28	43.1
	I do not want to answer.	5	5.3	20	30.8
	Total	95	100.0	65	100.0
In addition to the employees who create tips, are other workers also entitled to tipping?	Yes	28	29.8	20	31.3
	No	56	59.6	14	21.9
	I do not want to answer.	10	10.6	30	46.9
	Total	94	100.0	64	100.0

Source: Authors' research results

The described results indicate that the first hypothesis (H1: The orderliness of the tip distribution is not yet satisfactory) can be accepted, i.e., that there is still no clearly defined way of distributing tips, i.e., that it is not clearly regulated. Because the auxiliary hypothesis related to the permission to tip (H1.1. Most companies allow employees to receive and collect tips) can neither be accepted nor rejected. That is, we can accept the second auxiliary hypothesis which

indicates the existence of a standardized system of distribution of tips in Slovenia in relation to Montenegro (H1.2. In Slovenia, a regulated system of collecting and sharing tips is more present than in Montenegro). Also, the third auxiliary hypothesis, which refers to the fair distribution of tips among employees, does not include owners and managers of catering facilities (H1.3. In Montenegro, the tip itself is left to employees, who share it with colleagues more often than in Slovenia) cannot be accepted.

Respondents further answered questions about the main motivators that influence them when it comes to better service delivery and better job performance. From the obtained results we conclude that the main factors influencing employee satisfaction are a job well done or quality service provided to most respondents (N 103) in Slovenia (Mean value 4.17) while for most respondents in Montenegro (N 65) it is a salary as the main financial motivator (Mean value 4.51). Also, the obtained data indicate that the second factor that strongly affects the quality of service provided in Slovenia is guest satisfaction (Mean value 4.12), while in Montenegro it is the receipt of tips by guests (Mean value 4.25). Salaries and tips are in third place for employees in Slovenia (Mean value 4.09) while for employees in Montenegro it is a clearly defined reward system (Mean value 4.22). All of the above suggests that there are clear differences in social values, i.e., different internal factors that affect diversity when it comes to employee motivation. That is, in terms of the set hypotheses, the hypothesis (H2. The tip as a motivational activity is not yet sufficiently used) can be accepted that the tip as a motivational activity is still not sufficiently represented in Slovenia or Montenegro, which confirms the first auxiliary hypothesis (H2.1. Employees are even more motivated by a good salary in Montenegro) that employees are much more motivated by a good salary in Montenegro than in Slovenia, and the second auxiliary hypothesis (H2.2. In Montenegro, the motivational aspect of the tip is more pronounced) that in Montenegro the motivational aspect of the tip is much more pronounced because it falls under the financial workplace stimulation.

Table 3. Main motivator for employees and for getting a tip

	Slovenia			Montenegro		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Satisfied guests.	104	4.12	1.008	65	4.12	1.038
Work that is well done.	103	4.17	0.919	64	4.05	0.983
Reward system.	104	3.81	1.098	65	4.22	0.838
Good pay (money).	104	4.09	1.034	65	4.51	0.753
Getting a tip.	103	4.09	0.981	65	4.25	0.936
Mutual relationships in the group in which they work every day.	104	3.99	0.980	65	3.86	1.116

Source: Authors' research results

Respondents also made statements regarding the impact of tips on their behavior. The obtained results clearly show that the satisfaction of the majority of respondents (N 103) in Slovenia is directly related to the tip, i.e., that they feel satisfied when their work brings concrete results through a tip as a reward for effort and work (Mean value 4.29) while in Montenegro, the majority of respondents (N 65) believe that tips are directly related to financial stimulation or motivation in the workplace (Mean value 4.09). Generally speaking, both of them agree that gratuity is the main motivator that directly encourages them and creates satisfaction at work. The obtained results also indicate that the majority of respondents in Montenegro (Mean value

4.00) in relation to Slovenia (Mean value 3.82) agree with the statement that if they get a tip, they are kinder to the guests. Also, employees in Montenegro, in cases when they receive a tip, work more and therefore produce better quality work (Mean value 4.03) compared to employees in Slovenia (Mean value 3.89).

Table 4. The impact of tips on employee’s work

	Slovenia			Montenegro		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
If they get a tip, they work harder and therefore produce higher quality work.	104	3.89	1.023	64	4.03	1.112
If they get a tip, they are friendlier towards guests.	104	3.82	1.041	64	4.00	1.098
Getting a tip it in no way influences their work with guests.	102	2.95	1.262	64	3.23	1.306
When they get a tip, they feel satisfied because their work has brought results.	103	4.29	0.986	64	4.05	0.916
Getting a tip has no effect on how they feel.	104	2.71	1.204	62	3.00	1.280
In addition to pay and bonuses, they also receive tips, so they are prepared to work overtime.	104	2.44	1.253	64	3.63	1.189
Tips fall within financial stimulation in the workplace.	104	2.87	1.158	65	4.09	0.996
Because their income mainly consists of tips, they take fewer sick leaves.	101	1.87	1.128	65	3.38	1.141
If they can receive a tip directly in their pockets and do not have to share it with co-workers, they are prepared to work overtime.	103	2.10	1.295	65	3.46	1.147

Source: Authors’ research results

Since tips are the basis of motivation of employees in catering facilities to provide better service, the existence of differences in the ways of collecting and distributing tips can result in a decline in the quality of service provided or differences in the attitude of employees to work. Therefore, it is necessary to take certain actions that would be aimed at educating and expanding the world of owners and managers of restaurants if you want to avoid the occurrence of certain negative effects of the ban on collecting tips or unequal distribution of the same. The results of this research suggest that perhaps one way is to enact a clear legal framework for the distribution of tips and to remove any barriers that may arise when it comes to collecting tips from employees.

The main results obtained by this empirical research indicate situation that the seriousness and importance of the tip as the main motivating factor is still not present in Slovenia or Montenegro. That is, the tip as a motivational activity is still not used enough. We assume that there is an explanation for this situation. That is, the surveyed catering facilities are mainly privately owned. Finally, the areas of tourism and hospitality are just one of the activities in which it is possible to analyze the issue of tips.

5. DISCUSSION

This empirical research sought to point out the problems of the survey from the angle of the regularity of distribution and a key element of motivational activity of employees. These research results require an integrated approach that analyzes various psychological and sociological factors that have a direct impact on employees. One of the key factors that has been researched is the salary of employees, on which the satisfaction and motivation of employees directly depend. The purpose of this research was to analyze the tip as the main activity that has a direct impact on the motivation of employees in the hospitality industry of Slovenia and Montenegro. This research provides a solid basis for further research in this extremely interesting area. Various researches based on employee motivation have an important role for managers and owners of catering facilities who are trying to find new ways to motivate their employees in order to provide better service and make more profit. The results of the research also indicate that managers and owners of companies operating in the hospitality industry still do not sufficiently understand and consider the tip as an important motivational activity of their employees, i.e., the tip as a motivational activity is at a very low level. It is important that there is an understanding of this issue by both owners and managers and employees, in order to achieve the desired effects. It is evident that employees in Slovenia, and especially in Montenegro, are much more motivated by a good salary, i.e., that the motivational aspect of a tip is more pronounced in Montenegro than in Slovenia. That is, tips are seen as a direct financial stimulus in the workplace in the hospitality industry in both Slovenia and Montenegro. Managers and owners of catering facilities in Montenegro could be advised to pay attention to the conditions in which their employees work, i.e., to improve the working environment in order to increase employee satisfaction, which would result in a higher level of service quality. In Slovenia, on the other hand, owners and managers should pay attention to the orderliness of the distribution of tips, which would directly affect the satisfaction of their employees. Most of the research so far indisputably confirms the fact that tips have a positive and direct effect on employee motivation. Tip is a necessary impulse through which employees strive to provide the highest quality service in the field of catering (Clotildah et al., 2014). However, recent research on the topic of motivation emphasizes that the diversity of motives affects the motivation of employees and the quality of the service provided. The above research pointed to the fact that employee satisfaction is directly related to the way tips are distributed, i.e., that a regulated system of collecting and distributing tips has a positive impact on employees in both Slovenia and Montenegro. The results of the research show that employees are most satisfied when they are rewarded and when they receive a tip. Most of the respondents agreed that they function better when there is a clearly defined system of collecting and distributing tips, i.e., when the entire tip is left to employees when they do not have to share it with owners and managers.

In some cases, employees do not have the exclusive right to tip but have to share it with other employees who are not directly involved in the provision of services. Most of the employees stated that they are ready for additional effort and commitment and that they view the tip as a reward for their work and additional engagement in providing the highest quality service. Almost all employees who were surveyed in both Slovenia and Montenegro agreed that the main financial stimulus is a tip, and that this is one of the main reasons for regular work. Because they directly depend on tips, as an additional source of finance, they try not to be absent from work. Also, tips according to most respondents are the main motive for overtime work. According to the obtained results, the main shortcomings when it comes to tips in Slovenia and Montenegro are irregular distribution and differences in tips as an important motivating factor in the hospitality industry.

6. CONCLUSION AND FUTURE RESEARCH

This empirical research confirms the hypothesis that the orderliness of the distribution of tips in Slovenia and Montenegro is still not at a satisfactory level as in some other countries in the near and far environment. Most sources in the available literature point out that motivation is a key element of business organization success. The concept of orderliness in the distribution of tips by employers is highlighted by our research. Empirical results of the research indicate that most companies in Slovenia, and especially in Montenegro, allow their employees to take tips based on the realized service. In cases when employees are satisfied with their work environment, then they are more motivated to provide better service, which results in higher tips and higher business revenues. Various factors that affect the orderliness of the distribution of tips among employees in the hospitality industry are analyzed. Also, the tip was researched from the angle of motivational activity. The results of this research give a new angle to the issue of tips as variability in employee earnings. We believe that it is necessary for the owners and managers of catering facilities to be acquainted with the results of this research in the sense that standardized ways of distributing tips must be introduced and that it must be continuous. In addition, owners and managers of various companies working in the hospitality industry must be educated about the importance of tips as a key motivational activity that has a direct impact on the future business results of the company. There is great potential in terms of employee motivation when it comes to tips. We are also of the opinion that the tip as a key motivator and its regularity deserve deeper research that would shed light on the issue of internal motivators for employees who are directly involved in the provision of services in tourism and hospitality. Future studies can be realized in accompanying or complementary tourism activities at different levels in order to obtain comparative results that would contribute to the verification of these hypotheses. The specifics of the tourism and hospitality sector point to the fact that there are clear differences between the intensity and manner of distribution of tips in different countries or between different mentalities and lifestyles. Research that would take into account these socio-geographical characteristics of employees in the context of a tip could be very interesting.

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Draft version

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Business Model of Consumer Behavior with Included Nutritional Determinant

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Keywords:

Business model of consumer behavior;
Nutrition;
Nutrition determinant;
Self-explanatory



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Abstract: *The success of the operations of the companies that work with food products depends a lot on having information about the consumer purchasing decisions, and based on that, inclusion of marketing strategies that will ensure their success. Business models of consumer behavior can answer these important questions. The inclusion of nutritional determinants in these models is significant, and the model will provide answers to the extent of its impact on consumer behavior. Scope of the study within this paper is an applied original modeling concept for creating business models of consumer behavior when buying food products, where special emphasis is given to the nutritional properties of food products, i.e. in addition to other known determinants, the model includes a new determinant called nutritional. The model is built on several principles using modern information technologies, and one of the important principles is to provide greater clarity for a full understanding of the process involved in the model with integrated self-explanatory functionality. The model was partially implemented with data obtained from several surveys conducted in our research, and as outputs of the model, a set of customer responses were obtained.*

1. INTRODUCTION

Most companies research consumer shopping decisions in detail, in order to answer the following questions: what do consumers buy, where do they buy, how much do they buy, when do they buy and why do they buy. But the answers to these questions are not easy to obtain, because the answers are often hidden deep in the mind of the consumer. The process of decoding consumer behavior when shopping is a complex task because a number of factors (external and internal) of influence need to be determined (Solomon, 2006). However, human shopping behavior, despite its diversity, can be modeled on a consumer behavior model (Kotler & Armstrong, 2008), and by including the necessary economic methods, it can be presented as a business model. As a result, consumer behavior can be explored by analyzing all dynamic behaviors in a series of assumptions and conditions.

In the business models on consumer behavior it is necessary to include scientific methods and concepts using modern information technology such as database management system (DBMS), for consumer database management with information obtained from various sources; geographic information system (GIS), (Pick, 2005, Martinovski, 2017, Martinovski, 2013) which will create thematic consumer maps and business areas, models that can describe the current situation and design future strategies; advanced analysis of databases using data mining methods, such as Association Rules and the Apriori Algorithm, classification and cluster analysis, (Perner, 2006, Jannach et al., 2011, Han et al., 2012), methods that will enable obtaining a large amount of information and knowledge about purchasing rules and clustered customer profiles. The pan-

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demic caused by the coronavirus has changed the way consumers react to food, their behavior when choosing food and how they perceive their diet in general. Similarly, during the pandemic, a number of questions were raised about disease prevention which is one of the important topics in medicine and nutrition through the consumption of high quality nutritional food, and is a significant factor influencing the purchase of food products. Our other research shows an upward trend of food consumers who pay attention to their diet and think about the nutritional quality of food products (Martinovski & Spirovska-Vaskoska, 2015, Martinovski, 2016).

2. NUTRITION DETERMINANT

Nutritionism is a multidisciplinary, scientific and applied field based on food science and nutrition. The study of the composition of food, the nature of nutrients and their impact on the human body (Smolin & Grosvenor, 2011, Taylor, 2007) is one of the main goals of nutritionism. Improving health through a healthy diet, the importance of people’s nutritional needs and general diet are increasingly important to consumers. Therefore, the inclusion of nutritional determinants in business models of consumer behavior is important and necessary, and consumers are increasingly sensitive to the declarations of food products with marked nutritional properties (Martinovski & Simovska-Jarevska, 2015). These models will provide answers (outputs) to a number of questions that are important for a successful marketing strategy of companies in the food industry, especially the degree of impact of the determinant - nutritional properties. Thus, companies can direct the development in expanding the profile of their products, by improving the nutritional quality and increasing the profit.

The elements of the nutrition determinant, that are important for consumer behavior, are shown in Table 1. This entity consists of three attributes: ‘Nutritive element’, ‘Content and quantity’, and ‘Significance rating’ for a specific product group (from 1-lowest to 5-highest). In the development of food products, it is analyzed which of the nutritional properties of the nutritional determinant are important for food products. Most companies focus only on certain segments of the overall market, choosing the best segments for them with design strategies for profit. Companies need to target segments in which they can generate the most purchasing value. Differentiation and positioning of food products on the food map is increasingly directed according to the content of nutrients (Table 1). Food products with increased nutritional quality determined through content and quantity (rank of significance), will receive added value and thus greater purchase value and increased impact on purchasing.

Table 1. Nutrition determinant

Nutrition element	Content and quantity	Importance rank for a certain group of products (from 1 to 5) *
Carbohydrates and energy value	Content and quantity in the form of: monosaccharides (glucose, fructose, sucrose), disaccharides, oligosaccharides, etc.	
Proteins	Quantity and origin: vegetable or animal	
Vitamins and minerals	Content and quantity	
Organic acids	Content and quantity of: ormic, oxalic, citric, tartaric, lactic, malic, pyroglutamin, glucose, valerian, benzoic and other higher fatty acids	
Salts	Content and quantity of: phosphates, chlorides, sulfates	

Micro and macro elements	Content and quantity of: tin, sodium, calcium, phosphorus, sulphur, chlorine, magnesium, iron, aluminum, mercury, manganese, chromium, zinc, lead, arsenic, cadmium, titanium	
Aminoacids	Content and quantity of: lysine, histidine, arginine, aspartic acid, threonine, serine, glutamic acid, proline, glycine, cystine, valine, methionine, isoleucine, leucine, tyrosine, phenylalanine, tryptophan	
Enzymes	Content and quantity of: invertase, diastase (amylase), catalase, acid phosphatase, glucose-octase, polyphenoloxidase, peroxidase, esterase and proteolytic enzymes	
Lipids	Content and quantity of: triglycerides, sterols, phospholipids, free fatty acids, fatty acid esters	
Fibers	Content and quantity	
Nutritional health claims	Certificates	
Sensory characteristics	Color, taste, smell, hardness	
Product safety	Security standards	
Certification	Organic food, for quality	

* The importance of the nutritional property contained in the food product is determined, as follows:
1 - It does not matter, 2 - A little significant, 3 - Moderately significant, 4 - Significant, 5 - Very important

Source: Authors

3. BUSINESS MODEL OF CONSUMER BEHAVIOR

In the development of known models of consumer behavior, several types are encountered: models for identical consumers or different consumers; continuous valued or discrete valued models; lumped model or agent model; deterministic or probabilistic, linear ODE model; models for continuous product range or finite number of brands, etc. They include cultural, personal, psychological and sociological determinants, but none include the nutritional determinant when it comes to food products. Regarding the use of these models, little has been done in terms of understanding and it has been reduced to help. We think that is not enough, and because of that, there may be difficulties in their use by end users.

The concept of modeling for creating a business model of consumer behavior with the included nutritional determinant that we propose differs from the previously listed concepts of models, in that the proposed model includes all methodologies (which include all methods used in the model), inputs and outputs are represented as relational entities (E/R model), and each method consists of attributes. This structure of the model has a number of advantages, as follows: a) easy further development; b) easy application use; and c) self-explanation of the model.

The modeling stages we propose are represented as entities in a relational model (E-R model), including:

Stage 1: Output - Methodology – Input,

Stage 2: Conceptual model,

Stage 3: Logical model,

Stage 4: Physical model,

Stage 5: Verification of the model with feedback.

Stage 1 defines three main groups of entities: Output-Methodology-Input. First, the Output entity defines all outputs of the model and their forms (analytical form, graphical representation, or thematic map). The paper theoretically explains the model for food products, and in the following text only a part of the entities involved in it are shown and a partial implementation is made with data from survey research. Typical outputs for business models with the nutritional determinant included are:

Ou₁= degree of influence of: nutritional properties (nutritional quality), price, packaging and sensory characteristics, in analytical and graphic form.

Ou₂= degree of impact on quality and safety, in analytical and graphic form.

Ou₃= degree of impact of the declarations on which the nutritional properties are written, in analytical and graphic form.

Ou₄= Determining independence between education and nutritional properties, in analytical form.

Ou₅= Determining independence between gender and nutritional properties, in analytical form.

Ou₆= Determining independence between age and nutritional properties, in analytical form.

Ou₇= Determining independence between several different nutritional properties, in analytical form.

Ou₈= Consumer clusters.

Ou₉= Thematic maps of consumers (profitable consumers) by areas.

All these outputs are defined in the entity **Ou_m**. Second, the methodology(s) and required input are defined for each output.

For **Ou₁**:

Methodology 1 (M1.1, M1.2, M1.3, M1.4, M1.5) - average, standard deviation, variance, frequency, SUM and

Methodology 2 (M2.1) - Rank based method

For **Ou₂** and **Ou₃**:

Methodology 1 (M1.1, M1.2, M1.3, M1.4, M1.5)

For **Ou₄**, **Ou₅**, **Ou₆** and **Ou₇**:

Methodology 3 (M3.1, M3.2) - Frequency, Chi-Square test and Cramer's V test

For **Ou₈**:

Methodology 4 (M4.1) - Partitioning Clustering Method on a pattern of three answers to three different questions, pattern1: question1 - answer1, question1 - answer2 ... question3 - answer3

For **Ou₉**:

Methodology 5 (M4.1) - GIS methods - mapping

Methods and their attributes required to obtain predefined outputs are:

M1.1 (category, frequency, average)

M1.2 (category, frequency, standard deviation)

M1.3 (category, frequency, variance)

M1.4 (category, frequency, frequency)

M1.5 (category, frequency, SUM)

- M2.1 (category, frequency, rank, ranking)
- M3.1 (category, frequency, df, p, α , Chi-Square)
- M3.2 (category, frequency, Chi-Square, Cramer's V)
- M4.1 (category, frequency pattern1, consumer clusters)
- M5.1 (category, frequency, Area, GIS mapping)

For all entities - methodology required inputs are: database created from survey research and consumer databases.

The methods set two statistical hypothesis tests: Chi-Square and Cramér's V to determine the independence between two nominal variables. Each variable must have two or more categories. Data are used that reflect the total number of cases (frequency of cases) placed as pairs. In the analysis of independence between two variables, one possibility is to perform a Chi-Square independence test. If the p-values are close to zero (or $\alpha > p$, $\alpha = 0.05$), the null hypothesis of independence is refuted, which means that the variables are very likely to be statistically significant. However, this does not mean that the two variables are strongly related; it can happen that there is a weak relationship between the variables and p is around zero. Therefore, the Cramér's V test is additionally used, which uses the obtained value of Chi-Square and determines how strong the relationship is between the two nominal variables. The value of Cramer's V is in the range of 0 to 1, and the closer the value is to 1 the stronger the dependence between the two variables.

Partitioning Clustering Method is a method of data mining for grouping by classifying (dividing) information into multiple groups based on the characteristics and similarity of the data. The clustering method is used when the database contains multiple objects, creating user-specified data partitions in which each partition is a cluster and a specific area. There are several algorithms for division, and the most commonly used are: K-Mean, PAM (K-Methods) and CLARA algorithm (Clustering Large Applications. Classification is a model for data analysis, i.e. the process of finding a model that describes and distinguishes classes and concepts of data.

Stage 2 - In the conceptual model of the nutritional business model, concepts of all entities and all possible relations are established. The model includes the nutritional determinant as an entity (Table 1 and Figure 1). This entity is related to all other entities. In this phase, the relations between the entities are established: Output (Ou_m) - Methodology (Methodology n) - Input (In_j) and relation between the entities from the methodologies (Methodology 1 - Methodology n). Each methodology consists of methods ($M_{n,i}$), and each method consists of attributes (At_k).

Stage 3 - In the logical model (Figure 1) all entities and defined relationships between entities in the E-R model are set so that obtaining a self-explanation of the process is ensured. This means that for each output there will be a specific explanation of how it is obtained, which methods, inputs and data sources are used. $SEOu_m = (M_{n,i} \& In_j)$. This structure of the model allows easy further development and easy application. Where:

- $M_{n,i}$: i = th method of n-th methodology
- Ou_m : m-th output, In_j j-th input
- $At_{n,i,k}$: k-th attribute
- At_s : attribute - nutritional property
- At_{sk} : attribute - content and quantity of nutritional property
- At_r : attribute - ranking of significance.
- $SEOu_m = (M_{n,i} \& In_j)$: Self-explanation

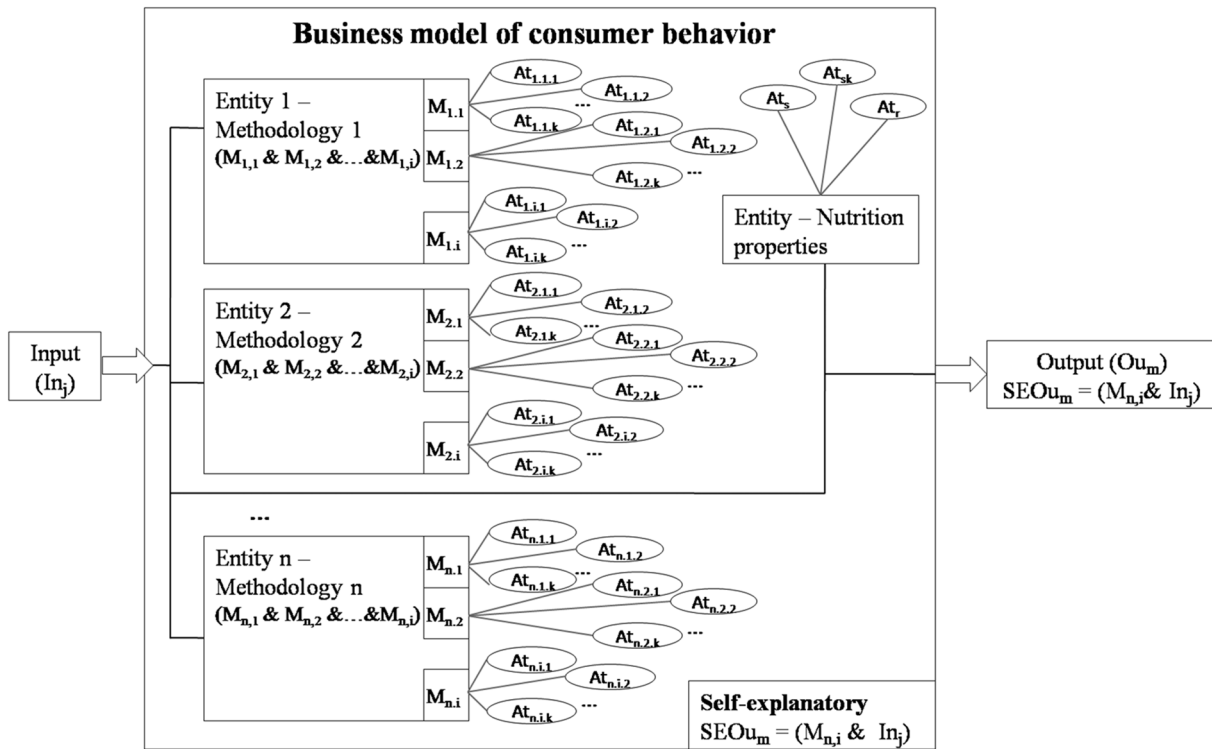


Figure 1. Logical structure of the business model of consumer behavior

Stage 4 - Physical model is the stage of realization of the logical model in a software solution. It is created in a software development environment, with the integration of multiple platforms. For example: integration between: GIS, DBMS (SQL) and data mining software.

Stage 5 - Verification is the final stage of modeling and it involves verifying the business model with test data. The output analyzes the output data, and this can be done very easily, because the self-explanation is returned to the model, i.e. the model explains receiving each output, so that the test check is easy and safe.

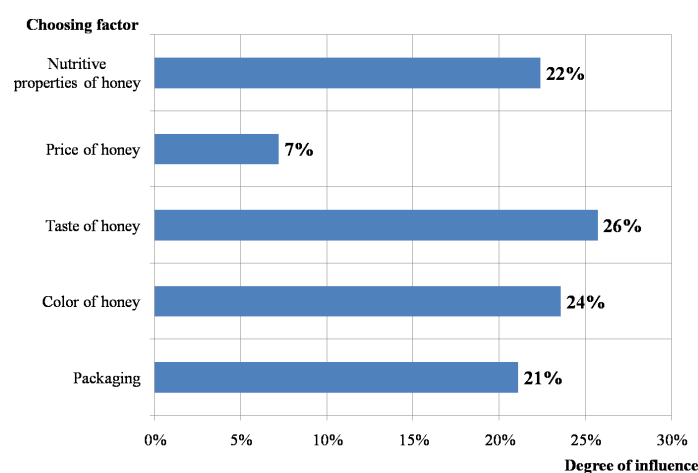
4. IMPLEMENTATION OF THE BUSINESS MODEL OF CONSUMER BEHAVIOR WITH SURVEY DATA

For the past few years, our marketing research has focused on surveys for detecting the key factors of influencing consumer behavior (Martinovski & Gulevska, 2017, Gulevska & Martinovski, 2018). A database is formed from the conducted research, and the conducted advanced analyzes result in concluding observations. To show a partial implementation of the business model of consumer behavior, we will use several of our surveys, and one of those surveys was done in R.N. Macedonia for bee honey as a food product (Martinovski & Gulevska, 2017). The main purpose of this survey is to detect attitudes about the nutritional determinants of honey and the labeling (declaration) of honey. In this research, a detailed analysis was made using the defined methods from point 3. A number of other calculations have been made and a lot of information and knowledge on consumer behavior related to the nutritional determinant of honey has been obtained; this paper demonstrates the acquisition of several results as model outputs using advanced methods. Table 2 and Figure 2 show the output (Ou_1) of the model obtained with Methodology 2 (M2.1) – a ranking-based method. Category: factors when choosing honey (rank, packaging, color of honey, taste of honey, price of honey and nutritional properties of honey).

Table 2. Output table for Ou_1 - Methodology 2 (M2.1)

Category					
Rank	Packaging	Color of honey	Taste of honey	Price of honey	Nutritional properties of honey
1	86	42	31	79	71
2	36	54	29	34	34
3	47	53	57	79	51
4	33	35	52	38	34
5	98	116	131	70	110
Ranking (Ou_1)	21%	24%	26%	7%	22%

Source: Authors

**Figure 2.** Graph as a model output1 (Ou_1) for ranking the most important factors when choosing honey

Tables 3, 4, 5 and 6 show the outputs Ou_4 , Ou_5 and Ou_6

Methodology 3 (M2.1, M2.2) is used to obtain the outputs Ou_4 , Ou_5 , Ou_6 .

For Ou_4 (Table 3):

M2.1 (category 1: education, category 2: familiarity with the nutritional properties of honey, Chi-Square test, Cramer's V test)

Table 3. Frequency of education - familiarity with the nutritional properties of honey and results of Chi-Square and Cramer's V tests.

Q8. Are you familiar with the nutritive properties of honey?				
Education	Yes	No	Partially	Total
High School	8	60	14	82
Bachelors or Master's or PhD	55	84	79	218
				300

Chi-Square	df	α	p	Cramer's V
28,75	2	0,05	<0.0001	0.3096

Source: Authors

Model output: $p < \alpha$ which means that **there is a statistical dependence** between the categorical variables, i.e. education and whether they are familiar with the nutritive properties of honey are **statistically dependent**, and the value of Cramer's V is 0,3096 which shows that this dependence is moderate.

For Ou₄ (Table 4):

M2.1 (category 1: education, category 2: familiarity with the benefits of honey for human nutrition, Chi-Square test, Cramer's V test)

Table 4. Frequency of education - familiarity with the benefits of honey for human nutrition and results of Chi-Square and Cramer's V tests.

Q7. Are you familiar with the benefits of honey as a food for humans?				
Education	Yes	No	Partially	Total
High School	28	5	49	82
Bachelors or Master's or PhD	124	13	81	218
				300

Chi-Square	df	α	p	Cramer's V
13,31	2	0,05	0,0013	0,2106

Source: Authors

Explanation: $p < \alpha$ which means that **there is a statistical dependence** between the categorical variables, i.e. education and whether they are familiar with the benefits of honey are **statistically dependent**, and the value of Cramer's V is 0,2106 which shows that this dependence is small.

For Ou₅ (Table 5):

M2.1 (category 1: gender, category 2: familiarity with the nutritional properties of honey, Chi-Square test, Cramer's V test)

Table 5. Frequency of gender - familiarity with the nutritional properties of honey and results of Chi-Square and Cramer's V tests.

Q8. Are you familiar with the nutritive properties of honey?				
Gender	Yes	No	Partially	Total
Male	21	83	43	82
Female	42	61	50	218
				300

Chi-Square	df	α	p	Cramer's V
10,77	2	0,05	0,0046	0,1895

Source: Authors

Explanation: $p < \alpha$ which means that there is a **statistical dependence** between the categorical variables, i.e. gender and whether they are familiar with the nutritional properties of honey are **statistically dependent**, and the value of Cramer's V is 0,1895 which shows that this dependence is small.

For Ou₆ (Table 6):

M2.1 (category 1: age, category 2: familiarity with the nutritional properties of honey, Chi-Square test, Cramer's V test)

Table 6. Frequency of age - familiarity with the nutritional properties of honey and results of Chi-Square and Cramer's V tests.

Q8. Are you familiar with the nutritive properties of honey?				
Age	Yes	No	Partially	Total
From 25 to 40 years.	25	37	21	83
From 25 to 40 years.	23	84	53	160
Over 55 years.	15	23	19	57
				300

Chi-Square	df	α	p	Cramer's V
10,17	4	0,05	0,0387	0,1377

Source: Authors

Explanation: $p < \alpha$ which means that there is a **statistical dependence** between the categorical variables, i.e. age and whether they are familiar with the nutritional properties of honey are **statistically dependent**, and the value of Cramer's V is 0,1377 which shows that this dependence is small.

In another survey on the impact of nutritional properties of food products on consumer purchasing decisions, using the Partitioning Clustering Method, a cluster was obtained (Figure 3) of respondents who answered yes to the questions:

- 1Q. It is important for me to consume healthy food.
- 2Q. I think I have knowledge about the nutritional characteristics of food products.
- 3Q. I consider that I can recognize the importance of the nutritional characteristics listed on the food product declarations.

Of the total number of respondents (400), 55% answered these questions with "yes" as set pattern 1. 1Q (yes) - 2Q (yes) - 3Q (yes).

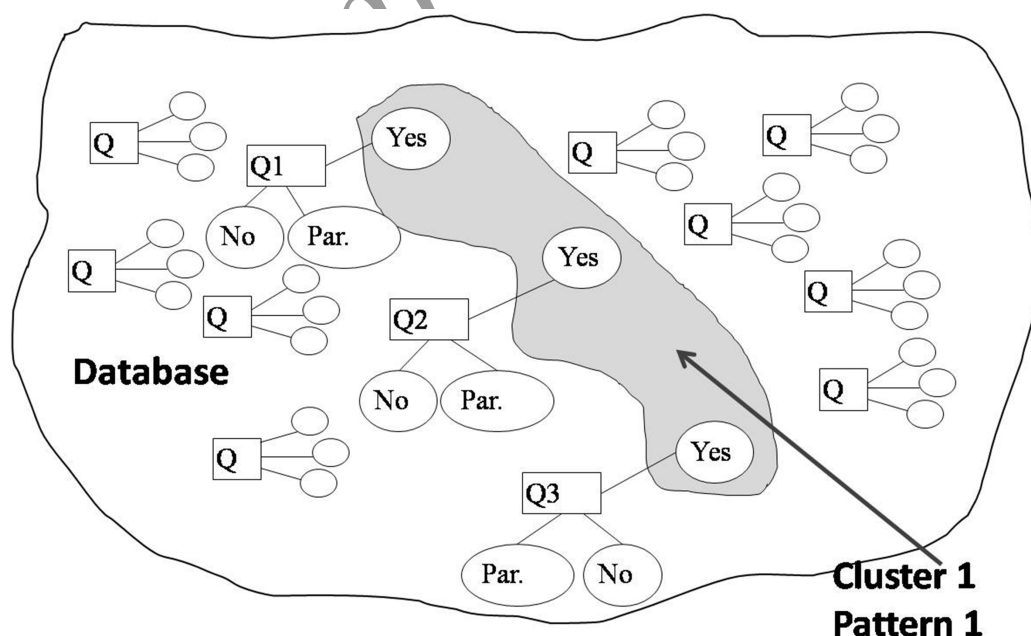


Figure 3. Cluster of respondents who answered "yes" to questions 1, 2 and 3.

A cluster is an output of a model that is represented in graphical or analytical form. The information obtained from the model is that there is a cluster of consumers who have knowledge of the nutritional characteristics of food products and they influence them when buying.

The self-explanation of the output model is: $SEOu_m = (M_{n,i} \& I_n)$. For example, for Ou_1 , $SEOu_1 = (M_{2,1}$ -Ranking based method, I_n - survey research in R.N. Macedonia) by explaining the method based on ranking by category, for example for packaging:

Package (%) = $\frac{SUM (frequency_1 * rank_1)}{SUM (SUM (frequency_1 * rank_1); SUM (frequency_2 * rank_2); SUM (frequency_3 * rank_3); SUM (frequency_4 * rank_4); SUM (frequency_5 * rank_5)))} * 100$

5. CONCLUSION

For companies in the food industry it is important to apply the concept of modeling that is presented in the paper to create a business model of consumer behavior with the inclusion of nutritional determinants. The main purpose of this model is to detect all factors influencing consumer behavior in the field of food and nutrition. Similarly, the model can determine the impact on consumer behavior of foods with improved nutritional quality, by emphasizing the components that affect human well-being and health. In building these models, it is important to use advanced scientific methods set up as entities in a relationship, which will enable the acquisition of important information and knowledge. The relationship of the entities will allow for a self-explanation of the model which is in other models reduced to help only.

The business model of consumer behavior with included nutritional determinant is an important part of the business of companies whose activity is food products, and it will enable the expansion and strengthening of their brands as a healthy diet. The benefits of nutritional business models of consumer behavior can be multifold: benefits for companies through the development of new food products with added nutritional value that would satisfy consumers, and thus greater profit for the companies; benefit for the citizens by consuming healthier and safer food products, etc.

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Evaluation of Distance Education in Mathematics at the Slovak University of Agriculture in Nitra

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Keywords:

Distance mathematics education;
Coronavirus pandemic;
Mathematical-statistical analysis;
Correlation coefficient;
Mann-Whitney U test



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Abstract: *The COVID-19 pandemic has caused disruption of education systems, from elementary and secondary schools to colleges and universities. This situation also affects the education conditions at the Slovak University of Agriculture in Nitra. Teaching process has been transferred from full-time to distance learning in virtual space. The main goal of the paper was to analyze how students of economics study programs mastered mathematical topics in conditions of distance learning. Correlation coefficient and Mann-Whitney U test were used to identify relations and significance of differences between points obtained in preliminary written assignments as well as the overall study results. In both research groups, taught in Slovak and English, results showed strong correlations between the number of points in exam test and the total number of points. In the English taught group the second strong correlation was confirmed between the total number of points and the points sum for all preliminary assignments.*

1. INTRODUCTION

The COVID-19 pandemic, caused by the transmission of an acute respiratory syndrome called SARS-CoV-2, has been raging worldwide for more than a year. The virus was first discovered in December 2019 in the Chinese city of Wuhan. By May 17, 2021, more than 163 million positive cases and more than 3.39 million deaths from COVID-19 had been confirmed in more than 190 countries or regions throughout the world. USA, India, Brazil, France and Turkey (*COVID-19 Coronavirus Pandemic*) are the most pandemic affected countries. In Slovakia, the first case of this disease appeared on March 6, 2020. By May 17, 2021, 387,659 people had been tested positive and 12,238 had died as a result of the disease (*Coronavirus in Slovakia in numbers*).

The pandemic has affected all areas of life, be it industry, healthcare, tourism, catering, etc. Of course, it has also influenced education at all levels, including higher education (Hudáková et al., 2020). This situation impacted millions of pupils, students and teachers all around the world. As a consequence, it was inevitable to close down schools, colleges and universities in order to protect the world's student population. This situation has also affected the education conditions at the Slovak University of Agriculture in Nitra (Slovak Republic). Since the beginning of March 2020, students have been participating in distance learning. New teaching and education methods have been introduced in teaching methodology in lectures, seminars and knowledge evaluation, either continuously during the semester or in the final exam.

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Current requirements on the graduates combine quality training and mastering of digital technologies for communication and data processing (Országhová, 2018; Országhová, Hornyák Gregáňová, 2020). This trend was accentuated during the pandemic, when profound mastery of information technology tools was necessary to ensure higher education (*Strategy of digital transformation of Slovakia 2030, 2019*). Distance education runs without the presence of students in the traditional form of teaching and its essence lies in independent study and it is also promising for further education of adults (Tomková, 2018).

In the era of information technology, personal development of teachers and development of training institutions are in mutual relation. The continuous development of society and technology introduce higher requirements on teachers, therefore institutions and teachers must co-operate to bring new methods into education and update the content of study (Batsenko et al., 2020). Students who study with the support of information technology tools must know principles of individual learning and self-discipline in order to apply benefits of e-learning in an appropriate way (Stoyanets et al., 2020).

Economic study programs include mathematical subjects which utilize applied mathematical methods and express relations in quantitative forms (Rozhkova et al., 2017; Alvarez, et al. 2018). Universities prepare graduates for the labor market where they will use mathematical knowledge to solve various practical problems (Farkašová, 2013). The use of mathematical and statistical methods allows only a detection of the occurrence of certain phenomena in the new global environment (Pechočiak, Kecskés, 2016). The analysis of study results in mathematics is an important tool for teachers who use appropriate methods and forms of education to develop and improve students' mathematical knowledge (Matušek, Gregáňová, 2019). An important role of schools is to prepare the young generation for professional life where they are able to use information and communication technologies which are linked to new competencies.

2. METHODOLOGY

In the paper, the authors analyze how students of the Faculty of Economics and Management of the Slovak University of Agriculture in Nitra managed the study of mathematics in a distance form. The authors evaluated the results of preliminary assignments as well as the overall results of the study by means of selected mathematical and statistical methods, calculation of correlation coefficient and Mann-Whitney U test in the Microsoft Excel 2013 program. The material for students' knowledge evaluation in the subject of Mathematics IA in the winter semester 2020 contained 6 assignments, all consisting of 3 tasks. Each correctly solved assignment was awarded 9 points. All teachers of the Department of Mathematics participated in the creation of assignments; here we present the thematic focus of assignments:

Assignment Z1: Graph of linear function, graph of quadratic function and their features.

Assignment Z2: Graph of exponential and logarithmic functions and their features.

Assignment Z3: Limit of a function and asymptotes of a function graph.

Assignment Z4: Compute the derivative of a given function.

Assignment Z5: Features of a function with the usage of derivative.

Assignment Z6: Application of derivative in economics problems.

Partial derivatives of a function with two variables.

Out of the total of 54 points in assignments, at least 30 points were necessary to get a credit. Students then took an exam test for 50 points, which contained 5 problems and 1 theoretical question from the semester curriculum. Here is a sample of an exam test:

1. Determine the equation of the slanted asymptote of $f: y = \frac{3 - 2x}{3x - 2}$. Sketch the asymptote in the coordinate system.
2. Determine the local extremes of $g: y = 4x^3 - 12x^2 - 36x - 10$.
3. Determine the intervals of convexity and concavity of $h: y = x^4 + 2x^3 - 12x^2 + 20x + 17$.
4. Determine the local extremes of $k: z = 4x - y - x^2 - y^2 - xy + 5$.
5. Compute the second partial derivatives of $z = 5x^2y^3 - 4xy^2 + 3xy + 2 \cos y - 8$.
6. Write the definition of a decreasing function and illustrate with an example (equation).

Points obtained in the semester and the exam were added and the authors evaluated the overall achievement of students according to the ECTS scale. For a successful completion of this subject it was necessary to obtain at least 64 points according to the following scale: 93 - 100%: excellent - A (1), 86 - 92%: very good - B (1,5), 79 - 85%: good - C (2), 72 - 78%: satisfactory - D (2,5), 64 - 71%: sufficient - E (3), 0 - 63%: fail - FX (4).

The obtained results were evaluated by selected methods of mathematical statistics. In the Excel program the authors created databases by organizing the results of evaluated tasks from each student. Altogether, the results of 114 freshman students taught in Slovak and 33 freshman students taught in English were evaluated. From these data the authors calculated the average score in individual tasks, as well as the average of the total number of points, further they calculated the correlation coefficients between the evaluated parts in order to find out a dependence between them. A weak dependence is when the correlation coefficient falls into the interval $\langle -1/3, 1/3 \rangle$, a mean dependence is for the values from intervals $\langle -2/3, -1/3 \rangle \cup \langle 1/3, 2/3 \rangle$ and a strong dependence is for the values from intervals $\langle -1, -2/3 \rangle \cup \langle 2/3, 1 \rangle$.

Another goal was the analysis of study results between groups of students taught in Slovak and English language. The authors investigated whether teaching mathematics in English had an impact on students' results in assignments, as well as on the results in the overall evaluation. Using the Mann-Whitney U test, they verified the null hypothesis that two independent random selections (X_1, X_2, \dots, X_m) and (Y_1, Y_2, \dots, Y_n) are from the same basic set, i.e. they have the same distribution function (Markechová et al., 2011). The first selection consisted of data from point evaluation of students in the group taught in Slovak; the second selection consisted of data from point evaluation of students in the group taught in English. The results of the analysis are presented in the next part of the paper.

3. RESULTS

During the semester, students could get 54 points for 6 sets of assignments (9 for each) and 50 points for the exam written test. In total, they could get 104 points. The average number of points together with percentages in a group of students taught in Slovak are given in Table 1 and a group of students taught in English in Table 2.

As we can read from the tables, students taught in English achieved a lower average number of points in assignments Z2, Z3, Z4 and Z5 and higher in assignments Z1 and Z6. The average number of points in the exam was approximately the same, the total number of points upon completion of the study was circa about 1.6 points worse in the English group. In Slovak groups the average overall evaluation was at the level of good - C (2), in English groups at the level of satisfactory - D (2,5).

Table 1. Points in a group of students taught in Slovak

	Z1	Z2	Z3	Z4	Z5	Z6	ΣZ	Exam	ΣZ Z+Exam
Average	7.24	7.46	7.14	7.44	7.00	6.85	43.11	38.03	81.14
%	80.41	82.90	79.29	82.66	77.73	76.07	79.84	76.05	78.02

Source: Authors

Table 2. Points in a group of students taught in English

	Z1	Z2	Z3	Z4	Z5	Z6	ΣZ	Exam	ΣZ Z+Exam
Average	7.27	6.03	6.55	7.30	6.15	8.00	41.30	38.24	79.55
%	80.81	67.00	72.73	81.14	68.35	88.89	76.49	76.48	76.49

Source: Authors

Table 3. Correlation coefficients between assignments in the group taught in Slovak

	Z1	Z2	Z3	Z4	Z5	Z6	Sum Z	Exam	Total
Z1		0.213	0.200	0.191	0.124	0.140	0.536	-0.119	0.204
Z2	0.213		0.160	0.131	0.225	0.029	0.510	0.041	0.315
Z3	0.200	0.16		0.097	0.342	0.151	0.592	0.059	0.375
Z4	0.191	0.131	0.097		0.296	0.207	0.525	0.080	0.355
Z5	0.124	0.225	0.342	0.296		0.248	0.679	0.021	0.394
Z6	0.140	0.029	0.151	0.207	0.248		0.545	0.170	0.437
Sum Z	0.536	0.510	0.592	0.525	0.679	0.545		0.077	0.616
Exam	-0.119	0.041	0.059	0.080	0.021	0.170	0.077		0.833
Total	0.204	0.315	0.375	0.355	0.394	0.437	0.616	0.833	

Source: Authors

There are also correlation coefficients between points obtained in individual assignments (Z1 - Z6), the sum of points in assignments (Sum Z), points in the exam test (Exam) and the total sum of points (Total). These data are listed in Tables 3 and 4.

Table 4. Correlation coefficients between assignments in the group taught in English

	Z1	Z2	Z3	Z4	Z5	Z6	Sum Z	Exam	Total
Z1		0.487	0.250	0.023	-0.064	0.205	0.555	0.297	0.543
Z2	0.487		0.497	-0.038	0.047	0.231	0.717	0.289	0.645
Z3	0.250	0.497		0.005	0.079	0.428	0.684	0.015	0.459
Z4	0.023	-0.038	0.005		0.440	0.372	0.438	0.011	0.295
Z5	-0.064	0.047	0.079	0.440		0.186	0.461	0.174	0.407
Z6	0.205	0.231	0.428	0.372	0.186		0.620	0.092	0.463
Sum Z	0.555	0.717	0.684	0.438	0.461	0.620		0.263	0.816
Exam	0.297	0.289	0.015	0.011	0.174	0.092	0.263		0.772
Total	0.543	0.645	0.459	0.295	0.407	0.463	0.816	0.772	

Source: Authors

In a group of students studying in Slovak language most of the dependences are weak, i.e. they are in the interval $\langle -1/3, 1/3 \rangle$. Thus, the students' knowledge of solution of tasks in one assignment does not affect the solution of tasks in other assignments. There is also minimal dependence between the sum of points in the assignments and points in the exam. There were also cases when students had relatively many preliminary points in the semester and few points in the exam test or vice versa. A mean dependence was shown between the individual assignments and the sum of points in all assignments. Also a mean dependence was found between the number of points in assignments 3, 4, 5, 6 and the total sum of points in the semester; as well as between the sum of points in assignments and the total sum of points in the semester (0.616). A strong dependence appeared only between the number of points in the exam test and the total number of points (0.833).

In the case of students taught in English, there are slight differences in dependences. Mean dependences were shown between individual assignments (Z1 - Z2, Z2 - Z3, Z3 - Z6, Z4 - Z5 and Z4 - Z6). Mean dependences were also confirmed between individual assignments and the sum of points in all assignments, in two cases there is a strong dependence between assignment Z2 (Z3) and the sum of points in all assignments Sum Z. Between individual assignments and test points (similarly as in the group of students taught in Slovak) there is only a weak dependence, albeit a little higher. A mean dependence was found between individual assignments and the total number of points, except for the assignment Z4. The dependence between the sum of points in assignments and the points in the exam was also weak. Thus, the same conclusion was confirmed as in the group of students taught in Slovak: students gained relatively many points in the semester, but few points in the exam test or vice versa. This is evidenced by a strong dependence between the number of points in all assignments and the total number of points (0.816), as well as by a strong dependence between the number of points in the test and the total number of points (0.772).

By using the Mann-Whitney U test the authors tried to find out whether teaching of mathematics in English had an effect on students' achievements. They analyzed the following data: points in assignments, the sum of points in assignments and the points in the exam between the two groups of students (taught in Slovak and English). The ranges of the analyzed files satisfy, $m > 30$, $n > 20$, therefore the following test criterion was used (Markechová et al., 2011, p. 205):

$$U = \frac{U_1 - \frac{1}{2}mn}{\sqrt{\frac{1}{12}mn(m+n+1)}} \quad (1)$$

The tested null hypothesis at the level of significance α is rejected, if for the test criterion and the table value $|U| \geq u_\alpha = 1.9599$.

The results of the Mann-Whitney U Test (Table 5) show that between the two groups taught in Slovak and English there are no statistically significant differences between the total sums of points, the sums of points in the semester or the sums of points in the exam.

Table 5. Results of Mann-Whitney U Test ($\alpha = 0.05$, 1.9599)

Assignment Slovak group	Assignment English group	<i>p</i> -value	<i>u_i</i> -value	<i>U</i> -value
Z1	Z1	0.897	1852	0.135
Z2	Z2	0.006*	1284.5	2.769*
Z3	Z3	0.165	1581	1.393
Z4	Z4	0.764	1816	0.302
Z5	Z5	0.031*	1414.5	2.166*
Z6	Z6	0.002*	1220.5	3.066*
Sum Z	Sum Z	0.184	1593.5	1.335
Exam	Exam	0.905	1854	0.125
Total	Total	0.516	1740.5	0.652

Source: Authors

From the analysis of six assignments, statistically significant differences were confirmed in three cases between the English and Slovak groups. The assignments Z2 and Z5 were better done by students from the Slovak group; the assignment Z6 was better done by students from

the English group. In both research groups it was shown that students were motivated during the semester to obtain the required number of points to get the credit, but in the exam their motivation decreased; many of them were satisfied with the final evaluation E(3).

4. CONCLUSION

The pandemic situation with COVID-19 has closed down the universities in order to protect students and teachers, and the process of education continued in virtual space. New teaching and learning conditions have affected the education methods and new procedures were required for evaluation of students' knowledge. In the paper the authors analyzed data obtained from teaching Mathematics IA in the 1st year of bachelor's degree at the Faculty of Economics and Management, where one research sample consisted of students taught in Slovak and the other sample consisted of students taught in English. The authors used the correlation coefficient and the Mann-Whitney U test to identify significance of differences between points obtained in mathematical assignments and exam tests. In the Slovak group, results showed a strong correlation between the number of points in the exam test and the total number of points (0.833). In the group taught in English a strong correlation appeared between the number of points in the exam test and the total number of points (0.773). Another strong correlation was confirmed between the total number of points and the sum of points in all 6 assignments during the semester (0.816). Obtained results will be used to update the teaching of mathematics during distance education at the Slovak University of Agriculture in Nitra. The intention of teachers in the innovative environment is that students acquire the necessary mathematical knowledge and skills that will increase their motivation for the study of mathematical subjects and achieve better evaluation in exams.

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Digital Methods of Education and the Level of Students' Knowledge in Mathematics

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Keywords:

Digital methods of education;
Distance learning;
Mathematics teaching;
Knowledge evaluation;
Z-test



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Abstract: *The global pandemic caused by the COVID-19 disease significantly affected higher education in 2020 and resulted in the transition from full-time to distance learning. The question here is the effectiveness of the implementation of new methods of online teaching and learning in relation to the quality of students' knowledge. The main goal is to analyze the mathematical knowledge and skills of students and compare the study results in Mathematics in the academic years 2018-2020 in the context of full-time teaching versus online teaching. The paper also points at the possibilities of teaching and studying mathematics using various tools and methods of digital education, e.g. LMS MOODLE, MS TEAMS and MS FORMS. The research sample consisted of students of the Faculty of Engineering and research data were retrieved from prelim tests, exam tests and final grades in mathematics exams and then were analyzed by selected methods of quantitative and qualitative research.*

1. INTRODUCTION

The paper presents the results of pedagogical research focused on the evaluation of educational outcomes in mathematics and the level of students' knowledge acquired with the support of information technology. Distance education allows using active and passive methods of education. Active methods include online lectures and video conferences with direct participation of teachers and students. Passive teaching methods include self-study of professional literature, uploaded presentations and elaboration of seminar papers. The situation caused by the COVID-19 pandemic required the use of detailed electronic study materials in the process of education.

At the Slovak University of Agriculture in Nitra, mathematical subjects in various study programs are focused on selected topics from mathematical analysis, algebra and statistics. Students will use the acquired math knowledge in various subjects of study.

According to Drijvers (2015), teachers, educators and researchers are confronted with many issues in the integration of digital technologies. D'Ambrosio and Borba (2010) study the interaction and formation between ICT and other trends in mathematics teaching. Borba et al. (2017) identify important development trends that also affect mathematics education: mobile technologies, large-scale open online courses (MOOCs), digital libraries and object design, co-learning through digital technologies and teacher education through blended learning. Rumanová and Drábeková (2019) deal with visualization of mathematics theme and their use in the educational process. Moreno-Guerrero et al. (2020) state the e-learning method has increased its use and application in

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teaching and learning processes during the spread of the COVID-19 pandemic. Pechočiak (2020) states „The coronavirus crisis forced us and taught us to make changes in education. We led the teaching process in other, distance ways. We have developed a number of new digital teaching aids, lectures and instructions for practicing their curriculum“ (p. 52). Drábeková et al. (2018) consider that „The Slovak University of Agriculture in Nitra with its educational, scientific and research activities represents the significant part of a European and world educational area. It has become a modern open university which reflects current needs in agri-food sector in a local and global scale“ (p. 23). As noted by Horská et al. (2015), universities search for possibilities to attract students, to offer them education of high quality and to bring value added and differentiation to the university education. Pechočiak and Kecskés (2016) state „The role of educational institutions in university graduates training in new global space is indisputable“ (p. 668). According to Košovská et al. (2020), mathematics as a part of university studies represents an enemy for most students and it is necessary to make it accessible and more attractive. According to Hudáková and Papcunová (2015), „students would need to focus more on practical skills than knowledge, and then modern and activating teaching methods could be applied to schools“ (p. 516). Sánchez-Guerrero et al. (2019) state that mathematics courses are the basis of engineering studies for engineering students and are necessary for mastering further engineering studies.

2. MATERIAL AND METHODS

The basic tool for a student and teacher in digital education is a laptop, tablet, computer, mobile phone, or other digital devices. This device will never replace a teacher, textbook or other teaching aids. Learning is a psycho-physiological process that can be supported by information and communication technologies, but cannot be replaced. Therefore, the digitization of education brings both content and qualitative changes. It enables simulation of the real environment, individual study pace, choice of place and time for study, reduces the fear of failure.

Učebný integrál

Newton - Leibnizov vzorec

$$\int_a^b f(x) dx = [F(x)]_a^b = F(b) - F(a)$$

Metódy integrovania

a) integrovanie priamo a rozkladom

Pr. $\int_1^2 (x^3 - 2x + 4) dx = \left[\frac{x^4}{4} - 2 \frac{x^2}{2} + 4x \right]_1^2 = \left[\frac{2^4}{4} - 2 \frac{2^2}{2} + 4 \cdot 2 - \left(\frac{1^4}{4} - 2 \frac{1^2}{2} + 4 \cdot 1 \right) \right] =$
 $= \frac{16}{4} - 4 + 8 - \left(\frac{1}{4} - 1 + 4 \right) = 8 - \frac{1}{4} - 3 = \frac{32-1-12}{4} = \frac{19}{4}$

b) integrovanie substitučnou metódou

Pr. $\int_0^5 e^{\frac{x}{5}} dx = \frac{x}{5} = t$ $\Rightarrow \int_0^1 e^t \cdot 5 \cdot dt = 5 \cdot [e^t]_0^1 = 5 \cdot (e^1 - e^0) = 5 \cdot (e - 1) = 5e - 5$

$\frac{1}{5} dx = dt$
 $dx = 5 \cdot dt$
 $a = 0 \Rightarrow t_1 = \frac{0}{5} = 0$
 $b = 5 \Rightarrow t_2 = \frac{5}{5} = 1$

Figure 1. Online teaching: The topic of a definite integral

Source: Authors

Digital tools are useful in teaching and learning. However, education is not just about access to digital devices; it requires an integrated approach taking into account the psychological, social, pedagogical and practical requirements of teaching and learning. Online lectures and exercises belong to the important aspects of e-learning, ensuring immediate “live” interaction between the teacher and a group of students. The online activity should primarily focus on sharing the volume of information as quickly as possible, requiring detailed preparation, a pre-determined and agreed course, as well as the appropriate technical equipment of the individual participants. The teacher becomes a moderator of student-led discussions and at the same time fulfills an organizational, social and intellectual role. The easiest way for group communication between students and teachers is supported by Microsoft Teams. Using this application, online exercises and lectures were held, while the teacher shared lectures created in PowerPoint. In teaching in the online environment, the interaction of students focused mainly on the prepared materials and teamwork. Figure 1 presents a sample from the online exercise in the subject Mathematics for technicians in MS Teams, teaching a definite integral.

Another educational platform that provides teachers and students with an integrated education system is LMS Moodle. It is used in distance learning, but also as a support for full-time education. In this system, we created courses for the subject Mathematics, but also for study groups individually. As part of online courses, we added current lectures, study materials and downloadable materials. Students can print them out and record observations and details. If the student has the content of the exercise in front of him, he can progress at individual speed and can discuss the topic. However, all electronic materials should receive feedback from students in the form of tests, questions, etc., so some teachers created assignments for students, which were evaluated during the semester.

Student assessment was effectively done using Microsoft Forms, which has built-in support for math and formulas. We used a quiz to create and evaluate mathematical tests, as we can assign points to individual assignments, insert mathematical formulas, give instructions, define the correct answers. Test characteristics are defined in the test settings, such as who can fill in the test, automatic display of results for students, entering the beginning and end of the test, random order of questions and more.

3. RESULTS AND DISCUSSION

The digital teaching methods mentioned in the previous sections have been applied as basic criteria for verifying the increase in the effectiveness of mathematics teaching by applying digital methods. Based on this, the research goals were set:

- finding out the level of students' knowledge in selected mathematical topics of the students of the Faculty of Engineering of SUA in Nitra,
- finding out the differences in study results in the subject Mathematics for Technicians between three different samples of students.

In formulating the research hypotheses, we relied on theoretical knowledge on this issue, on the experience based on our pedagogical practice. We want to verify the main hypothesis: By implementing digital methods, we will increase the level of knowledge of students. The input data determined the level of knowledge of mathematics in students in the years 2019 - 2021. Tests from exams in the summer semester in the subject Mathematics for technicians were evaluated, which were obtained in three samples of students:

Year 2019 (60 students) - tests from exams in the summer semester of school year 2018/19, Year 2020 (73 students) - tests from exams in the summer semester of school year 2019/20, Year 2021 (53 students) - tests from exams in the summer semester of school year 2020/21.

In groups 2020 and 2021, students used the digital methods listed in the Material and Methods section. The test was written by students who registered for the exam in the subject Mathematics for Technicians; the time for elaboration was 90 minutes. The test was assigned to students via MS FORMS.

The exam test contained 5 tasks with the following thematic content:

Task 1: identifying the domain of a function,

Task 2: application of the derivative of a function with one real variable,

Task 3: definite integral – the area of a planar shape,

Task 4: differential equation,

Task 5: theoretical questions.

For the correct solution of each task there were 10 points and 5 theoretical questions, each for 2 points.

Figure 2 shows an example of two tasks from the test (presented in Slovak). In problem number 4, students counted the content of the shape bounded by the function and the x-axis. In task 5, they answered the question of how the monotonicity of a function changes at a point of local maximum.

Skúška z predmetu Matematika pre technikov test 41 (MpT skúška 10.6.2021 9:30) - Uložené

Otázky	Odpovede
<p>4. Vypočítajte obsah útvaru ohraničeného funkciou f a osou x. Načrtnite obrázok, do grafu zakreslite aj vypočítané priesečníky s osami súradníc. (Počet bodov: 10)</p> <p>$f: y = -x^2 - 4x + 5$</p> <p>Zadajte svoju odpoveď</p>	
<p>5. Funkcia má lokálne maximum v bode, v ktorom sa mení funkcia: (Počet bodov: 2)</p> <p><input type="radio"/> z klesajúcej na rastúcu</p> <p><input checked="" type="radio"/> z rastúcej na klesajúcu ✓</p> <p><input type="radio"/> z konvexnej na konkávnu</p> <p><input type="radio"/> z konkávnej na konvexnú</p>	

Figure 2. Demonstration of two tasks from the exam test

Source: Authors

Using MS FORMS tools, we can evaluate students' answers. In Figure 3 is presented an evaluation of the theoretical question about the concavity of a function: If all points of the graph of the function f lie above tangents constructed at any point from the interval (a, b) , then the function is on this interval (1 b.): a) increasing, b) decreasing, c) concave up, d) concave down.

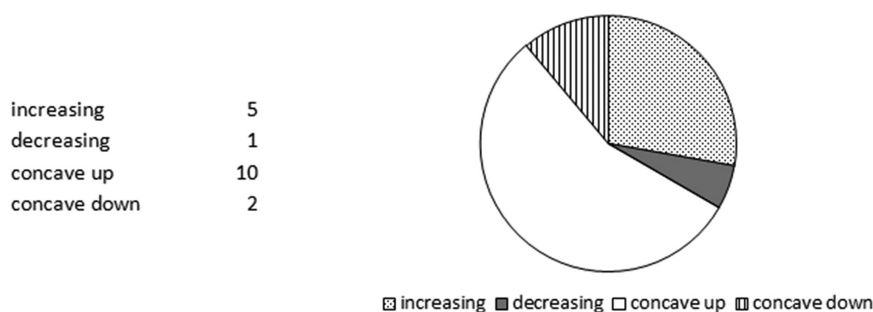


Figure 3. Evaluation of answers to a theoretical question

Source: Authors

In the answers, we see that 56% of students answered correctly (option c) and 44% of students gave an incorrect answer.

In the individual years 2019 to 2021, we evaluated the tasks from the exam test and compared the success of students in percentages. Figure 4 shows the results and we see that in 2020 there was a decrease in the level of knowledge compared to 2019 in the topic of application of derivation (Task 2). We recorded the largest increase in points in theoretical questions in 2021 compared to previous years (Task 5). This means that students used digital methods and electronic materials in their studies, which were supplemented in 2021 by other topics.

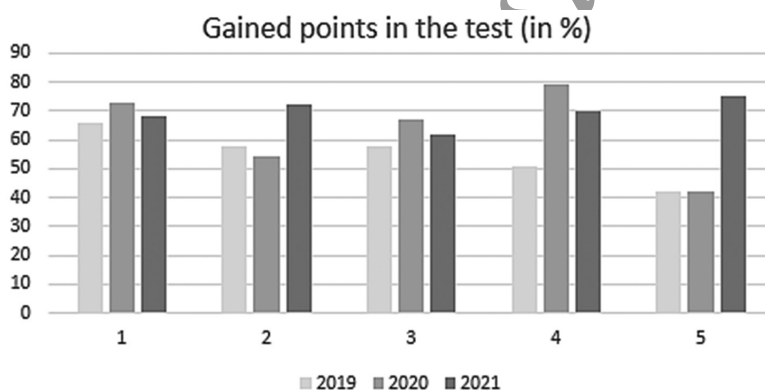


Figure 4. Evaluation of individual tasks from the exam test by year

Source: Authors

Using the z-test, we will test the null hypothesis, which states that the level of knowledge of students is the same, in contrast to the alternative hypothesis. There is a test problem of null hypothesis $H_0 : \mu_1 = \mu_2$ against alternative hypothesis $H_0 : \mu_1 \neq \mu_2$.

Table 1. Results of z-test

	2019 and 2021		2019 and 2020		2020 and 2021	
Mean	33.87	27.8	31.19	27.8	33.87	31.19
Variance	293.963	88.976	185.157	88.976	293.963	185.157
Observations	53	60	73	60	53	73
z Stat	2.289		1.692		0.941	
z Critical one-tail	1.960		1.645		1.645	

Source: Authors

In Table 1 we see that the value of the z-test is 2.289 for the years 2019 and 2021, the critical value is 1.960 at the level of significance $\alpha = 0.025$. For the years 2019 and 2020, the value of the

z-test is 1.692, the critical value is 1.645 at the level of significance $\alpha = 0.025$. Since the value of the z-test in these two cases is greater than the critical value, we reject the null hypothesis. This means that we accept an alternative hypothesis: the average level of students' knowledge is significantly different in these groups.

If we compare the years 2020 and 2021 (Table 1), the value of the z-test is 0.941 and the critical value is 1.645 at the selected level of significance $\alpha = 0.025$. Since the value of the z-test is less than the critical value, we do not reject the null hypothesis, which states that the level of knowledge of students is the same in the evaluated groups.

4. FUTURE RESEARCH DIRECTIONS

The analysis of study results in MS FORMS could help teachers focus on topics that have been mastered by students the least. The research has shown that MS FORMS can be used for feedback as well as for conducting surveys. The aim of the implementation of digital methods in education is an improvement of the average mark in mathematical subjects. Further research will be aimed at comparing the results of other tasks, identifying the main problems and causes of errors and then proposing ways to eliminate students' errors.

5. CONCLUSION

The pandemic, in addition to major problems, also brought a significant shift in education. It has accelerated the digitization of the educational process, shifting digitization to other areas of life. The way teachers and students work is modernized and changed during teaching with the support of digital resources. It influences educational competencies in such a way that it is necessary to redesign the content, methods and forms of university education. In the paper we tested the hypothesis that digital methods help to increase the level of students' knowledge. Based on results of z-test we can state that methods of digital education have brought positive results and confirmed the improvement of study outputs in Mathematics.

We assume that the benefit of using digital methods will be the development of mathematical skills and thinking of students. We emphasize independent work, activity and application of knowledge from mathematical subjects in practice. When increasing the effectiveness of education, feedback is also important to identify students' problems and find ways to eliminate them. Teachers aim to increase the level of knowledge of students and the quality of the educational process. Obtained research results will serve as the basis for the innovation of mathematical education in the process of digitization of university studies.

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Draft version



Level of Knowledge in Personal Finance by University Freshmen Management Students

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Keywords:

Financial literacy;
Financial education;
Questionnaire survey



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Abstract: Financial literacy becomes one of the key competencies for life in modern society, and its importance grew significantly in the last decade. The study aims to determine how well newly coming university management students understand basic consumer financial concepts. The research is based on primary data by questionnaires and a sample of 342 students from the target population within Slovakia and the Czech Republic. The questionnaire contained in its first part some questions covering the individual personal socio-economic characteristics. In the second part, the respondents solved thirteen problems submitted as multiple-choice questions that tested their knowledge about personal finance. Authors examine the relationships among the personality characteristics of the students and their financial literacy. This leads to several remarkable findings. Due to the specialization of the study, the difference between the genders is blurred. As a significant source of the differences in financial literacy, the authors detect the previous education of the respondents and the forms of education in financial literacy.

1. INTRODUCTION

The importance of sound financial decision-making and orientation in the financial market is growing, especially in times of crisis. The current post COVID era is no exception. Whether the EU itself or individual countries, they all offer different rescue programs for individuals and companies. The right choice of the provided alternatives can have far-reaching consequences in the future. There is also a rich discussion about the demographic crisis and reforms in social programs. The correct retirement program must be selected at an early age when people do not yet have enough experience, but their choice will affect their entire future lives. Therefore, our study focuses on a group of young people standing on the threshold of their adult life, on the university freshmen.

The objective of this study is to verify the state of financial literacy of beginning students of management and economics. For this target group, we can assume a closer relationship to the issue concerning the professional focus of their field of study. In doing so, we took into account their previous education as a crucial determinant. As the individual types of secondary schools differ in their focus and content of education, we came to the formulation of the first research hypothesis:

Hypothesis one: The level of financial literacy depends on the type of completed high school.

Assuming that the resulting financial competencies depend on the form, how the education takes place, we formulated the following research hypothesis.

Hypothesis two: The level of financial literacy depends on the method of financial education.

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One of the most frequent demographic factors in the financial literacy survey is gender differences. Therefore, we also focused our third hypothesis on gender differences.

Hypothesis three: Men and women achieve different results in financial literacy.

2. LITERATURE REVIEW

In the literature, we can find many different concepts of financial literacy. Roughly speaking, we can present it as the ability to understand finance. As the first, we introduce the very simple definition of financial literacy given by Kim. *Financial literacy is the basic knowledge that people need in order to survive in modern society.* (Kim 2001). Mandel presents a more sophisticated definition that incorporates 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” (Mandell, 2007). A more exact definition gave (Lusardi and Mitchell 2014), who defined financial literacy as the knowledge of basic financial concepts needed to make rational financial decisions regarding saving, investing, taking out loans and insurance. According to (Huston 2010), this term represents the ability to make informed judgments and make effective decisions regarding the use and management of money. For purposes of this paper, we adopt the definition of the financially literate person published in (Kozubíková, 2015). She defines a financially literate person as a person *Who uses his ability to make a qualified judgment on the basis of the knowledge, skills and experience gained thus enabling him to smooth financial security throughout life.*

The authors devoted much effort to find the factors that influence the level of financial literacy. As the first important factor, they analyzed the difference between the genders. For example, (Fletschner & Mesbah, 2011) consider that women are less financially informed than men; however, their knowledge improves significantly with education. Similarly, (Falahati and Paim, 2011) presented a study that included 2,340 college students, and this study indicated gender differences in different dimensions of financial literacy, in which males were more knowledgeable in financial matters than female students.

Several authors also examined the relationship between financial literacy and education. As he states (Lusardi, 2019), a positive correlation between education and financial literacy is insufficient. Even educated people may not be savvy enough to work with money. Similarly, (Mandell & Klein, 2009) argue that the impact of financial education on financial behavior is uncertain. Let us also mention (Hastings et al, 2013), where the authors concluded that the influence of financial education on improving financial literacy is contradictory.

3. METHODOLOGY

Respondents in our sample are Czech and Slovak young people aged from 18 to 20. All of them are freshmen at the universities that applied for the management study program. The sample data were collected using the questionnaire research. Overall, we distributed 420 questionnaires among the students. After sorting the questionnaires and removing the questionnaires with intentionally wrong answers or incomplete responses, we obtained a sample of 343 questionnaires. That means the response rate was 81.67 %.

In the research, we used a self-developed questionnaire that consists of two parts. In the first part of the questionnaire, we have collected selected socio-demographic data of the respondents, particularly their age, gender, and the type of school they have studied. We also asked about the respondents' attitudes towards financial literacy. Specifically, we mainly investigated:

- the level of importance attributed to financial literacy,
- to what extent do they feel financially literate.

To test the actual financial literacy level of the respondents, we designed the second part of the questionnaire in the form of thirteen multiple-choice questions. Each question had four answer options, one correct answer, two incorrect and the "I don't know" option. The questions covered the following functional areas of financial literacy:

- time value of money, interest and inflation perception,
- basics of investing,
- financial decision making,
- annuities and mortgaging.

Analyzing the sample, we examined the level of financial literacy of students who have just entered university. But our aim was also to detect the factors that affect financial knowledge, skills and attitudes. We used a chi-square test of independence to verify the dependence on individual factors.

When sorting according to the importance that respondents attach to financial literacy or according to the school they finished, we obtained several groups that we compared. It is impossible to test these groups pairwise, but we have to apply the analysis of variance (ANOVA) method instead. The ANOVA approach enables us to reveal statistically significant differences in the results of individual groups. To conduct ANOVA we test the null hypothesis

$$H_0: \mu_1 = \mu_2 = \dots = \mu_n \quad (1)$$

that states there is no difference among the means of n disjoint groups. Further, we performed a post-hoc analysis to determine the causes of inequalities in the averages of partial datasets using Tukeys' Honestly Significant Difference Test. This approach is widely accepted in the statistical literature and is easily performed.

4. RESULTS

From the collected demographical data, we can extract some general characteristics of the sample. The age of all respondents is in the interval from 18 to 20 years, and the mean equals 19.73. It is adequate to the fact that most students leave secondary school at age 19. Here are also absolvents of the bilingual schools with 5- or 6-years study program, and they move the average age over 19. Concerning gender, our sample contains 65.8% of women and 34.2% of men. It can seem gender imbalanced, but this ratio corresponds to the whole population structure of the freshmen management programs. Partially, it is also related to men's less willingness to answer questionnaires. The graduates of the high school dominate in our sample as they represent almost 50%. On the other hand, graduates of secondary technical schools have the smallest share, which makes up less than 10%.

We have collected descriptive statistics of the percentage of success of answers in Table 1. In this table, we present the overall success and success rates broken down by individual functional areas of financial literacy. These results brought some surprises. In particular, it is a very high

success rate in financial decision-making. On the other hand, we see an extremely weak level in matters related to the time value of money and interest.

The distribution of correct and incorrect answers in individual functional areas of financial literacy is illustrated graphically in Figure 1. Figures 2 - 5 then illustrate this information according to the single types of schools that the respondents attended. One can easily observe a reduced portion of the “I don’t know answers” among the business academies graduates. Moreover, this shift does not increase the share of the incorrect answer.

Table 1. Descriptive statistics of the percentages of the correct answers for total score and single functional areas of financial literacy

	Min.	1-st Quartile	Median	Mean	3-rd Quartile	Max
Total	0.077	0.385	0.538	0.513	0.615	0.923
Interest	0.00	0.00	0.25	0.273	0.50	1.00
Annuities	0.00	0.50	0.50	0.615	1.00	1.00
Investments	0.00	0.25	0.50	0.483	0.75	1.00
Decision	0.00	0.667	1.00	0.803	1.00	1.00

Source: Own elaboration

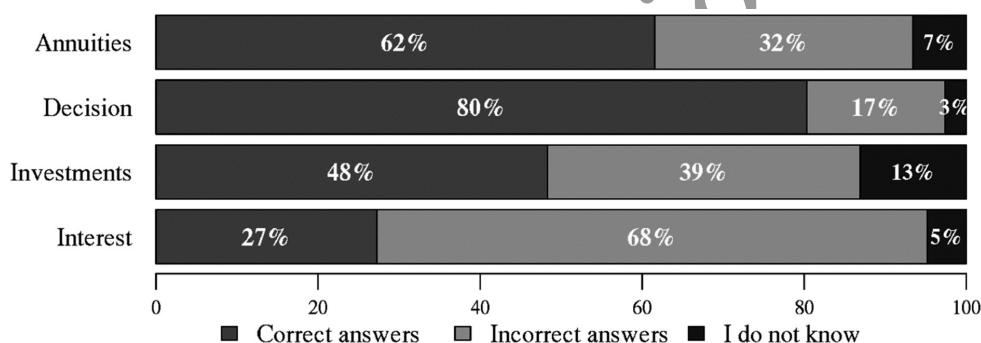


Figure 1. Percentages of correct and incorrect answers and “don’t know” answers

Source: Own elaboration

As mentioned in the literature review, many studies have shown that gender is a significant factor influencing financial literacy level. Therefore, we were the first to analyze the dependence of the results on gender. We divided the respondents into four groups according to their overall success and gender. The result of this classification we present in Table 2. Subsequently, we performed a chi-square test of independence. The corresponding *p*-value reached 0.4218, which did not allow rejecting the hypothesis that the level of financial literacy is independent of gender.

For average success rates, we get a value of 51.69% for women and 50.43% for men, and the difference is therefore relatively small. Applying the *t*-test, we confirmed that the difference between genders is not statistically significant. In this case, we obtained the *p*-value of 0.537, which means we cannot reject the hypothesis that both means are equal.

As a significant factor that affects financial literacy, we analyzed the type of school completed before entering university. Dividing the respondents according to the finished school and performance measure we present in Table 3. Consequently, we confirmed a strong dependence of the performance on the type of school by the chi-square test. The *P*-value is 0.023 which allows the rejection of independence with a confidence level greater than 95%.

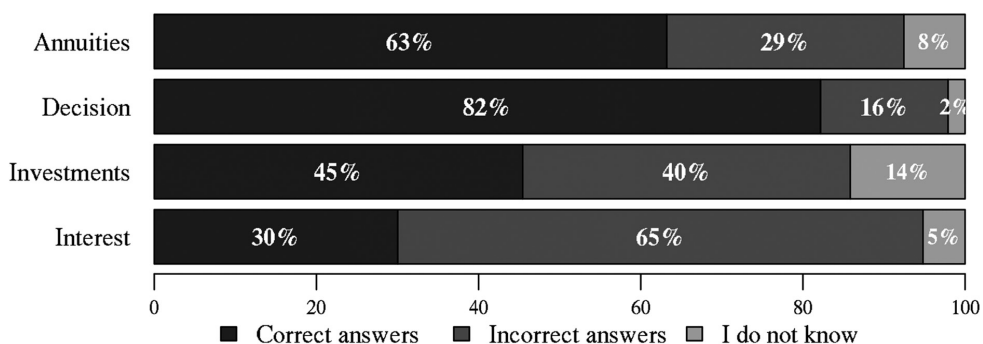


Figure 2. Percentages of correct and incorrect answers and “don’t know” answers in the group of high school graduates.

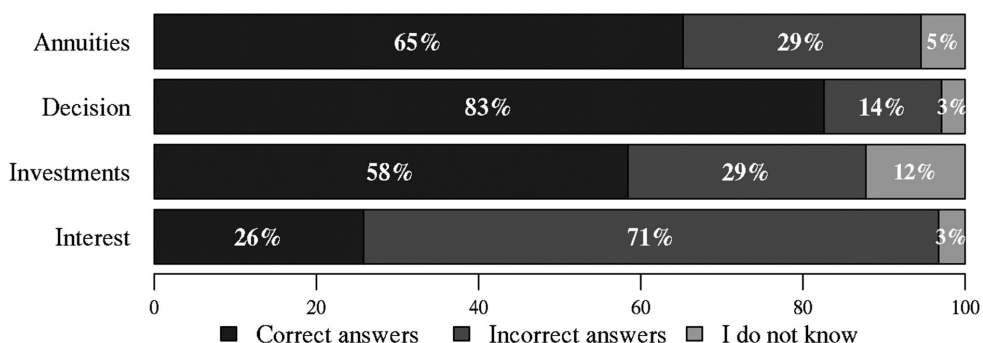


Figure 3. Percentages of correct and incorrect answers and “don’t know” answers in the group of business academies graduates.

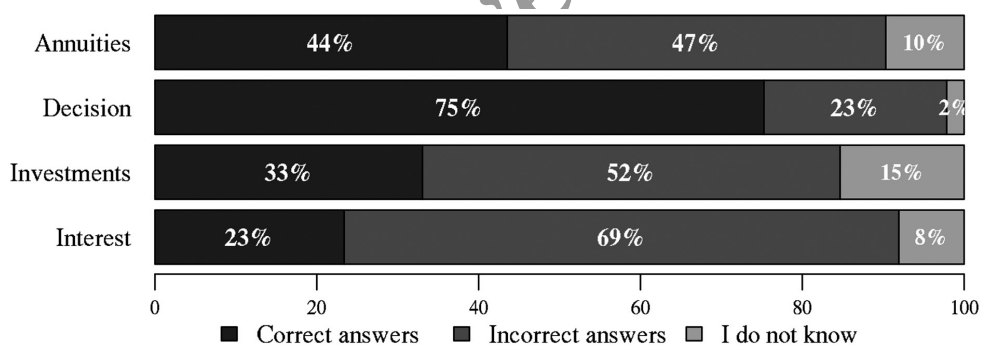


Figure 4. Percentages of correct and incorrect answers and “don’t know” answers in the group of technical high schools graduates.

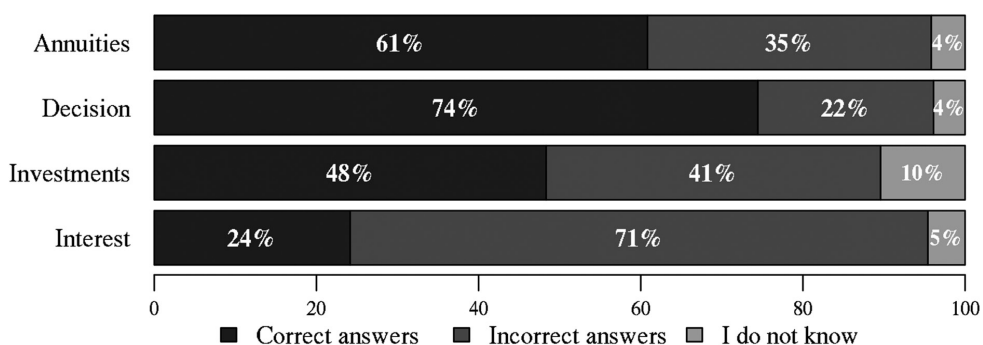


Figure 5. Percentages of correct and incorrect answers and “don’t know” answers in the group of vocational schools’ graduates.

Source of figures 2-5: Own elaboration

Table 2. Counts of respondents divided according to the gender and percentages of the correct answers

Gender	Percentage of correct answers			
	Under 25%	25%-50%	50%-75%	Over 75%
Men	11	50	40	16
Women	18	83	98	26

Source: Own elaboration

We can obtain a more detailed look at the differences in the level of financial literacy through analysis of variance. The results summarized in Table 4 confirm the strong dependence on this factor.

Table 3. Counts of respondents divided according to the gender and type of the finished school

Type of the school	Percentage of correct answers			
	Under 25%	25%-50%	50%-75%	Over 75%
High school	11	62	66	20
Technical school	6	17	8	0
Business academy	7	27	41	17
Vocational school	5	27	23	5

Source: Own elaboration

Table 4. Results of ANOVA with respect to the factor of the previous education

Source of variability	Sum of squares	Degrees of freedom	Mean square	F-value	p-value
Previous School	0.4705	3	0.15684	5.1763	0.00165
Residual	10.2415	338	0,03030	-	-
Total	10.712	441	-	-	-

Source: Own elaboration

We have detected the source of these differences by post-hoc analysis using Tukey's HSD test. As it is visible from Table 5, the worst results were achieved by absolvents of the technical schools. Their low percentages are the main source of the dependency on the previous education and differences in the average performance between the types of schools. This significant drop in knowledge among high school graduates is visible from the boxplots in Figure 6, on the right. Graduates of technical high schools not only achieved the lowest median of all types of schools, but even their third quartile does not reach the median level of grammar schools and business academies.

Table 5. Results of the Tukey's HSD test with respect to the previous education

School	High school	Business academy	Technical school	Vocational school
High school	-	0,5241	0,0126	0,6512
Business academy		-	0,0012	0,1438
Technical school			-	0,2200
Vocational school				-

Source: Own elaboration

In addition to the type of school attended, we took into account the approach to education in financial literacy that is a significant factor also. Here we distinguished four alternatives:

- a separate subject,
- an autonomous block as a part of another subject,
- fragments in several subjects,
- none at all.

Table 6. Descriptive statistics of the average scores according to the form of financial education

Form of education	Descriptive statistics					
	Min	1-st Q	Median	Mean	3-rd Q	Max
Separate subject	0.07692	0.38460	0.4615	0.4858	0.6154	0.92310
Autonomous block	0.2308	0.4615	0.5385	0.5458	0.6154	0.7692
Fragments	0.07692	0.38460	0.5385	0.5285	0.6154	0.92310
None	0.07692	0.38460	0.4615	0.4541	0.5385	0.92310

Source: Own elaboration

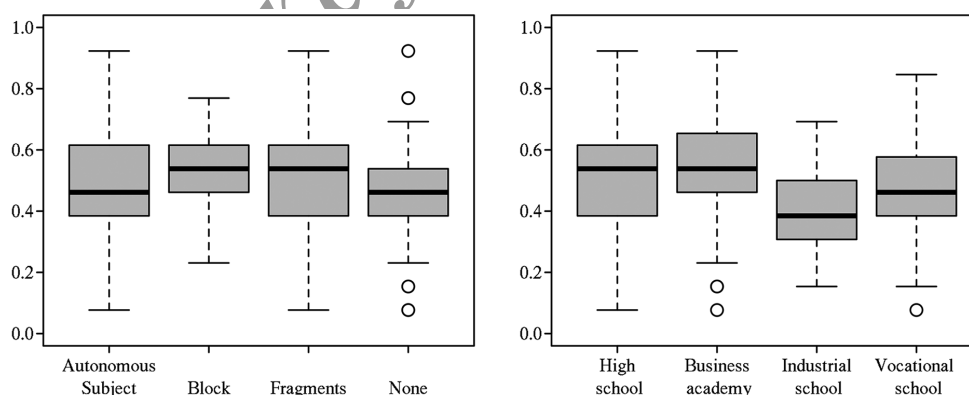
Table 7. Resulting p-values of the t-tests of the mean scores equality according to the form of the education

Form of education	Separate subject	Autonomous block	Fragments	None
Separate subject	-	0,0456	0,0767	0,1905
Autonomous block		-	0,5085	0,0032
Fragments			-	0,0036
None				-

Source: Own elaboration

We summarized the resulting successes in Table 6. It is a surprising result that respondents who reported education in financial literacy as a separate subject performed worse than respondents who gained knowledge as an autonomous block within another course or as fragments across other lectures. As expected, those who had no financial education did the worst.

The differences visible in Figure 6 (on the left) were also confirmed by a test of statistical hypotheses about the equality of the mean values. We present the resulting p-values of the t-test for single forms of teaching in Table 7. It shows that we cannot reject the hypothesis of equality of mean values when comparing a separate block of teaching and fragments in several subjects and, surprisingly, when comparing a specialized course and no education. The rejection of the hypothesis for the equality of mean successes between teaching in separate subject and fragments in several subjects is on the edge, with a confidence level exceeding 92%.

**Figure 6.** Boxplots of the respondents' performances according to the form of education (left) and by the type of school completed (right).

Source: Own elaboration

5. DISCUSSION

When evaluating the average level of financial literacy of newly entering university students in the study program management, we can state a solid level with a success rate of over 50%. The

median even reached 53.85%, which means that half of the respondents have above-average knowledge. Unlike the studies already mentioned in the literature survey, we did not confirm the lower financial literacy of the women. There are several arguments by which we can explain this apparent contradiction. First of all, it is necessary to emphasize that our analysis focused on students of a specific field of study, where financial literacy is one of the key competencies. Therefore, one can expect that students of this field will have a better relationship with the issue than the rest of the population, which is reflected in their higher financial literacy, especially for women. The second important phenomenon is also the composition of the sample according to the completed secondary school. About one-third of the women graduated from the Business Academy, that is specialized in practical economic skills. It creates the preconditions for a higher level of financial literacy than the current gender standard. In any case, in this specific case of the selected segment of the population, the validity of hypothesis three was not confirmed.

As we can observe from the graphs in Figures 1 - 5, knowledge is not distributed uniformly in individual functional areas of financial literacy. Surprisingly, the weakest results were achieved by respondents in the area of simple interest, time value of money and inflation perception. It turns out that in short-term thinking, students tend to underestimate problems and neglect the impact of time. They tend not to respect the present values of financial flows and compare only absolute amounts regardless of their timing. On the contrary, in the case of more complex tasks connected, for example, with annuities or investments, they are already aware of the higher level of complexity of the questions themselves, and they are approaching the solution more cautiously.

We have proved that previous education in financial literacy is a notable factor affecting financial literacy. We recorded statistically significant differences between graduates of individual types of schools. Graduates of grammar schools and business academies achieve better results. Their relative successes are on the same level. However, as is observable from the box-fences in Figure 6, graduates of business academies tend to achieve higher average success rates. This state we can explain by the fact that their education focuses more specifically on practical economic subjects. This specialized education is then reflected in a higher level of financial skills.

Graduates of secondary industrial schools and secondary vocational schools achieved less satisfactory results. It is due to the strictly technical focus of these types of schools. The surprising fact is the higher success rate in the case of secondary vocational schools, where the practical part of teaching for a given field has an important position. This can be explained by the fact that apprentices receive a symbolic financial reward for their practice. Managing their own money thus leads to a higher level of practical experience in the field of finance. In contrast, students in industrial high schools are still supported by pocket money from their parents and focus on technical subjects in their education. Just introduced results confirm the validity of hypothesis one.

The impact of the method of financial education on the resulting financial literacy is also worth attention. We found a surprising result that in education within a separate subject, the median of the acquired knowledge was lower than in the case of blocks in another course or more lessons in other courses. We explain this by the general absence of interdisciplinary cooperation. Students generally approach individual subjects separately and do not look for connections with other courses. They slide to learn “the subject for the subject”, and there is no synergistic effect of combining knowledge. Finance and financial literacy are no exception. The division of the issue into several areas thus leads to a better awareness of the practical context of financial literacy. This confirmed the validity of hypothesis two.

6. FUTURE RESEARCH DIRECTIONS

The presented research focused on a specific group of new students coming to universities in the Czech and Slovak Republics. In doing so, we focused on students of economic study programs. From the point of view of future research, several possible directions are offered. One of them is a subsequent survey of the level of financial literacy of university freshmen in the post-COVID era and to assess the effectiveness of distance education in the online form. Another direction of future research is to identify the crucial cognitive and emotional elements that influence the financial literacy level. Last but not least, there is also the possibility of monitoring progress in financial literacy in the context of further economic education and consumer behavior of respondents.

7. CONCLUSION

Summarizing the results of our survey, we come to principal findings. In the segment of the university freshmen studying programs with an economic focus, the difference in financial literacy between the genders blurred. So, the resulting skills are positively affected by the close relationship between the financial competencies and the chosen study field. We have also shown that the decisive influence on the results has the form of the financial education implementation, and not only the type of completed high school. The survey confirmed some inefficiency in including financial literacy as a subject. Including the financial literacy lessons in other subjects leads to better results as it provides higher interdisciplinary cooperation and connection with practice.

ACKNOWLEDGMENT

The paper was conducted within the project KEGA No 007ŽU-4/2021 Innovative courses to improve financial and economic literacy of the technical fields' students.

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The Importance of Aesthetic Experience in Fine Dining Restaurants

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Keywords:

Experience economy;
Aesthetic experience;
Fine dining;
Restaurant;
Importance



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Abstract: The importance of aesthetic in fine dining restaurants has been recognized as an important factor in creating a perfect service and a memorable experience. The purpose of this study is to investigate guests' importance of certain aspects of aesthetic experience in fine dining restaurants in Croatia. Data were collected using an online self-administered questionnaire. Descriptive statistics were used to analyse the data and determine the importance of different aesthetic components in fine dining restaurants. An independent sample t-test was performed to assess the perceived differences between those who have been in fine dining restaurants and those who have not been yet but have the intention to visit them in the future. The results of the study could serve as a guide for restaurant managers to improve the components of the aesthetic experience and enhance the overall guest experience and business performance in fine dining restaurants.

1. INTRODUCTION

The question of aesthetic experience in restaurants is quite new and the results of this paper will provide insight into the importance of aesthetic guest experience in the fine dining industry. This research focuses on measuring the level of aesthetic experience in the restaurant, which determines the overall guest experience. In this case, the measurement was done from the guests' point of view and the results showed the needs and desires of guests when they visit fine dining restaurants. Trends are constantly changing, and therefore restaurants need to adapt certain aspects of their service to improve the final aesthetic experience that the guest feels, senses and tastes during the visit. The focus of the research was fine dining restaurants in the Republic of Croatia. Croatia is a small country, but rich in flavour diversity, local food and traditions. In addition, Croatia has a great potential for the development of gastro tourism, but so far it has not been sufficiently recognised, as in other countries, such as Italy, Spain and France (Skryl et al., 2018).

Although extensive research is being conducted in the measurement of restaurant service quality, little research has been performed regarding the measurement of aesthetic experience in restaurants. The main purpose of this study is to empirically investigate guests' importance of certain aspects of aesthetic experience in fine dining restaurants in Croatia. Specifically, the study intended to answer the following research questions: (1) What are the key components of aesthetic experience in fine dining restaurants?; (2) What is the level of guests' importance re-

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garding certain aspects of aesthetic experience in fine dining restaurants? and (3) What are the differences between the importance of aesthetic experience in fine dining restaurants for those who have been in fine dining restaurants and those who have not been yet, but have the intention to visit them in the future? The present study aims to contribute to the knowledge of aesthetic restaurant experience. The structure of this paper is divided into the theoretical background, methodology, results, and conclusion.

2. THEORETICAL BACKGROUND

The concept of fine dining restaurants, as part of the elite and limited market niche, is consisted of top-notch dining standards and represents the dining tradition in global cuisine (Kwun & Oh, 2007). The most important segment in fine dining restaurants is the guest experience, which is largely driven by hedonic, or emotional aspects of consumer behaviour, including the need for entertainment and emotional value (Ryu & Han, 2011).

Due to the constant battle in the market, fine dining restaurants try in all possible ways to highlight their company in the market and give their guests a complete restaurant experience. Ankor (2012) defined experiences as highly personal, subjectively perceived, intangible, ever fleeting and continuously on-going. Dishes and ambient invite aesthetic involvement by producers and consumers, and they demand judgments of both gustatory and metaphorical taste and may give rise to the emergence of taste makers (Lane, 2013).

Horng & Hsu (2020) stated that aesthetics is what makes an object beautiful and what humans feel when they encounter a beautiful object. Aesthetic experience is a process to perceive-feel-sense an object, represent active sensation, emotion, cognition and integrate the aesthetic pleasure appraisal (Di Dio and Vittorio, 2009).

The research applied in the context of the restaurant industry and directed to measuring aesthetic restaurant experience, mainly use the following dimensions in measurement: physical environment (Canny, 2014; Han & Ryu, 2009; Hanks & Line, 2018; Horng & Hsu, 2020; Hwang & Ok, 2013; Ryu et al., 2012; Ryu & Shawn Jang, 2008; Wu & Liang, 2009), food aesthetics (Campo et al., 2017) and aesthetic labor (Tsaur et al., 2015; Warhurst et al., 2000).

Before deciding to use the service of a restaurant, the guest encounters the physical appearance of the restaurant. To begin with, he encounters the exterior, then the interior, the appearance of the staff, and finally the appearance of the food. Han & Ryu (2009) state in their work that the physical environment contains facility aesthetics, ambience, lighting, layout, table settings and service staff.

Food has been studied by anthropologists, sociologists, historians and different cultural critics, all of who have focused on increasing understanding of the role that food plays in human affairs (Sweeny, 2017). Campo et al. (2017) define food aesthetics as an interaction between taste and sight that creates a certain influence on the customers' choices about food. There is a saying that eyes eat before the mouth.

The importance of aesthetic labour has significantly increased in the service industry during the last twenty years. Böhme (2003) artistically defined aesthetic labour as the integrity of those activities which aim to give an appearance to things and people, cities and landscapes, to endow

them with an aura, to lend them an atmosphere, or to generate an atmosphere in ensembles. What is more, Warhurst et al. (2000) defined aesthetic labour as an environmental stimulus in which employees exhibit the capacities and attributes for embodying an organization.

3. METHODOLOGY

The instrument for collecting primary data in this study was a self-administered questionnaire which consisted of 3 parts. The first part of the questionnaire referred to the habits of visiting fine dining restaurants and included 7 items. The second part of the questionnaire contained 24 items to measure three aesthetic restaurant experience constructs: (1) aesthetic physical environment, (2) food aesthetic and (3) aesthetic labour. Each construct of aesthetic restaurant experience was measured using a 5-point Likert scale of importance (1 = extremely unimportant and 5 = extremely important). The last part of the questionnaire included additional questions on the socio-demographic profile of the respondents, such as age, gender, marital status, level of education, monthly income, working status, frequency of restaurant visits and the type of restaurant that respondents visit most often. The questionnaire was developed in English and then translated into the Croatian language.

The target population of the study were guests who are visiting or have the intention to visit fine dining restaurants in the future. Data were collected during March and April 2021. A convenient sampling method was utilized to collect data. Given the situation caused by the disease COVID-19, it was not possible to physically distribute the questionnaires in fine dining restaurants. Therefore, an online survey was created and distributed through social networks and the researcher's contacts.

4. RESULTS

Descriptive statistical analysis was run on respondents' demographic variables. The results are shown in Table 1.

As shown in Table 1, the representation of women was higher (71.14%) compared to men (28.86%). In terms of age, the two most frequent groups of respondents were between 21-30 years old (28.41%), and respondents aged 50 and over (22.60%). The lowest number of respondents was in the age group less than 20 years (6.04%). Considering the marital status, the largest number of respondents were married (44.52%), but there was a significant number of unmarried respondents (38.26%). More than half of the respondents had a university degree (52.80%). Most of the respondents were full-time employees (70.69%) and almost a quarter of respondents (26.17%) have a monthly income of HRK 4,001.00-6,000.00. Most of the respondents visit restaurants for more than 10 times a year (48.10%), and only 7.61% of respondents go to restaurants once or twice a year.

Based on the obtained data, it was determined that out of the total number of respondents, 45.19% visit fine dining restaurants, while 54.81% of respondents stated that they have never visited this type of restaurant. However, 63.67% of respondents who have never been to a fine dining restaurant, have the intention to visit them in the future. For the rest of the respondents who do not have the intention to visit fine dining restaurants (36.33%), the main reason was too expensive services (57.30%). The primary motive for visiting fine dining restaurants was the enjoyment of food and drink (32.54%), while the secondary motive was trying new dishes (26.18%). The main criteria for choosing the right fine restaurant are the recommendations of friends (30.66%) and an interesting offer of food and drinks (23.21%).

Table 1. Demographic characteristics of respondents (N=447)

Items	f	%	Items	f	%
<i>Sex</i>			<i>Working status</i>		
Male	129	28.86	Employed or self-employed	316	70.69
Female	318	71.14	Unemployed	16	3.58
<i>Age</i>			Student	89	19.91
Less than 20	27	6.04	Others (e.g., retired persons, housewives)	26	5.82
21 – 30	127	28.41	<i>Monthly income</i>		
31 – 40	98	21.92	Less than 2.000,00 HRK	65	14.54
41 – 50	94	21.03	2.001,00-4.000,00 HRK	53	11.86
50 or more	101	22.60	4.001,00-6.000,00 HRK	117	26.17
<i>Marital status</i>			6.001,00-8.000,00 HRK	91	20.36
Unmarried	171	38.26	8.001,00-11.000,00 HRK	56	12.53
Married	199	44.52	11.000,00 HRK or more	65	14.54
Extramarital union	37	8.28	<i>Frequency of restaurant visits</i>		
Widow/widower	10	2.24	1-2 times a year	34	7.61
Divorced	30	6.71	3-4 times a year	47	10.51
<i>Education</i>			5-6 times a year	50	11.19
Elementary school	5	1.12	7-8 times a year	51	11.41
High school diploma	157	35.12	9-10 times a year	50	11.19
University degree	236	52.80	More than 10 times	215	48.10
M.Sc. / Ph.D.	49	10.96			

Source: Author's research

The results of descriptive and bivariate analyses are presented below. Table 2 reports the results for the respondents' importance perceptions of certain aesthetic experience attributes, as well as the significance of the difference in the mean scores between fine dining guests (N=202) and potential guests (N=156) of fine dining restaurants.

Table 2. The comparison of aesthetic experience attributes between fine dining guests and potential guests (N=358)

Attributes	Guests n=202 (M ^a , SD)	Potential guests n=156 (M ^a , SD)	Gap	Sig.
PHYSICAL ENVIRONMENT AESTHETICS	3,99	3,82		
<i>Restaurant exterior</i>				
This restaurant's architecture should have an attractive character.	3.74 (1.08)	3.57 (1.13)	0.17	0.14
The restaurant exterior should be visually appealing.	3.70 (1.02)	3,69 (1.05)	0.01	0.92
The restaurant landscape surrounding should be special and attractive.	3.49 (1.09)	3.54 (1.02)	-0.05	0.64
<i>Restaurant interior</i>				
The restaurant interior décor should be attractive.	4.13 (0.99)	3.92 (1.09)	0.21	0.06
The colours used in interior design should create a pleasant atmosphere.	4.16 (1.04)	3.91 (1.07)	0.25	0.03*
Furniture (tables and chairs) should be of high quality.	3.78 (1.04)	3.45 (1.06)	0.33	0.03*
The number of tables should not make restaurant environment difficult to navigate.	4.04 (1.00)	3.78 (1.12)	0.26	0.02*
It should be easy to move around the restaurant and find what you are looking for.	3.90 (1.08)	3.93 (1.04)	-0.03	0.77
<i>Ambience</i>				
The overall lighting level in the restaurant should be appropriate.	4.09 (0.96)	3.81 (1.07)	0.28	0,01*

The temperature in the restaurant should be comfortable.	4.22 (0.91)	3.99 (1.02)	0.24	0.02*
The smell in the restaurant should be pleasant.	4.40 (0.85)	4.19 (1.05)	0.21	0.04*
Background music should make the restaurant a more pleasant place.	4.19 (0.93)	4.05 (1.09)	0.14	0.19
FOOD AESTHETIC	4,21	4,02		
The food served by the restaurant should be delicious.	4.58 (0.80)	4.36 (1.03)	0.23	0.03*
The food in the restaurant should be unique.	3.79 (1.02)	3.56 (1.19)	0.23	0.06
The food in the restaurant should be made from fresh ingredients.	4.50 (0.88)	4.32 (1.02)	0.18	0.07
The food presentation should be visually appealing.	4.13 (1.00)	3.83 (1.16)	0.30	0.01*
Portion size should be appropriate.	4.07 (0.94)	4.03 (1.08)	0.05	0.65
AESTHETIC LABOR	4,20	3,76		
Restaurant staff should have an attractive appearance.	3.22 (1.13)	3.02 (1.12)	0.20	0.09
The appearance of the restaurant staff should match the corporate image of the restaurant.	3.66 (1.13)	3.49 (1.21)	0.17	0.17
Restaurant employees need to have a refined style of conversation.	3.79 (1.08)	3.43 (1.19)	0.36	0.00*
The restaurant should consider the physical appearance of its employees (uniform, hairstyle, makeup).	3.93 (1.03)	3.64 (1.12)	0.29	0.01*
Employees should be friendly to guests.	4.47 (0.85)	4.13 (1.09)	0.34	0.00*
Employees should treat guests well.	4.55 (0.79)	4.29 (1.02)	0.26	0.00*
The behaviour of restaurant staff towards guests should be pleasant.	4.52 (0.84)	4.29 (1.01)	0.23	0.02*

Note: ^a Importance mean ranges from 1 to 5; SD – standard deviation; * p < 0.05

Source: Author's research

The mean scores of guests who visit fine dining restaurants ranged from 3.22 to 4.58. The lowest mean score was for the attribute “restaurant staff should have an attractive appearance”. This implies that guests do not perceive very much important visual appeal of restaurant staff. The landscape is also less important to restaurant guests, as evidenced by the low mean score of the variable “the restaurant landscape surrounding should be special and attractive” (3.49). On the other hand, the highest mean score was for “the food served by the restaurant should be delicious” (4.58). This indicates that for the guests of fine dining restaurants, the central and most important factor is the food taste, even though the food in fine dining restaurants should be unique and visually appealing. Furthermore, the results show that the food aesthetic construct is the most important of three aesthetic restaurant experience constructs with the mean value of 4.21, followed by the construct aesthetic labour with a mean value of 4.20. The least important construct by the restaurant guests was the aesthetic physical environment with a mean score of 3.99. Based on the above, it is possible to conclude that guests who visit fine dining restaurants perceive food aesthetics as the most important in creating the overall aesthetic restaurant experience.

The means score of potential guests of fine dining restaurants (those who have not visited yet this type of restaurant) ranged from 3.09 to 4.56. As with fine dining guests, potential guests gave the lowest mean score for the variable “restaurant staff should have an attractive appearance”. Starting from that, it is possible to stipulate that for potential guests of a fine dining restaurant the attractive appearance of the staff is less important. Oppositely, the highest mean score was for “the food in the restaurant should be unique”. Fine dining restaurants are a type of restaurant that stands out with quality compared to other types of restaurants. Considering that, a high grade in terms of the uniqueness, that potential guests gave, was expected. Also, the results show that potential restaurant guests, as well as restaurant guests, evaluate food aesthetic with the highest average rating (4.02), followed by aesthetic physical environment (3.82) and

aesthetic labour (3.76). Thus, from all this, it is possible to determine that guests and potential guests of fine dining restaurants perceive food aesthetics as the most important segment in achieving the overall aesthetic restaurant experience.

The results of the independent sample t-test show that in 13 out of 24 aesthetic experience attributes, significant differences were found between regular fine dining guests and potential guests of fine dining restaurants. An independent sample t-test showed that regular fine dining guests rated higher on most of the attributes of aesthetic labour (5 of 7 attributes). Significant differences were also found on 6 attributes of physical environment aesthetics, including colours of interior design, quality of furniture, table arrangement, restaurant lighting, temperature, and smell. This implies that regular fine dining guests perceive physical environment of a restaurant more important and different than those who have never been in the restaurant. The importance of food aesthetic two groups of respondents mostly perceive the same. The differences were found in 2 out of 5 attributes. These attributes were “delicious food” and “visually appealing food presentation”.

5. CONCLUSION

The contribution of this research is very applicable in managerial aspects. The results have shown which components of aesthetic guest experience are the most important from the guest's perspective. What is more, the results are extremely important for restaurateurs and restaurant management because it is possible to gain insight into what guests need and perceive while they visit fine-dining restaurants. The insight could provide important information which could help the restaurant to make the reposition on the market.

The study has some limitations that offer opportunities for future research. Unfortunately, the effects of global pandemic COVID-19 limited the data collection which was conducted only through an online survey. What is more, the structure of respondents has shown the unequal distribution of responses by gender and age which consequently limited the results. Moreover, the results of respondents refer only to a small geographical area (Republic of Croatia) and therefore cannot be generalized. Lastly, the largest number of respondents are the personal contacts of authors. One of the proposals for future research is to investigate the perception of aesthetic restaurant experience immediately after dining experience. This could happen with collaboration with fine dining restaurants which would help in questionnaire distribution. Also, there is a possibility to investigate aesthetic restaurant experience from other aspects (professional point of view). Furthermore, other aspects of the aesthetic restaurant experience in fine dining restaurants could be identified and explored in order to gain a better understanding of this concept.

From a practical standpoint, this study helps Croatian restaurant managers better understand the guests' importance of certain aesthetic experience attributes in fine dining restaurants. The results of the study could help restaurateurs in designing service delivery and improving service quality.

ACKNOWLEDGMENT

This paper is result of the student scientific project „MEASURING AESTHETIC GUEST EXPERIENCE IN RESTAURANT” which is supported by the Faculty of Tourism and Hospitality Management in Opatija, University of Rijeka, Croatia.

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