SELECTED PAPERS

Association of Economists
and Managers of the Balkans
UdEkoM Balkan

Leadership, Innovation, Management and Economics:
Integrated Politics of Research

SELECTED PAPERS

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Preface

Organizing is an evolutionary phenomenon, distinctive because of the laws of existence and maintaining all structures in all processes of their functioning. As such, it is a civilizational phenomenon also that occurs as a component of human, individual and social activities and as a factor in the overall development of man and society. On the other hand, as a deliberate human activity, organizing involves seeking solutions to problems that occur on the way to achieving specific goals. No goal can be achieved without appropriate or necessary, or at least minimal organization of conditions, factors, and processes needed for goal achievement. However, the new era requires new types of leaders and managers, and new forms of organization; demands those who are willing and able to lead the company/corporation/state, in a distinct competitive environment, with all the good and bad sides brought by the globalization of world economy.

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

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

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

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

Association of Economists and Managers of the Balkans headquartered in Belgrade – Serbia along with the partner institutions, namely the Faculty of Engineering Management - Belgrade, Serbia; Modern Business School - Belgrade, Serbia; the University of Novo Mesto, Faculty of Business and Management Sciences, Slovenia; the University of Novo Mesto, Faculty of Economics and Informatics, Slovenia; Business Academy Smilevski - BAS, Skopje, North Macedonia; and BAS Institute of Management, Bitola, North Macedonia organized 7th International Scientific-Business Conference titled: Leadership, Innovation, Management, and Economics: Integrated Politics of Research – LIMEN 2021 on December 16, 2021.

Bearing in mind the challenges of a dynamic engagement in contemporary organizations, it is clear that the analysis of these important subjects should be applied interdisciplinary approach. For this reason, the main theme of the conference LIMEN 2021 was processed through the following key topics:

- COVID-19 Pandemic Influence on Business Operations and Management
- Leaders and Leadership
- Entrepreneurship
- Innovation
- Creativity
- Management of Small and Medium-sized Enterprises
- Contemporary Strategic Management
- Financial Management and Banking
- Marketing Management
- Project Management
- GREEN Management
- Natural Resource Management
- Quality Management
- Management of New Technologies
- Management Information Systems
- Education Management
- Intercultural Management
- Public Sector Management
- Human Resources Management
- Organizational Behavior
- Business Ethics
- Macroeconomics
- Microeconomics
- Finance
- Marketing
- Labour Law
- Business Law

LIMEN 2021 keynote speaker was Prof. Dr Dominika Gałkiewicz representing the University of Applied Sciences Kufstein, Tirol, Kufstein, Austria with the topic *"Sustainability Regulation and Reporting: Trends in the Dach Region".*

Within publications from LIMEN 2021 conference:
- 15 double peer-reviewed papers have been published in the Selected Papers - International Scientific-Business Conference LIMEN 2021,
- 39 double peer-reviewed papers have been published in the Conference Proceedings - International Scientific-Business Conference LIMEN 2021,
- 70 abstracts have been published in the Book of Abstracts - International Scientific-Business Conference LIMEN 2021.

Altogether LIMEN 2021 publications have more than 600 pages. All full papers have DOI numbers and ORCID iD integration.

Participation in the conference took nearly 140 researchers with the abstracts/papers representing 16 different countries from different universities, eminent faculties, scientific institutes, colleges, various ministries, local governments, public and private enterprises, multinational companies, associations, etc.
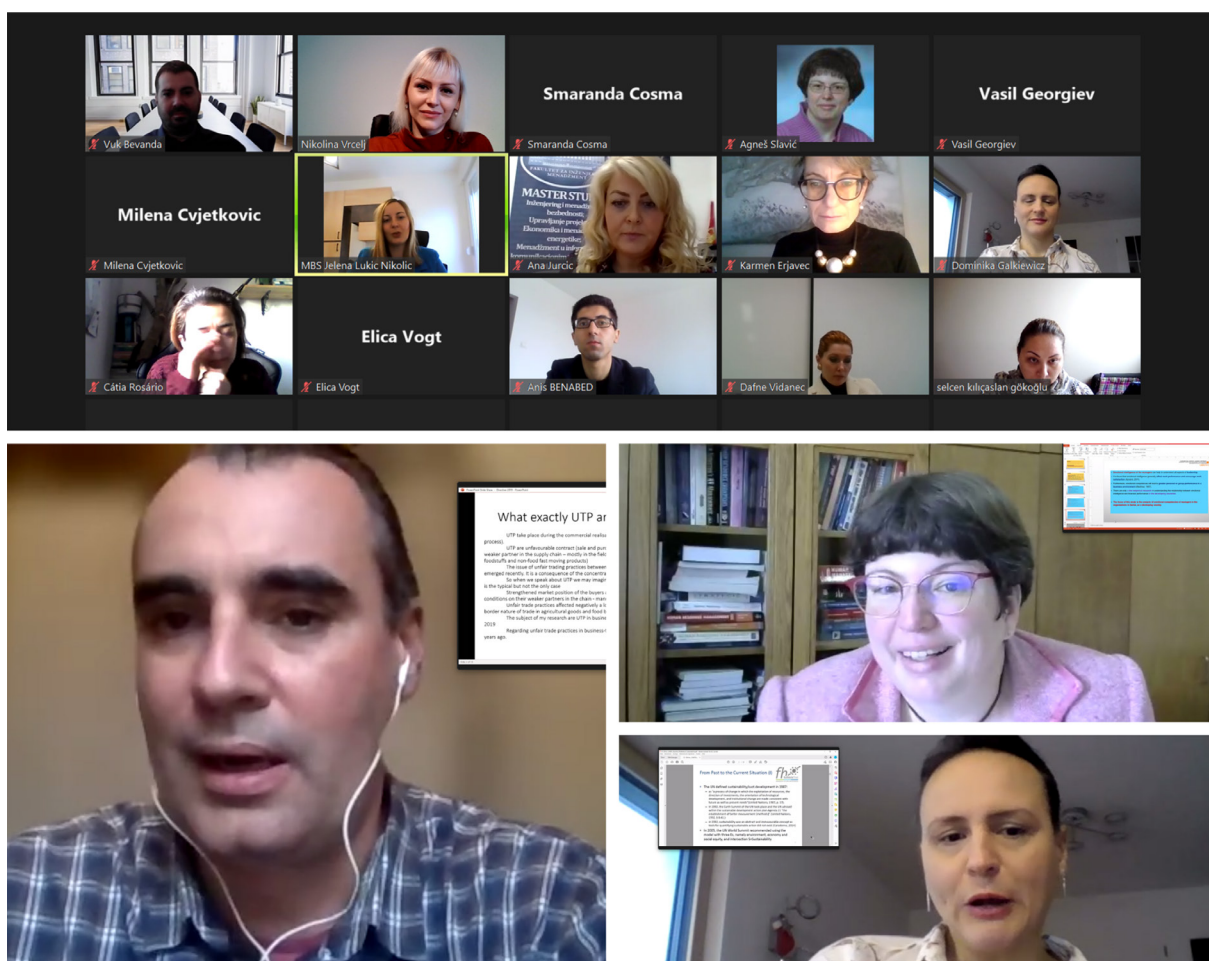
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Significance of Innovations in the Time of Crisis – The Impact of COVID-19 Pandemic on Innovation Activities

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Abstract: The outbreak of the coronavirus pandemic in 2020 is unquestionably one of the greatest challenges the world has ever faced. Aside from the terrible repercussions for human health, the current situation with COVID-19 pandemic has impacted all economies across the globe. Based on scientific literature, publicly available data and analytical reports, this paper will try to identify the changes in innovations potential of certain countries caused by the current pandemic. Observing the indicators of the Global Innovation Index (GII), comparative analysis will show how much has the pandemic affected the innovation capacity of the chosen countries and indicate the differences among them. Furthermore, the paper aims to research and to perceive the importance of undertaking innovations and R&D activities in crises such as the spread of coronavirus.

1. INTRODUCTION

Despite the fact that the 21st-century world had been already changing fast and it had become clear that only those who had been continuously adapting and improving can succeed, the COVID-19 pandemic emphasized, even more, the necessity of being able to adjust to new conditions fast enough. It started as a health threat and continued to grow into a serious crisis, economic and social, disturbing every aspect of peoples' lives. The global economy slowed down, international relations were on the test, many sectors of the economy were collapsing and organizations were fighting for their survival. Overcoming difficulties often required the introduction of new methods, implementation of different approaches and creation of some original solutions. To survive, many companies have found ways to transform the ongoing crisis into an opportunity for success. COVID-19 has caused many enterprises to become innovation-oriented, forcing entrepreneurs to innovate and emphasizing innovation as an effective approach for overcoming the negative consequences of the pandemic (Van Auken et al., 2021). Government support regarding financial aid, adequate infrastructure and policy measures that encourage acquiring new knowledge and technology development had an important role in improving organizations' performance and capability to innovate.

2. INNOVATION AS RESPONSE TO THE CRISIS

The evidence from previous economic crisis shows that enterprises which are able to maintain their innovation activities gain an advantage over those that are not, and are capable to recover faster. Firms that did not invest and conduct any innovation process experienced the largest losses (Spescha & Woerter, 2019). Those who continued to be innovative and to support their research and development (R&D) projects, adapted more easily, improving their resilience and sustaining competitiveness (Flammer & Ioannou, 2015). The previous researches also

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implied that enterprises which undertook R&D-based innovations, usually more radical than non-R&D-innovations, were more isolated from the external economic shocks and achieved more stable growth development than non-R&D innovators (Laursen & Salter, 2006). Furthermore, small and medium enterprises (SMEs) which invest in R&D and innovations have increased their chances for survival during a recession (Jung, Hwang & Kim, 2018).

However, the ongoing COVID-19 crisis has differed in many ways from the previous economic crises. Closure of state borders, lockdowns and quarantines have never been seen before in modern times and therefore organizations have had to find different approaches to solve the existing problems. Common product or process innovation usually has not been good enough to face the unprecedented circumstances the whole world has been in. Enterprises have been forced to find new ways of implementing innovations into their business and decide what type of innovation is necessary for survival and fast recovery during the pandemic. Not only that strategic competitive innovation has turned out to be the main source of financial success during the crisis, but the type of innovation has had a significant impact as well (El Chaarani et al., 2021). The research of El Chaarani et al. (2021) showed that marketing and process innovations have had a considerable and positive effect on firms' financial results, while the product or organizational innovations have had no impact on financial performance. Hence, the results suggest that enterprises should adopt new process practices based on cost reduction and quality improvement, and develop new marketing strategies which would enable them to build a loyal relationship with customers and enter new markets. The study of Chinese enterprises' response to the COVID-19 crisis supported these claims showing that in almost all industries firms "have explored possible options of marketing innovation strategies to different degrees and in different forms" (Wang et al., 2020, pp.215). Not only that companies were compelled to create new ways of responding to the crisis, but they had to do it as fast as possible. Innovation processes that would otherwise take years now were forced by the unexpected health crisis to move rapidly, achieving radical shifts in technology in days (Brem, Viardot & Nylund, 2021). Besides that, firms and organizations from completely different industries were ready to unite in order to help society to overcome the crisis, which provided new ideas for innovation. The results of recent studies suggest that the pandemic has served "as an effective catalyst for service innovations" as well, pressuring organizations to go beyond usual strategies and testing their dynamic capabilities (Heinonen & Strandvik, 2021). The main difference between service innovations during the COVID-19 crisis and pre-crisis period is that now the great emphasis has been placed on the relevance, regarding created value for customers, rather than on originality and newness.

3. AN OVERVIEW OF SELECTED GLOBAL INNOVATION INDEX (GII) SUB-INDICATORS BEFORE AND DURING THE PANDEMIC

While the COVID-19 pandemic had an overall negative impact on the global economy, it has a mixed impact on the innovation system, with certain industries experiencing growth or contraction in R&D spending. The Global Innovation Index (GII) assigns a ranking to world economies based on their ability to innovate, which consists of about 80 indicators categorized into innovation inputs and outputs. Sub-indicators of innovations show factors that significantly affect the innovation level of these countries' economies.

Research and development (R&D) – R&D refers to the actions that companies engage in order to innovate and create new products and services. R&D investments foster innovation and creativity, leading to the development of new technologies, knowledge, concepts, ideas, and expertise, which increases the country's innovative capacity. It is vital to have the competence

of R&D for an effective innovation process since R&D precedes innovation as a preliminary phase. Innovations are the outcome of a company's proactive R&D.

Gross expenditure on R&D, % of GDP – The proportion of gross domestic product (GDP) committed to research and development, also known as R&D intensity, is shown by gross domestic spending on R&D. R&D expenditure as a percentage of GDP is an indicator that may be used to assess the relative level of investment in creating new knowledge. One of the key preconditions for further development of scientific-research potential, creation and commercialization of innovations, is increasing allocation for R&D.

Innovation linkages – Effective innovation links allow companies to expand their base of ideas and technology and are crucial to locate complementary knowledge and competencies to overcome hurdles like limited finance and a lack of managerial resources and technological competencies. Nowadays, innovation linkages increasingly rely on the integration of diverse technologies and the combination of various types of knowledge and skills. Furthermore, innovative companies are facing increased rivalry, a faster rate of invention and a shorter life cycle, all of which drive them to seek faster ways to develop.

University-industry R&D collaboration – The ability of a university to assist industry innovations, inventions and consulting has become a major factor of innovation capacity and prosperity in many countries. University-industry R&D collaboration is increasingly seen as a tool for enhancing innovation through knowledge exchange (Ankrah & AL-Tabbaa, 2015). To increase research productivity and encourage the transfer of university research findings, state governments have to implement some administrative policies and initiatives.

Knowledge creation – The constant combination, transfer, and conversion of various types of knowledge is referred to as knowledge creation. As a result of knowledge creation, new knowledge is disseminated, assimilated and integrated into new goods, services, and systems (Phan & Peridis, 2000). Knowledge is widely recognized as a critical component of all types of innovation (Tekic et al. 2013). The unique outputs of knowledge creation are also known as innovations (Škudiene et al. 2021).

Patents by origin – Patents can be obtained by introducing and controlling R&D operations, acquiring a competitive advantage, and establishing a foothold in the marketplace. A patent is an exclusive right awarded for an invention, which is a product or a technique that offers a new technical solution to a problem or provides a new way of doing something in general. In order to obtain a patent, technical details about the invention must be given to the public in the form of a patent application. Patents by origin are determined on the basis of a patent application, which includes the residence of the first-named inventor.

Scientific and technical articles –The number of published scientific and technical articles, as well as their citations, show that quantitative and qualitative scientific outcomes can contribute to the formation and strengthening of scientific research and innovation capacity. The goal of the scientific and technical articles is to disseminate information about new research findings that are based upon relevant, strong and understandable proofs of their validity (Marušić & Marušić, 2009).

The impact of COVID-19 on the countries' innovativeness can be assessed by comparing the score and rank of mentioned sub-indicators. In order to determine how much this global crisis

has affected the innovation systems of some countries, the analysis includes data before the pandemic as well. Table 1 shows ranks and scores of GII and some sub-indices of innovations for the US, China, Japan, and India.

Table 1. Comparative overview of some innovation parameters on the global level, 2017-2020

GII	R&D	Gross expenditure on R&D, % GDP	Innovation linkages	University-industry R&D collaboration	Knowledge creation	Patents by origin	Scientific and technical articles
US (score/rank)							
2017	78.9/4	2.7/10	48.8/16	78.4/1	65.0/6	15.9/6	11.5/43
2018	77.9/3	2.8/9	54.3/9	80.9/1	72.3/3	15.1/6	10.5/44
2019	77.1/2	2.8/9	60.6/8	75.7/4	72.8/3	13.8/1	10.7/48
2020	78.3/2	3.1/8	59.9/5	74.4/3	79.9/3	13.3/1	18.9/46
China (score/rank)							
2017	59.1/17	2.1/14	30.7/58	56.5/27	69.1/4	65.6/1	11.7/42
2018	58.8/17	2.1/15	27.2/58	56.5/27	68.1/4	53.7/1	11.9/42
2019	58.8/16	2.2/13	24.5/48	56.5/29	70.4/4	55.1/1	13.8/39
2020	59/14	2.2/14	31.3/32	70.5/6	70.5/4	53.2/1	21.3/42
Japan (score/rank)							
2017	77.3/5	3.1/5	45.7/20	62.3/22	54.9/11	49.7/1	9.8/52
2018	76.3/5	3.2/5	50.2/12	64.5/18	56.1/11	47.8/1	9.2/53
2019	74.9/5	3.3/5	47.7/17	62.4/20	57.2/11	45.3/1	9.7/53
2020	74.3/4	3.2/4	46.4/18	60.1/22	58.3/11	45.0/1	16.8/50
India (score/rank)							
2017	34.3/32	0.6/52	37.4/41	57.2/25	15.6/55	1.5/55	5.6/73
2018	34.2/35	0.6/50	33.6/41	60.1/23	20.9/42	1.6/52	5.3/77
2019	32.9/35	0.6/57	26.6/41	47.7/45	19.8/51	1.6/51	5.8/76
2020	32.51/35	0.7/52	24.1/50	42.7/65	21.0/51	2.0/36	10.3/84

Source: Authors, based on the Global Innovation Index Report (2018, 2019, 2020, 2021)

In the field of R&D, the best-positioned country within the group throughout this observed time was the US (2nd place in 2020 and 2019) and Japan (4th place in 2020 and 5th place in 2019, 2018 and 2017), whereas India was the worst-ranked country. Analysis of data presented in Table 1, leads to the conclusion that Japan is the biggest spender on R&D and the best ranked according to the gross expenditure on R&D (3.2% of GDP in 2020 and 3.3% of GDP in 2019), followed by US (3.1% of GDP in 2020 and 2.8% of GDP in 2019) and China (2.2% of GDP in 2020 and 2019). The R&D expenses below 1% of GDP were recorded in India. According to the GII, the US is the best-ranked country within the innovation linkages (59.9 and 5th place in 2020, 60.6 and 8th place in 2019 and 54.3 and 9th place in 2018). During these four years, high score and rank in this category has been achieved also by Japan (46.4 and 18th place in 2020, 47.7 and 17th place in 2019, 50.2 and 12th place in 2018), while China and India had an unfavorable ranking and score. An overview of university-industry collaboration points that the US was the best among the other countries in the mentioned group, with a GII of 89.9 and at 1st place in 2018. Based on a comparison of the score and rank within knowledge creation, India was the lowest-ranked country in 2017, 2019, and 2020, followed by Japan. The US (3rd position in 2018, 2019 and 2020) and China (4th place during all observed years) were the highest-ranking countries of the observed group in terms of this indicator, while Japan and India recorded lower rank. In the domain of patents by origin, the US had the leading positions in 2019 and 2020 (13.8 and 13.3 the 1st place) as well as China and Japan in all regarded periods. Towards scientific and technical articles, it could be noted that all the countries had an unfavorable ranking throughout the observed period.

To evaluate the achievements of some European countries, scores and ranks are presented in Table 2. The findings show that the economy of Switzerland, according to the World Intellectual Property Organization (WIPO), was the best ranked in the domain of the R&D during the observed years (2nd place in 2017, 4th place in 2018 and 2019 and 3rd place in 2020), followed by second-ranked Sweden and the third-ranked United Kingdom. Sweden and Switzerland hold first and second place when it comes to the gross expenditure on R&D. Of the above-mentioned top 4 European countries, Sweden has the highest rankings in terms of innovation linkages (4th place in 2017 and 2nd place in the other three years). Concerning university-industry collaboration, Switzerland is the first, and the Netherlands and Sweden are the second and third countries in Europe. During the whole period, Switzerland also dominated in knowledge creation and patents by origin. Furthermore, Switzerland has been top-ranked in Europe considering scientific and technical articles, followed by Sweden.

Table 2. Comparative overview of some innovation performances in Europe, 2017-2020

GII	R&D	Gross expenditure on R&D, % GDP	Innovation linkages	University-industry collaboration	Knowledge creation	Patents by origin	Scientific and technical articles
Switzerland							
2017	80.2/2	3.4/3	57.9/3	79.5/1	89.9/1	17.4/5	38.0/2
2018	77.9/4	3.4/4	63.0/3	79.1/3	84.7/1	16.5/5	34.1/3
2019	76.6/4	3.3/4	66.2/5	77.5/2	87.9/1	16.7/1	35.8/3
2020	75.8/3	3.2/6	63.9/4	77.1/2	86.6/1	15.6/1	56.6/3
Sweden							
2017	77.0/6	3.3/4	56.8/4	70.7/10	75.9/2	11.2/9	32,1/7
2018	75.3/6	3.4/3	66.1/2	71.8/9	73.5/2	11.3/10	30.2/7
2019	74.0/6	3.3/3	76.2/2	71.0/7	76.0/2	10.7/9	31.9/8
2020	74.1/5	3.4/3	70.3/2	67.1/11	78.4/2	10.8/8	54.4/5
United Kingdom							
2017	68.8/11	1.7/20	50.8/10	73.1/6	58.0/9	6.8/17	25.3/16
2018	67.8/9	1.7/22	50.1/13	73.7/7	66.9/5	6.4/16	23.8/16
2019	67.6/9	1.7/21	51.0/14	69.0/11	66.2/6	6.1/15	25.2/15
2020	67.7/9	1.8/21	47.0/17	63.7/16	65.0/8	5.6/16	43.7/13
Netherlands							
2017	65.8/12	2.0/17	54.4/6	76.1/5	64.3/7	10.5/10	22.8/21
2018	64.4/12	2.0/17	59.0/5	75.5/4	65.0/7	10.0/12	20.8/21
2019	65.3/11	2.2/14	62.6/7	74.4/5	65.7/8	9.5/10	22.3/22
2020	64.0/11	2.2/15	54.8/10	72.4/5	67.7/6	8.9/11	41.3/16

Source: Authors, based on the Global Innovation Index Report (2018, 2019, 2020, 2021)

4. R&D INVESTMENT AS DETERMINANT OF SUCCESSFUL SURVIVAL AND RECOVERY FROM THE COVID-19 CRISIS

According to the latest Eurostat data, on average around 2.3% of GDP was spent in the EU on research and development during 2020, which represents a slight increase of 0.1% compared to 2019 (2.2%). However, that increase could lead to a misconception since it is a consequence of the GDP reduction caused by the COVID-19 crisis. Analysis of the amount of money spent on R&D in the EU clearly shows that in 2020 EU member states spent 1 billion less than the year before, 311 billion € compared to 312 billion in 2019. Belgium and Sweden were the countries with the highest R&D intensity (3.5%). Austria, Germany, Denmark, Finland and France followed, all with the R&D expenditure above the EU average. The rest of the member states recorded lower

levels, whereas six of them were below 1%, with Romania being at the very end of the scale (0.5%) and Malta and Latvia at a somewhat better position with 0.7% of R&D intensity (Eurostat, 2021). The largest part of R&D expenditure was spent in the business enterprise sector (66%), even as triple as in the higher education sector (22%). The government sector spent around 11% of total R&D funds and the private non-profit sector about 1%. The data concerning government budget allocations for R&D (GBARD) indicates that the pandemic has urged countries to decrease their funds for R&D activities. The share of GBARD in total general government expenditure in the EU area has declined to 1.42% in 2020 from 1.46% in 2019. However, the total government budget allocations for R&D (GBARD) across the EU in 2020 amounted to 100 786 million €, recording a rise compared to previous years (Eurostat, 2021). Switzerland, Sweden and the Netherlands have emphasized the most a need for university-industry R&D collaboration, in order to battle the COVID-19 pandemic and commercialize research fast.

Although still incomplete, data published by the Organization for Economic Cooperation and Development (OECD) provides estimations that government budgets for R&D in the OECD countries have increased in real terms by 6.2% in 2020 (OECD, 2021). Even though the R&D budgets have grown over the years, this rise was significantly higher than the one recorded in 2019 (3.2%), almost certainly as a result of additional funds distributed for R&D activities in the health sector, particularly for those related to the COVID-19 vaccine development and medical treatments. Based on the preliminary data, the OECD (2021) evaluation of R&D investments made by companies suggests that business R&D expense continued its growth in 2020, but at a noticeably reduced rate and with considerable variation across industries. Namely, the average R&D expense growth in selected companies in 2019 was 9.7%, whereas in 2020 it was around 6.2%. The software, computer services, technology hardware and electronic equipment sector recorded the biggest increase in R&D investment. The pharmaceuticals and biotechnology industry experienced significant growth of R&D funds as well, mainly directed towards projects and research related to COVID-19. On the other hand, industries like automotive, aerospace and defense were the most affected by the pandemic, suffering the biggest R&D investment fall. As stated in the report, the analysis of the selected group of companies also indicated an increase in R&D intensity across all industries, considering that companies' R&D investment grew faster, or fell less, than the revenue in 2020.

In 2020, companies in the US and China increased their overall R&D investments by 9.1% and 18.1%, respectively (Grassano et al., 2021). During the coronavirus crisis, US and Chinese corporations increased their R&D share in specific sectors, such as health (US – 17.9%, China – 30.7%), ICT services (US – 2.4%, China – 21.2%) and ICT manufacturers (US – 12.4%, China – 21.2%) (Grassano et al., 2021). In 2020, patent applications increased and this trend is projected to continue. According to the report of World Intellectual Property Indicators (WIPO, 2021), the companies based in the United States have filled up the most patent applications abroad, followed by applicants from Japan and China.

5. CONCLUSION

The sudden and unexpected crisis caused by the pandemic forced everyone – individuals, societies, organizations and governments across the globe to accept new circumstances and behave according to them. Therefore, changes and innovations have become inevitable and much needed. Despite the crisis, governments across the world have tried to devote as much financial resources as possible to R&D in the last two years. Although the pandemic has caused negative

consequences and severe losses, effects on innovation activities have been mixed, and mostly positive in many areas. The ongoing crisis highlighted the critical importance of the system of cooperative knowledge creation, technology development and creative solutions as a response to COVID-19 challenges. Investments in innovations surged in areas connected with COVID-19 containment, such as medicine and biotechnology, information and communication technology (ICT), ICT hardware and electrical equipment, according to the GII 2021. On the other hand, corporations in the transportation and travel sectors, whose business models were entirely thrown off by the pandemic, tended to reduce their R&D spending. The digital transformation has been expedited during COVID-19 and many companies transferred their activities online, linking users to markets, suppliers and resources. There is no doubt that this "new normality" created the necessity of new approaches, methods or products which pushed innovations forward, more and faster than ever before.

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Changes and Adaptations of Business Models Caused by the Crisis Scenario

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Abstract: *Due to the fast-changing environment caused by the impact of the pandemic, a response to companies' behavior is inevitable. These pandemic crisis scenario triggers searching for changes, adjustment, and adaptation of business models to seek new opportunities for competitive advantage. Therefore, the paper aims to analyze, identify and evaluate the impact of a pandemic on a firm´s business model, specifically to changes in its business elements. The research methodology applies a statistical apparatus mainly the Mann-Whitney U test, using the econometric software EViews for identifying the significance of individual business model elements within national economy sectors and branches before the pandemic and the current post-pandemic crisis. Data were obtained from 173 Czech and Slovak companies' owners (executives). The findings represent the perception and view of businesses on the current post-pandemic crisis and their priorities changes in specific elements of business model.*

1. INTRODUCTION

The phenomenon of application of business models (BM) has grown steadily over the last decade, with changing global, market conditions having a major impact on the change and orientation of companies in the use of technology, easier availability, high mobility, pressure, and variable customer preferences. Furthermore, the current global post-pandemic crisis is a source for the necessary conversion in approaches to how to manage, develop, strengthen and compete with these new challenges. Therefore, the paper aims to analyze, identify and evaluate the impact of a pandemic on a firm's business model, specifically to changes in its business elements.

Business modeling and BM design provide an operationalized visualized tool for understanding the operations of a particular company. There are approaches to how to proceed to create a business model (see, for example, Osterwalder and Pigner, 2010; Wirtz 2011; Gassmann, Frankenberger, Csik, 2014). They all provide a process approach for constructing the general form of the BM. In a similar vein, based on a comparison of these three approaches (see for, Steinhöfel and Kohl, 2016), the authors used the Business Model Canvas (BMC) procedure by Ostervalder and Pigneur (2010), which allows the construction of the BM into nine elements: value propositions, customer segments, channels, customer relationships, revenue streams, key partners, key activities, key resources, and cost structure. The applied framework is accepted because it not only allows the definition of the element, they also define the relationships between the elements (Chungyalpa et al., 2016).

Therefore, the authors intend to map the impact of a pandemic crisis influences in companies and identify significant changes in individual elements of the BM; the same framework was

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applied before (2019) and in the current post-pandemic situation (2021). This yielded data that can be compared with each other and draw the main consequences.

The paper is structured as follows: first, a literature review represents the issue of BM adaptation within the composition of individual BM elements. In this way, the context under the structure of the BM elements and the possibilities of approaches from the perspective of entrepreneurs/owners/managers due to the necessity of innovation, change, and adaptation, are introduced. Next, the following part of the paper is focused on a research methodological framework, including the research results. Then, the paper extends with a discussion part, the authors highlight the noted changes, reflect the results. Also, the authors ask questions for the clarification of the identified results in BM and point out the main trends and areas of the BM elements that are characterized by the main "cores" of change. Then, concluding remarks provide knowledge for the transfer of findings for entrepreneurs/ managers/scholars who can follow up and further examine the impact of changes on the structure of BM.

2.   BUSINESS MODEL ADAPTABILITY

The BM is defined in the literature in terms of the company's value offer and market segments, the structure of the value chain needed to implement the value offer, the mechanism of obtaining the value that the company uses, and how these elements are interconnected (see, for example, Foss and Saebi, 2015; Morris et al., 2005; Teece, 2010; Wirtz et al., 2016). The BM essentially depicts an aggregated and simplified explanation of the company's respective activities (Wirtz, et al. 2016). Intuitively, "a business model is a description of an organization and how that organization functions in achieving its goals (e.g., profitability, growth, social impact)" (Massa et al., 2017, p. 73). Therefore, we consider it as a suitable tool for an operationalized description of the company's main activities. In this way, the phenomenon of the BM is accepted for practical and voguish reasons (Prescott and Filatotchev, 2021, p. 518) by entrepreneurs, managers, and scholars. And it is practitioners and managers who pay attention to BM as a phenomenon (Schwarz and Stensaker, 2016), which has a concrete practical application not only in the establishment of companies but also in their management, development, and competitiveness.

Wirtz et al. (2016) conduct a comprehensive study defining the BM of origin, development, and future research perspectives. We follow the idea that the BM has reached the global impact, which is strengthened by current post-pandemic developments. Furthermore, the adaptability of the BM is determined by the speed of implementation of changes in individual elements, in the structure of a particular business model. We adopt the basic logic, where it is necessary to operationalize the company's activities (distribution into individual components), then manage these components, control performance, and initiate changes according to the firm´s results. These changes must be implemented by owners/entrepreneurs/managers, who can spread specific plans for change, innovation, and improvement of individual activities (visualized as elements of BM) and then develop them more into specific plans, responsibilities, and time frames.

Additionally, in the paper, we combine the area of BM structure (value creation, innovation, and components) and also the area of the business model management process (implementation of changes, realization, change, and development). It is not important to deal with the concept of the BM, it is taken over and theoretically already analyzed – see, for example, Casadesus-Masanell and Ricart (2010), Wirtz, 2011, Zott et al. (2011), and Baden-Fuller and Haefliger (2013). But on the contrary, it is important to highlight adaptability, which can be a source of

competitive advantage (Reeves and Deimler, 2011). A flexible structure and the dispersion of decision-making rights into specific parts of the business model can be levers to increase the company's adaptability.

The authors understand adaptability as a company's approach to consider, both external and internal conditions that shape the market environment in which the company exits and sells its products or services. The rate of adaptability is determined by the ability to create change, innovate, and implement it. The interaction between BM adaptation and the success of new ventures can be seen in a study by Balboni and Boroluzzi (2015). According to Adámek and Meixnerová (2020, p. 864), business success is given by the effectiveness of creating individual elements of the BM in their interconnection and the ability to transform inputs into outputs. Additionally, in connection with the BM, we see the potential where the adaptability of the BM is key to maintaining or improving competitive advantage depending on post-pandemic developments (as well as other global crises in the past). Contrary, some critics say that the shifts are sudden reactions to the pandemic, and once "normalcy" is restored, companies will return to their former business models or find a new one to settle. This may well happen, but the opportunity the pandemic has brought to digitize business or identify a viable alternative BM can be well exploited by companies searching to broaden their horizons (Seetharaman, 2020).

Overall, based on a theoretical definition, the paper deals with the identification of specific nine elements of the BMC that are subject to changes and adaptation in reaction to current post-pandemic developments. In response to the empirical gap, we attempt to understand what business model elements see the companies as the leading in adaptation and is the source of survivability, development, or even strengthening the competitive advantage. To do so, we assume that the identification of key elements of the BM will be positively reflected in the need for adaptation, and subsequently in the survivability, growth, and profitability.

3.   DATA AND METHODS

We use data from a survey about the effects of the post-pandemic crisis and the influence of individual elements of the BM. Data were collected in 2019 and subsequently, the same mechanism was implemented in 2021, when the pandemic was already fully manifested and a crisis, the post-pandemic period was coming. The questionnaire was completed in cooperation with the owners/directors of the businesses in the form of a personal interview. The sample of respondents was selected selectively, there was feedback on the willingness to participate in the research. A total number of 173 businesses from the Czech and Slovak republic participated in the survey and provided their perspective. Data are processed using Microsoft Office Excel and econometric software EViews (see, for example, Bin Othman and Heng, 2014; Allbright, 2013).

The question of how to measure business models and their changes has not been answered in the BM literature (Saebi et al., 2016). This means that a validated measurement scale is still not available. Instead, as the Clausse study (2016) shows, each dimension of the business model is commonly measured individually. Furthermore, nine elements of the BMC were used to specifically identify the significance. The businesses present different industries and we adapt the criterion of classification according to the specific national sector, namely two sectors, secondary and tertiary. The significance of the change in the main key element of the business model was researched, which is core for the necessary changes and rapid adaptation for the survivability of the company when the significance before and after within the current post-pandemic situation

was compared. Given the nature and importance of the secondary and tertiary sectors for national economies, according to the national economy sector in the Czech Republic, the services sector has a dominant share in gross value added (62 %), the share of industry is 30 %. (Deloitte, 2020). Thereafter, a data and methods part is presented, and we aggregated two hypotheses.

H1 *It is likely that firms representing the secondary sector in a post-pandemic crisis are adapting the most in the cost element than in other elements of the Canvas business model.* In this hypothesis, we assume that companies in this sector are characterized by high fixed costs and general production costs are essential inputs, and therefore will seek immediate adaptation to the situation (e.g. disproportionate increase in raw material and energy costs, etc.)

H2 *It is probable that companies in the tertiary sector in a post-pandemic crisis adapt most to the element of channels than to other elements of the Canvas business model.* We assume that companies providing services will make the necessary changes in the availability of their services and forms of communication to customers, such as higher levels of digitization and bringing the company's activities closer to target segments.

To verify hypotheses a descriptive analysis approach was employed for data analysis (Shafi et al., 2020). The nature and scope of business models are distributed normally, and despite immediate government restrictions on business activities during the period under review, they have tilted the distribution towards non-normal distribution. Assumption of normality, Table 1, confirms the Moivre – Laplace Theorem (Allbright, 2013), and therefore the authors of the paper use the nonparametric Mann-Whitney U test (Bin Othman & Heng, 2014), Table 2. Before using the Mann-Whitney U test, the normal distribution was verified using the Shapiro-Wilk normality test, Table 1. A simple random sample was taken from Table 2 and checked in Table 1.

Table 1. Assumption of normality

Businesses	Shapiro-Wilk test
Industry	0.00013-0.04400

Source: own processing in EViews

4. ANALYSIS AND RESULTS

Table 2 summarizes the results of the dependence of each element of BM when compared to two periods (before the pandemic and current post-pandemic crisis). To measure the significance of each BM element, we asked respondents to indicate on a 5-point Likert scale (1-minimum significance, 5 maximum significance). The businesses that have more than one subject of activity were divided evenly into industries. Surveyed businesses (Table 2) are classified according to the Classification of Economic Activities according to NACE (Czech Statistical Office, 2021), which is internationally recognized as NACE (Statistical Classification of Economic Activities in the European Community); it classifies enterprises into sectors in terms of national economy: primary sector (raw materials), secondary sector (production and industry), tertiary sector (services sector), and quaternary sector (services sector). Table 2 shows for each of the addressed businesses identified elements of BM that need to be changed to improve their competitive position in the market.

In the secondary sector, a significant dependence and importance on the BM factor "revenue streams" was identified. As a result, businesses in the industry primarily address possible options in which they can generate their revenue, how they can multiply it. Here, the possibilities

of additional capital lending, the transition from property ownership to leases, and shared principles prevail. Also, firms responded to a certain creation of cash reserves, for example by selling assets. On the other hand, companies are looking for ways to earn new ways of earning (for example, licensed sales, payments for use, and brokerage). The second important element was the "customer segment", where firms predominate in B2B, so the criterion for survival, maintaining the company's activities are actively involved in identifying key customer segments and maintaining them. In this way, firms are active in the possibilities of finding new segments (for their constant offered values). It is therefore surprising that companies are not willing to change their internal processes or make offers but are seeking revenue opportunities and new segments/markets, or they want to retain existing customers.

Table 2. Significance of the business model elements according to sector and industry

National economy sector	Branch	Representation [%]	Elements of the business model [%]							
			Customer segments	Value proposition	Channels	Customer relationships	Key activities	Key partners	Cost structure	Revenue streams
Tertiary	Travel / Transportation	37	0.041	0.067	0.130	0.062	0.052	0.052	0.067	0.057
Tertiary	Financial	5	0.016	0.016	0.010	0.021	0.021	0.021	0.021	0.016
Secondary	Industry	18	0.047	0.052	0.052	0.067	0.052	0.073	0.088	0.036
Quaternary	Technological	6	0.016	0.021	0.031	0.031	0.021	0.021	0.021	0.016
Tertiary	Tourist/ Accommodation	8	0.031	0.021	0.041	0.031	0.021	0.026	0.036	0.041
Tertiary	Other	16	0.041	0.057	0.052	0.047	0.021	0.031	0.031	0.026
Tertiary	Educational	4	0.016	0.016	0.021	0.005	0.005	0.010	0.010	0.010
Tertiary	Entertainment	3	0	0	0	0	0.005	0.005	0	0
Tertiary	Medical	2	0	0.005	0.010	0.005	0	0	0	0.005
Primary	Agriculture	3	0	0.005	0.005	0.016	0	0	0.016	0.005

Source: own processing in EViews, significance level 5 %

Therefore, we can state that H1 is not supported. The businesses represented secondary sector in a post-pandemic crisis are not adapting the cost element but they adapted activities in BM element "revenue streams" and "customer segments".

In the primary sector, we encounter a mix of findings where individual branches have different results. Overall, the crucial importance of the BM element is found in "customer segment", "customer relationship", and "key activities". There is an evident focus on the customers and their needs, which means that businesses are willing to get as close as possible, use appropriate targeting, use technology, and digitization of pro-customer processes. The activities of firms

move to solve the customer's problem by matching the offered value. The concentration on key activities of companies is due to higher demands on the services provided; these activities are performed by resources (but these are not the main interest). Simplification and streamlining of activities and internal processes are important for companies, they have the potential for some cost savings and especially the re-adjustment of activities in the future (see below the horizon). These activities are again associated with higher involvement of information technology in internal activities (automated systems, processes, etc.) The meaning of "channels" appears only at the financial branch, there is importance in the availability of services to customers (online access, online administration, communication, document processing, etc.); all this has accelerated digitization in the banking and financial sector. "Value proposition" (tourist/accommodation) was identified in other positions. Here it is evident that many companies from this branch have focused on changing the offered value as a whole. For example, they are abandoning the original offered value to new ones (e.g. combined and additional services, offer corrections, new freemium models). It is a matter of companies seeking to reach customers despite the negative restrictions and limitations surrounding them and looking for ways to change the values offered.

In this regard, H2 is not supported. The businesses that represented the tertiary sector in a post-pandemic crisis adapted mostly BM elements "customer segments", "customer relationship", and "key activities".

5.   DISCUSSION

The results may stir up a debate about which BM element is the best suited for adaptation in the current post-pandemic situation. It is not possible to say unequivocally what is the most appropriate. Thus, it is appropriate to review the overall BM (which, however, does not confirm the results of the research), and accordingly take further process steps based on the company's capabilities, consider external influences and overall business's potential. Therefore, businesses can make decisions under conditions that they either perceive as an opportunity or a threat. Hence, the current post-pandemic situation contributes to a reactive perception, where companies reduce threats rather than see opportunities; this has been confirmed in the secondary sector. Also, there is a discussion concerning the differences in long-term or short-term impact. The question is whether short-term measures on the revenue streams side are the proper solutions. From a long-term perspective, it is appropriate to combine with elements of the offered value, which is a fundamental way the business can open new perspectives. But there are some limitations in the conservative approach, which are characterized by a strong industrial history and a certain inflexibility. On the other hand, the businesses are aware of the importance of their customers (due to the predominance of the industry sector and B2B markets), when they expect ways to be active in segments, how to diversify them, and adapt them to the specific value offered.

In contrast to these observations, the tertiary sector is characterized by a focus on the customer perspective, trying to find both new segments, maintain existing, but also seek new value, which can be a source of longer-term competitive advantage. There is a fundamental difference compared to the secondary industry where businesses are more flexible, have a greater effort to seek and implement new opportunities, such as investing in technologies and activities to simplify their internal processes, all for satisfied customers. These aspects are probably due to the high concentration of competition, where each advantage can be a source for a more significant competitive position. The high concentration of businesses causes a more competitive struggle, also due to the minimum barriers to entry.

In summary, it can be stated that the businesses in the secondary sector are adapting to the current post-pandemic crisis and most of them are more responsive to the threat than to do so for their development and market opportunities. In this regard, against the secondary sector is the tertiary sector, where the pro-customer perspective dominates with a willingness to change the value offered.

6. CONCLUSION

The paper contributes to the debate on how BM element influence relates to the externalities caused by the pandemic and the need to change and adapt to the BM changes in the businesses. Admittedly, these findings of the paper represent the perception and view of businesses on the current post-pandemic crisis and their priorities changes in specific elements of BM. For example, this will deliver businesses to respond appropriately to change and adapt more quickly to maintain their market position or, conversely, to take advantage of new opportunities.

In more detail, regarding the current state of the influence of individual elements of the BM, we found that the businesses that represented the secondary sector in the post-pandemic crisis are not adapting the "cost structure" element but they adapted activities in the BM element as "revenue streams" and "customer segments". In contrast, the businesses represented the tertiary sector adapted mostly the BM elements as "customer segments", "customer relationships", and "key activities".

Finally, the results confirmed the approach of businesses the effort that they want to react to the development in a certain direction, but these reactions are different. The approaches of businesses to individual BM elements are different in the observed sectors. Finally, it can be stated that companies have certain reserves in increasing the efficiency of internal processes, setting specific relationship mechanisms for generating the value offered. Thus, the transfer of research results to the participated businesses is a suitable way to support the binding and other options for entrepreneurs/owners/managers to consider a specific BM of their entities in a long-term perspective. This research aims to generalize the effects of the pandemic and the subsequent economic crisis in a common context, where the BM elements are a tool for the adaptability of the BM to preserve business activity.

7. FUTURE RESEARCH DIRECTIONS

The results of this research should be judged in light of its limitations. First, our research has limitations in the representation research sample, in the number of businesses, and also the uniformity of representation according to individual industries. Furthermore, we need to consider the problematic pandemic situation and the capacity of the research authors. Dependencies between individual elements of BM were also not investigated. The focus of further research will be on the significance and dependence between the individual elements of BM and also the expression of the effect of the whole complex change in BM. Additionally, dependencies between individual elements of BM were not researched.

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Are SMEs Ready for the Transition Towards Circular Economy? Proposal for an Assessment Framework

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Abstract: *Small and medium enterprises (SMEs) contribute significantly to the European GDP and have a pivotal role in the ecological transition from linear to a circular economy (CE). SMEs, however, have more trouble than bigger firms making their business models circular. This article analyses the key factors that SMEs should manage for a strategic transition towards CE. Based on qualitative content analysis on the existing literature about CE in SMEs, we identify governance, relations with stakeholders and innovation as CE key pillars. It is also found that SMEs' attitude toward them changes during the transition process. The article contributes to filling a gap in the research about SMEs' transition towards circularity and provides a conceptual framework for SMEs' self-assessment in the transition path.*

1. INTRODUCTION

The health emergency caused by Covid-19 stressed the vulnerability of the traditional development model concerning the environment, economy and wealth protection, emphasising the importance of resilience as an attitude able to generate economic opportunities whilst returning environmental and social benefits. The change from linear to circular economy (CE) can be the legitimate answer to many critical issues in the current economic development situation concerning the overproduction of waste, global warming, and the unbalanced consumption of resources by people in the world.

CE is more sustainable management of the natural resources incorporating a regenerative system (Ellen MacArthur Foundation, 2013; European Commission, 2015; Bocken et al., 2016; Korhonen et al., 2018) which is characterized by a closed loop achievable through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing and recycling (Geissdoerfer, 2017).

European small and medium enterprises (SMEs) account for 99% of total EU business and the European Union remarked their pivotal role in the shift to a more sustainable economic development. Some characteristics of SMEs, as the owner-manager and the informal relations and communication processes, however, slow down the transition to formalised and structured sustainability practices (Russo and Tencati, 2009). Therefore, the sustainability approach of SMEs tends to remain silent (Jenkins, 2004; Matten and Moon, 2004; Ormazabal et al., 2018) highlighting the importance to encourage the SMEs' strategic transition to CE by means of a change in their business models.

In this paper, we refer to transition management theory to emphasize both the role of firms in structural and global changes and the role of regulators, policymakers and institutions in creating the conditions to facilitate the circular transition.

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The research question leading our study is the following: *What are the most important factors/pillars on which the transition towards CE is based within SMEs?*

To answer this question, we aim at offering a novel conceptualization of SMEs' CE transition suggesting a conceptual framework to understand the complex and long-term process, characterized by different maturity steps, which distinguishes the circular shift of small and medium enterprises.

This paper contributes to the academic research filling an existing gap in the literature about SMEs and circular economy with a novelty approach. It also provides a firm-level tool to assess the circular transition with potential applicative impacts.

2. BACKGROUND AND LITERATURE REVIEW

This paper refers to the Transition Management theory as the theoretical background to deal with problems linked to complex societal sustainability challenges (Van Bakel et al., 2009). The transition approach embraces two literature branches: The Multi-Level Perspective (MLP), which focuses on the actions by multiple actors to achieve the desired outcomes, and the Transition Management (TM) which states the deliberate influence by actors in the transition process. TM literature suggests frameworks for aligning the different stakeholders' actions on some common key factors to achieve the desired results, but they have been criticized for their limitations as the scarce consideration of multi-system interactions and the politics of transition (Hoppe et al., 2016; El Bilali, 2020), their disregard of the firm-level perspective (Mendoza et al., 2017; Brendzel-Skowera, 2021), the lack of an integrated vision of the business within a general concept of sound governance (Loorbach, 2007), the absence of the explanations about the way firms move forward from one stage of transition to the next (Jabbour, 2010; Ormazabal et al., 2015)

In this paper we aim at identifying and analysing the key factors for a transition towards CE regarding the SMEs, going beyond the existing frameworks and contributing to the existing literature. In fact, many types of research about the topic exist, debating the reasons why or why not SMEs are approaching the circular principles (Rizos et al., 2016; Pheifer, 2017; Kirchherr et al., 2018; Yadow et al., 2018; Siegel et al., 2019; Tura et al., 2019), the conceptualization of Circular Business Models (Brendzel-Skowera (2021), the different stages firms go through in the progress for green practices (Ormazabal et al., 2015; Brendzel-Skowera, 2021), the different SMEs' attitude to environmental matters in assessing their 'green management' maturity (Hubbard, 2009; Jabbour, 2010; Klewitz and Hansen, 2011). These contributions, however, highlight a research gap regarding the key factors of the sustainability transition that SMEs should manage to drive towards circularity (Bassi and Dias, 2019; Brendzel-Skowera, 2021) according to a strategic and long-term vision.

3. RESEARCH: METHODOLOGY AND RESULTS

This study applies a qualitative content analysis on selected academic contributions in the field of circular economy applied within SMEs for answering our research question: What are the most important factors/pillars on which the transition towards CE is based within SMEs?

We searched the Web of Science (WoS) database for academic publications using the query string 'Circular Economy + Small and Medium Enterprise' in all fields. Figure 1 shows the

selection process. On the selected papers we looked for CE barriers and enablers as points to which we pay special attention to understand the main factors of the transition to CE.

Qualitative content analysis (Sargeant et al., 2006; Munn et al., 2018; Chen et al., 2020) gave us a series of firms' factors enabling or limiting the application of CE within SMEs.

43 articles analysed in detail with qualitative content analysis

92 published contributions

101 Results (from 2006 to September 2021)
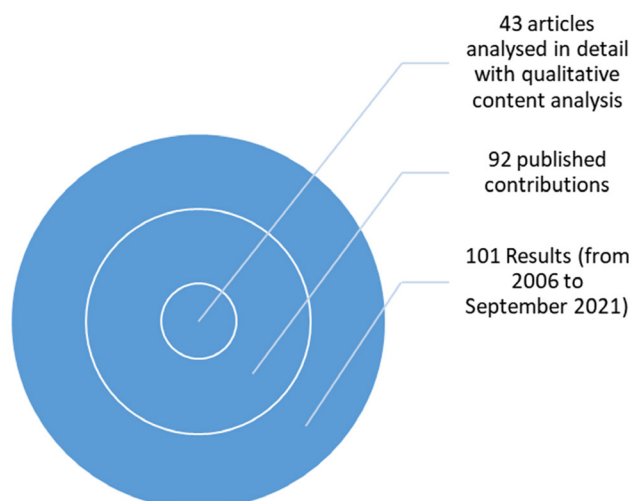
Figure 1. The selection process
Source: Web of Science (WoS) database

These factors have been coded first in sub-categories and then in categories obtaining three fundamental pillars for CE transition (Figure 2): (a) governance (structures, processes and information flows which guarantee the transformation of resources in value for stakeholders); (b) relations with stakeholders (that ensure closing the circular loop); (c) innovation in product, processes, business models and organization (that is the base for the transition from the linear economy to the CE).

SUB-CATEGORIES CODING
- CATEGORIES CODING

Structures and resources
Processes
Communication
- GOVERNANCE

Internal stakeholders
External stakeholders
- RELATIONS

Technical innovation
Business model innovation
Innovation in organization
- INNOVATION
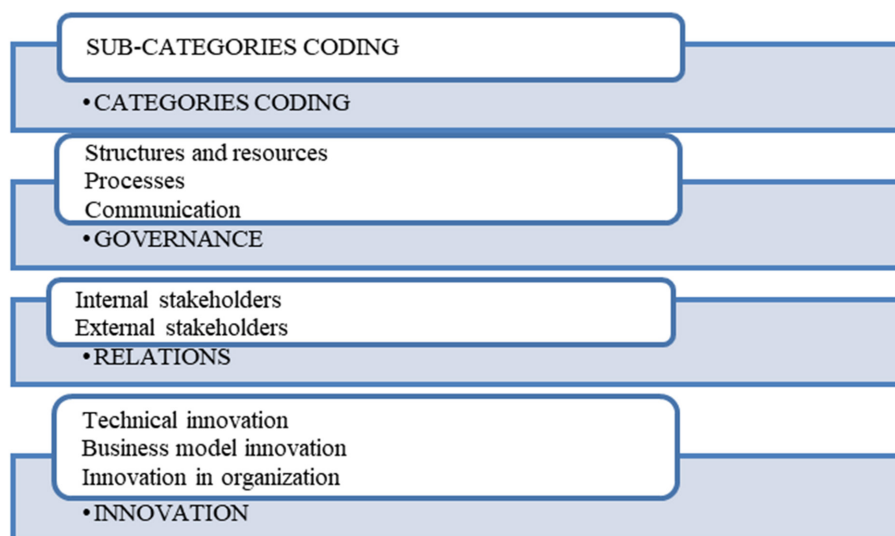
Figure 2. The Coding Frame
Source: Web of Science (WoS) database

The business management literature confirms the importance of the identified pillars for the long-term success of firms, but it doesn't approach them according to an integrated approach (Gennari and Cassano, 2020).

Based on the literature review concerning the three identified CE pillars, we were able to propose a conceptual framework (Table 1) according to the TM approach. In fact, the transition process towards sustainability goes through different stages (Noci and Verganti, 1999; Jabbour, 2010; Girotra and Netessine, 2011; Klewitz and Hansen, 2011; Ormazabal et al., 2015; Saidani et al., 2017; Chen et al., 2020; Brendzel-Skowera, 2021; Holzer et al., 2021), which can be summarized in three firms' approaches: reactive approach (sustainability behaviours are dominated by external pressures, as regulations from governments, authorities and stakeholders); proactive approach (the effort to reduce environmental impacts goes forward external and upcoming pressures); innovative approach (the impetus for innovation involves every activity carried out within the firm depicting a new vision of the future and transforming the firm in one of the leading companies thanks to focused marketing and communication).

Table 1. The Transition Process to CE

	Reactive	Proactive	Innovative
Governance	Pressures by market demand	Beyond compliance	Sustainability into the strategy
	No special expertise or skills	Development of organizational capabilities	Green communication
	Occasional environmental practices	No systematization of environmental activities	Maximum engagement of entrepreneur and management
Relations	Pressures by stakeholders	Local cluster	Industrial symbiosis
	Occasional relations in the value chain	Collaboration with some stakeholders categories	Collaboration with knowledge institutions
Innovation	Emphasis on costs reduction	Partial innovation in products and services	Radical innovation engaging the business model

Source: Own research

4. DISCUSSION

The results of this paper identify in governance, relations with stakeholders and innovation, the three CE pillars for a strategic transition to CE by SMEs. These pillars were already studied by business administration literature but without an integrated approach and without emphasizing the transition management approach. Based on the results we developed a conceptual framework that contributes to highlight that the three founding pillars act together and evolve in the CE transition.

The conceptual framework was tested in a small enterprise operating in the bioenergy industry in the Region of Lombardy (Italy). The tested firm belongs to the agricultural sector and started the biogas business in 2012 with an average production of 5 GWh energy per annum. Biogas is considered a clear example of CE because the gas production comes from crop residues and animal manure allowing to close the circular loop inside the farm.

We proposed our framework to the entrepreneur, asking him to indicate on a scale of value the firm's attitude with regard to the different issues in the framework (1. Totally agree with/Things done; 2. Partially agree with/Things partially done; 3. Things to do).

We first observed that the transition speed of the firm is not homogeneous concerning the different pillars. The firm can be positioned halfway between reactive and proactive steps, committed to anticipating only a few challenges of circular transition without an integrated

approach. The entrepreneur started the biogas project because of external opportunities and convenience (government incentives), but without prior knowledge in the CE and engagement by the employees. He passed from the initial reactive step pressured by an external factor to the proactive one thanks to more awareness about the benefits project would take in the future. He is conscious of the importance that a radical innovation on the whole existing business model (biogas plant and farm) could have for the market growth of the firm.

The most critical aspect seems to be the relations with external stakeholders, in particular the difficulties in creating networks and stable relations with suppliers to catch all the opportunities of closing the loop in the entire value chain.

5. CONCLUSION

This study contributes to the existing literature filling a gap in the research about the transition of SMEs towards CE, emphasizing the need for a dynamic vision and integrated management of key different dimensions. This paper goes beyond the fragmented and focused research on CE giving importance to two aspects: approaching the circularity business as a strategic and new vision of the future that cannot be confined in occasional and fragmented actions, and gaining awareness that the transition to CE should be managed both by firms and institutions as a dynamic process.

We conceptualize the findings in a theoretical framework that depicts the different attitudes SMEs can have with respect to the CE founding pillars depending on their knowledge and awareness of circularity. This framework can contribute to practice as an assessment tool. The example case proved that CE transition in SMEs can move with different speeds regarding the different key pillars. For this reason, SMEs have to be educated to gain full consciousness about the need to rethink their business models according to the three CE pillars when they decide to embrace the circular approach. Furthermore, the awareness by policymakers about the different SMEs' attitudes for these pillars can be a valid support in the definition of global or industry policies.

Our study suffers from some limitations. We conceptualized the theoretical framework based on the academic literature to date and tested it on a single example case. Hence, we suggest some directions for future research. Additional qualitative or quantitative research is welcome to give evidence of different ways to manage CE practices by SMEs. Further studies could apply the conceptual framework to other SMEs, also at the industry (meso) or national (macro) level to give evidence about the effectiveness of CE support actions by policymakers.

The European Union is actively involved in encouraging SMEs to make a faster transition to green business by international funds as the Next Generation EU programme, which binds a part of the sums received by countries in green initiatives, the European measures of the Just Transition Fund and InvestEU, the many initiatives available on the European Cluster Collaboration Platform. The path for a green and fair transition is traced. More contributions from scholars are needed to make SMEs more conscious about the need to face it according to a strategic vision of the future.

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Using AI in SMEs to Prevent Corporate Insolvencies: Identification of Frequently Used Algorithms Based on a Literature Review

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Abstract: *Digitization in enterprises enables the application of artificial intelligence, especially machine learning. One area of use for artificial intelligence is in the creation of an insolvency forecast for companies. With a literature review, the current status on the usage of artificial intelligence in insolvency forecasting is presented. For this purpose, the two databases Scopus and Web of Science are searched for scientific papers on the topic of artificial intelligence and corporate insolvencies to get an up-to-date impression of the status quo. A particular focus is placed on small and medium-sized companies. It is shown that artificial intelligence methods provide better results compared to classical methods. The research reveals that the most important algorithms related to the prediction of potential corporate insolvency are artificial neural networks, decision trees and support vector machines as well as hybrid models.*

1. INTRODUCTION

Artificial intelligence includes an extensive range of various technologies, such as machine learning, chat bots, translation programs or image classification. Artificial intelligence can be used to optimize products or services, processes, and many other areas in the enterprise to improve business performance. Artificial intelligence will be a game changer in the enterprise world and create value in the company (Wamba-Taguimdje et. al. 2020; Gentsch 2019; Plastino & Purdy 2018; Chamoni & Gluchowski 2017). Meanwhile, there are many publications examining the drivers of business performance through AI (Reis et. al. 2020; Mishra & Pani 2020; Lui et. al. 2022). There has also been a lot of activity in the business community regarding the use of artificial intelligence (Mertens & Barbian 2019; Koropp & Treitz 2019; Bahrammirzaee 2010). Machine learning algorithms have become increasingly popular in the stock market and banks in recent years. For example, they are used to analyze stock prices, value real options, or detect fraud (e.g., Han & Kim 2021; Bao et. al. 2022).

Another topic in business administration is the estimation of the probability of insolvency of companies. This topic will become more important in the future if one looks at the number of company start-ups as well as the number of insolvencies. In terms of corporate insolvencies in Austria, the number has fallen by 40% from 2019 (5,018 cases) to 2020 and 2021, to 3,034 cases in each year (KSV1870 2022). Some of this can be attributed to the government aid that was distributed to companies during the Corona pandemic. The focus is on small and medium-sized enterprises (SMEs), as they represent the majority of the Austrian business landscape. Depending on the size definition[3] used, they account for around 99% of Austrian companies.

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3   For example the Commission Recommendation of 6 May 2003, 2003/361/EG, EUR-Lex – 32003H0361 – EN – EUR-Lex (europa.eu) accessed on: 14.01.2022.

Combining insolvency forecasting focusing on small and medium enterprises with the use of artificial intelligence technologies, the following research question arises in this context:

What artificial intelligence technologies applicable to SMEs are being researched to prevent corporate insolvencies, and what input data has a positive impact on the output variables?

The structure of the paper is as follows. This chapter contains the introduction to the topic. Section 2 describes the method and approach used in this paper. Section 3 presents the results and algorithms The fourth chapter presents future research directions. The paper ends in the fifth section with the conclusion.

2. METHODS AND PROCEDURE

Based on the research questions, a literature search was started. To this end, a general overview of the topic was first compiled and the research questions refined before starting the actual search. Since artificial intelligence and insolvency avoidance are very broad topics in which a lot has already been published, a literature review was carried out on these two topics (e.g. Snyder 2019; Wright et. al. 2007; Webster & Watson 2002). The procedure is primarily based on the proposed process of Wright et. al. 2007, who divide it into the following steps:
1. Research question,
2. Research protocol,
3. Literature search,
4. Data extraction,
5. Quality assessment,
6. Data analysis and results, and
7. Interpretation of results.

After the research question was defined, keywords for the search were defined and documented in a research protocol. Synonyms were also used to see which search string would lead to the most appropriate results. The search period was limited to the years 2008 to July 2021. The reason for this is that insolvency forecasting research experienced a significant upswing with the global economic crisis and therefore paper for this period in particular appears to be of interest, as the computer capacities for the use of artificial intelligence are also available. The search string in the Scopus database was carried out with the following search query: TITLE-ABS-KEY((ai OR "artificial intelligence" OR "machine learning") AND (avoid* OR predic* OR preven* OR warn* OR hinder OR prognost*) AND (insolv* OR bankrupt* OR failure* OR "financial distress" OR default) AND (SME* OR SMB* OR "small enterprise*" OR "small business*" OR "small and medium size enterprise*")). The search string in the database Web of Science was carried out with the following search query: TS[4]=((ai OR "artificial intelligence" OR "machine learning") AND (avoid* OR predic* OR preven* OR warn* OR hinder OR prognost*) AND (insolv* OR bankrupt* OR failure* OR "financial distress" OR default) AND (SME* OR SMB* OR "small enterprise*" OR "small business*" OR "small and medium size enterprise*")).

As can be seen in Figure 1, the entire research process was divided into nine steps. In the first four steps, the publications from the first search query are taken into account; from the fifth step onwards, all publications are treated together. The individual process steps are as follows:

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[4]   TS … operator searches title, abstract and keywords.

1. When creating the first search query, the terms of the research question, including relevant synonyms, were taken into account.
2. 30 publications were found in the Scopus database and 19 in the Web of Science database.
3. After excluding duplicates, 37 results remained from the first search query.
4. In the fourth step, the results of the first search query were subjected to screening. Here, 28 publications were excluded, five publications were selected as relevant, and four publications as very relevant. From the very relevant publications, all references were selected for a forward search.
5. The forward search found 192 publications in Scopus and 213 publications in Web of Science.
6. 257 publications remained after excluding duplicates.
7. The search results also referred to the results of the first search. After excluding these, 254 results remained.
8. Now a screening (as in step 4) was carried out for the results of the forward search. In this process, 58 publications were classified as relevant.
9. In the final result, 67 publications were classified as relevant.

The papers studied for the following results are not presented separately below but can be found in Appendix 1 (algorithms) and Appendix 2 (input variables).
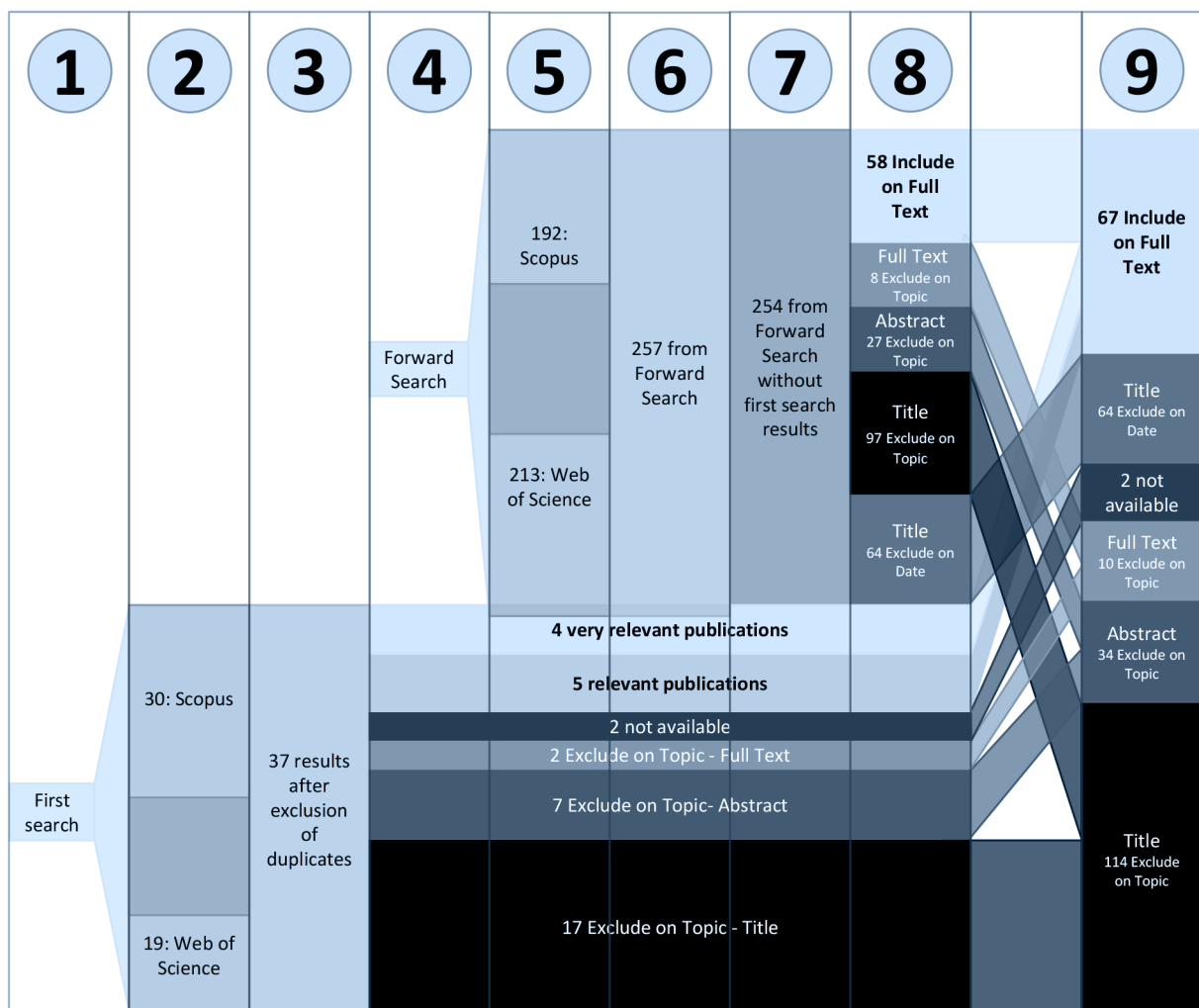
Figure 1. Process for selecting the papers
Source: Process following Snyder 2019; Wright et. al. 2007; Webster & Watson 2002

3. RESULTS AND ALGORITHMS

Growing computer capacities, as well as user-friendly software solutions, increase the possibility for SMEs to apply artificial intelligence methods. Various algorithms are already being used in research.

Table 1. Overview of artificial intelligence methods for insolvency prediction in SMEs as a result of the systematic literature review [multiple applications possible]

Methods	Absolute Frequency
Artificial Neural Networks	17
Random Forests and Decision Trees	14
Support Vector Machines	7
Hybrid models and ensemble methods	12
Others	17

Source: Evaluation based on papers indexed in Scopus and Web of Science

Table 1 shows the algorithms used from the literature search of relevant scientific publications. In some articles, for example, several methods were compared, which means that the frequency shown in the table is higher than the number of articles examined. It can be seen that especially contributions with Artificial Neural Networks as well as Random Forests and Decision Trees were applied. Support Vector Machines are also an approach that is becoming increasingly important. It also becomes clear that a mix of these models, so-called hybrid models and ensemble methods, are applied. Hybrid models and ensemble methods describe the fusion of different technologies to combine the advantages of the methods used. The most common algorithms are explained below.

Artificial neural networks are a famous method of artificial intelligence. These imitate the neural networks of the human nervous system. They start from a cluster of connected artificial neurons and thus process the information in an ever-changing structure.
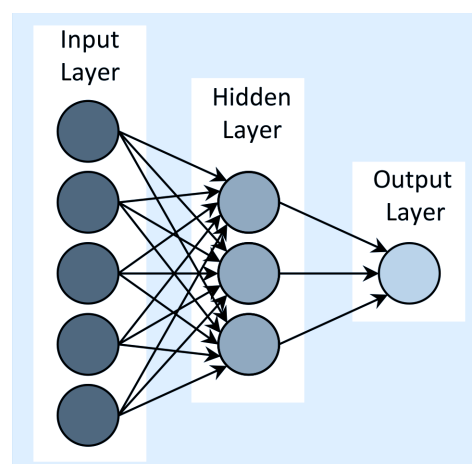
Figure 2. Schematic representation of an artificial neural network with an input, a hidden and an output layer

Source: Own illustration

Figure 2 shows the structure of a simple neural network. The number of neurons in the input layer equals to the number of variables fed in (five). The neuron in the output layer outputs either 1 (insolvent) or 0 (not insolvent). The number of intermediate layers depends on the data mate-

rial as well as the research question. The more intermediate layers are used, the more complex patterns hidden in the data can be mapped. In this example, an intermediate layer (hidden layer) is represented with 3 neurons. When using many layers (deep learning), it is usually no longer clear how the output comes about. The inside of the neural network thus appears like a black box.

Another commonly used method for insolvency prediction is the use of random forests. A random forest contains many individual random and non-correlated "decision trees", where each tree provides its own prediction result, and the most frequent result is taken as the overall result. Figure 3 shows an example of a company in which the individual decision trees lead to the results "not insolvent" or "insolvent", with the majority of the overall result leading to "not insolvent".
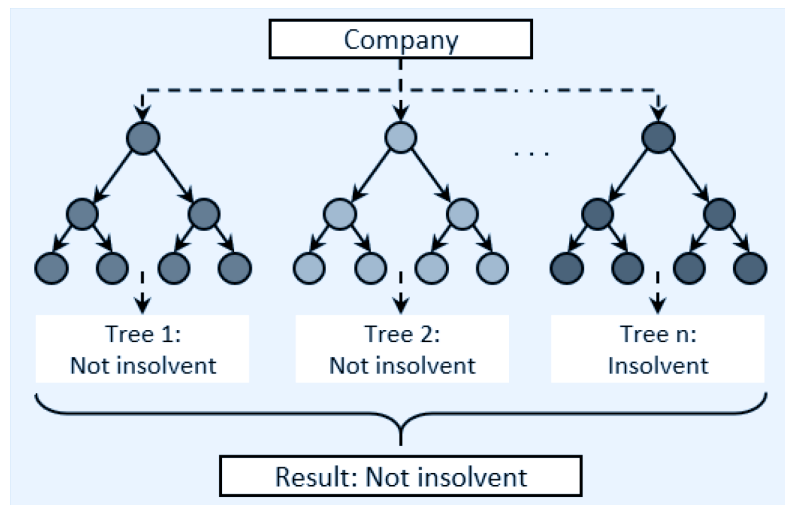
Figure 3. Representation of a Random Forest consisting of n Decision Trees
Source: Own illustration

In Support Vector Machines (SVM), data points are divided into classes so that the distance between the nearby data points and the dividing line is as large as possible. This means that the dividing line A is preferred over B, since it has a greater distance to the data points. This separating line or hyperplane thus depends only on the nearest vectors. These hyperplanes can only perform a separation if the objects are linearly separable. Since this rarely corresponds to reality, the so-called "kernel trick" is used. For this purpose, the training data are transferred into another dimensioned space until they are linearly separable by special kernel functions. Subsequently, these are back-transformed.
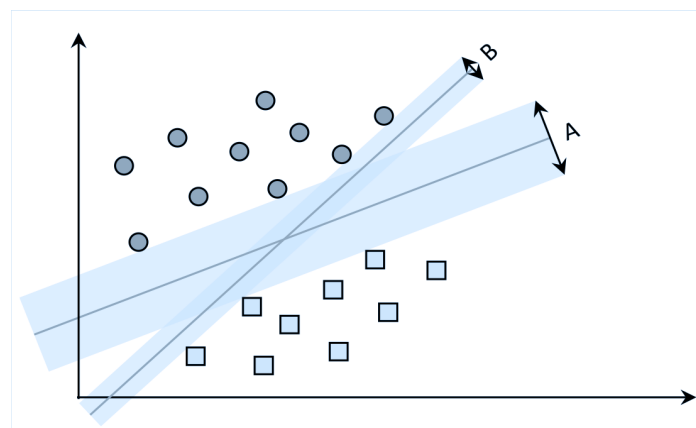
Figure 4. Illustration of the operation of a Support Vector Machine
Source: Own illustration

All methods have in common that data is needed for the algorithms. These input variables can be both quantitative and qualitative in nature. For small and medium-sized companies, current literature was used to investigate which newer influencing factors have a positive impact on the company and can thus contribute to insolvency prevention.
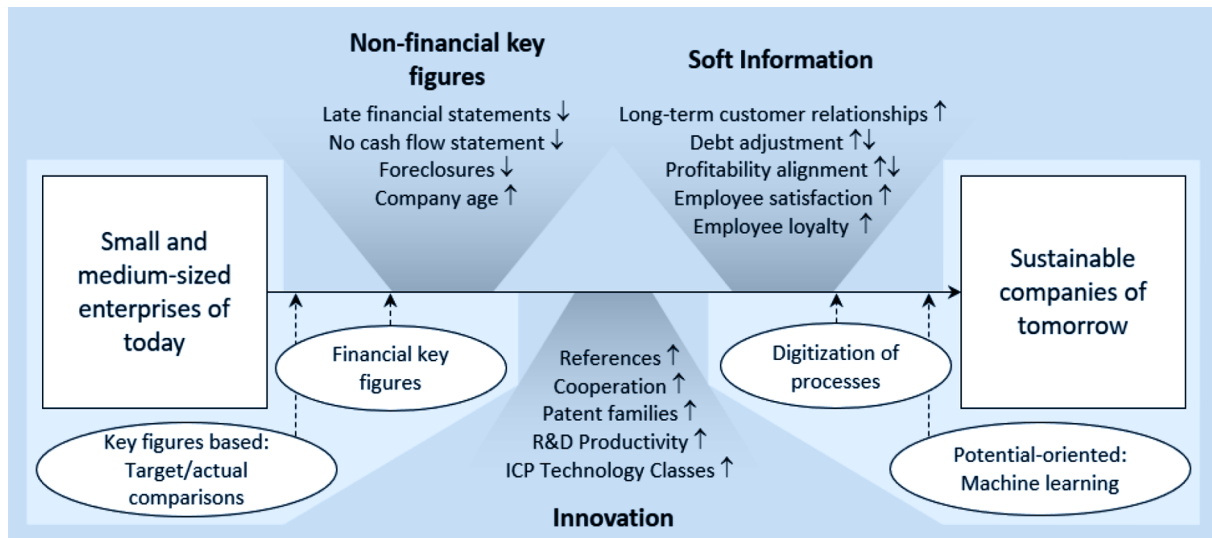
Figure 5. Factors influencing small and medium-sized enterprises to avoid insolvency
Source: Influencing factors based on literature presented in Appendix 2

Figure 5 shows influencing factors that can make a company more resilient in order to prevent insolvency. These criteria were derived from the literature (Appendix 2) and divided into three sub-categories: non-financial indicators, soft information and innovative drivers. On the one hand, these factors can serve as input variables for the algorithms and, on the other hand, entrepreneurs can place a special focus on optimizing these areas in order to improve company performance and thus prevent insolvency.

4. FUTURE RESEARCH DIRECTIONS

The topic is still very relevant even after many years. What is new is the use of artificial intelligence for insolvency forecasting. This is shown by the increase in these publications in recent years. Based on the analysis, it can be deduced for the future that research potential is seen in the following areas: (1) differences in the target group of the forecast, (2) expansion and correlations of the input variables, and (3) expansion of the potential of data analyses.

Insolvency forecasting has a variety of stakeholders. In addition to the entrepreneurs themselves, these include policymakers, investors, banks, employees, and society or consumers. For each of these groups, different issues are relevant – while society may be interested in the most accurate forecast possible with minimal overall deviation, for investors or banks, the types of errors (type 1/2 errors) are of great importance. For a bank, a loan default weighs much more heavily than a failed investment. For the entrepreneur himself, the reason for impending insolvency and the proposed solutions are of enormous importance. This distinction may lead to the consideration of different input variables or to the choice of a different insolvency forecasting technique.

In the area of input variables, there is now a wide range of data that can be analyzed using modern methods. While specific meanings are usually attributed to individual parameters today,

the interrelationships between variables, especially when they go beyond 2 dimensions, remain hidden. However, it has been shown that these are by no means insignificant; for example, a different geographic location may have a significant impact on the importance of individual variables. This is reflected in the fact that most insolvency forecasting models to date have been tested and used only in small geographic areas.

Artificial Intelligence, Machine Learning and Big Data are still in their infancy (e.g. Di Vaio et. al. 2020), especially in terms of practical application in insolvency forecasting. The possibilities can only be estimated so far. There is also still potential in the area of transparency and traceability, which could possibly represent a further milestone in user acceptance.

5. CONCLUSION

This paper presents a literature review on the use of artificial intelligence in bankruptcy forecasting and input variables for algorithms. For this purpose, keywords were defined based on the research question and combined into a search string to search for relevant papers in both Scopus and Web of Science databases. The process was iterative, and according to the research protocol, several passes were made until the search produced reasonable results. After establishing certain inclusion and exclusion criteria, the number of papers found was reduced to an editable number. The papers were reviewed based on the titles and abstracts to determine their relevance to answering the research question. When in doubt, the full paper was reviewed. In addition, a forward search was applied to identify additional relevant papers. As key findings and to answer the research question, it is significant that research is currently being conducted in particular on artificial neural networks and decision trees as well as hybrid models. As far as input variables are concerned, a trend towards soft information can be identified.

Theoretical implications concerning the approach arise, for example, due to the selection of the period from 2008 to July 2021. The year 2008 was chosen due to the global financial crisis with the accompanying economic crisis, as from this point on the topic of insolvency forecasting came to the fore. Furthermore, the methods in the search were narrowed down to artificial intelligence, although many methods have been used for decades. For the analysis, only publications in the two databases Scopus and Web of Science as well as the reference list of these papers were considered. Papers in other databases or even non-indexed papers might have remained undiscovered in this process.

It can be concluded overall that research is being conducted in the field of insolvency forecasting using artificial intelligence methods and that the number of papers is increasing, but this number is still manageable at present. In particular, the use in SMEs will still become a bigger issue.

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APPENDIX 1

In Appendix 1, the following table presents which artificial intelligence algorithms were used in the papers.
1. Artificial Neuronal Networks
2. Support Vector Machines (SVM)
3. Random Forest und Decision Trees
4. Ensemble Method und Hybrid Method
5. Bagging, Boosting, Stacking
6. Others (including Deep learning/Big Data, k nearest neighbor, naive Bayes, Bayesian Belief networks, Cognitive Mapping, Ant Colony Optimization, integrated ensemble machine learning, random subspace)

1	2	3	4	5	6	Year	Author/s	Title
x						2008	Angelini, E; di Tollo, G; Roli, A	A neural network approach for credit risk evaluation
x						2008	Tsai, CF; Wu, JW	Using neural network ensembles for bankruptcy prediction and credit scoring
		x				2009	Fantazzini, D; Figini, S	Random Survival Forests Models for SME Credit Risk Measurement
			x			2009	Nanni, L; Lumini, A	An experimental comparison of ensemble of classifiers for bankruptcy prediction and credit scoring
x						2010	Tseng, FM; Hu, YC	Comparing four bankruptcy prediction models: Logit, quadratic interval logit, neural and fuzzy neural networks
x	x	x	x	x		2011	Wang, G; Hao, JX; Ma, JA; Jiang, HB	A comparative assessment of ensemble learning for credit scoring
x						2011	Mittal, S; Gupta, P; Jain, K	Neural network credit scoring model for micro enterprise financing in India
			x	x		2011	Wang, G; Ma, J	Study of corporate credit risk prediction based on integrating boosting and random subspace
	x		x	x		2012	Wang, G; Ma, J	A hybrid ensemble approach for enterprise credit risk assessment based on Support Vector Machine
		x	x	x		2012	Wang, G; Ma, J; Huang, LH; Xu, KQ	Two credit scoring models based on dual strategy ensemble trees
x						2013	Ciampi, F; Gordini, N	Small Enterprise Default Prediction Modeling through Artificial Neural Networks: An Empirical Analysis of Italian Small Enterprises
x					x	2013	Burda A., Cudek P., Hippe Z.S.	Profiieseeker – Early warning system for predicting economic situation of small and medium enterprises
x						2014	Bekhet, HA; Eletter, SFK	Credit risk assessment model for Jordanian commercial banks: Neural scoring approach
		x	x			2014	Wang, G; Ma, J; Yang, SL	An improved boosting based on feature selection for corporate bankruptcy prediction
					x	2015	Abdelmoula A.K.	Bank credit risk analysis with k-nearest-neighbor classifier: Case of Tunisian banks
x			x			2016	Li, K; Niskanen, J; Kolehmainen, M; Niskanen, M	Financial innovation: Credit default hybrid model for SME lending
x			x			2016	Zhu, Y; Xie, C; Sun, B; Wang, GJ; Yan, XG	Predicting China's SME Credit Risk in Supply Chain Financing by Logistic Regression, Artificial Neural Network and Hybrid Models
		x	x	x	x	2016	Zhu, Y; Xie, C; Wang, GJ; Yan, XG	Predicting China's SME Credit Risk in Supply Chain Finance Based on Machine Learning Methods
		x	x	x	x	2017	Zhu, Y; Xie, C; Wang, GJ; Yan, XG	Comparison of individual, ensemble and integrated ensemble machine learning methods to predict China's SME credit risk in supply chain finance

						Year	Authors	Title
					x	2017	Oliveira, MDNT; Ferreira, FAF; Ilander, GOPB; Jalali, MS	Integrating cognitive mapping and MCDA for bankruptcy prediction in small- and medium-sized enterprises
x		x				2018	Addo, PM; Guegan, D; Hassani, B	Credit Risk Analysis Using Machine and Deep Learning Models
x						2018	Huang, XB; Liu, XL; Ren, YQ	Enterprise credit risk evaluation based on neural network algorithm
x	x		x		x	2019	Qu, Y; Quan, P; Lei, ML; Shi, Y	Review of bankruptcy prediction using machine learning and deep learning techniques
x	x	x				2019	Giannopoulos, V; Aggelopoulos, E	Predicting SME loan delinquencies during recession using accounting data and SME characteristics: The case of Greece
x					x	2019	Alaka, H; Oyedele, L; Owolabi, H; Akinade, O; Bilal, M; Ajayi, S	A Big Data Analytics Approach for Construction Firms Failure Prediction Models
		x				2019	Zhu, Y; Zhou, L; Xie, C; Wang, GJ; Nguyen, TV	Forecasting SMEs' credit risk in supply chain finance with an enhanced hybrid ensemble machine learning approach
	x					2019	Sigrist, F; Hirnschall, C	Grabit: Gradient tree-boosted Tobit models for default prediction
	x	x			x	2020	Arora, N; Kaur, PD	A Bolasso based consistent feature selection enabled random forest classification algorithm: An application to credit risk assessment
	x	x				2020	Teles, G; Rodrigues, JJPC; Rabelo, RAL; Kozlov, SA	Comparative study of support vector machines and random forests machine learning algorithms on credit operation
x		x				2020	Gregova, E; Valaskova, K; Adamko, P; Tumpach, M; Jaros, J	Predicting Financial Distress of Slovak Enterprises: Comparison of Selected Traditional and Learning Algorithms Methods
		x				2020	Boughaci, D; Alkhawaldeh, AAK; Jaber, JJ; Hamadneh, N	Classification with segmentation for credit scoring and bankruptcy prediction
		x			x	2020	Moscatelli, M; Parlapiano, F; Narizzano, S; Viggiano, G	Corporate default forecasting with machine learning
					x	2020	Uthayakumar, J; Metawa, N; Shankar, K; Lakshmanaprabu, SK	Financial crisis prediction model using ant colony optimization
x		x				2021	Malakauskas A., Lakstutiene A.	Financial Distress Prediction for Small and Medium Enterprises Using Machine Learning Techniques
17	14	7	12	7	10			Sum

Source: Listing presentation based on studies by Ciampi et al. 2021, Malakauskas et al. 2021, Zhu et al. 2019, and Zhu et al. 2017.

APPENDIX 2

The following table in Appendix 2 shows what kind of information can have a positive impact on corporate performance and prevent potential corporate insolvency.

Here, the following column labels 1 to 4 represent a mapping to the information that was examined in the papers.
1.   Financial hard information
2.   Financial soft information
3.   Non-financial hard information
4.   Non-financial soft information

1	2	3	4	Year	Author/s	Title
			x	2009	Hsu, YH; Fang, WC	Intellectual capital and new product development performance: The mediating role of organizational learning capability
x			x	2010	Lugovskaya, L	Predicting default of Russian SMEs on the basis of financial and non-financial variables
		x		2010	Moon, TH; Sohn, SY	Technology credit scoring model considering both SME characteristics and economic conditions: The Korean case
		x		2010	Altman, EI; Sabato, G; Wilson, N	The value of non-financial information in small and medium-sized enterprise risk management
		x		2010	Zeng, SX; Xie, XM; Tam, CM	Relationship between cooperation networks and innovation performance of SMEs
		x	x	2011	Rosenbusch, N; Brinckmann, J; Bausch, A	Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs
		x	x	2012	Grunert, J; Norden, L	Bargaining power and information in SME lending
		x		2013	Pederzoli, C; Thoma, G; Torricelli, C	Modelling Credit Risk for Innovative SMEs: the Role of Innovation Measures
		x		2013	Andries, P; Faems, D	Patenting Activities and Firm Performance: Does Firm Size Matter?
x		x		2014	Gupta, J; Wilson, N; Gregoriou, A; Healy, J	The effect of internationalisation on modelling credit risk for SMEs: Evidence from UK market
		x	x	2014	Kosmidis, K; Stavropoulos, A	Corporate failure diagnosis in SMEs A longitudinal analysis based on alternative prediction models
x		x		2015	Camacho-Miñano M.-M., Segovia-Vargas M.-J., Pascual-Ezama D.	Which Characteristics Predict the Survival of Insolvent Firms? An SME Reorganization Prediction Model
	x	x	x	2015	Chen, YN; Huang, RJ; Tsai, J; Tzeng, LY	Soft Information and Small Business Lending
		x	x	2015	McCann, F; McIndoe-Calder, T	Firm size, credit scoring accuracy and banks' production of soft information
		x		2015	Ciampi, F	Corporate governance characteristics and default prediction modeling for small enterprises. An empirical analysis of Italian firms
x		x		2016	Filipe, SF; Grammatikos, T; Michala, D	Forecasting distress in European SME portfolios
x		x		2016	Andreeva G., Calabrese R., Osmetti S.A.	A comparative analysis of the UK and Italian small businesses using Generalised Extreme Value models
		x		2016	El Kalak, I; Hudson, R	The effect of size on the failure probabilities of SMEs: An empirical study on the US market using discrete hazard model
			x	2016	Song, H; Yu, KK; Ganguly, A; Turson, R	Supply chain network, information sharing and SME credit quality

		x		2017	Pan, HF; Kang, MS; Ha, HY	Do trade area grades really affect credit ratings of small businesses? An application of big data
	x		x	2018	Smondel, A	SMEs' soft information and credit rationing in France
	x		x	2018	Castillo, JA; Mora-Valencia, A; Perote, J	Moral hazard and default risk of SMEs with collateralized loans
		x	x	2018	Baidoun, SD; Lussier, RN; Burbar, M; Awashra, S	Prediction model of business success or failure for Palestinian small enterprises in the West Bank
		x	x	2018	Gabbianelli, L	A territorial perspective of SME's default prediction models
		x		2018	Gupta, J; Barzotto, M; Khorasgani, A	Does size matter in predicting SMEs failure?
		x		2018	Andrikopoulos, P; Khorasgani, A	Predicting unlisted SMEs' default: Incorporating market information on accounting-based models for improved accuracy
		x		2018	Gupta, J; Gregoriou, A	Impact of market-based finance on SMEs failure
	x		x	2019	Cornee, S	The Relevance of Soft Information for Predicting Small Business Credit Default: Evidence from a Social Bank
	x		x	2019	Habachi, M; Benbachir, S	Combination of linear discriminant analysis and expert opinion for the construction of credit rating models: The case of SMEs
		x		2019	Abdullah, NAH; Ahmad, A; Zainudin, N; Rus, RM	Predicting Financially Distressed Small- and Medium-sized Enterprises in Malaysia
x	x			2020	Ciampi, F; Cillo, V; Fiano, F	Combining Kohonen maps and prior payment behavior for small enterprise default prediction
x				2020	Ogachi, D; Ndege, R; Gaturu, P; Zoltan, Z	Corporate Bankruptcy Prediction Model, a Special Focus on Listed Companies in Kenya
7	6	21	16		Sum	

Source: Listing presentation based on studies by Ciampi et al. 2021, Malakauskas et al. 2021, Zhu et al. 2019, and Zhu et al. 2017.

The Impact of COVID-19 on the Small Businesses Economic Performance: Evidence from Italy

Annalisa Baldissera[1]

Abstract: *The purpose of this paper is to identify the effects caused by COVID-19 on the economic performance of Italian small businesses in the year 2020, with particular regard to the relationships between the determining variables of the operational management profitability. This survey can be useful in guiding the management of the firm, since it allows to intercept the management areas characterized by greater fragility which, as such, must be subjected to closer monitoring. The research considered a sample of 322 small Italian companies. To identify the impact caused by the pandemic on the performance of the selected sample, the research used a Pearson correlation analysis applied to the main variables of the operating area and observed the five years 2016-2020 in order to understand the main variations that occurred in 2020 compared to previous years. The research showed that in 2020 the core business suffered a general loss of elasticity demonstrated by the presence of a significant reduction in the correlation between revenues and production costs (raw materials, services, employees and depreciation). The lower reactivity of costs to changes in revenues contributed to the sharp erosion of the net income of the companies in the sample.*

1. INTRODUCTION

The international crisis caused by the COVID-19 pandemic has had serious consequences on the performance of companies, causing a general worsening of their economic results. In conditions of extraordinary criticality such as those occurring in 2020 – the year the pandemic spread − the maintenance of adequate levels of profitability and efficiency was hindered by a general decline in demand and a reduction in turnover levels (Kalogiannidis, 2020).

In the Italian context, the entrepreneurial fabric is characterized above all by the presence of small and medium-sized enterprises (Goodman, *et al*., 2016) which, while on the one hand can benefit from greater management flexibility (Bamford, 2020), on the other, generally do not possess high levels of financial strength.

In particular, the greater managerial flexibility of small businesses derives mainly from their low level of bureaucracy (Alves *et al*., 2020). However, at the same time, the financial weakness of small firms, and especially undercapitalized ones, increases the likelihood that they will suffer a greater loss of profitability, as well as lead to longer recovery times and less resilience (Katare *et al*., 2021).

In addition, small Italian companies had to face the emergency in an economic context characterized, for over 10 years, by slow and not yet complete growth, due to the consequences of the 2008 financial crisis (D'Amato, 2020). Although the recovery had begun weakly, profitability levels prior to the 2008 crisis had not yet been recovered, placing small businesses in a situation of substantial weakness that made them not sufficiently ready to deal with the shock caused by the pandemic.

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COVID-19 has caused a collapse in demand and business activity, both in manufacturing and in services, and overcoming the crisis now requires resilience, agility and flexibility (Rapaccini *et al.*, 2020).

As revealed by recent research conducted on over 5,800 small businesses, COVID-19 has not only caused a global health crisis but has also had a devastating effect on the economy, causing the closure of many economic activities and drastic staff reductions, which they have added to the well-known financial fragility that typically characterizes small businesses (Bartik *et al.*, 2020).

Another recent research conducted on the active small businesses in the United States found that the decline in the number of entrepreneurs was the largest ever and the losses were felt in almost all economic sectors (Fairlie, 2020).

Based on these premises, the present research aims to analyze the effects that the COVID-19 shock has produced on the relationships between the determining variables of the profitability of companies.

The identification of these relationships is an essential element for improving economic performance as it allows management to be directed towards useful actions to restore the equilibrium conditions that the crisis has altered.

2. METHODOLOGY

a) Sample selection

The survey was carried out by selecting a sample of small businesses, built on the basis of quantitative parameters which, according to the Italian Civil Code, allow for the preparation of the financial statements in an abbreviated form. In particular, the Italian Civil Code provides for 3 categories of companies, as illustrated in Table 1.

Table 1. Size of companies according to the Italian civil code

Type of firm	No. of employees	Total revenues	Total assets
Micro-enterprises	Not exceeding 5	Not exceeding € 350,000	Not exceeding € 175,000
Small businesses	Not exceeding 50	Not exceeding € 8,800,000	Not exceeding € 4,400,000
Medium and large companies	Higher than 50	Higher than € 8,800,000	Higher than € 4,400,000

Source: Own elaboration

The sample analyzed was selected by considering among all small Italian companies, only unlisted and active joint-stock companies, established no more than twenty years ago. The period of twenty years represents an acceptable time interval to observe the economic results of the sample, placing itself in an intermediate position between the date of the constitution that dates back over time and an excessively recent date of the constitution.

The number of companies included in the sample selected as above is equal to 322.

Table 2 shows the economic trends of the sample during the 2016-2020 period.

Table 2. Economic trend 2016-2020 (Thousands of Euros)

Variables	Years				
	2020	2019	2018	2017	2016
Revenues	793,889	807,479	678,767	583,707	480,979
Costs for raw materials	199,878	207,957	184,982	170,951	154,110
Costs for services	300,156	308,649	256,319	215,263	170,160
Cost of employees	188,240	182,745	144,862	119,853	103,424
Depreciations	26,286	25,175	20,885	17,689	17,126
Provisions	705	823	403	429	167
Profit (loss)	-4,549	2,420	7,263	7,314	6,242

Source: AIDA Bureau van Dijk

b) Empirical analysis

The empirical survey was conducted by analyzing the economic trends of the sample in the 2016-2020 period.

In particular, the study has taken the profitability of operations as an indicator of economic performance, since it is precisely the core business that has been deeply affected by the serious crisis triggered by the pandemic.

On the one hand, the demand reduction has caused a fall in revenues; on the other, operating costs have remained unchanged or, in some cases, have even increased, with serious damage to profit margins.

In this regard, it is important to emphasize that, for efficient management, in the face of a reduction in revenues, maintaining the economic balance would require a corresponding decrease in costs.

However, this objective is not always achievable and becomes even more difficult to achieve in the presence of extraordinary events, unknown to firms.

In particular, there are at least three fundamental factors that can hinder the reduction of costs in the face of the decline in revenues:
a) the presence of fixed costs which, in any circumstance, ordinary or extraordinary, make immediate management adjustments almost impossible;
b) the institutional constraints on the reduction of variable costs;
c) external factors, among which the conditions of the economic environment in which the firm operates are of essential importance.

As regards the factor *sub* a), the literature has underlined how the presence of high fixed costs constitutes one of the possible causes of failure of small businesses; therefore, before starting the business, the entrepreneur should first obtain an amount of capital appropriate to the size of the firm and keep fixed costs at a low level (Lussier, 1996).

Concerning factor *sub* b), it is important to note that the decrease in variable costs with decreasing volumes of activity is not always automatic, especially in contexts in which firms encounter institutional constraints to reduce the cost of some production factors. In this regard, Italy constitutes an example of significant rigidity in the job market and labor costs (Biasi, 2013).

With regard to factor *sub* c), it is necessary to consider that the pandemic represented not only a devastating but also a completely unexpected event for firms, and, as such, it did not allow for the redefinition of business structures to be planned in advance.

With reference for example to the costs of materials, the literature has shown that the hypothesis that they did not vary much even in the sectors affected by the lockdown is reasonable, given the unforeseen and sudden nature of the COVID-19 shock (Carletti *et al*., 2020).

Added to this is the delay with which firms recognized the serious consequences of the pandemic, perceiving the economic crisis only after share prices had started to fall (Buchheim *et al*., 2021).

Given the centrality of operational management, the study focused on the analysis that the reactivity of costs to changes in revenues has shown in the extraordinary and exceptional economic conditions caused by the pandemic shock.

In order to identify the alterations of the economic relationships that have occurred in the context of the operational management (Panno, 2019), the revenues were assumed as independent variable, while the following variables were considered dependent:
− costs for raw materials;
− costs for services;
− costs of employees;
− depreciations.

The research is based, in fact, on the assumption that, especially for small businesses, the reduction of operational management costs (Pencarelli *et al*., 2020) represents an essential element for survival in a highly disturbed economic environment such as the one in which the world economy stands today.

In particular, the study of the relationships between revenues and costs of operational management was carried out by applying the Pearson correlation analysis which allows identifying the strength and direction of the correlation existing between the variables examined.

In this sense, the research used the Pearson correlation coefficient as an indicator of the elasticity of costs compared to revenues.

The elasticity of costs represents a particularly significant management factor both because it provides a concise and effective measure of the company's ability to react to events capable of changing the volume of revenues, and because it has a high forecast utility.

In fact, literature has often used elasticity to estimate the variation in operating costs in the context of various surveys aimed at making predictions on the consequences of the Coronavirus. In particular, these studies were conducted to forecast the impact of the crisis in terms of losses, equity depletion and corporate defaults (Buchetti *et al*., 2021), or to estimate the COVID-19 cash crunch (De Vito, Gómez, 2021).

The greater the elasticity of costs, the more likely it is that the reduction in revenues will not affect the profitability of operations, given that profit margins tend to remain stable.

On the contrary, the greater the rigidity of the costs, the less is the possibility that the profit margins will remain unchanged as revenues decrease.

Especially in conditions of economic crisis, such as those caused by the pandemic, the company's ability to quickly adapt management to changing environmental conditions is a strategic factor of absolute importance. In this sense, the achievement of a high level of cost elasticity can be a useful tool to preserve the profitability of management, since it allows to better contain the serious consequences that the reduction in revenues causes on the economic performance of the firm.

3.   EMPIRICAL FINDINGS

Table 3 presents the Pearson correlation coefficients for each dependent variable during the period 2016-2020.

Table 3. Pearson correlation coefficients 2016-2020

Dependent variables	Years				
	2020	2019	2018	2017	2016
Costs for raw materials	0.553	0.643	0.692	0.663	0.748
Costs for services	0.619	0.648	0.665	0.675	0.624
Costs of employees	0.294	0.424	0.525	0.561	0.628
Depreciations	0.0737	0.219	0.217	0.215	0.4

Source: Own elaboration

As Table 3 shows, in the year 2020, all correlations underwent a greater weakening than that which occurred in the previous four years.

In particular, the weakening is lower in relation to costs for raw materials and services, while it is much more marked for employees' costs and depreciations.

As regards the correlation between revenues and costs for raw materials, as well as between revenues and costs for services, the data can be considered representative of the company's ability to adjust its operating costs to changes in turnover. The correlation, although it had decreased compared to the previous four-year period, was nonetheless not negligible.

On the contrary, the cost of employees has shown a more decisive reduction in elasticity compared to previous years and its correlation with revenues has become rather weak.

Finally, the correlation between revenues and depreciation was practically nil in 2020.

4.   CONCLUSION

The observations carried out allow us to affirm that in the year 2020, in which the economic shock caused by the pandemic took place, the characteristic management of small Italian businesses suffered a remarkable decline in its elasticity (Schivardi, Guido, 2020), analyzed here through the reconstruction of the reactivity of costs to varying of business volumes.

This implied that faced with the reduction in revenues due to the drop in demand caused by the pandemic, small businesses were not able to proportionally reduce costs and maintain the previously achieved levels of profitability (Bernardi *et al.*, 2021; Orlando, Rodano, 2020).

However, while the reactivity of variable costs for raw materials and services has maintained levels not too far from the previous years, the elasticity of employees costs has significantly reduced, while that of depreciation was almost zero.

In this regard, some specific considerations are appropriate.

First of all, regarding employees' costs, it is necessary to remember that Italy is characterized, even in ordinary conditions, by a particular rigidity of the labor market. Moreover, with the spread of the pandemic, the Italian government has adopted specific measures aimed at the protection of employment levels through the prohibition on dismissal imposed on firms.

Secondly, concerning depreciation, the presence of a particularly weak correlation with revenues, i.e. 0.0737, can in part be explained by the measures adopted by the Italian government to support the financial statements, including the possibility of not allocating depreciation for the year 2020.

Over the last decade, the global economic context has been particularly unstable. The experience lived by firms around the world, from the financial crisis of 2008 to the pandemic crisis that began in 2020, has now made it clear that flexibility has become an essential strategic factor for long-term survival.

To this end, operational management, in which the main source of the economic performance of firms resides, must be ready to face with maximum speed the changes that now occur more suddenly and unexpectedly than in the past.

From an economic point of view, flexibility must translate into the ability to manage costs adequately and in particular the ability to create a business structure in which operating costs move in harmony with revenues in order to safeguard profit margins in the face of completely unpredictable events.

The readiness for change must become a normal condition, especially for small businesses that often have the modest financial strength and therefore must be ready to continuously support the profitability of operations.

The evidence that emerged from the research may be useful for the concrete orientation of management, since in the face of unpredictable and sudden events, such as the spread of COVID-19, one way to survive consists in the ability of the company to promptly adapt its operational management, especially considering that, in the objective impossibility of achieving adequate levels of revenues, the room for maneuver must be concentrated on costs.

In this sense, improving the elasticity of operational management can represent an essential condition for dealing with unexpected exogenous events with respect to which reaction times must be particularly rapid.

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Use of Internal Communication Channels and Employees Communication during COVID-19 Pandemic and Afterwards

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Abstract: *The situation at the time of the pandemic COVID-19 and afterwards posed great challenges for companies as they had to adjust to a "new normal". This situation posed a challenge to the use of internal communication channels, employee engagement and satisfaction with the company. It is argued that the use of internal communication channels is an important factor in increasing employee engagement and satisfaction with the company. The study aimed to investigate the use of communication channels and their impact on employees' satisfaction with their jobs, the meaningfulness of their work and their commitment to their company during the crisis COVID-19. An explorative qualitative and qualitative research approach was used to determine the use of communication channels and employee engagement during the COVID-19 pandemic and afterwards by Slovenian employees. The results of the statistical analysis show that there is a significant relationship between the use of communication channels and the satisfaction level of Slovenian employees. Finally, suggestions are made for organisational communication strategies in times of the pandemic.*

1. INTRODUCTION

There is consensus on the definition of internal communication as part of communication practise, which is becoming increasingly important (Tkalec Verčič et al., 2021; Welch, 2012). Communication with employees begins before they enter an organisation and continues after they leave (Tkalec Verčič et al., 2021). Internal communication is commonly understood as synonymous with intraorganisational communication (Tkalac Vercic et al., 2012), while the construct of communication satisfaction (operationalised by Downs and Hazen in 1977; Tkalec Verčič et al., 2021) has become a research direction within organisational communication. In organisational communication (as in internal communication), satisfactory and effective communication can contribute to organisational productivity and performance as well as external customer orientation (Tkalec Verčič et al., 2021; Downs and Adrian, 2004; Hargie and Tourish, 2000).

Internal communication practises include various communication activities, informal and formal, with the aim of sharing information with one or more public within the organisation. These activities can be carried out to communicate horizontally, downwards, or upwards, and are usually carried out by each member of the organisation. However, it is the responsibility of management to ensure that internal communication systems are effective and efficient (Carriere and Bourque, 2009). When communication systems are managed successfully, they can improve the relationship between employees and managers (Tkalec Verčič et al., 2021; Welch, 2012). They can also lead to greater awareness of organisational threats and opportunities, but on the other hand, they can also pose a risk if ignored (Tkalec Verčič et al., 2021; Tkalac Verčič, 2019).

The pandemic COVID-19 has profoundly affected the way people live and work around the world. Organisations have responded to the pandemic with the expected measures – reorgan-

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isation, the adaptation of work at the organization location and introduction of home-working or teleworking. Regardless of the size of the organization, continuous communication is fundamental to success, not only in business terms but also in a broader sense, as it enables sharing of information between people within and outside an organisation. When communication through established channels is interrupted during a crisis, the company must adapt by using appropriate communication channels. The main adaptation strategy is based on gathering information by using appropriate communication channels to respond, within their available resources, to changes in the external company environment, in our case to drastic changes resulting from the pandemic situation COVID-19.

Media richness theory is useful in identifying appropriate communication channels as complex matters should be communicated via a richer communication channel, (e.g., face-to-face) because it can provide information, while routine issues should use a leaner channel (e.g. printed reports) (Daft and Lengel, 1984). An appropriate communication channel must be selected with respect to the complexity of the message to ensure successful transmission. The channel chosen for the transmission of a message has a certain richness that affects the perception of the communication, and is therefore generally suitable for the transmission of a particular message. The richness of the medium depends on: a) the ability to provide immediate feedback; b) the number of communication signs used, such as non-verbal communication, tone of voice, and other verbal and non-verbal signs; c) the ability to personalise messages; and d) linguistic variety (Daft and Lengel, 1984). However, media richness theory cannot explain the popularity of communication channels less rich than e-mail and SMS because it is assumed that communication channels are static and do not alter with use.

A Slovenian study conducted during the first wave of the pandemic among 312 full-time teleworkers (at least 3 days per week) shows that respondents were most satisfied when they used telephone calls, followed by e-mail, then videoconferencing and chats. Respondents expressed a relatively high level of negative attitudes, namely the most negative attitude towards the lack of face-to-face interaction with colleagues. Men rated working from home more negatively than women regarding the lack of personal interaction with colleagues. Older people over 56 felt the lack of face-to-face interaction with colleagues and the information overload more than younger people, and respondents with higher education levels miss more face-to-face interaction with the manager and are more concerned about the lack of important information than respondents with lower education (Erjavec, 2021).

It is believed that employees who are engaged have a higher and stronger emotional attachment to their company and tend to recommend their company to others, investing more time and effort to achieve their company's goals (Quirke, 2008). Employee engagement is "a positive fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli et al., 2001, p. 74). Engaged employees tend to contribute to their company with higher performance. In other words, they are more likely to remain part of the organisation. Organisations that have effective communication skills with their employees experience less turnover and resistance and have higher returns to shareholders, higher employee engagement and greater commitment (Goodman and Truss, 2006; Yates, 2006). Organisations that have effective communication skills are more likely to have more engaged employees (Watson, 2002) and this contributes to organisations experiencing fewer financial problems (Yates, 2006). The organization's symmetrical internal communication efforts contribute greatly toward a higher level of employee engagement (Kang and Sung, 2017). The study of employees from five-star

hotels in Turkey found that there is a significant correlation between the frequency of use of communication channels and employees' satisfaction with their jobs (Uysal, 2020).

This paper aims to identify a relationship between the use of communication channels and employee engagement in Slovenian companies during the COVID-19 pandemic crisis, and then to find out in what way the use of communication channels influences employee engagement.

2. MATERIALS AND METHODS

2.1. Participants

To investigate how the use of communication channels affects employee engagement, Slovenian remote workers were approached to participate in the study. Data collection took place from 15 April to 15 May 2021. Data was collected via a web-based survey that took about 10 minutes on average to complete. A total of 281 full-time teleworkers (at least 3 days per week) participated in the study. The sample consisted of 34.9% (N = 98) men and 65.1% (N = 183) women. Up to 25.4% of the respondents were up to 25 years old, 20.8% between 26 and 35 years old, 33.6% between 36 and 45 years old, 13.7% between 46 and 55 years old and 8.0% between 56 and 65 years old and 0.2% were more than 66 years old. The majority of the respondents (66.6%) had a Bachelor's degree, followed by those with a Master's degree (22.4%), secondary school (5.1%) and a PhD (5.3%). Most of them worked in education and social services (37.8), followed by those who worked in services and intellectual performance (34.9%), management and administration (13.8%), production and trade (7.4%), health (4.1%) and other (2.0%).

2.2. Instruments

The data in the study were collected using a self-administered questionnaire. This study used an organisational commitment questionnaire (OCQ) by Mowday, Steers and Porter (1979) to examine participants' level of commitment to their organisation and the Empowerment Scale developed by Spreitzer (1995) to measure participants' meaningful work. The final questionnaire consisted of three sections. In the first section of the questionnaire, participants were asked 4 questions about demographic details such as gender, age, sector, and education. In the second section of the questionnaire, participants were asked 11 questions about the frequency of use of the communication channels their organisations may have used during the pandemic COVID-19 and were asked to indicate their level of agreement with each item.

In the third section of the questionnaire, participants were asked about their level of commitment to their organisations and dissatisfaction with their work, and were asked to indicate their level of agreement (from 1 = strongly disagree to 5 = strongly agree). The Cronbach's alpha value of the OCQ, according to Mowday et.al. (1979) ranges from 0.84 to 0.91. The OCQ was also designed to include several negatively worded questions requiring reverse scoring. The Cronbach's alpha reliability coefficient of the Empowerment Scale developed by Spreitzer (1995), which was included in the second section of the questionnaire to measure employees' sense of purpose in their work, was reported to be 0.79. It is important to note with this scale that only three questions of the empowerment scale on meaningfulness were used in this study. The items used were again designed on a five-point scale from 1= strongly disagree to 5= strongly agree. The variables of frequency of use of communication channels and forms of the meeting were also included. The frequency had the following dimensions: never, insignificant working time,

several times a week, daily up to 10 min, daily 10-30 min, daily 30-60 min, daily 1-2 hours, daily more than 2 hours; forms of meetings: face-to-face meeting, team or small group meeting (3-6 persons), meeting (6-10 persons), conference (more than 10 persons).

2.3. Data Analysis

In addition to simple descriptive statistics, a Pearson and Spearmen correlation was performed to access the association between variables. IBM SPSS Statistics for Windows, version 25.0 was used for all analyses. P values 0.05 were considered statistically significant.

3. RESULTS

Most teleworkers (43.4%) use the telephone most frequently across all communication channels, between 1 and 2 hours per day. No less than 25.4% of respondents use the phone for more than 2 hours. Most of the respondents (42.3%) use email for 30 to 60 minutes a day, but 25.3% also use it for one or two hours. Video conferencing is used by most respondents (39.5%) several times a week, but 19.9% also said they use it for more than 2 hours a day. Chat or instant messaging for work is insignificant work time for the majority of respondents (47.3%), and 31.7% of respondents also use it from 10 to 30 minutes.

Table 1. Frequency of using internal communication channels (N = 281)

	Never	Insignificant work time	Several times a week	Daily up to 10 min	Daily 10-30 min	Daily 30-60 min	Daily 1-2 hours	Daily more than 2 hours
Phone calls	0.0	0.0	1.5% (5)	2.5% (8)	5.5 (17)	21.7 (68)	**43.4% (135)**	25.4% (79)
Emails	0.0	2.1% (6)	2.1% (6)	3.2% (12)	25.3% (71)	**42.3% (119)**	26.3% (74)	2.5% (7)
Video conferences	0.0	7.4% (21)	**39.5% (111)**	2.8 (10)	2.8% (10)	4.9% (14)	20.9% (59)	19.9% (56)
Chats or instant messaging	16.7% (47)	**47.3% (133)**	3.5% (10)	4.3% (12)	31.7% (89)	3.9 (11)	2.8 (10)	0.7% 2

Source: Own research

As can be seen in Figure 1, telephone calls were the most frequently used internal communication channel with a mean score of 4.2 out of 5. Chats and instant messaging were ranked as the least frequently used internal communication channel with a mean score of 2.5 out of 5 (the scale ranged from 1 = never to 5 =always).
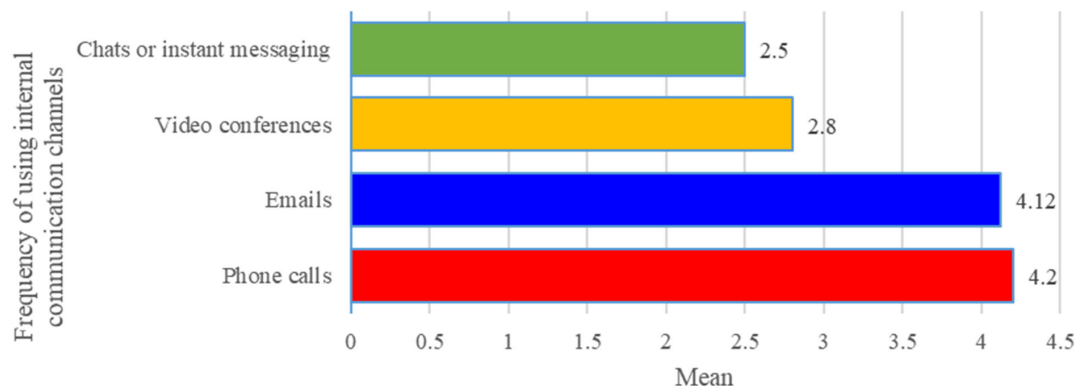
Figure 1. Satisfaction with communication channels (N = 281)
Source: Own research

After the item analysis, the principal component factor analysis was conducted on the data. As a result of the principal component analysis, three factors were identified, namely dissatisfaction with work, the meaningfulness of employees' work and employees' commitment to their work. The factor loadings can be seen in Table 2 below for each factor and item.

Table 2. Findings of Principal Component Analysis (N = 281)

Scores	Commitment to work	Meaningfulness of work	Dissatisfaction with work
1. I find my values and the organization's values are very similar	0.88		
2. I talk up this organization to my friends	0.72		
3. I am proud to tell others that I am part of this organization	0.71		
4. For me this is the best of all possible organizations for which to work	0.72		
5. I am extremely glad that I chose this organization to work for over others I considered	0.72		
6. I would accept almost any type of job assignment to keep working for this organization	0.73		
7. This organization really inspires the very best in me in the way of job performance	0.74		
8. I really care about the fate of this organization	0.71		
9. I often find it difficult to agree with this organization's policies relating to employees	0.61		
10. I am willing to put in a great deal of effort beyond that normally expected to help this organization be successful	0.59		
8. I really care about the fate of this organization	0.51		
9. I often find it difficult to agree with this organization's policies relating to employees	0.58		
10. I am willing to put in a great deal of effort beyond that normally expected to help this organization be successful	0.54		0.49
11. Deciding to work for this organization was a definite mistake on my part	0.51		
12. The work I do is meaningful to me		0.83	
13. The work I do is very important to me	0.41	0.77	
14. My job activities are personally meaningful to me	0.43	0.77	
15. It would take very little change in my present circumstances to cause me to leave			0.78
16. I could just as well be working for a different organization as long as the work was similar			0.66
17. There's not much to be gained by staying with this organization	-0.51		0.59
18. I feel very little loyalty to this organization		-0.51	0.57

Source: Own research

Pearson Correlation statistics were conducted to determine the relationship between frequent use of communication channels and employee engagement with their organisation. No significant relationship was found between frequent use of internal communication channels and employees' level of commitment (r = -0.05, p = 0.521).

Pearson Correlation statistics were conducted to determine the relationship between frequent use of IC channels and employees' meaningfulness of work. No significant relationship was found between the frequent use of internal communication channels and the meaningfulness of employees' work (r = – 0.09, p = 0.631).

Pearson Correlation statistics were conducted to determine the relationship between frequent use of IC channels and employee dissatisfaction with their jobs (see Table 3). A significant relationship was found between frequent use of internal communication channels and the level of employee dissatisfaction (r = 0.513, p = 0.000).

Table 3. Correlation between frequency of the use of internal communication channels and employees' dissatisfaction levels (N = 281)

		Frequency of the use of communication channels	Dissatisfaction factors
Frequency of the use of communication channels	Pearson's r	1	0.513
	p-value		0.000
Dissatisfaction factor	Pearson's r	0.513	1
	p-value	0.000	

Source: Own research

The finding of this study regarding increased employee satisfaction through the frequent and appropriate use of internal communication channels is consistent with the findings of Uysal, (2020) that there is a significant correlation between the frequency of use of communication channels in five-star hotels in Turkey and employee job satisfaction during pandemics.

4. FUTURE RESEARCH DIRECTIONS

Since communication disadvantages might be related to internal communication channel use and other variables whose relationship we could not investigate due to space constraints, future research should find out how communication disadvantages are related to communication channel use and satisfaction with communication channels and job satisfaction.

Organisational communication during the pandemic COVID-19 provides an opportunity for new analyses of theory and practise from interdisciplinary and multicultural perspectives. Of particular interest will be conceptual and evidence-based reviews related to employee engagement and well-being.

5. CONCLUSION

The number of studies examining the relationship between frequent use of internal communication channels and employee engagement in crises as COVID-19 pandemics is very limited. Therefore, it is claimed that this study is different from the relevant studies in the literature. Using the Pearson correlation test, it was found that frequent use of internal communication channels has a significant impact on employees' job dissatisfaction. However, no significant relationship was found between frequent use of internal communication channels and employees' sense of purpose in their work and commitment to their organisations.

The results suggest that the use of internal communication channels could have a positive impact on employee dissatisfaction in times of crisis, but that the perceived meaningfulness of work and employee engagement are not significantly influenced by the use of the channels. In other words, employees who are communicated by their colleagues in times of crisis are more satisfied.

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The Relationship between Managers' Emotional Competencies and Organizations' Financial Performances

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Abstract: The topic of emotional intelligence has attracted considerable interest from both academics and practitioners. Emotionally intelligent leaders have the ability to express, understand and regulate their own as well as others' emotions. Previous evidence suggests that emotionally intelligent leaders play a crucial role in encouraging employees to perform at their best at work, which in turn can improve the financial performance of the organization. Still, there is little empirical evidence to support these claims from developing countries. Therefore, the research question of this paper is: Which of the leaders' emotional competencies are required for outstanding financial performance of the organization? In this study, emotional competencies are analyzed through the self-awareness and self-management clusters. This study proposed and tested the relationship between managers' emotional competencies and an organization's financial performances, such as growth in profits, profitability, return on assets (ROA) and return on equity (ROE). Empirical data were obtained via a questionnaire survey involving 300 employees from 80 organizations in the Republic of Serbia. The methodology used in the study is a well-known ESCI questionnaire. The findings revealed a weak positive correlation among emotional self-awareness, aspiration for success and adaptability as emotional intelligence competencies and financial performances, whereas emotional self-control and optimism did not have any statistically significant relationship with financial performances. The results provide implications regarding the development of emotionally intelligent leaders, supporting emotional competence at the organizations.

1. INTRODUCTION

Emotional intelligence can be defined in different ways. The authors Salovey and Mayer defined emotional intelligence as "the ability to monitor one's own and others' feelings and emotions to discriminate among them and to use the information to guide one's thinking and action" (1990, p. 189). According to Boyatzis (2006, p. 124-125), emotional intelligence could be considered an intelligence if it is different from other personality constructs in the way that it adds value to understanding the human personality and behavior if it is related to a set of alternative behavioral manifestations and finally if it is related to life and job outcomes. A higher level of emotional intelligence can be found if one has the desire to improve their listening skills in order to understand others' feelings, express self-reflection, emotional control and wants to change (Rahim & Malik, 2010, p. 192). Furthermore, people having a higher level of emotional intelligence achieve "more success, make better interpersonal relations, work more effectively, and spend healthier life than those people having a lower level of emotional intelligence (Chew, Zain, & Hassan., 2013).

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Leaders should have a certain level of emotional intelligence to identify and understand the emotions of their employees (Mura et al, 2021). The crucial part of the emotional intelligence concept is empathy, which can be expressed between leader and employee to develop cooperation and motivation. For this reason, it is believed that modern leaders who strive for effective business must possess skills that involve social and emotional competencies. The established theoretical relations between the mentioned variables lead to the assumption that there is a possible influence of the managers' emotional intelligence on the achieved organizational financial performances. Finally, this paper postulates that the organizational success and failure of today's organizations are determined by the level of emotional intelligence of both the leaders and their employees.

Based on the above mentioned, the research question arises: *Which emotional competencies are sufficient and necessary for outstanding financial performance?* The answer to this research question will provide information on which of the managers' emotional competencies need to be professionally developed in the future in order for them to become exemplary leaders to all employees. Thus, based on the question formulated above, the general aim of this research project is to explore *whether there is a relationship between emotional competencies, such as self-awareness and self-management cluster competencies and financial performance, such as growth in profits, profitability, ROA and ROE.*

In order to achieve the overall aim of this study the following main hypotheses were developed:
H1: There is a statistically significant positive relationship between self-awareness cluster competencies and financial performances.
H2: There is a statistically significant relationship between aspiration for success and financial performance.
H3: There is a statistically significant relationship between adaptability and financial performance.
H4: There is a statistically significant relationship between emotional self-control, as well as optimism on one side and financial performances on the other side.

This study uses quantitative research, i.e., correlation analysis to empirically measure the proposed relationships in the context of 80 medium and large organizations from Serbia.

2. THEORETICAL BACKGROUND

The initial definition of emotional intelligence stated that it was a type of social intelligence that included a person's ability to analyze his/her own as well as others' emotions and to use these analyses to guide his/her actions (Salovey & Mayer, 1990). Likewise, Bar-On defined emotional intelligence as a group of non-cognitive capabilities, competencies and skills that could be used to cope with environmental changes or pressures (Bar-On, 1997). According to the Bar-On model, emotional intelligence skills are intra-personal skills, inter-personal skills, adaptability, stress management and general mood.

This study applied the competency-based model of emotional intelligence defined by the author Goleman (1998). Competencies are in the focus of this model since they can be defined as "underlying characteristics of the person that led to or caused effective or superior performance" (Boyatzis, 1982). Thus, emotional competence is an ability to recognize, understand, and use emotional information about oneself or other people that leads to or causes superior

performance (Boyatzis, 1982). In this model, emotional intelligence is taken as emotional and social competencies, which are divided into four clusters: self-awareness, self-management, social awareness, and relationship management. The first two clusters describe emotional competencies while the other two describe social competencies. The basic characteristics of the mentioned clusters are:

1. Self-awareness is the ability to understand one's emotions as well as recognize their impact on others. It is measured through three competencies as *emotional awareness*, meaning the recognition of one's emotions and their effects, then *accurate self-assessment* referring to the ability to recognize one's strengths and weakness and finally *self-confidence,* as a strong sense of one's self-worth and capabilities.

2. Self-management is the ability to manage internal states, impulses, and resources. It is measured through six competencies, like *emotional self-control* meaning the ability to keep calm and control disruptive emotions and hasty impulses, *transparency*, referring to the adaptability from the perspective of change, *achievement* as the ability to improve ourselves and reach the highest standards, *adaptability* – the capacity to juggle multiple demands without losing focus or energy, *initiative* as starting things before anyone asks and *optimism* in reaching goals despite restrictions.

3. Social awareness is the ability to read people and understand situations accurately. It is measured through *empathy*, *organizational awareness,* and *service orientation*.

4. Relationship management is the ability to induce desirable responses in others. It is measured through *developing others*, *inspirational leadership*, *change catalyst*, *influence, conflict management* and *teamwork* and *collaboration*.

It can be deduced that self-awareness is the most fundamental element of emotional intelligence. It is critical to understand how and why people react emotionally to different stimuli in the workplace. By building self-awareness, people could better cope with change (Diggins, 2004). Conversely, one of the most important competencies that motivate employees to higher engagement and therefore to better productivity are: achievement, initiative and optimism, as part of the self-management cluster (Bipath, 2007, p. 32).

The variables most often researched concerning emotional intelligence are different outcomes of organizational performances (Goleman, 2001; Harrison, 1997; Higgs, 2004). The reason for the mentioned link can be found in the core of the process of developing emotional intelligence in an individual, which begins with emotions that influence the creation of opinions and results in actions performed by individuals and the performances they achieve. Furthermore, the emotional competencies can influence managers' leadership style which determines their perceptions and their further behavior. Hence, it can be stated that the managers' emotional intelligence can help them understand all aspects of leadership. High-performance managers were rated significantly higher in emotional intelligence than average-performing managers (HayGroup, 2005).

The focus of research on emotional intelligence is generally on the most often associated variable, namely job performance. It is found that emotional intelligence generally affects work performance and encourages work satisfaction (Ayranci, 2011). Apart from that, emotional competencies will lead to greater personal or group performance in a business environment (Martinez, 1997).

Still, some contradictory research results must be addressed. The majority of research works to date have pointed out the positive impact of emotional intelligence and organizational performance (Bresnik, 2004; Cavallo & Brienza, 2002; Rapisarda, 2002). Some authors emphasize

that this impact is more indirect than direct (Rode, Mooney, Arthaud-Day & Near, 2007). On the other hand, there are authors who proved that there is no relationship between emotional intelligence and organizational performance (Bresnik, 2004). Also, there is a research gap, as there is only empirical research on understanding the relationship between emotional intelligence and financial performance in developing countries. Consequently, this study has zoomed in on the analysis of emotional competencies of managers in the organizations in Serbia, as a developing country.

3. METHODOLOGY RESULTS AND DISCUSSION

The adopted questionnaire was implemented to gather data from the managers and employees. The sample consists of 80 middle-level managers and 300 employees, working in 80 medium and large organizations in Serbia. Out of the 80 managers, 69 were male respondents, while 11 were female respondents. Moreover, out of the 300 employees, 197 were male respondents, with 103 female respondents. Concerning the age of the respondents, the majority of them were within the age group of 25 to 54 years.

The implemented questionnaire consists of 68 items related to emotional intelligence, with an additional 4 items related to financial performance. All questions were rated on a five-point Likert type scale, having 1 = strongly disagree up to 5 = strongly agree and 3= neither agree nor disagree. Additional items concerning the gender, age, education level and work position of managers and employees were added to the questionnaire. After completing the questionnaire, the reliability of the statements that measure certain variables was analyzed through Cronbach's Alpha coefficient. Cronbach's alpha is the most commonly used indicator of internal consistency. The generally agreed-upon lower limit for Cronbach's alpha is 0.70 (Hair, Anderson, Taham, & Black, 1998). The value of this coefficient for the questionnaire was 0.815, indicating the very good reliability of the scale as well as the very good internal coherence of the statements in the questionnaire.

The data on emotional intelligence was collected through the well-known questionnaire, ESCI (Emotional social competency inventory) developed by Boyatzis, Goleman and Ferry. It is a 360-degree tool designed to assess the emotional and social competencies of individuals and organizations. It is based on emotional competencies identified by Goleman (1998) described in his work *"Working with Emotional Intelligence"*, and on competencies from Hay/McBer's (1996) *Generic Competency Dictionary* as well as Boyatzis's Self Assessment Questionnaire (SAQ) (HayGroup, 2005). The questionnaire measures emotional and social competencies organized into four clusters: self-awareness, self-management, social awareness, and relationship management. The survey questions deal with critical aspects of each skill that indicate the presence of this skill in the behavior of the individual being assessed. For the purpose of this study, the authors measured only emotional competencies belonging to two clusters: i.e., self-awareness and self-management. Financial performances were examined as an independent variable, as a part of organizational performances. Organizational performances could be defined as the measures of survival and organizational success which can be measured from a different perspective. The objective measure uses real figures from organizations while the subjective measure uses the perception of respondents (Pizam & Ellis, 1999). The financial performances were studied from the angle of the managers' perception as perceptual or subjective measures. These measures can be accurate as objective measures; thus, managers are a more comfortable lending insight into their perception of financial measures than the specific financial measures

of their organizations (Ackelsberg & Arlow, 1985). Correlation analysis was used to check the relationship between the dependent variables, emotional intelligence competencies and independent variables, i.e., financial performances.

Table 1 shows the descriptive statistics for the questionnaire containing only emotional competencies from the ESCI questionnaire and financial performances. It summarizes the number of people who participated in the study, the mean scores, the standard deviation, the variances, Skewness and the Kurtosis values for each emotional competency measured.

Table 1. Descriptive statistics for the questionnaire

	Min.	Max.	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Self-awareness	2,00	4,83	3,6622	,51544	,001	,141	,620	,281
Aspiration for success	2,67	5,00	4,4256	,47102	-1,167	,141	1,974	,281
Adaptability	3,18	4,83	4,0579	,35684	-,295	,141	-,345	,281
Emotional self-control	2,67	5,00	4,0161	,47359	-,152	,141	-,261	,281
Optimism	3,00	5,00	4,2272	,44352	-,386	,141	-,169	,281
Financial performances	1,00	5,00	3,4283	,75946	-,159	,141	,603	,281

Source: Authors

Correlation analysis was applied to examine the hypothesis to determine the existence or non-existence of relations between the managers' emotional competencies and the financial performances of the organizations.

In previous research on this topic, it was found that there was a statistically significant relationship between competencies, such as: self-confidence, adaptability, achievement, and initiative, on the one hand, and organizational performance measured using BSC methodology (financial perspective, marketing perspective, internal perspective, learning and development perspective), on the other hand (Bipath, 2007, p. 162). Further, the author Boyatzis pointed out that emotional competencies predicted the financial performance of leaders, with an indication that 93% of the competencies predicting performance were from the emotional intelligence clusters (2006, p. 130). However, a study conducted by the author Ayranci (2011) found that the combined effects of spiritual and emotional intelligence on financial performance were very weak. The same author also pointed out that some components of emotional intelligence (adaptability, stress management, interpersonal empathy, interpersonal relationships, and intrapersonal self-acceptance) did not have significant effects on financial performance, while self-consciousness and willingness to face challenges had the weakest effects (p. 27).

Based on the results of the correlation analysis (Table 2), it can be concluded that there is a positive correlation of weak intensity between emotional self-awareness and financial performances (ρ=.151, Sig=.009); aspiration for success and financial performances (ρ=.175, Sig=.002) as well as adaptability and financial performances (ρ=.179, Sig=.002). These empirical results indicate that the hypotheses H1, H2 and H3 are supported, while the hypothesis H4 is not supported. Furthermore, there is no statistically significant relationship between emotional self-control as well as optimism and financial performance.

Table 2. The correlation coefficients

		Self-aware-ness	Aspiration for success	Adaptabil-ity	Emotional self-con-trol	Optimism	Financial perfor-mances
Self-awareness	Correlation Coeff.	1,000	,215**	,664**	,109	,203**	,151**
	Sig. (2-tailed)	.	,000	,000	,059	,000	,009
Aspiration for success	Correlation Coeff.	,215**	1,000	,743**	,243**	,343**	,175**
	Sig. (2-tailed)	,000	.	,000	,000	,000	,002
Adaptability	Correlation Coeff.	,664**	,743**	1,000	,371**	,439**	,179**
	Sig. (2-tailed)	,000	,000	.	,000	,000	,002
	N	300	300	300	300	300	300
Emotional self-control	Correlation Coeff.	,109	,243**	,371**	1,000	,260**	-,038
	Sig. (2-tailed)	,059	,000	,000	.	,000	,517
	N	300	300	300	300	300	300
Optimism	Correlation Coeff.	,203**	,343**	,439**	,260**	1,000	,092
	Sig. (2-tailed)	,000	,000	,000	,000	.	,111
	N	300	300	300	300	300	300
Financial performances	Correlation Coeff.	,151**	,175**	,179**	-,038	,092	1,000
	Sig. (2-tailed)	,009	,002	,002	,517	,111	.
	N	300	300	300	300	300	300

*   Correlation is significant at the 0.05 level (2-tailed).

**   Correlation is significant at the 0.01 level (2-tailed).

Source: Authors

4.   CONCLUSION

Given that there is an empirical gap on the relations between the emotional intelligence of leaders and financial performances in developing countries, the purpose of this study was to seek a better understanding of the relationship between emotional intelligence competencies of managers and financial performance in the business environment of Serbia. Based on the conducted empirical analysis, the authors concluded that there was a weak positive correlation between emotional self-awareness, aspiration for success and adaptability as emotional competencies and financial performances, where emotional self-control and optimism did not have any statistically significant relationship with financial performances. The obtained results helped answer the key question: What emotional intelligence competencies mostly distinguish effective leaders from ineffective leaders? This is a vital issue since it is believed that competencies within emotional intelligence can be learned. Furthermore, it is of great importance since, if managers find reaching the desired level of emotional intelligence difficult, they are more likely to make wrong decisions, which will, in turn, lead to poor business performance (Ayranci, 2011). The study results should be taken as the basis for a proposed program to develop emotional com-

petencies. If one takes into account that self-awareness is the most fundamental element in developing emotional intelligence and that building self-awareness, people would find it easier to cope with change (Diggins, 2004). Moreover, the crucial issue in future training and education programs ought to be the development of self-awareness competencies such as emotional awareness, accurate self-assessment and self-confidence.

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HR Department: How Business Ownership and Activity Type Affect Its Existence in the Albanian Companies

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Abstract: *Human Resources Management is an important function of organizational management. The way an organization uses its human resources for the development and implementation of its strategies can strongly affect its performance. Human Resources Management (HRM) in the context of a market economy is still a new concept in Albania.*

About thirty years after the transition from a centralized economy towards a free-market economy, the job relations in Albania are undergoing important changes; therefore, businesses should be able to successfully face the fast development of technology, globalization effects, and the need to have an efficient and effective labour force to fulfill, in the best way possible, the economic objectives. The role of the HR department is crucial towards such achievements; however, this role and its potential towards organization success is not fully appreciated by the Albanian private sector companies and often the HR department is not existent, or its role is vague.

This paper uses literature review and quantitative research to analyse the role of the HR department as a key function of organizational management and to explore the extent of HR department presence in the big companies in Albania, in the view of ownership and type of business activity.

1. INTRODUCTION

Human Resources Management (HRM) is an important management function, which greatly contributes to organizational success and when properly managed it can serve as a competitive advantage. Since Albania has transitioned from a centralised economy, running for about 46 years, towards an open market economy in the early nineties, the human resources management, in the view of an open market economy was a novelty and it took time for the private sector to understand the role of HRM in the organization and to consider such investment. However, HRM practices in the private sector are still new and the necessity and benefits of having a properly functioning HR department, policies and practices, are still not fully understood and implemented. The HRM in the organization is primarily perceived to have an administrative rather than a managerial role.

The role of HRM often is not carefully considered for its potential to improve organizational performance. Even though there is a growing number of big companies which appreciate HRM and its impact on the organization, there is still a considerable number of businesses that do not pay attention to the necessity of having an HR department with proper policies and practices in place.

The need for the Albanian private sector to effectively manage human resources becomes more crucial in the front of growing competition from domestic and foreign companies, free trade and globalization, and especially facing the challenges towards EU integration. Proper management of human resources would greatly contribute to improved quality of products and services; increased creativity and innovation; motivation, commitment, qualification, efficiency and effectiveness of the workforce, which in turn would contribute towards a competitive advantage.

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This article aims to explore one aspect of HRM in big companies in the private sector in Albania, which has to do with the presence of the HR department, its size ratio compared to other practices, and whether the business ownership and the activity of the company are factors which affect the existence of the HR department in the Albanian big companies.

2. LITERATURE REVIEW

Good HRM is a feature of visionary organizations. HRM builds upon the assumption that human resources are the ones that would form a competitive advantage for an organization, and the purpose of HRM is to incentivize and emphasize the commitment of its employees towards the organization. HRM practices focus on processes of recruitment and selection, management of talent, training and development of employees, performance management, remuneration management, motivation, planning and organizing, as well as the definition of job functions in the organizational structure. The HRM philosophy, in general, has evolved over time as a result of economic development, industrialization, the evolvement of human rights principles and management ethics. The development of the HRM concept is based upon the effective use of employees and their treatment as resources or assets that strongly contribute to the fulfillment of the strategic goals of an organization.

Different researchers have defined HRM in different ways. The definition provided by Dessler (2007) about HRM is: "Applied policies and practices to guide the human aspect of management, including recruitment, selection, training and performance evaluation". Hellriegel et al. (2009) define HRM as: "The process of analysis and management of the needs for human resources in an organization, aiming to guarantee the fulfillment of the strategic objectives". HR management is a philosophy of people's management in an organization, based on principles and values. According to Storey (2001), "HRM is based on the supposition that it is the human resources that can create a competitive advantage for an organization, and the purpose of HRM is to incentivize and empower employees' commitment." The way how employees are managed and developed is considered one of the main factors contributing to the organizational performance (Marchington and Wilkinson 1997, Philips 1997). The HRM function is comprised of several policies and practices, which are especially important for a growing organizational performance. The efficient and effective development of such practices contributes to better quality products and services as well as to growing benefits for the employees. According to Gubbins et al. (2006) if HRM policies and practices are well defined, they affect the perceptions and attitudes of managers and employees towards their job.

Different researchers suggest that applied practices in the HRM field affect organizational performance by having a direct influence on the attitude and behaviour of the employees. Organizational performance growth is the focus of today's management practices, by clearly defining what needs to be achieved and how it can be achieved. Management of human resources clearly influences the improvement of organizational performance. According to Guest (1997) 'An element which characterizes HRM is the principle that performance is improved through people's work in an organization'. Huselid and Becker suggest that a professionally designed and deployed HRM system represents a significant economic asset for an organization. Ramsey et al. (2000) emphasize the fact that the opportunities and benefits offered through HRM practices affect the employees to have a better perception about the fulfillment of their needs.

Effective management of employees is considered the most difficult and complex aspect of management in an organization nowadays. Different authors have raised the importance of HRM

towards an improved organizational performance as well as contributing to the achievement of strategic goals and objectives. However, the presence of an HR department in an organization, as well as the extent of the policies and practices applied has to do with several factors related to economic development as well as related to the stage in the lifecycle of an organization. In small organizations, the focus is on survival and HR practices may not be properly documented or structured and defined with a clear methodology, and often the HR department is not present. On the contrary, larger organizations that are more settled and have secure business strategies, often establish their HR departments with formal policies and practices, such as job descriptions, formal remuneration systems, hiring and retention of employees, training and development, etc. In general, as staff size grows and organizations become complex, the HR function becomes more formalized and sophisticated (Hornsby and Karatko, 1990).

Executives in the HR department and other functional areas attempt to fit policies and processes to the business needs, yet the business needs vary depending on organizations' stages of development (Baird and Meshoulam, 1988). The HR practices and systems must fit the needs of the organization and often require management to support significant organizational change. The size of an organization will certainly affect the way how HR practices and systems are designed and implemented, and the size of an HR department is usually measured as a ratio of HR FTE (full-time equivalent) staff versus the total number of employees (FTE). This is one of the HR indicators which is usually known as the 'HR-to-employee' ratio.

Different authors have defined a benchmark related to the number of employees which marks the existence of the HR department. There are different opinions about this number for a company to hire an HR specialist and therefore start an HR department. Some refer to 50 employees, often to 100 employees, however, there is not a clear-cut reference for that. According to Brewster, et.al (2006) the HR function is usually formalised and structured in organizations with more than 200 employees. Other researchers such as Galanaki and Panayotopoulou (2008) and Fernandes-Sanchez et al. (2008) have used 200 as the employee number to select companies to analyse different aspects of HRM. According to Albanian law[2] companies with 50 to 249 employees are categorised as medium enterprises while those with 250 and more employees as big enterprises. Considering these two levels, Albanian companies with 250 or more employees are selected for the purpose of this article, considering that their size implies that organizations need to have structured and formalised HR systems and practices, therefore such companies would make a valid target for the hypotheses analysis.

3. METHODOLOGY

The purpose of this article is to explore the extent of the presence of the HR department in the Albanian companies and whether the business ownership and activity type of these companies play a role in the existence of the HR department. As defined by the literature review, the establishment of the HR department is related to the size of the organization. As small businesses tend to struggle for their survival, the establishment of the HR department is not a priority. The need for HR presence becomes more crucial as the company grows. As provided in the literature review, the target companies for this article are those with 250 and more employees. The size of the organization affects the dynamics of HR development in an organization, both in terms of structure as well as in terms of policies, systems, and practices.

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[2]   Law No. 10042, date 22.12.2008

The data for this research are gathered via questionnaires as a tool for systematic data collection. The questionnaire is constructed with concise, clear, and understandable questions measured on a 5 level Likert scale, and the responses are analysed using quantitative methods. The data collection is guided by the confidentiality principle. 65 companies were selected forming such a sample size that provides a confidence level of 95% and a margin of error of 5%. The analysis of the internal consistency and reliability of the questionnaire was performed using Cronbach Alpha whose coefficient value resulted to be over 0.80 proving as such the validity of the questionnaire.

The analysis regarding HR department in these selected companies is done using two dynamics: a) *the presence of HR department* in these companies in the viewpoint of ownership and activity type; and b) *the size of the HR department* using the indicator of HR-to-employee ratio, often referred to as HR ratio. For the purpose of this article, the companies are categorized following their ownership and type of activities as follows.
- Ownership:
  - *Albanian* – the owners are Albanian individuals and/or entities
  - *Foreign* – the owners are foreign individuals and/or entities
  - *Joint* – companies have joint ownership of Albanian and foreign individuals and/or entities.
- Activity type*: Production; Service;* and *Trade.*

For the analysis, five hypotheses were defined to statistically analyze the effect of ownership and activity type on the existence of the HR department, as well as to the HR ratio (HR-to-employee) in the big companies in Albania.

Hypotheses:
H_1: *The existence of HR departments in Albanian big companies is affected by the ownership in these companies.*
H_2: *The existence of HR departments in Albanian big companies is affected by the type of activity these companies perform.*
H_3: *The size of the HR department in the Albanian big companies is sufficient to perform all tasks and responsibilities.*
H_4: *The HR ratio in the Albanian big companies is affected by the type of ownership in these companies.*
H_5: *The HR ratio in the Albanian big companies is affected by the type of activity these companies perform.*

4. RESULTS

As Albania has come out of a centralized economy under a communist regime, the private sector has started to develop from the early nineties. About 79% of the companies that are part of the research are established before 2006 while about 54% are established between 1991 and 2000.

About 49% of the questioned companies offer services operating mainly in the banking, telecommunication, education, health care, and customer care, while 43% are production companies and only 8% are trading companies. Regarding ownership, 44% of the companies have foreign ownership, while 43% have Albanian ownership and only 13% have joint ownership, foreign and Albanian. Based on the analysis, the foreign-owned companies operate mainly in the services industry (63%) and production (37%), while the Albanian-owned companies operate mainly in production (42.3%) and services (38.5%).

The HR department in the big Albanian companies is the focus of this article. The presence of the HR department in companies of this size (250 and more employees) is an awareness indicator that the company appreciates HRM and has invested to at least create the structure for such management function. On the other hand, the size of the HR department analyzed using the HR ratio provides information regarding the sufficiency of the HR staff in the company structure, which implies the extent of applying HR practices in an organization. As described in the literature review, there is not any clear-cut reference regarding the value of such ratio, however, a comparison with different research on different countries provides some feedback on the level of such ratio.

4.1. The existence of an HR department in the Albanian companies

From the companies researched, only 11% result not to have an HR department. In these companies, the main tasks part of the HR role, such as recruitment and selection, performance evaluation, remuneration, are under the responsibility of the CEO and Finance department which cover mainly the administrative aspects of the HR practices.

The analysis about the effect of the ownership in the existence of the HR department, provides some feedback about the level of awareness of the Albanian entrepreneurs regarding the necessity of having in place an HR department. Therefore, the analysis compares the companies with foreign, Albanian or joint ownership. The categories regarding activity type, aim to analyse whether the existence of HR department is more present in the service sector, compared to production or trade, considering that the service companies are from mainly the banking and financial sector in Albania, as well as telecommunication.

1. Hypothesis one suggests that *there is a significant relationship between the type of ownership and the existence of HR departments in the big companies in Albania.*

About 89% of the questioned companies do have an HR department within their organizational structure. The HR department is missing in 26% of the companies with Albanian ownership and 12% of the companies with joint ownership, while all foreign-owned companies do have an HR department in their organizational structure.

To analyze whether such difference is statistically significant, a 'Chi-Square test of Independence' was performed, using two non-numeric variables: 'ownership' as an independent variable and 'existence of HR department' as a dependent variable. The ownership type is analysed in three layers: Albanian, foreign, and joint ownership. The test resulted statistically significant, X^2 (df=2, N=65)=11.087, P=0.004, therefore we can conclude that there is a statistically significant relationship between the type of ownership and the existence of HR department in the Albanian big companies.

In order to measure the effect between the two variables, Cramer's v coefficient is calculated resulting in a value of 0.372, which shows an average strength of association between the two variables (classification according to Rea & Parker, 1992) type of ownership and existence of HR department. Therefore, Hypothesis one is accepted.

2. Hypothesis Two suggests that *there is a significant relationship between the type of activity and the existence of HR departments in the big companies in Albania.*

From the questioned companies, it is about 19% of the production companies, 20% of the trading companies and 7% of the service companies which do not have an HR department in their structure. Most of the production companies in this category are mainly companies outsourced by other companies for clothing and shoe production. From the data analysis, service companies are more inclined to have an HR department (93%), considering that part of these businesses operate in the banking and financial sector, telecommunication, etc. However, in order to analyze whether this difference is statistically significant, a 'Chi Square test of Independence' is performed using 'activity type' as an independent variable and 'existence of HR department' as a dependent variable. The type of activity is analysed in three layers: production, services, and trade. The test value resulted as X^2 (df=2, N=65)=2.248, P=0.325 and since P value is higher than 0.05 the relationship between these two variables is considered not statistically significant. Therefore, we can conclude that Hypothesis two is rejected.

4.2. The size of the HR department in the Albanian companies

The number of HR staff in an organization is not a meaningful indicator if considered alone; therefore, the HR ratio is used to measure the sufficiency of the HR staff. This indicator measures the ratio between the HR staff versus the total number of employees using full-time equivalent (FTE) numbers. Such an indicator is called 'HR-to-employee ratio'. Since there is no previous research regarding this ratio in Albanian companies, other research is used as a reference point for comparison.

Previous research from Brewster et al. (2006) provides the average ratios in Europe overall and some countries within Europe. According to this study, the HR ratio in Europe resulted to be 1.59 HR staff per 100 employees with a variation among different countries, where the average ratios for Bulgaria were 1.02, Ireland 1.99, UK 1.50, Germany 1.46, Spain 1.28 and 1.52 in Estonia. The Society for Human Resource Management (SHRM) (2015) has done some research regarding the HR ratio in the US, analyzing more than two thousand companies of different sizes in the US. The average HR ratio resulted to be 2.57 for all organizations. As staff number increased the HR ratio decreased.

According to SHRM, small businesses (1-250 FTE) in the US have an HR ratio of 3.4, while companies with 251-1,000 FTE have an HR ratio of 1.22. For larger companies, the ratio decreases to 1.03 HR staff per one hundred employees. As shown in Table 1, about 72% of the questioned companies have an HR ratio of less or equal to 1 per one hundred employees, while only 15% have a ratio between 1.1 and 1.5%, comparable to the rates of EU average and US value of companies with staff above 250 up to 1000, which is more comparable to the sizes of Albanian companies.

The average value of the HR ratio for the Albanian companies is 0.81 with a minimum value of 0.26 and a maximum value of 1.86 and a 0.48 standard deviation (Sd). The distribution is clearly visible as shown in Figure 1.

Table 1. HR ratio in the Albanian companies

HR ratio	%	accumulated %
0.1–0.5	38	38
0.6–1.0	34	72
1.1–1.5	15	87
1.6–2.0	13	100
total	100%	

Source: Own research
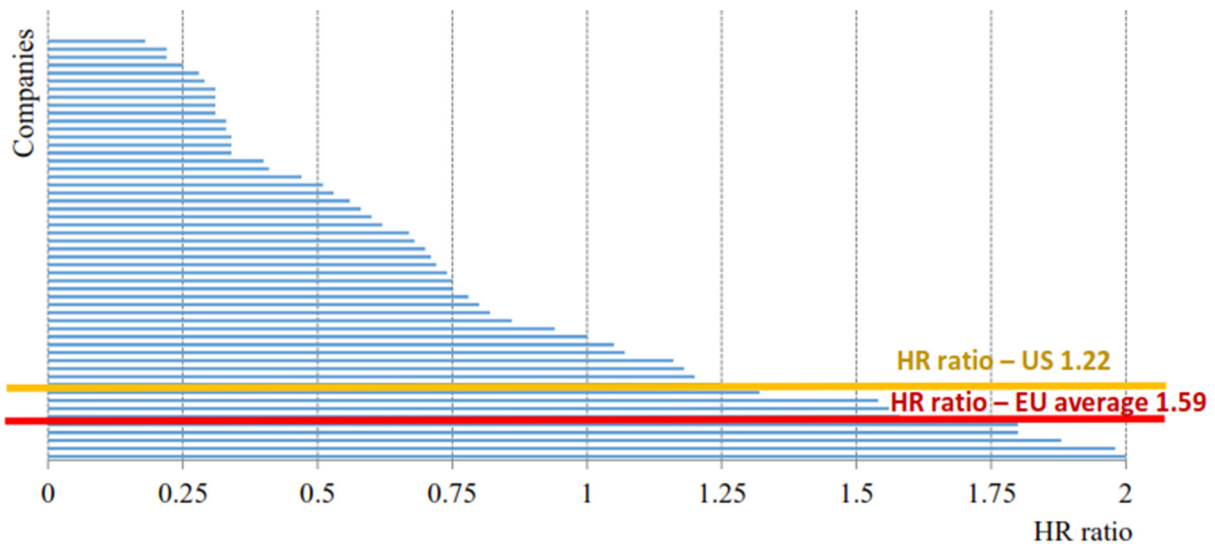
Figure 1. HR ratio of AL companies vs other countries
Source: Own research

3. Hypothesis three suggests that *the size of the HR department in the Albanian big companies is sufficient to perform all tasks and responsibilities.*

The companies were asked to respond whether they perceive their HR staff number as sufficient to perform all their tasks and responsibilities. About 47% of the companies have responded that their HR staff number is either too small or somehow sufficient. However, to analyse whether such perception is realistic a Pearson's r correlation analysis is performed using two numerical variables: 'HR staff is sufficient' and 'HR ratio'. At first, the analysis of the normality of the two variables was performed using the graphical analysis (Q-Q plot) (Figure 2 and 3) and analysis of Skewness and Kurtosis.
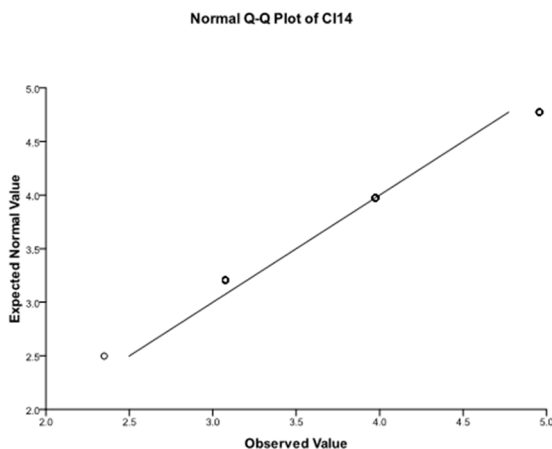
Figure 2. Sufficiency of HR staff
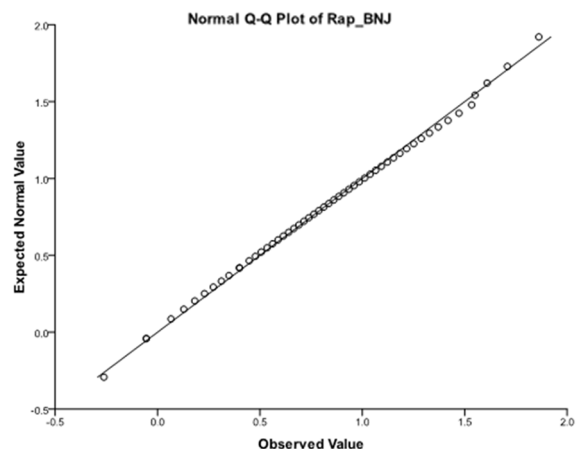
Figure 3. HR ratio

Source: Own research

The test showed that there is a positive correlation $r(58)=0.390$, $p=0.004$, of an average level *(Hopkins, 1997)* between the perception of the companies about the sufficiency of the HR staff versus the HR ratio. As such, it can be concluded that the number of HR staff in the big companies in Albania is not sufficient to perform all tasks and responsibilities that such function requires. Therefore, hypothesis three is rejected.

4.   Hypothesis four suggests that *the HR ratio in the big companies in Albania differs in relation to the ownership of these companies.*

From the data analysis results, the average value of the HR ratio is 0.81 HR staff per one hundred employees (FTE). The companies with foreign ownership, in general, have a higher ratio compared to the other companies with Albanian or joint ownership. About 41% of the researched companies have an HR ratio with a value above 1.1 per one hundred employees compared to the other companies, where only 16% of the companies with Albanian ownership and 14% of the companies with joint ownership have HR ratios in these values.

To analyze whether this finding is statistically significant, the **'One-way ANOVA'** test was performed to compare the effect of the independent variable 'ownership' to the dependent variable 'HR ratio'. The analysis of the normality was performed using graphical analysis (see Figure 4) for both variables as well as Skewness and Kurtosis.
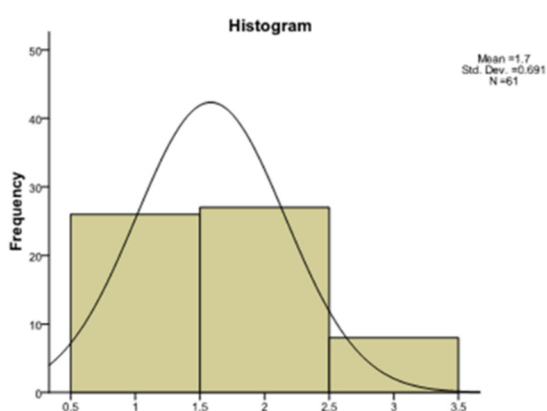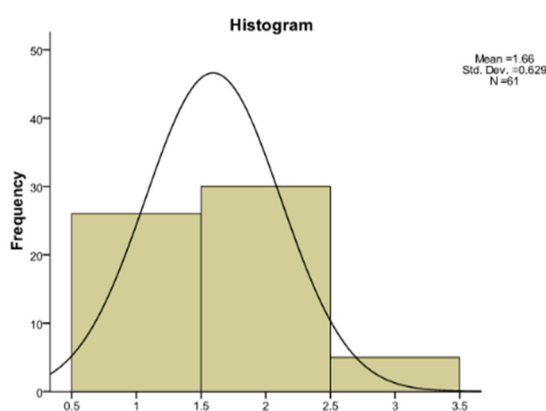
Figure 4. Ownership   **Figure 5.** Activity type

Source: Own research

The supposition of homogeneity of the variances was tested using Levene's test, which resulted in $F_{(2,58)}=0.224$ and $P=0.8$. The Anova test value resulted to be $F_{(2,58)}=2.438$ and $P=0.098$. Considering the P-value, the result is not statistically significant; therefore, there is not any statistical evidence that can prove any connection between the HR ratio and the ownership for the Albanian companies. Therefore, hypothesis four is rejected.

5.   Hypothesis five suggests that *the HR ratio in the Albanian big companies differs in relation to the type of activity these companies perform.*

The analysis of the 58 companies showed differing HR ratios of the companies concerning their activity type. The companies which offer services, in general, have a higher HR ratio compared to the companies which deal with trade or production.

To statistically analyze such a relationship, the **'One-way ANOVA'** test was performed to compare the effect of the independent variable 'activity type' to the dependent variable 'HR ratio'. The analysis of the normality was performed using graphical analysis (see Figure 5) as well as Skewness and Kurtosis.

The supposition of homogeneity of the variances was tested using Levene's test, which resulted to be $F_{(2,58)}=1.085$ and $P=0.346$ $(P>0.05)$. The Anova test value resulted to be $F_{(2,58)}=0.898$ and $P=0.414$. Considering the P-value is higher than 0.05 it can be concluded that the relation between the HR ratio and the company activity type is not statistically significant. Therefore, hypothesis five is rejected.

5. CONCLUSION

HRM is a management function that needs special attention considering its impact on the creativity, innovation, motivation, efficiency and effectiveness of the workforce, transforming it into a precious asset for the organization. Job relations in Albania are undergoing important changes as the private companies must be able to successfully face the technology advancement, globalization, growing domestic and foreign competition, and the need to have an efficient and effective workforce, in order to fulfill the economic objectives.

The focus of the article is put on exploring the existence and the size of the HR department in Albanian companies, as the prerogative condition for a proper HRM function. The target of this research were the Albanian companies with 250 or more employees, which are considered by law as big companies in Albania. The analysis was performed in the view of the raised hypotheses regarding the effect of ownership and type of activities both in the existence of the HR department, as well as on the HR ratio, and whether the size of the HR department is perceived to be sufficient for the appointed tasks and responsibilities. The analysis was structured based on five hypotheses which were evaluated in order to prove their validity.

The HR department resulted to be present in 89% of the companies' overall, and it is the companies with foreign ownership and the ones delivering services, which have a higher presence of HR department compared to other companies. The lack of an HR department is a characteristic of big companies with Albanian ownership. The existence of such a department is key for HRM development in a company, as it would create the premises for qualitative management of the employees, and therefore every practice related to it.

The HR department overall results to have less staff than needed for the fulfillment of tasks and responsibilities. This creates a risk for the companies because the overload of roles would result in less quality and diminishing results. The low HR ratio is a characteristic of the big companies in Albania, and such ratio is not affected by the ownership or activity type of these companies.

Understanding properly the role of HRM towards organizational success and investing in creating the proper structure to support such management role, is key for the organizational success overall. In Albania, although a considerable part of the businesses is aware of the importance of having a properly qualified and motivated workforce, still at times the role of the HR department and the importance to have a well consolidated and functional department is not fully understood. Such lack of understanding would cause many difficulties in managing human resources, affecting the overall organizational performance and labour market; therefore, raising awareness of the business community for proper human resources management has utmost importance.

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The Role of Integrated Marketing Communications in Building a Brand and Improving Business Performance

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Abstract: *Organizations through various forms of marketing communications strive to increase brand awareness and create a brand image in the market. Through these communications, relationships between consumers and companies are developed, to build customer loyalty. Correlation relations showed that there is a great dependence between the variables of marketing communication and the variables of brand building and business performance. The regression model found that marketing communications have the greatest impact on brand recognition in the market, highlighting the impact of public relations and direct marketing. It has been confirmed that economic propaganda, sales promotion and internet marketing are the best predictors of market participation as business performance of an organization. The results of the research indicated that the impact of marketing communications on brand building is greater if the organization is ready to conduct adequate marketing research and to the greatest extent satisfies the needs and requirements of consumers.*

1. INTRODUCTION

The role of consumers in modern business is changing significantly. In the communication process, the consumer is the one who takes control and decides whether and when to receive the message (Kitchen & Schultz, 2009). The effectiveness of marketing communication has a significant contribution to building a strong brand (Keller, 2009) and a key role in achieving business success (Prasad & Dev, 2000). Integrated Marketing Communications (IMC) has an important role to play with building and maintaining relationships with stakeholders, and leveraging those relationships in order to create brand value based on customers (Baidy & Maity, 2010; Kerr & Drennan, 2010).

For brands that have obvious and relevant values in the market, they require different ways of communication in order to maintain the perception they have with customers. The use of consistent messages of different levels has different consequences on the structure of brand knowledge depending on how well we know the brand (Delgado-Ballester, Navarro & Sicilia, 2012).

Marketing communication plays a key role in creating and maintaining relationships among those who have a common interest, but certainly also in relations in terms of marketing and brand management (Amiri, Dastourian, Foroudi & Nankali, 2017). Greater competitiveness is ensured through integrated marketing communication (Brunello, 2013). The goal is to raise awareness and knowledge about products and services, create an image and tendency to buy products (Damarjati, Kusumavati & Mavardi, 2016). Brand loyalty represents a positive customer perspective towards the brand (Buil, Martinez & De Chernatoni, 2013).

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2. LITERATURE REVIEW

According to the research (Elliott & Boshoff, 2008), the impact of business orientations on integrated marketing communications was analyzed, whereby it is realized a positive impact of market orientation and proactive orientation of competitors on the application of IMC. The research (Šerić & Gil-Saura, 2012a) confirmed the existence of a positive correlation between the application of integrated marketing communications, information and communication technologies and brand value from the customer's perspective. This research established a positive relationship between brand trust and brand loyalty.

Perceived quality has a positive impact on customer loyalty, with quality perception created in the minds of consumers helping to increase satisfaction and leading to brand loyalty. Companies through the means of marketing communication should present a real picture of products and services in the market, providing numerous and effective details to their customers, while ensuring their complete loyalty (Ahmed, Rizwan, Ahmad & Haq, 2014). The efficiency of communication channels contributes to achieving customer loyalty more than the quality of communication, which only indicates that it is crucial to make efforts in a combination of customer-specific channels, according to his preferences (Hänninen & Karjaluoto, 2017). According to research (Buil, Martínez & De Chernatony, 2013) it was found that a strong and valuable brand could be effective in company performance and achieving organizational goals, which is achieved by its effects on consumer reactions and responses. Research (Amiri et al., 2017) confirmed that IMK has a positive and significant impact on brand image, quality perception and brand loyalty, while a significant effect was achieved on business performance and competitive advantage in the market.

It has been confirmed that integrated marketing communications have a positive effect on the brand's financial performance, affecting the communication campaign and market performance (Luxton, Reid, & Mavondo, 2015). Stronger integration of marketing relationships and brand management research contributes to the analysis of customer identification and satisfaction (He, Li & Harris, 2012). Marketing efforts are a key condition for providing quality, including customer feedback, in preparation for future product and service development. The effects of interaction of services and promotional activities have a positive impact on customer satisfaction, thus enabling the maintenance of a competitive market position (Ramanathan, Subramanian & Parrott, 2017). Organizations must make continuous efforts to build comparative advantage, by improving brand reputation, positive thinking, and meeting consumer expectations. Adequate brand management contributes to improving the competitive position in the market (Vranješ, Jovičić, & Drinić, 2016).

Research (Slotegraaf & Pauwels, 2008) has shown that average sales growth is achieved with promotional efforts for low value brands, while marketing communication provides continuous cumulative sales effects when it comes to higher value brands with a tendency to innovative development. Brand building develops a strong connection with customers and creates opportunities for interaction with them, which opens the possibility of creating new market positioning strategies (Gligorijević, 2011). The research (Bakator, Đorđević, Ćoćkalo & Bogetić, 2020) found that there is a positive relationship between the relationship with consumers and the brand, the relationship between consumers and products, and trust in the brand and the quality of the relationship with the brand.

Advertising on a website and selling over the Internet also affects the achievement of a better financial result. Marketing strategy varies according to the frequency of advertising. When it comes to sending messages, social media sites are the most popular and cost-effective distribution channels. Promotional activities create strong brands that can maintain the negative aspects of lower product quality (Bakator & Petrović, 2016). Research (Cvjetković, Jovanović, Stepanov & Cvjetković, 2020) found that the quality of digital marketing communications affects better positioning of products and services in the market, as well as further strengthening of the brand, with visible effects on gaining competitive advantage in the market The impact of innovative marketing in the Industry 4.0 framework increases the competitiveness of companies (Ungerman, Dedkova & Gurinova 2018), with an emphasis on the use of various tools to build relationships with customers, which results in competitive advantage (Weru & Mbugua, 2017).

3. RESEARCH METHODOLOGY

The research presented in the paper was conducted at the beginning of 2021. The subject of the research was the application of integrated marketing communications in the company's business. The research sample included 307 managers from companies operating in the territory of the Republic of Serbia. The surveyed companies are mostly privately owned (74.9%), which have a domestic national origin (83.7%). According to the size of enterprises, the percentage of medium-sized enterprises was the highest (38.7%), slightly less of small enterprises (34.9%), while large enterprises were the least represented (26.4%).

The presented research proves the following hypotheses:
H1: Variable marketing communications show statistically significant relationships to the variables brand building and business performance.
H2: Variable marketing communications show statistically significant relationships to brand building variables with a moderating effect of marketing research.

The research aims to point out the importance of marketing communications of companies for building a brand on the market and improving the business performance of the organization. Marketing communication of the company was analyzed through the variables used to communicate with consumers and the environment. Variables were analyzed through the efficiency of the application of various instruments of integrated marketing communications. The marketing orientation of the company was analyzed through the evaluation of the application of economic propaganda, personal sales, sales promotion, events and experiences, direct marketing, public relations and internet marketing. The mentioned variables were evaluated based on claims where the respondents expressed themselves on a scale from 1 to 5, where 1 – I do not agree at all, while 5 – completely agree. The organizations evaluated the variables that indicate the position of the brand of their products and services on the market and the level of achieved business performance. Variables of the brand building were analyzed through the achieved image, identity and reputation of the brand in the market, but also through the loyalty that consumers have to it and its recognizability. The business performance of the organization was assessed through variables that indicate profitability, sales growth, market share, productivity and competitiveness of the organization. These variables were rated on a scale of 1 to 7, where 1 indicates a very low value and 7 a very high value. Data were collected from a methodologically created online questionnaire. The collected data were processed using the statistical program IBM SPSS Statistics 25. The methods used for data analysis are descriptive statistics, correlation and regression analysis.

4. RESEARCH RESULTS

Descriptive statistics were used to evaluate the analyzed variables. Table 1 shows the values (minimum, maximum and average) and standard deviation for each analyzed variable of marketing communication, brand building and business performance.

Table 1. Descriptive statistics of variables marketing communication, brand building and business performance

Variables	N	Min	Max	Mean value	Standard deviation
Economic propaganda	307	1	5	3,94	1,114
Personal sales	307	1	5	4,01	1,139
Sales improvement	307	1	5	3,58	1,440
Events and experiences	307	1	5	3,65	1,342
Direct marketing	307	1	5	4,00	1,190
Public relations	307	1	5	4,08	1,149
Internet marketing	307	1	5	4,22	1,081
Brand image	307	1	7	5,53	1,410
Brand identity	307	1	7	5,82	1,356
Brand reputation	307	1	7	5,78	1,320
Brand loyalty	307	1	7	5,78	1,318
Brand recognition	307	1	7	5,78	1,364
Profitability	307	1	7	5,37	1,323
Sales growth	307	1	7	5,47	1,380
Market share	307	1	7	5,32	1,444
Productivity	307	1	7	5,23	1,502
Competitiveness	307	1	7	5,49	1,339

Source: Author's own research

The results of the research of descriptive statistics show that the activities of marketing communication of companies are very well evaluated. Among the best assessed variables of marketing communication are internet marketing and public relations. This indicates that organizations recognize the importance of applying internet marketing in creating a brand in the market and communicating with increasingly demanding consumers. In the conditions of modern business and online environment, the role of consumers is changing. Communication control is in his hands, and he chooses when he will receive the message, where he will receive it and whether he even wants to receive messages from the organization that comes into contact with him. Also, public relations enable the organization to build good relations with all stakeholders in business and are an effective means of creating good public images and building a brand in the market. Among the lowest rated variables of marketing communications were the improvement of sales and events and experience. Sales improvement is a significant tool whose effective application can greatly contribute to organizations increasing their market share and gaining more customers. Through further activities, they strive to build long-term relationships and loyalty with their customers. Also, the results indicate that organizations do not pay enough attention to various events and experiences as a purposeful method for creating a reputation in the market and building a brand.

High values were also noted for brand building variables. The brand identity was among the best-rated variables. With the identity of their brand, the companies strive to contribute to the most efficient experience with consumers with striking symbols. By building brand identity, organizations seek their place in the market and the minds of their consumers. Originality in

creating a brand contributes to creating the best possible brand image among competing products on the market. Brand image is the variable that respondents rated the worst. This indicates that organizations need to invest much more effort to contribute to a better image of their brand in order for users to experience it as well as possible.

By evaluating the business performance variables, the organizations indicated that they were satisfied with their business with high values. The best rated variable is competitiveness. These values indicate that organizations are satisfied with their position in the market, which only points to the fact that by effectively applying marketing communication and improving business performance, they achieve their recognition in the market and the brand that has its loyal customers. Among the weakest rated variants of business performance was productivity. This points to the fact that organizations need to improve their business and improve and reduce business costs over time, making their brand more accessible to their consumers.

The interrelationships and relations between the analyzed variables were examined through correlation analysis. Table 2 shows the values of the achieved correlations.

Table 2. Correlation between marketing communication variables and brand building and business performance variables

Variables	Economic propaganda	Personal sales	Sales improvement	Events and experiences	Direct marketing	Public relations	Internet marketing
Brand image	,399**	,387**	,353**	,285**	,356**	,386**	,413**
Brand identity	,326**	,388**	,306**	,205**	,320**	,349**	,355**
Brand reputation	,404**	,375**	,355**	,273**	,453**	,393**	,276**
Brand loyalty	,445**	,485**	,427**	,331**	,431**	,394**	,389**
Brand recognition	,494**	,469**	,346**	,372**	,449**	,462**	,384**
Profitability	,521**	,475**	,451**	,372**	,408**	,477**	,510**
Sales growth	,455**	,342**	,301**	,289**	,258**	,321**	,363**
Market share	,589**	,503**	,374**	,394**	,434**	,440**	,417**
Productivity	,508**	,386**	,346**	,354**	,260**	,376**	,330**
Competitiveness	,314**	,308**	,321**	,245**	,352**	,289**	,346**

**   Correlation is significant at 0.01.

Source: Author's own research

The results of the research show that the variables marketing communication and the variables brand building and business performance have established strong and statistically significant correlations. All correlations that have been established are positive and indicate a moderate and significant correlation between the analyzed variables.

The variables economic propaganda, personal sales and sales improvement have achieved a significant correlation with the variable brand loyalty. This relationship indicates that organizations can build a loyal relationship with their customers by effectively conducting personal sales and maintaining that relationship by improving sales and providing various benefits to their customers. With these variables, primarily economic propaganda, organizations strive to attract as many consumers as possible, and then various methods and techniques of personal sales and sales promotion strive to ensure that these consumers are satisfied and remain loyal to the brand. This certainly affects the increased sales volume, which is confirmed by the established high values of the correlation between the mentioned variables of marketing communication and the variable of profitability. The marketing communication variable that has established a significant correlation with the profitability variable is internet marketing. This indicates that

organizations, in order to meet the needs and requirements of the modern consumer, must conduct their promotion and sales activities in the digital environment through the site as a starting basis for communication and social networks and e-mail. In addition to increasing profitability, the variables economic propaganda and personal selling have made a significant correlation with the variable market share.

Statistically significant correlations were achieved between the variables economic propaganda and public relations with the variable brand recognition. Economic propaganda is the most important means by which companies can promote their product on the market and build a brand that will be recognizable. Investments in economic propaganda enable the organization to improve its place in the market and in the consciousness of consumers and thus be in front of its competition. Public relations also play an important role in the fight against competition and building recognition on the market. Through various activities, organizations can show their socially responsible business, while highlighting their brand and thus contribute to its greater recognition. Direct marketing is a variable that has established a significant correlation with variable brand loyalty, while a slight correlation has been achieved with variable productivity. The direct marketing activities of the organization have the opportunity to achieve a loyal relationship with its customers, because in this form of communication it makes personal contact with the consumer, and therefore there is a possibility to meet his needs and requirements in full. This form of marketing communication does not have significant effects on productivity, but its effects are significant in the area of improving profitability. This once again points to the fact that loyal consumers increase the profitability of the organization.

Correlation analysis confirmed the positive relations of high value, which proved hypothesis 1. It was confirmed that the variables of marketing communication showed statistically significant relations to the variables of brand building and business performance, which proved their impact.

These correlations were determined once again from the aspect of the application of marketing research in the organization. The aim was to indicate whether the intensity of correlations between variable marketing communications and brand building variables changes if the organization effectively conducts marketing research, considers the needs and requirements of its customers and measures their satisfaction with a given brand. The results are shown in Table 3.

The results of the research show that there are statistically significant differences in correlation relations between those organizations that conduct marketing research and those organizations where this is not the case. Namely, the organizations that conduct marketing research, have already confirmed statistically significant relationships between variable marketing communications and variables of building a brand, have now achieved even greater values. This only indicates that by effectively applying marketing research and considering the needs and requirements of consumers, a brand can be created on the market that will enable greater customer satisfaction and loyalty to a given brand. This claim is supported by the high values of correlations between the variables of economic propaganda, personal sales, public relations and internet marketing, with the variables of brand loyalty and brand recognition in the market.

The importance of marketing research for building a recognizable brand in the market and gaining the loyalty of customers has been confirmed through the establishment of insignificant and negative correlations between analyzed variables those organizations that do not conduct this research. The results of the research showed that mostly insignificant and negative correlations

were recorded, while only the variant of direct marketing achieved a low correlation with all variables of brand building. Negative correlations were established between the variable an event and experience and the variability of loyalty and brand recognition and the variable of public relations and the variable of brand loyalty. This indicates that activities and events that are not in line with the needs and requirements of consumers and purposeful action of the organization, cause dissatisfaction among consumers and the public and lead to consumers not remaining loyal to the brand. This is also influenced by the struggle of competing brands that invest great efforts in marketing research and direct their activities towards the demands and needs of consumers that they have really expressed, and thus improve the recognition of their brand in the market.

Table 3. Correlation between the variables marketing communications and the variable brand building depending on the conduct of marketing research

Variables	Economic propaganda	Personal sales	Sales improvement	Events and experiences	Direct marketing	Public relations	Internet marketing
Companies which conduct marketing research							
Brand image	,456**	,489**	,340**	,339**	,349**	,416**	,472**
Brand identity	,364**	,532**	,277**	,220**	,235**	,402**	,461**
Brand reputation	,457**	,428**	,289**	,324**	,445**	,504**	,355**
Brand loyalty	,531**	,627**	,475**	,439**	,491**	,538**	,515**
Brand recognition	,565**	,596**	,370**	,459**	,478**	,571**	,490**
N	226	226	226	226	226	226	226
Companies which don't conduct marketing research							
Brand image	,176	,162	,315**	,061	,308**	,240*	,236*
Brand identity	,046	,046	,224*	,041	,362**	,099	,049
Brand reputation	,087	,142	,291**	,033	,346**	,040	,009
Brand loyalty	,114	,186	,250*	-,050	,239*	-,081	,053
Brand recognition	,168	,157	,183	-,004	,306**	,024	,046
N	81	81	81	81	81	81	81

**   Correlation is significant at 0.01.,
*   Correlation is significant at 0.05.

Source: Author's own research

Results of correlation analysis confirmed that the positive correlations between the analyzed variables of marketing communications and the variables of building a brand were achieved by those organizations that conduct marketing research, while organizations that do not conduct these surveys recorded slight and negative correlations. Hypothesis 2 was confirmed by these relations, actually it was determined that the variables of marketing communication achieve statistically significant relations to the variables of brand building with the moderating effect of market research.

The influence of marketing communication on brand building and improvement of business performance was confirmed by the establishment of statistically significant values of correlation relations. Regression analysis determined the individual contribution of independent variants of marketing communications to the dependent variables of brand building and business performance.

The results of regression analysis showed that marketing communication activities were the best indicators of brand recognition (R^2=0,321). This indicates that the organization influences the recognition of its brand in the market by conducting marketing communications activities, actually these activities explain 32.1% of variations in brand recognition. When it comes to the individual contribution of the analyzed variants of marketing communications, the greatest influence on brand building was achieved by the variables public relations and direct marketing.

Regression analysis determined that the variables of marketing communication were the best predictors of market share of the organization ($R^2 = 0.381$). These results indicate that organizations are increasing their market share through the efficient implementation of marketing communications activities, actually these communications explain 38.1% of variations in the market share of organizations. Based on statistical significance, the largest individual contribution was made by the variables economic propaganda, sales promotion and internet marketing, with economic propaganda having a statistically significant impact on all analyzed values of business performance, except competitiveness.

These results indicate that organizations can use integrated marketing communications to improve their business and build a brand in the market. Public relations and direct marketing activities mostly contribute to build brand recognition in the market. Acceptance of the brand by consumers and the creation of loyal customers open the possibility for greater market participation. Activities that contribute to the expansion of market share are economic propaganda that strives to constantly remind the brand and keep it in the minds of consumers. By improving sales, organizations strive to improve relationships with their customers and keep them loyal to the brand. Internet marketing includes activities that the organization must effectively manage in order to meet the needs of the modern consumer.

5. CONCLUSION

The impact of effective application of marketing communications on brand building has been confirmed by previous research (Keller, 2009; Šerić & Gil-Saura, 2012a; Amiri et al, 2017). Marketing communications have also confirmed their contribution to improving business performance (Brunelo, 2013; Lukton et al., 2015; Amiri et al, 2017; Cvjetković et al, 2020). The presented research in this paper confirms the influence of marketing communications on brand building and improvement of business performance, emphasizing the individual contribution of the analyzed activities of marketing communications of the company.

Research has confirmed the importance of economic propaganda, personal sales and sales improving to create loyal customers and improve business profitability. Brand recognition in the organization's market is built by creative economic propaganda and efficient public relations. The results of the research confirmed the importance of public relations and direct marketing in the successful presentation of a brand on the market and differentiation in relation to competing brands. The application of marketing communications influences the acquisition of greater market share, with research confirming the importance of economic propaganda, sales improving and internet marketing. Effective application of marketing communications in the organization's business can significantly contribute to build a brand in the market, primarily through its recognizability. The role of these communications is to create loyal consumers, based on which organizations take greater market share and achieve greater profitability. Each of the analyzed activities of integrated marketing communications has its contribution to creating and building a brand in the market, while special attention should be paid to economic propaganda, sales improvement and internet marketing, while the importance of public relations in creating positive public images is inevitable. The presented research in the paper can be the basis for some future research that will be based on the analysis of creating a strategy of market performance based on marketing activities that have proven to be significant in this research.

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Boosting Agribusinesses with Brands during COVID-19 Pandemic

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Abstract: *Agribusiness is one of the major forces in global economic development. Since the 1980s, diversification has been seen by agribusiness as one of the right strategies to improve and increase its status, but the COVID-19 pandemic has exposed the vulnerabilities of agribusiness. In this new context, companies have capitalized on the marketing dimension, shaping their identity to transfer and add value, especially to end consumers. The brand is an intangible bridge that strengthens entrepreneurial capital. The paper aims to analyze the impact of the COVID-19 pandemic on the main players in the agribusiness industry, taking into account marketing performance indicators such as turnover, rating and brand value before and during the COVID-19 pandemic. Exploratory research was performed based on the analysis of secondary data. Given the annual agribusiness reports, the first ten agribusinesses were generated and analyzed using the rankings on turnover, profit and brands developed by Forbes, Brand Finance and Interbrand. The research classified agribusiness taking into account the market they addressed: B2B, B2C, or mixed formula. Only Nestlé is present in all the rankings. From the rating point of view, the pandemic generated by the new Coronavirus did not produce notable implications on the brand of the big players in the international agribusiness. For Romanian agribusinesses, Transavia, Cris-Tim, Vel Pitar are in the top ten in terms of turnover and brand value. The study emphasizes the complementarity of analyzes and the interdependence between them.*

1. INTRODUCTION

Agriculture and the food industry have historically been some of the main drivers of economic growth and development. Considering Maslow's pyramid needs, this industry is based on meeting basic needs without which our lives could not exist. Beyond the production side, the provisions which are mentioned in the new Common Agricultural Policy (CAP) in the National Strategic Plans (well-known PNSs), as well as in the Green Deal, encourage the coagulation of the processing component of agri-food products (by promoting the Farm-to-Fork concept), thus obtaining considerably higher yields. Moreover, it is increasingly stimulated by setting up cooperatives or any other form of association, making it much easier to access projects with non-reimbursable European funding or escalating the multiple crises that we are faced with (sanitary, economic, social) (Schebesta & Candel, 2020; Dani, 2015; Moschitz et al., 2021).

Diversifying the activity of companies by expanding to animal husbandry, distribution of agricultural inputs, own capitalization points (physical or online stores), as well as the part of collection-transport-storage, and sometimes even export, have become the concerns of those who want to maximize revenue (Hron et al., 2007). The call made indirectly to the paradigm shift of delimiting traditional growth (organic, linear) and approaching exponential growth it is one of the secrets of evolution: mergers and acquisitions; diversification/ expansion of business; integrated chain, with the effect of increasing efficiency and reducing losses, etc. (King et al., 2010, Neves et al., 2019).

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The pandemic caused by the COVID-19 virus was a real challenge for the entire economic spectrum, this field included, because of the normality with which we were used to, changed its dynamics. In a relatively short time, we have witnessed redefinitions on a historical scale, so adaptation and continuous determination were two driving factors towards striking a balance. This redefinition of normalcy could be perceived as a reset, as a historical change, having an impact on the life of every citizen. In this context, adaptation and openness are two vital, key elements that can contribute to what changing the lifestyle we were used to before will entail. Most human beings are reluctant to change, probably a reaction specific to human nature, but later most of the population will shift its perspective to adapt and cooperate towards evolution and progress. During this period, more so than before the pandemic, companies have capitalized on the marketing component, outlining its identity for the transfer of value for end consumers, not just a product or service. The relationship of the actors with the final beneficiaries of their work has been strengthened, this facilitates a more accurate position of the distribution of products on the market and an increasingly obvious delimitation of the launched offers. The brand is therefore an indisputable binder, an invisible, intangible bridge that leads to much greater entrepreneurial equity. Internationally, this vital component of the company life is given much greater importance, the results being truly remarkable. Companies in developing countries distribute considerably smaller resources to intangible assets because they still face major systemic and organizational challenges. During the pandemic, there were some changes to the perception of this period, a fact highlighted by the profile entities that study these changes (Brenes et al., 2020; Grashuis, 2017; Lewis et al., 2014).

Given the lack of applied research on the brand-performance relationship for agribusinesses, it is not known the role of branding on profitability. This research addresses the gap in understanding with an analysis of the leading agribusinesses. This paper proposes a new approach to the analysis of the impact of the pandemic on the global agribusiness industry in terms of brand value, recorded ratings, and capitalizing on the evolution of the number of brands in the industry (before and during the pandemic). Moreover, the strategy is also considering companies in terms of the way they carry out their activity: only in relation to other companies (B2B), only in relation to final customers (B2C), or mixed formula.

The main purpose of this research is to study the brand-performance relationship for agribusiness by analyzing the evolution of the main marketing indicators – turnover, profit, rating, and brand value – before the pandemic, and during it respectively. The present research came up with the following research questions:

RQ1. How to select companies in the field of agribusiness?
RQ2. Which are the top 10 economic actors (globally and nationally in agribusiness) in terms of turnover?
RQ3. Which are the 10 most profitable players (worldwide and national level) from agribusiness?
RQ4. Which are the top 10 economic actors (globally and nationally – agribusiness) in terms of brand value?

The research questions are approached through empirical analysis of the top ten agribusinesses at the international level. Also, a zoom-in at the national level (Romania) is assumed. The following general propositions are postulated:

P1. Agribusiness companies with a high brand value are among the top companies in terms of turnover.
P2. Agribusiness companies with a high brand value are among the top companies in terms of profit.

2. LITERATURE REVIEW

Agribusiness is a complex term that, especially at the beginning of its appearance, was marked by bias. Over time, researchers have conducted various studies to give this new concept as clear and concise an understanding as possible. Initially, agribusiness has been associated with the notion of the value chain (Clay & Feeney, 2019), so that later, as its implications were much better understood, to be incorporated under this dome both the agricultural production part and the activities preceding it: supply of agricultural inputs, respectively subsequent ones, such as conditioning, storage, processing, capitalization (of agri-food products) (King et al., 2010).

According to the Cambridge Dictionary, the industry called agribusiness brings together all the entrepreneurial activities that are closely related to the production, processing and selling of agri-food products including the input factors used (https://dictionary.cambridge.org/us/dictionary/english/agribusiness). Therefore, capitalizing on these considerations, in this research paper we will select only companies that meet these criteria.

The pandemic caused by the COVID-19 virus has produced multiple changes in all areas of activity, visible and consistent changes that should have probably been implemented worldwide decades ago. Agriculture and the food industry, generically called agribusiness, have been around since ancient times a primordial field. The most developed companies in this pre-pandemic industry focused on digitization, process automation and not, lastly, in taking advantage of the opportunities offered by artificial intelligence citation (Galaz et al., 2021). Both perspective of production (of raw material), as well as that of processing, to obtain some agri-food products of the highest quality, modern techniques have been used, innovative ways to increase efficiency and efficacy. On a large scale, these approaches cannot be observed, because they involve very high costs, which outlines a real challenge for small and medium-sized companies in this complex industry. The pandemic forced the implementation of these processes to ensure competitiveness for these smaller companies. Sources of funding that can ensure the transformation of the goals into reality have been multiplied both in terms of European non-reimbursable funds, government funds, or even subsidized loans, which are appreciated and used by entrepreneurs.

Brand and the branding process are, in general, a subjective dimension, but one that has been the subject of numerous studies and research to substantiate some theories and relevant conclusions on these terms. In *Aaker on Branding*: *20 Principles That Drive Success*, David Aaker promotes the idea of delivering a mood, an emotion, not only of a product and/ or service. In this regard, Aaker advances the idea of recognizing one brand as an asset with a strategic value, unquestionably contributing to generational customer loyalty (Aaker, 2014). Quantifying the impact of this intangible, strategic asset, both in terms of quantity (market share, level of revenue, etc.) and quality (contribution to goodwill), leads to its relevance and usefulness on a decision-making level (especially top management). The implications of these processes even reach stakeholders, visibly influencing relations with them.

The concern towards the use of consumer-oriented production systems is common in competitive markets and is a potential source of competitive advantage and a driving force for shaping the marketing activities of organizations (Hanf & Kühl, 2005), including those in the field of agribusiness (Chahal & Kaur, 2013). The need for differentiation is increasingly felt among companies involved in the production of agribusiness commodities. The differentiation rep-

resents a strategy that is aimed at the leadership level in agribusiness, by introducing quality attributes for products or services (Saes & Spers, 2006). Creating and promoting strong brands is an element of differentiation in agribusinesses as well.

Due to changes in the current business environment, the decision to buy agricultural goods is becoming increasingly complex and difficult, and the use of branding strategies represents an opportunity, increasing the value of products (Oliveira & Spers, 2018). The new practices of marketing and commerce are important dynamic forces that continue to shape the production markets and market channels (Kaufman et al., 2000).

The measurement of brand value (brand equity) has been studied by several authors who have proposed models for its estimation (Aaker 1996; Keller 1993; Yoo et al., 2000). Brand capital is defined by Keller (2003) as marketing effects attributable only to the brand. Huang and Sarigöllü (2014) have proposed product-market performance measures because consumers are willing to pay higher revenues because of the brand. This measure is a better choice for the continuous pursuit of brand equity, as it is a more accurate and practical measure (Huang & Sarigöllü, 2014; Oliveira & Spers, 2018). Extremely little academic literature is paid to the study of the role of branding in agribusiness. Oliveira and Spers (2011) studied the attribute 'trust' and how the actual consumer perception encourages the implementation of branding strategies in agribusiness. A major challenge regarding the neglect of the branding component can be identified at the level of traditional agribusiness entities, local companies, small businesses, even medium-sized ones. Specifically, in the eyes of most consumers, their offers are perceived as similar or even identical in some cases. The lack of technical expertise of consumers could be combated by clearly differentiating these products, by exposing the definite benefits they offer and finally, it would even play the role of an educational component. Entrepreneurial marketing can serve as a relevant answer to this challenge, providing added value for all participants in the process (Lewis et al., 2014). However, several private companies develop and publish various rankings based on different calculation models of brands in various fields, including agribusiness.

3. MATERIALS AND METHODS

Exploratory research was performed using the analysis of secondary data to provide empirical evidence. To identify the companies to be analyzed in the present study, the delimitations regarding the agribusiness industry were capitalized: brand awareness, through the trust and credibility offered by the company, the coverage they enjoy internationally, the history they have and especially, the existence of an annual upward trend in terms of sales volume, as well as the evolution of annual brand value (in international and national rankings). The selection of these companies relied on two main criteria: the complexity of their business (diversification from farm to fork), respectively on the market coverage (expansion on international markets) they enjoyed in the sphere of world agribusiness. These were used as criteria in drawing up the ranking. These are not the only examples that meet these criteria, but they are certainly among the most eloquent economic actors for this selection. To achieve the top in Romania we capitalized on the same criteria. Then, based on the annual reports of the selected agribusinesses, the top ten were generated and analyzed using the turnover and the profit and analyzed considering brands ranking developed by Forbes, Brand Finance and Interbrand.

Forbes (https://forbes.com) publishes the top of the most valuable brands in the world annually through a specific methodology, using income and earnings before tax and applying multiples, generates the final value of brands and compiles charts with the most valuable brands.

Brand Finance (https://brandfinance.com) is another source that analyze brands' perspectives. According to the annual reports of this publication, the values of the brands are the basis for drawing up these rankings. The Royalty Relief approach is used here, which is a way to evaluate brands according to industry standards (regulated in ISO 10668). Specifically, it is about an estimate of probable future revenue that can be attributed to a brand by calculating the royalty rate that would be charged for its use for the purpose of reaching brand value. Brand Finance reports that this is understood as a net economic benefit realized by the licensor if the respective brand would act on the market.

Interbrand (https://interbrand.com) is a strong name in brand consulting, being one pathfinder when it comes to brand-specific tools. The Interbrand methodology consists in providing a vision of awareness of the current state (how the brand currently contributes to business growth), respectively a perspective on amplifying the impact it has for a more solid development, according to information presented on the website of this publication. According to available documents, it can be deduced that the value of a brand is in fact the accumulation of information obtained from financial analysis, the role of the brand and the power of a brand. Notice therefore a comprehensive approach, which radiographs even the smallest details, aiming for correct and objective creation of the intended results.

4. RESULTS AND DISCUSSIONS

The protagonists who work in this field, both internationally, as well as those acting at the national level (Romania), are real models of involvement and perseverance in achieving the intended performance. Analyzing them is a complicated process but also a very useful one for understanding the whole agricultural landscape.

4.1. The main economic actors operating in agribusiness at the international level

The international context of agribusiness is characterized by a special dynamic, marked with priority by the main economic entities (top 10) acting at this level. Whether it's companies that rely primarily on providing agricultural inputs or entities covering a wider range of specific activities reaching the final consumer (by processing the raw material), all the nominated companies play a fundamental, key role in the global economic context. Referring to the turnover, it can be concluded that these companies are strong, developed, and able to support the implementation of innovative, sustainable practices, sustainable to meet the needs of consumers efficiently. Certainly, the power of these economic actors also influences Romanian agribusiness through the multiple partnerships and collaborations they have with the main Romanian entities in the field. Table 1 shows the top 10 agribusinesses having as benchmarks the turnover registered in 2020 and the market served.

The top is opened by the American company Cargill, a giant that operates at the level the main activity of which is the production and distribution of agricultural products and agri-food. Its international values also have direct links in Romania, through Cargill Romania, a company that is also an important player in the Romanian agribusiness market. The second place is held by the well-known economic entity Nestlé, a Swiss concern which through its many products occupies an important market share in the world food industry. Archer Daniels Midland Company is the third-largest company in the above ranking, a company whose portfolio includes activities associated with agriculture, industry food and more (ethanol and biodiesel production, corn, wheat and cocoa processing, logistics networks, etc.). BASF is a name known to almost all

actors in agribusiness, a well-known reputation in the field. Even if it only ranks 4, the group's portfolio includes a range of chemicals, various industrial solutions, as well as several specific agricultural technologies. Position 5 is occupied by Sysco Corporation, a multinational economic entity that is involved in the distribution of food and more. The spread of the services offered is extremely high, over 90 countries, and among the classic services, the company also turned to consult customers who can be satisfied in a complex and efficient way. The next position in this ranking is occupied by the JBS company, which specializes in meat processing (beef, chicken, pork). Tyson Foods (position 7) plays a key role in the global agri-food market because it has been associated with several activities such as the processing and distribution of chicken, beef, and pork. Innovation is a fundamental goal for these economic actors, pursuing streamlining processes and increasing their associated efficiencies. Bunge is a mainstay name in agribusiness because it covers through its services a wide range of services, among which can be mentioned: trade (also transport, respectively storage) cereals and oilseeds, oil production and various grits for food animals, bakery, pastry and more. Therefore, we reach medium-sized companies in the agricultural sector and the food industry (including with operations at the level Romania). Canada-based Nutrien weighs heavily on the fertilizer market, having partnerships and collaborations in many countries. The company's policies address both B2B as well as B2C (with over 1000 retail stores). Syngenta Group, coming in on the last position, is a global supplier of seeds and protection products of plants, with great resonance and on the territory of our country. This name enjoys great notoriety among farmers, position gained over time, through perseverance, innovation, and much involvement.

Table 1. Largest agribusiness companies (internationally)

2020 Position	Name of the company	Country	Year it was founded	Turnover - change % (2020 vs 2019)	Profit - change % (2020 vs 2019)	B2B- B2C- mixed
1	Cargill	USA	1865	1.05%	17.19%	B2B
2	Nestlé	Switzerland	1866	-3.36%	2.76%	mixed
3	Archer Daniels Midland Company	USA	1902	-0.46%	29.20%	mixed
4	BASF	Germany	1865	-1.61%	-112.83%	B2B priority
5	Sysco Corporation	USA	1969	-10.82%	-87.43%	mixed
6	JBS	Brazil	1953	1.16%	-41.83%	mixed
7	Tyson Foods	USA	1935	2.81%	4.04%	mainly B2B
8	Bunge	USA	1818	0.63%	-184.85%	mixed
9	Nutrien (Formerly Agrium Inc. in Potash Corp)	Canada	2018	4.08%	-54.55%	mixed
10	Syngenta AG	Switzerland	2000	5.15%	-2.07%	mixed

Source: Own projection based on the financial statements in the annual reports

4.2. The main economic actors operating in agribusiness at the national level

At a national level, the situation is very different in magnitude, considering the volume of considerably lower sales. It can be easily noticed the specifics of the activity of these economic entities. Worldwide, there is a specialization and a much greater focus of companies on a narrower range of activities; in Romania multiple moving parts are integrated into the production process of the agri-food chain, reaching the provisions of the well-known Farm-to-Fork concept. Ranking based on turnover on which the companies concerned registered in 2020 can be found in Table 2.

Table 2. Largest agribusiness companies in Romania

2020 Position	Name of the company	Country	Year it was founded	Turnover - change % (2020 vs 2019)	Profit - change % (2020 vs 2019)	B2B- B2C- mixed
1	Smithfield	Timiș	2000	4.57%	-234.68%	priority B2C
2	Promat Comimpex	Satu Mare	1998	9.62%	2.87%	priority B2B
3	Cris-Tim	Prahova	1992	-9.88%	-57.34%	priority B2C
4	Unicarm	Satu Mare	1994	0.60%	102.01%	priority B2C
5	Transavia	Alba	1991	2.25%	-26.92%	priority B2C
6	Vel Pitar	Vâlcea	2007	9.27%	75.79%	priority B2C
7	Plantagro Com	Vaslui	2001	-18.28%	-22.28%	priority B2B
8	Agricost	Brăila	2013	7.64%	-4.67%	priority B2B
9	Avicarvil	Vâlcea	2008	17.06%	-22.30%	priority B2C
10	Avicola Buzău	Buzău	1991	1.95%	-104.88%	priority B2C

Source: Own projection based on the financial statements submitted to the Ministry of Public Finance

In the national top of agribusiness companies, the first position is Smithfield, an entity controlled by the Chinese group WH, considered as being the largest player in the world on the pork market. Second place goes to Promat Comimpex, which handles both production and distribution (being a major player in the market for fertilizers, pesticides, and seeds in Romania). Cris-Tim, the third-largest company, manages a large portfolio of activities, integrated under the dome of the Farm-to-Fork concept. At the same time, this company is one representative for the sausage market in Romania and beyond, constantly opting for innovation, as well as towards the integration of processes. The next company (Unicarm, position 4) from the ranking made above, is traditionally constructed, covering both the production part of animal husbandry (animal farm), as well as the pastry, bakery, dairy, sausage, and finally, the urban and rural retail area (currently having over 100 stores nationally). A well-known producer of chicken, Transavia (position 5) is involved both in the part of vegetable production (over 10,000 ha cultivated) and in the part of slaughter, channeling its energy both in the domestic market and for export. It can be noticed that this family business model reaches the consumer through its products finally, a goal that has been successfully implemented for over 30 years. A representative name for the baking industry in Romania is Vel Pitar, ranked 6th in this top. Referring to this company, words like milling come to mind, bakery, pastry, processes made with a lot of perseverance and passion. Founded in Vaslui, Plantagro Com operates in the oilseeds sector, which is exactly what it does, providing the input factors needed for production processes as well as supply field-specific technical assistance. A reference name for the Romanian agribusiness is Agricost, the largest farm based on the area it cultivates (over 56,000 ha – Great Island of Brăila). However, concerning the turnover that was registered in 2020, it occupies only the 8th position. With multiple investments in production, slaughtering and marketing of chicken meat, Avicarvil turned its attention to retail (having several stores of its own). The ranking ends with Avicola Buzau, a major producer of poultry meat, an entity controlled by the group Aaylex Trading.

Internationalization and the processes specific to business globalization have intensified a lot the dynamics of their operations, propelling them to a higher level. In Romania especially, the overall increase in value added through processing has benefited from visible progress, although it is not very developed. By attracting government funds, investments, and/ or through various associations (e.g., through horizontal and vertical cooperation), dynamics could change in this important branch of agribusiness. Transaction costs record expenses to be considered (for example, multiple operations such as loading/ unloading or relatively long distances between the

place of production of the raw material and the processing costs), costs which could be considerably reduced by another approach, more pragmatically and more efficiently. As transferring from the national to the international level, a lot of movement on the market can be noticed, such as a rapidly changing shareholding composition (in Romania this sense is rigid, being still strongly marked by conservatism), rethinking and re-establishing the balance of power in an increasingly growing economy competitive and continuously developing and growing (although against the background of the pandemic generated by the new Coronavirus has created important changes in the business world, its agribusiness maintained the trend, with no significant changes in achieving the objectives followed). Trends in the international arena will inevitably be reflected in this framework at the national level, and this can be anticipated to some extent by knowledgeable entrepreneurs aware of international trends, who show ingenuity and openness. Globalization and the internationalization of business pose considerable challenges, but it need not be an obstacle, on the contrary, it must be seen as an incentive for development.

4.3. Comparative analysis of agribusiness brands before the pandemic (2019) and during the pandemic (2020)

According to the results of Brand Finance, the rating of brands in the global agribusiness, value brands, respectively their number in 2019 vs 2020 is presented in Figure 1.

2019   2020
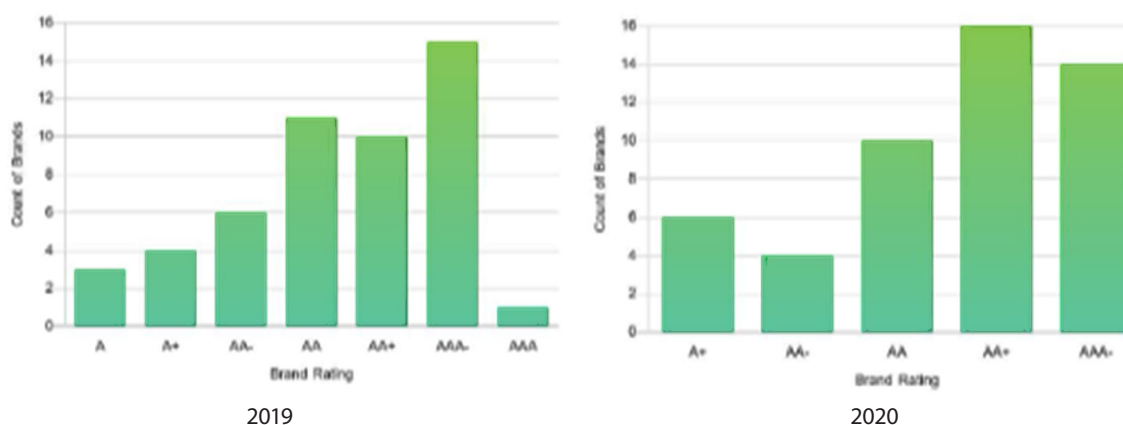
Figure 1. Agribusiness brands ranking – international level
Source: Brand Finance

If in 2019, the brand rating was analyzed from the perspective of seven categories (A, A +, AA-, AA, AA +, AAA-, AAA), one year later, in 2020, the makers of these representation graphs were based on five classes (A +, AA-, AA, AA +, AAA-). At first glance, there are no significant numerical changes in the composition of these classes, but the oscillations of the names of the companies involved can be distinguished (according to the reports published by the source cited – Brand Finance). From a rating point of view, the pandemic generated by the new Coronavirus has not had a significant impact on the brand of the big players in international agribusiness. Regarding the value of agribusiness brands (country classification), the situation in 2019 vs 2020 is shown in Figure 2.

The first 4 positions in the ranking presented here (reference year 2019) are also found in 2020. The United States, China, Switzerland, and Italy remained (with very small fluctuations) on previously consolidated positions, despite the existence of some significant challenges in the market (generated with pandemic priority). Unlike in 2019, France and the United Kingdom have im-

proved their brand value (the analysis is carried out at the level of all brands in the two countries, which of course can be placed under the dome of agribusiness), which implicitly leads to a more favorable positioning of the products from both places. At the same time, it can be noticed that the last position, which was occupied by Denmark in 2019, was attributed to the Netherlands a year later, no change at all surprising in terms of the relatively small percentage that the Nordic country benefits from. In the ranking made in Table 1 were identified the 10 largest pawns from international agribusiness, and five (50%) were from the United States of America, therefore, placing the US in the first position in terms of brand value, an additional argument from this point of view. Also in this ranking, two positions are reserved for Switzerland, another leading state when it comes to analyzing the value of brands. Considering these aspects, it can be once again emphasized the complementarity of the analyzes and of the interdependence between them.

Figure 2. Brand Value by country
Source: Brand Finance

Every year, Brand Finance compiles the top of the most valuable brands out of several areas of activity, including agribusiness. It can easily be noted that there are no major differences between the situation recorded in 2019, respectively the specific picture for 2020 (Figure 3).
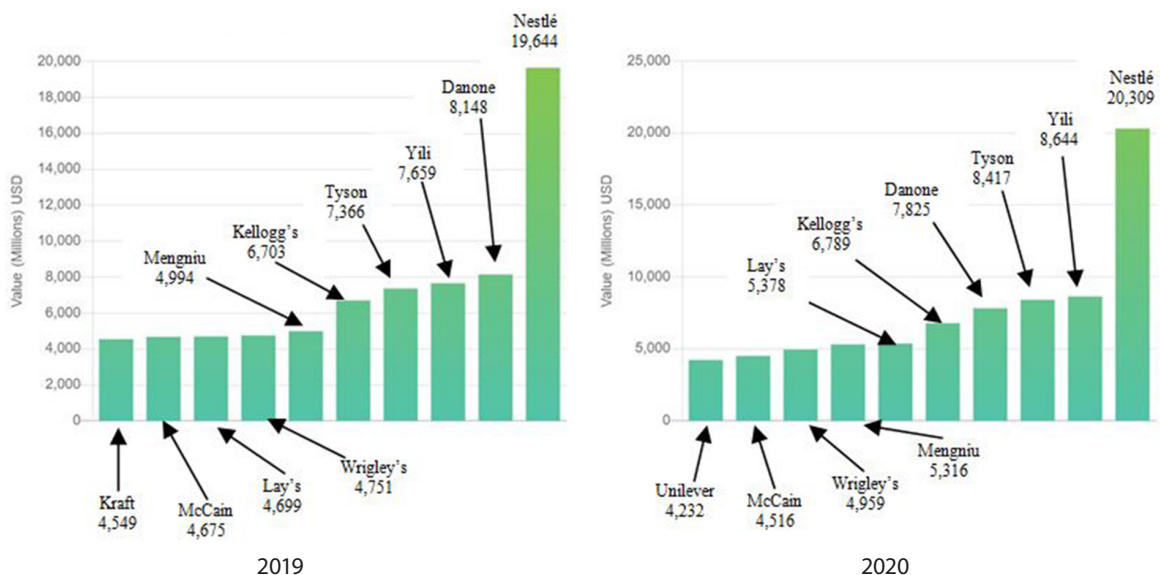

Figure 3. Top Brand Values
Source: Brand Finance

95

Even if there was a change in the scale on which the brand value is measured (millions of USD), the picture is representative. In both cases, Nestlé comes in the first place, being indeed a solid economic entity, prosperous and strongly anchored in the increasingly challenging economic situation around us. In this case, we can even signal an increase in value (during the pandemic versus the initial situation).

Depending on the number of brands in agribusiness (country classification), the situation is shown below (Figure 4).
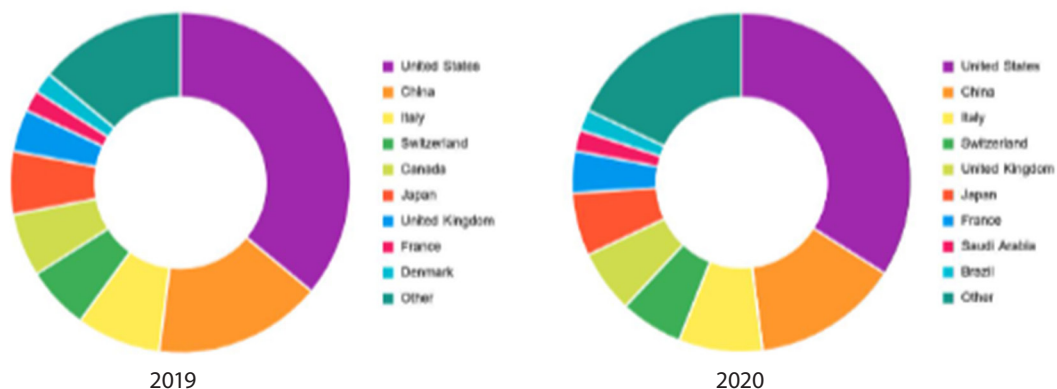
Figure 4. Number of brands by country
Source: Brand Finance

The impact of the pandemic generated by the presence of the COVID-19 virus among us also resonated with the number of brands in agribusiness (viewed from an overall perspective, distribution by country). This influence was not extremely strong, in the sense in which some states such as: USA, China, Switzerland, even Italy, have had conservation of their positions (more than 60% of the specific situation in 2019 can be found in 2020).

The surprise comes in the case of Canada, a state that has disappeared from this top 10 made by Brand Finance, while the United Kingdom appreciated its number of brands during the pandemic (taking over from Canada in 2019). The emergence of Saudi Arabia is also noteworthy, as well as that of Brazil, in the ranking achieved in 2020, which marks an important development for these two states, in terms of food and more (from the perspective of productivity, not consumption).

After analyzing the tops made by the three publications (Brand Finance, Interbrand, Forbes), only two companies are present in all hierarchies: Nestlé and Danone respectively.

Unlike Brand Finance which achieves top 10 (by fields of activity), Interbrand and Forbes achieve top 100 (overall), and to identify agribusiness companies it is necessary to go through this top 100 and then extract the companies that are part of the studied field. Based on Forbes results, the following agribusiness companies are included: Nestlé, Danone, and John Deere. In the classification made by Interbrand (top 100 brands in all industries), there are Nestlé, Danone, Kellogg's and John Deere.

The positions occupied by the companies are shown in Table 3 (both for 2019 and 2020). Concerning the Romanian market, the situation is presented in Table 4.

Table 3. Agribusinesses in Forbes and Interbrand Tops

Forbes			Interbrand		
Position (2019)	Brand	Evolution 2020 vs 2019	Position (2019)	Brand	Evolution 2020 vs 2019
50	Nestlé	+ 4 positions	59	Danone	- 3 positions
76	Danone	+ 6 positions	60	Nestlé	- 3 positions
98	John Deere	- 4 positions	57	Kellogg's	+ 9 positions
			84	John Deere	+ 5 positions

Source: Own projection based on the Forbes and Interbrand hierarchies

Table 4. Top brands in Romania

Source: Own projection based on the Brand Finance hierarchy

The comparative analysis of the tops carried out by Brand Finance on some economic actors in Romania (2019 versus 2020) underlines the fact that there are no significant changes. The only change is observed in the case of the last two positions in the ranking (9th and 10th place), which is reversed. Interestingly, the first 8 positions remain unchanged, which leads to the idea of market stability, the positions being already awarded by the big players. At the same time, another remark is that, out of 10 brands considered to be the most valuable and representative for Romania, 8 are to a greater or lesser extent related to food. In other words, 80% of the brands that make up this top are related to some extent to agribusiness. This idea strengthens the position of the agricultural and agri-food sector in Romania, which is composed of strongly consolidated brands.

An aspect that deserves to be analyzed and detailed, is the existence of other companies in agribusiness in the Forbes, Brand Finance and Interbrand charts, compared to the charts in this paper. This can be attributed to several causes, but it does not mean that the analysis is an erroneous or incomplete one. On the contrary, the coexistence of multiple perspectives in the preparation analysis and interpretation is a factor that shapes the dynamics and complexity of the field.

Analysis from both perspectives (both in terms of turnover and from the outlook of profit in the years analyzed, 2019 and 2020), helps researchers understand what impact has a greater integration of the Farm-to-Fork concept in the operational activity, but also the strategic role of economic actors. In other words, focusing on more links in this chain implicitly leads to increased efficiency and, consequently, to increased added value (thus managing to mark a considerably higher profit). Not coincidentally, the presence of a higher profit rate for the capitalizing entities, the principles of the circular economy, integrate sustainable practices in their activity, respectively diversifying its market presence through a series of tools specific to the branding process.

5. FUTURE RESEARCH DIRECTIONS

It is interesting and relevant to analyze and follow the complementarity and interdependence of national and international analyses. Even if they act with priority at the level of Romania, the Romanian companies are part of a broad international mechanism, major changes in the marketing macro-environment affecting the territories of the Member States as well. This discussion does not summarize only the analyses pointed out in this research paper, on the contrary, it generates new research directions that play a key role in top management strategies. New research directions remain unexplored by broadening the spectrum in terms of studying one brand (beyond the analyzed indicators), as well as making rankings from the perspective of other witnesses (in addition to the turnover or profit marked by the companies). Certain comparative analyses can be performed to draw relevant conclusions before the pandemic, during the pandemic – the present analysis, but also after the pandemic.

6. CONCLUSION

In this research paper, rankings have been compiled (top 10) targeting the international level as well as the national sphere of agribusiness, based on their turnover (2019 and 2020), as well as the coverage of the activities found within the Farm-to-Fork concept. Moreover, the research benefited from the analyses and the profit marked by the selected companies in the two landmark years. Scope and the characteristic dynamics of the international level (the first company in the international top 10), is placed at a much higher level than the one registered in Romania (the first company in the top 10 nationally – Romania) – turnover in 2020: $114.69 billion – international vs. $0.30 billion – national. Comparative analyses of the classifications drawn up by three profile publications: Brand Finance, Forbes and Interbrand (as for the previously selected companies), led us to the result that only two companies (Nestlé and Danone) are found in all 3 hierarchies. From these, only Nestlé is present in the list of the largest agribusiness companies. Considering Romania, three companies mentioned in the top 10 (Transavia, Cris-Tim, Vel Pitar) appear also in the analysis of international publications mentioned above.

The complexity of the companies' activity, from the perspective of diversification under the Farm-to-Fork dome, market coverage (in terms of expansion in international markets), as well as a number of issues concerning: brand awareness (taking into account trust and the credibility offered by the company), the history of the companies and, in particular, the existence of an annual upward trend of the sales volume, corroborated with the evolution of the brand annual value, gives the present research work an important utility in the field of agribusiness analyzes.

The COVID-19 pandemic has forced the emergence of new practices and approaches, playing a vital role in relaxing and redefining new normality, considerably more dynamic than the re-

ality we were used to before it appeared. Analyzing the impact of the pandemic, it cannot be drawn a cause-and-effect pattern, because every economic actor of this industry has a particular specificity, depending largely on wider or more modest integration of the provisions of the Farm-to-Fork concept. Economies of scale and superior returns from experience (know-how) characteristic of each company, produce significant effects that are reflected in the financial statements of their annual reports.

Establishing the relationship between the brand of companies and their performance must be configured according to several criteria, which may differ from one domain to another, from one industry to another. In this context, the presence of new ways of future research is noticeable, through a deep scan of the subdomains of interest.

The economic spheres have all faced the presence of the pandemic, but the impact has not been felt with the same intensity, so we are even talking about antagonistic positions: survival vs diversification. In this regard, when it comes to agribusiness, new elements aimed at stimulating competitiveness (e.g., marketing instruments), to visibly diversify and increase the surplus generated by the company.

From the research limitations perspective, a wide spatial horizon (international level) that contains many variables from a marketing perspective, in this case, the brand, can be noticed. In the present research, we capitalized only on the value of brands, the rating recorded and the evolution of the brands in the industry (before and during a pandemic), indicators that we considered relevant to reach objectives set. The selection process of agribusinesses is based on several criteria, but it also contains a dose of subjectivism. Moreover, the delimitation of companies from the perspective of the market in which they play is not a radical one, in the sense that to increase turnover, these actors are willing to implement several changes in the decision-making processes.

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Firms´ Behaviour in Selling Regional Brands and Customer Loyalty in E-commerce

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Abstract: *The paper aims to present research results on regional brand sales and customer loyalty. The object of the research was small and medium-sized enterprises in the Czech Republic selling regional products and operating in e-commerce. The subject of the research is broadly defined. The paper first deals with the current state of knowledge. The theoretical background is focused on professional literature and studies oriented on regional branding and e-commerce. Both the VosViewer method and the historical method are used in the theoretical discussion. The empirical research includes primary qualitative research. It is qualitative research focusing on SMEs operating electronic sales of goods including regional brands. The research focuses on the business strategy, the establishment of e-stores, the nature of the offer, as well as customer loyalty and performance of the businesses. The results indicate a lower orientation of respondents in the researched issues, not attaching importance to customer relationship management. Customer loyalty is perceived, which is confirmed by the respondents' behaviour according to them. However, half of them do not evaluate it at all, nor do they monitor repeat purchases in the context of behavioural loyalty.*

1. INTRODUCTION

Regions in the EU and the Czech Republic have their unique character. Regions offer interesting products that have unique characteristics influenced by the specific culture, traditions and customs of people who have lived in the regions for a long time. The range of regional products in the Czech Republic is quite rich. Products that are produced in the regions can apply for a regional label, which is awarded by the country's Association of Regional Labels[3] according to set rules such as the origin of the goods, ecological characteristics and regional uniqueness. Regional brands are most often sold in tourist information centres, museums and hotels. Regional brands are also offered in smaller shops run by the producers themselves, at fairs, markets and pilgrimages. Is the sale of regional brands realistic in e-commerce or is it a vision of the future? The COVID 19 pandemic has also contributed to the digitalisation of the market. There has been a greater consumer interest in e-commerce offerings. Has this also affected regional products?

The interest of Czech consumers in regional products is confirmed, for example, by Stoklasa and Starzyczná in their study (2016). But does this also apply to the online environment? And what are the benefits for companies selling regional brands? This issue is still not sufficiently explored. Often, SMEs are also involved in selling regional brands, and it is unique products that appear in their product offerings, even if they are not always regional products. SMEs are closer to the customer. But how do they perform in the online environment and participate in the regional brand offering? It is this area that the authors want to focus their research on the issue of regional branding.

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The aim of this paper is to present research results on selected areas of regional product branding and related customer loyalty. The subject of the research is understood more broadly. The object of the research was small and medium-sized enterprises in the Czech Republic within the Moravian-Silesian region, which are engaged in the sale of regional products and operate in e-commerce. The starting point is a brief search of the available literature and the current state of knowledge. The authors used both the historical method and the VOSviewer method to monitor the focus of attention to the issue in professional publications. The empirical research started with primary qualitative research, the results of which will be presented in the present paper. The research focuses on the following main thematic areas: business strategy, the establishment of e-shops, the nature of the offer, as well as customer loyalty and business performance.

2. LITERATURE REVIEW

The exploration of the current state of knowledge will focus on brand and regional branding and e-commerce and SMEs.

The brand has many definitions. For example, the American Marketing Association (AMA) defines a brand as a name, term, sign, symbol and design or a combination of these terms used to identify products and services provided by one or more sellers. A brand allows companies to differentiate themselves from competitors. Many marketing experts identify with this perception of the brand (Kotler and Keller, 2016, Burrow 2021). Kotler and Keller (2013) emphasize that brands are one of the most valuable intangible assets of a company, which practically implies the need for continuous brand enhancement. Brand positioning, market share and economic benefits (turnover, profitability) play an important role. Brand preferences are in the focus of attention not only of researchers but also of many companies.

When applying the VOSviewer method to investigate the representation of the term brand in the WoS database publications (365 publications), the brand was most frequently associated with the following keywords: value, brand experience, brand trust, brand image, equity, attitude, perception and branding. A very strong connection can be found between the concept of equity and the other concepts, which confirms Kotler and Keller's (2013) previously mentioned assertion that brand can be seen as the most valuable intangible asset. There was less connectivity between brand experience and perception, which was surprising. Customer perception is linked to their experience with the brand and their experience of the brand. Even in the digital world, great customer experiences can be delivered through different communication channels (Siebert, Gopaldas, Lindridge and Simo, 2020). So far, this issue has not been given adequate space. For regional branding, the keywords were development, originality value, consumer and tourism.

Regional brands are also important in that they enable cooperation between local entrepreneurs, public authorities or nature conservation institutions and the tourism sector (Stoklasa, Starzyczná, and Matušínská, 2014). The response of regional companies was not always optimistic, as businesses did not always perceive the real benefits optimistically gained by the regional brand. The effects related to personal recognition increased business prestige and promotion were the most highly rated.

Regional brands and branding have been studied by researchers all over the world. In Scandinavia, for example, Cassinger and Eksel (2017) deal with the development of regional brands. Based on qualitative research, they formulated suggestions in regional brand planning. Coe (2019) looks at regional brands, particularly in southern Africa and Southeast Asia. He points to their importance

within the international environment in terms of the region's influence and the region's ability to raise resources from investors and donors or to cooperate. The effectiveness of brands in Russian regions has been discussed by Illarionov and Makarov (2018). The authors linked brand development to the quality of governance of regional authorities. The development of regional brands from a public administration perspective was also addressed by Lu, de Jong, Song and Zhao (2020) in the Chinese market context, where regional brands are sometimes the result of public authorities rather than the result of historical development linked to traditions in a given place. The researchers assess the historical aspects of regional brands. They also assess the potential for developing regional brands of agricultural products in an online environment (Yu, Ren, Ye, & Dai, 2018).

Kotler, Kartajaya, and Setiawan (2016, 2021) point to the productivity gains in the digital world under Marketing 4.0 and 5.0, which are also characterized by sales humanization, brand humanization, and multichannel marketing, as well as predictive, contextual, and agile marketing focused on profitability. New and progressive business models can be used in the e-commerce environment. Entrepreneurs, especially SMEs, have the opportunity to access new markets, both domestic and foreign.[4] The study in the V4[5] countries has clearly shown that digitalisation and technological progress is significant opportunity for SMEs. They can reach customers they have not been able to reach before, get to know them even better and identify their economic potential. They can also better reach the younger generation, who are closer to the technological advances of the time. Technological advances in goods distribution and logistics are expanding the market and enabling almost every business to operate on a global scale. This can also be true for smaller and locally oriented businesses. A German study (Hildenbrandt, 2015) focused on the use of local e-commerce in the sale of bakery goods. The study pointed to optimal revenue growth, increased efficiency, customer satisfaction and brand loyalty. A study on East Asian SMEs confirmed that brand and corporate image are the most important benefits of e-commerce (Jahanshahi, Zhang, & Brem, 2013). Subsequent research could proceed in this direction, identifying cultural differences in consumer behaviour that are just a reflection of the traditions and customs of specific regions and local living conditions. These findings have been confirmed by the work of other researchers (Zhang et al. 2011; Heinemann et al. 2013; Niranjanamurthy et al. 2013). Therefore, selling regional SME products in an online environment is also the focus of our qualitative research.

3. RESEARCH DESIGN, METHODOLOGY AND DATA PROCESSING

The main objective was to conduct a pilot survey among regional e-commerce companies and to find out whether and what benefits they have gained from the introduction of an e-shop. It was also to test whether managers were familiar with basic concepts such as CRM and customer loyalty. The object of the research was to find out how the introduction of e-commerce has affected regional businesses. The research subjects were SMEs selling regional products and operating in e-commerce. A database of this regional e-commerce was compiled at the beginning of the research. Subsequently, the research questions were asked:

Q1: What impact did the introduction of the e-shop have on the company?
Q2: Why do businesses with regional products set up an e-shop?
Q3: How do regional e-commerce businesses approach customer loyalty and customer relationship?

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The authors wanted to understand the issue in more depth and also wanted to test the knowledge of some key concepts, so qualitative research in the form of a structured interview was chosen. The structured interview contained 24 questions, which were divided into four thematic units. Managers of all the companies in the pre-established database (81 e-commerce businesses) were contacted by email and telephone and asked if they would be willing to participate in the research. Only ten company managers agreed to participate in the research. The remaining managers were unwilling to cooperate – some were unsure whether their responses would be useful and the vast majority of managers did not have time to participate in the research. For this paper, the most relevant data to answer the research questions were selected.

4. RESEARCH RESULTS

The first set of questions was focused on Sales process assurance. According to the summarized data presented in Table 1, it can be said that the managers of regional e-commerce companies do not use CRM systems mostly (70%). However, some of them did not even know this concept, so it had to be explained to them during the interview and only then they answered the question. Managers do not use the CRM system for many reasons, the most common being that they do not have sufficient human resources. Within regional e-commerce companies, these are mostly small tradesmen who run their business alone, or in two or three people at most, and often do not have the space and often not enough financial resources and expertise for these marketing activities. The majority of respondents (60%) started using e-commerce later. The reasons for setting up an e-shop were different. The most important ones include the possibility to expand their radius of action beyond the region, to sell more or to gain new customers, etc. The majority of respondents (80%) said that there was no need to change their business strategy to set up an e-shop. However, a very surprising response was given by 10% of the respondents who said that they did not and do not have a business strategy for their business.

Table 1. Sales process assurance

Σ	Does your company use a CRM system? If yes, how does this process work? If not, why not?
7	No. Of which: they don't have enough resources (1), they don't have enough human resources (3), they don't think it's important (1), they're just a small business (1) they don't have the time (1)
3	Yes. Of which: know their customers (1), use but not in e-shop (1), only for communication, newsletters (1)
	When and for what reasons did you start using the e-shop?
4	Since the beginning of the company. Of which: because of sales (1), as part of a project (1), when they decided to start the business (1), because of sales – e-shop before the business (1)
6	Later. Of which: because of sales (2), they thought they were going to become a bigger company (1), because of Covid-19 (1), they thought about it for a long time but decided only recently (1), e-shop as a complementary sale, about 15 years after the company was founded (1)
	Was it necessary to change the business strategy of the company because of the e-shop, if so, how?
8	No
1	They had no strategy at all
1	Yes. Originally they wanted to trade only in the B2B market and resell raw materials, but due to lack of interest they switched to the B2C market and started selling through e-shop and in stores

Source: own elaboration

The second set of questions was focused on Product range in the e-shop. As can be seen from Table 2, 70% of regional e-commerce shops sell non-regional products, i.e. those that are not regionally branded, in addition to regional products. Almost half of them reported that regional products represent between 5 and 20% of their total sales. 100% of the respondents reported that they only use regional labelling within the Czech Republic, but 10% would like to obtain EU labelling in the future.

Table 2. Product range in the e-shop

	Does your e-shop offer only regional products and brands?
3	Yes
7	No
	If not, what share do regional products account for in total sales?
2	Around 2 – 5 %
3	More than 5 % but up to a maximum of 20 %
2	More than 20 % but up to a maximum of 50 %
	Do your regional brands also have protection within the EU, i.e., Protected Designation of Origin, Protected Geographical Indication or Traditional Speciality Guaranteed?
10	No. Of which: (1) would like to obtain a Protected Geographical Indication and (1) produces kosher products for one client

Source: own elaboration

The third set of questions was focused on Customers and loyalty. Table 3 shows a summary of the responses to selected questions from this set. Company managers had a considerable problem with the concept of customer loyalty. They did not know what exactly it meant, so this concept was explained to them. Once they were familiar with what customer loyalty was, 90% of the respondents said that they perceived it as something positive. They believe it is important to value loyal customers. 100% of the respondents have regular customers, but only 50% of them rate repeat purchases. Those managers who do evaluate repeat purchases (50%) use the e-shop directly for this purpose. It was interesting to note that 60% of respondents do not evaluate customer satisfaction.

Table 3. Customers and loyalty

Σ	How do you perceive the concept of customer loyalty?
9	Positive. It is important to follow it up and value regular customers (6); Of these: they have a loyalty program for customers (1); they add a free gift to the order for regular customers (1), loyalty is related to getting to know them better and having personal contact, for example at the farmers' market (1)
1	Negative. 10% of customers order and do not collect the goods
	Do you have loyal (regular) customers who repeat their purchases?
10	Yes
	Do you evaluate repeat purchases? If so, how? If not, why not?
5	No. Of which: lack of time (1); it doesn't matter how much we sell (1); not yet, but we plan to do it with the new e-shop (1)
5	Yes. Of which: surveyed via e-shop (4); in B2C market they do not have recurring, but in B2B they do (1)
	Do you evaluate customer satisfaction and attitudes? (relationship to the offer, brand, company) If yes, how? If no, why?
6	No. Of which: if they weren't satisfied (1), they wouldn't come back (1); it's enough to expand the customer base (1)
4	Yes. Of that: Verified by customers from Heureka (1); reviews on seznam.cz and google.com (2); use surveys but e-shop (1)

Source: own elaboration

The fourth set of questions (see Table 4) was focused on Company performance. It can be said that 50% of the respondents reported an increase in sales, but most of them were not able to say whether this increase was caused by the e-shop. Respondents were also unable to accurately determine whether sales from e-commerce sales affected sales from brick-and-mortar stores, as 70% of respondents did not break down sales. The majority of respondents who did not experience a change in sales after the introduction of e-commerce believe that the main reason is the non-typical goods they sell.

Table 4. Company performance

Σ	Have you seen a significant increase in sales in connection with the introduction of the e-shop? When did sales start to change?
5	Yes. Of these: they noticed the effect of advertising (1); the increase was visible but the e-shop is short so they were not able to assess it (1); yes, but they do not know if it is the e-shop (1); they started from zero so the growth was visible (1); they could not say from when the sales started to change due to the e-shop (1).
5	No
	Has the change in sales related to the e-shop affected sales from normal sales? How? How have you reacted to this change?
7	No. Businesses don't usually keep sales separate.
3	Yes. Of these: they have a split and mainly e-shop sales are growing (1); e-shop sales are growing but they would rather sell offline (1); e-shop sales account for a larger share (1).
	If your sales have not changed after the introduction of the e-shop, what do you consider to be the main reason for the lack of change in sales?
5	Reasons: customer fears about the future (2), atypical goods (3), lack of investment (1)

Source: own elaboration

At the end of the structured interview, the positives and negatives of the introduction of the e-shop were investigated (see Table 5). The most significant positive was the opportunity to gain new customers and to take their products beyond the region to new markets. The e-shop also helps some businesses to increase sales at certain times of the year, for example before Christmas. The most significant negative is the difficulty in selling alcoholic beverages, especially beer. Carriers have different requirements for transporting this type of goods.

Table 5. Positives and negatives of setting up an e-shop

	What positive and negative experiences have the e-shop brought you? (complications, improved economic situation ...)
7	Positives. Of which: more people know about them, they reach the borders of regions (2); higher sales, without e-shop from the beginning established businesses would not sell (1); improved economic situation (1); filled a big hole in the market (1); increase in sales, corporate orders thanks to e-shop mostly before Christmas (1); people could buy their news right away (1)
8	Negatives – from this: no law on recommended selling price, manufacturer has no way to control the price of their product in the market, no legal recourse for unclaimed packages (1); occasional buying of orders (1); complications (1); it's a lot of work, problems with shipping – they lose money on shipping (1); difficulties with delivery (1); they don't keep up in general, they don't keep up with improving the site, there are only two of them (1); complications due to beer sales (2)
2	Neither positives nor negatives

Source: own elaboration

5. DISCUSSION

The majority of respondents (70%) reported that they do not use a CRM system (Table 1). Barriers that prevent respondents from using CRM systems include lack of financial resources or lack of human resources and experts. Alshawi et al (2011) and Boon et al (2011) take talk about the most common barrier being lack of financial resources or lack of financial knowledge. Insufficient knowledge of CRM and its architecture can also be one of the barriers to CRM implementation (Liagkouras, Metaxiotis, 2014; Piskar, Faganel, 2009, Kmieciak 2011). This reason was also confirmed by the study of Starzyczna, et al. (2007). Therefore, it is possible to believe that managers of regional e-commerce companies do not use CRM system also because they are not familiar with this concept.

However, most SMEs are not aware of the benefits that CRM can bring (Boon et al., 2011). Meanwhile, SMEs benefit from proximity to customers. Many of them operate at the region-

al level. They serve diverse segments. CRM can provide them with a competitive advantage (Stoklasa et al, 2013). Most respondents (Table 2) offer both regional and non-regional products. This approach is quite logical, especially since they rate the regional products offered as atypical, which may imply lower demand for such specialized goods. The analysis of the product range would deserve more attention in this research also concerning the level of business risk. Up to 90% of respondents admit (Table 3) that customer loyalty is important and 100% of respondents said they have regular (loyal) customers. However, most respondents do not survey customer satisfaction because they believe that if they repeat their purchases, it is not necessary. However, Pilík, Piska and Sasínková (2012) point out that it is satisfaction and trust in the company that affects customer loyalty. The same view is held by Kim et al (2009), emphasising the positive attitude and loyalty of the customer to the retailer leading to repeat purchase behaviour. These are not isolated views, although we do encounter that there are customers who need a change at some stage in their lives and leave, once they are satisfied. Some satisfied customers need a change at some stage in their lives and leave anyway. Storbacka and Lehtinen (2002) also point out that, purely in theory, customer satisfaction can grow up to a certain point because the customer does not know what to expect. However, according to the authors, this is not the case in long-term relationships.

6. CONCLUSION

Based on these data, it is now possible to answer the predefined research questions. These were:
Q1: What impact did the introduction of the e-shop have on the company?
Q2: Why do businesses with regional products set up an e-shop?
Q3: How do regional e-commerce businesses approach customer loyalty and customer relationship?

Answers may be as follows:
A1: The introduction of an e-shop has had a positive impact. Businesses have gained new customers, their products have reached beyond the borders of the region and there has been an increase in sales.
A2: Managers of regional firms introduced e-shops to increase sales and there was a growth in the business. Among other things, the introduction of the e-shop was a kind of response to the market situation (COVID-19 pandemic).
A3: Loyalty is perceived as a positive factor; respondents have loyal customers. Thanks to the e-shop, the customer base is growing, but half of the respondents do not evaluate the repeat purchases at all. Almost two-thirds believe that they cannot afford sales promotion and if some of the companies provide sales promotion, they do so only sporadically. Company managers do not engage in CRM mainly due to a lack of resources.

Thus, it can be summarized that e-commerce is important for regional firms. They see it as an opportunity to expand their promotional radius beyond the region and gain new customers. Reserves are found in firms' analytics, sales research, repeat purchases and customer satisfaction research. The research also reveals a weak knowledge of the concepts of CRM and customer loyalty. These concepts had to be explained first. The qualitative research conducted had some limitations. These were mainly the small number of respondents and the reluctance of some potential respondents to participate in the research. It is necessary to explore this area further. Further research should therefore be conducted on a larger sample of respondents. Quantitative research is envisaged and respondents should be motivated to be willing to participate in the research.

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Complexity of Creating Customer Experience under the Influence of Digital Transformation

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Abstract: *In a digital context, the customer experience represents a complex field of competition for companies in the process of retaining loyal and attracting new customers. The digital transformation paradigm, in the technological and business aspect, should create value for the customer and increase the customer experience easier. However, challenges such as dynamic market changes and disruptions leading to increasingly complex customer requirements, make customer journey management a critical field for companies. This paper presents a preliminary review and provides insight into the problems of building loyalty and increasing customer experience under the influence of digital technologies. The recognized problems, according to secondary data, indicates that the potential of customer experience management with the help of digital technologies was not achieved. In this paper, recommendations for the elimination of mentioned problems were defined and how usage of digital technologies can contribute to building loyalty through analysis, monitoring, and support of customer journey.*

1. INTRODUCTION

Today, for companies is very difficult to adapt and improve the customer experience through static plans which provide an analysis of the processes and the impact of various changes that could be achieved. As a consequence, the customer experience (CE) is presented as a competitive field which in the new digital context implies the fighting for a position between manufacturers and as such is considered of great interest in the marketing field (Nurcan et al., 2020). The reasons for this are the needs and preferences of customers that are rapidly changing, becoming more complex, requiring an adapted approach and constant upgrading of services and products (Cay et al., 2019); (Silhavy et al., 2019), and users are also co-creators of its own value (Matarazzo et al., 2021). Digital transformation is a paradigm that fundamentally changes the business of companies, which does not refer exclusively to the technological aspect but includes strategy, culture, people, and business models. It seems that with all the technological and business advances, creating value for the user and increasing the user experience should be easier. Nevertheless, in the scientific literature, these claims have been mentioned with caution and some problems in the context of the customer journey are emphasized. Building customer loyalty in the digital age largely requires the digital transformation of processes and actions that analyze, track, and support customer journey (Prabowo et al., 2021). This segment remains omitted in the strategic development of companies because it requires additional effort in research and development of this complex area individually, and companies are already focused on the digital transformation of the entire business. The complexity of this field stems from managing changing customer behavior, understanding complex data and information about them, and implementing the optimization process for customers. Also, business in the marketing segment requires the transformation of business models, integration of various digital technologies, and

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adaptation to changing business conditions (Nurcan et al., 2020). Despite the complexity of tracking customer journey processes, which ultimately has a significant impact on the customer experience, digital transformation provides an opportunity to change that. If companies want to build loyalty, they need to change and adapt, as research by consulting firm Gartner found that 57% of customers stopped buying from the company because a competitor offered a better experience, and 67% of customers are willing to pay more for a better customer experience (Nurcan et al., 2020). Digital transformation has a significant impact on the quality of products and/or services and the perception of value (Nguyen et al., 2020). Digital technology involved in marketing processes can increase perceived value due to quality collaboration and interaction during and after the purchasing decision making process, resulting in loyalty building. The four ways how digital transformation affects the customer experience and transforms the information needed in this segment are understanding customers, enabling sales activities, managing customer touchpoints, and integrating digital capabilities (Nurcan et al., 2020). This aims to transform the customer experience and achieve awareness with the help of informativeness, entertainment, social presence, and sensory appeal (Matarazzo et al., 2021). This paper provides insight into the issue of increasing customer experience and building loyalty in a revolutionary age where everyday disruptions change the needs and expectations of customers. The main goal of this paper is to recognize problems that bring digital technologies in the customer journey. In response to the problems identified, the impact on elements of the marketing mix was explored. Based on the identified problems, it was investigated which elements of the marketing mix affect and which disorders they cause in relation to each element. Through analyzing secondary data sources, the industries which met the impact of the recognized problems were pointed out.

2. RESEARCH BACKGROUND

This paper is preliminary research of the impact of digital technologies on the customer journey, and the problems encountered by companies under their influence. The first part of the research deals with the analysis of problems that arise in a very dynamic environment influenced by digital technologies and what impact they have on the elements of the marketing mix. Elements of the marketing mix that will be observed in correlation with the problems brought by digital technologies in the customer journey are: Product/Service, Place/Distribution, Promotion, Price, Process, Physical Evidence and People (Caliskan et al., 2020). The observed problems are the motivation for the implementation of this research because customer loyalty, influenced by a lot of digital innovations, is interrogative for almost every company. This paper will address the specific problems of individual industries that have experienced changes in consumer behavior under the influence of digital technologies.

This paper aims to answer the following research questions (RQ):
RQ (1): What are the problems in building customer loyalty and increasing customer experience with the presence of digital technologies?
RQ (2): Which elements of the marketing mix are most influenced by the recognized problems?
RQ (3): Which industries are most affected by recognized problems?

The relevant database Scopus and platform Web of Science were searched by title, with the complex query "digital technologies" OR "digital technology" OR "digital transformation" AND "customer" OR "customer value" OR "customer experience" OR "customer journey". The research was limited to years from 2019 to 2021. The search in database Scopus resulted in

23 articles. The search result in platform WoS was 11 articles. After reviewing the articles, the same articles in Scopus and WoS were identified and the final result of articles for the analysis was 26 articles, and of these, 17 were available in full access form for further analysis. The analysis is shown in the continuation of the paper.

3. RESULTS

Table 1 provides a comprehensive overview of the results of the analyzed articles. The table shows the analyzed literature, recognized problems, and their impact on the elements of the marketing mix. Also, the results include a review of industries that have been the subject of research in the analyzed literature.

Table 1. An overview of the research scope

Reference	Problems	Marketing mix elements	Industry
(Abuhasan & Moreb, 2021)	P01, P02, P03	people, physical evidence, place	banks
(Prabowo et al., 2021)	P04, P05	services, people, physical evidence	e-commerce (in the fashion and beauty category)
(Matarazzo et al., 2021)	P04, P06, P07	services, people, process	small and medium-sized firms (SMEs) – the food, fashion, and furniture design industries
(Nah & Siau, 2021)	P08	services, people, price	automotive industry
(Fernández-Rovira et al., 2021)	P09, P10	people, process, resources (price)	not specified
(Rados et al., 2020)	P11, P12	people, process	automotive industry
(Nöjd et al., 2020)	P05, P13	process, place	not specified
(Castagna et al., 2020)	P02, P09, P14, P15, P16	process, price, promotion, service	handicraft and/or retail SMEs (luxury jewelry industry)
(Lalic et al., 2020)	P17	process, distribution	food production chains
(Nguyen et al., 2020)	P18, P17	service, price	the insurance sector
(Nurcan et al., 2020)	P14, P19	process, promotion	banks
(Castagna et al., 2020)	P04, P14, P20	people, distribution, service	the insurance sector (health sector)
(Gil-Gomez et al., 2020)	P21	people, distribution, promotion	not specified
(Nayak et al., 2019)	P09, P22	price, people	the insurance sector (health sector)
(Koilada, 2019)	P23, P24	process, promotion, distribution	not specified
(Cay et al., 2019)	P01	people, process	automotive industry
(Silhavy et al., 2019)	P13, P25, P26	process, promotion, distribution	not specified

Source: authors elaboration

Concerns about information and cyber security (P01) and private data of the customer (P10) are one of the problems that today occupy great attention in scientific circles. The issue of protecting customers and their data will certainly become a matter of interest to companies if they want to retain loyal customers (Abuhasan & Moreb, 2021); (Fernández-Rovira et al., 2021). The lack of knowledge about the opportunities and benefits that digital technologies bring to customers and companies (P02, P06) is a broad thematic problem. Companies face the problem of insufficient knowledge of the technologies and the way to implement them in marketing processes (Abu-

hasan & Moreb, 2021; Matarazzo et al., 2021). Also, following digital trends requires resources that they cannot easily afford. Companies that use technologies, of all the benefits they offer, such as analysis and data of customers (P16, P18, P26), make little use of it to improve marketing processes and actions (Abuhasan & Moreb, 2021) and ultimately to increase loyal customers. Neglecting digital instruments (P07) is risky and can seriously jeopardize the company's survival. It is important capacity build and acquisition of knowledge and skills which are needed for the implementation of technologies into business processes and competitive and collaborative usage of them (Matarazzo et al., 2021). In addition, the planning and management of digital technologies at the strategic level of the company should have a main role in the marketing aspect, which requires changes in management, vision, and preparation of appropriate strategies (P04) that play a role in gaining new competitive advantages (Matarazzo et al., 2021).

Traditional advertising, marketing, and sales activities do not have a significant impact on the loyalty of existing customers (P12), so there is a need to implement innovative concepts and business models (P07) (Rados et al., 2020). Companies are required to engage and make additional efforts in creating products and/or services, allowing customers to play an active role in creating a unique user experience in the digital and physical world (Prabowo et al., 2021); (Nah & Siau, 2021). The presence of contemporary digital technologies has changed the business of physical and virtual stores. Creating value for customers in physical markets requires significant investment in space (P03) and physical evidence (P05). Virtual markets are expected to provide more functionality through interfaces on channels such as search engines, more unknown platforms, and other websites such as special interest websites for customers (P25) (Nöjd et al., 2020).

Uneven application of technology and lagging adoption of digital transformation concepts in business is the result of different levels of maturity and ability due to the development capabilities gap between small and medium enterprises and large companies, but also different sectors. Large companies have significant resources that have enabled them to adopt digital technologies in everyday business processes (Fernández-Rovira et al., 2021). A large number of companies are struggling with high investments in technologies for which they do not have enough resources (P08, P09). Also, one of the research found that SMEs do not usually adopt more updated versions of marketing tools and technologies (P15), such as mail marketing, banner advertising, fake marketing, advergames (Castagna et al., 2020). Small and medium-sized enterprises lag behind in adaptability and they find it difficult to adopt rapid technological trends (P09) for which they lack the support of suppliers and the environment (P14) (Castagna et al., 2020); Nurcan et al., 2020).

Furthermore, there is still uncertainty about how customers perceive the value of providing services facilitated by digital technology. Interactions between digital technology and service quality dimensions, i.e. how digital technologies affect loyalty and customer relationships, as well as financial success in terms of profitability and value of the company, are still undetermined (Nguyen et al., 2020; University of Oulu, Information Processing Science, Oulu, Finland et al., 2019). A problem that requires a lot of attention and the need for further research are processes related to touchpoints of contact with customers (P13). These are the points where companies come into contact with customers, which has the greatest impact on the customer experience and ultimately on the purchasing decision and loyalty. According to secondary data analysis, the most common problems that are recognized in the obtained research are explained in more detail (see Appendix). Figure 1 shows the frequency of problems in individual elements of the marketing mix.
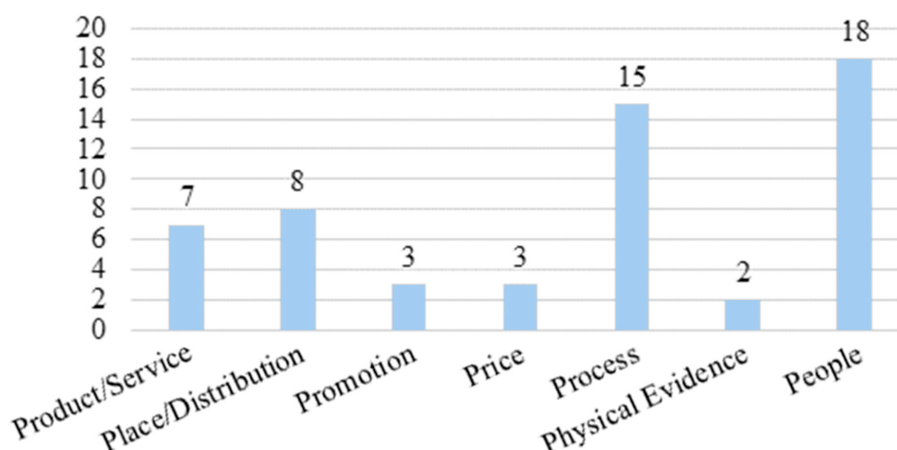
Figure 1. The frequency of problems in individual elements of the marketing mix

Source: authors elaboration

The presence of recognized problems had the greatest impact on processes and people as elements of the marketing mix. The results are not surprising given that these two elements are usually recognized as key in the transformation of companies' processes and make the biggest difference in creating a competitive advantage. Table 2 shows the correlation of the identified problems mentioned earlier in this paper with the elements of the marketing mix.

Table 2. Correlation between marketing mix elements and problems

Marketing mix element	Problems
Product/Service	P04, P07, P08, P14, P18, P20, P24
Place/Distribution	P03, P05, P14, P17, P19, P20, P21, P25
Promotion	P15, P21, P25
Price	P08, P09, P22
Process	P01, P06, P07, P09, P10, P11, P12, P13, P14, P15, P16, P17, P19, P23, P24
Physical Evidence	P03, P05
People	P01, P02, P04, P06, P07, P08, P09, P10, P11, P12, P13, P14, P16, P18, P20, P21, P23, P26

Source: authors elaboration

Entry into the revolutionary digital age and constant development of technologies led to individual industries having faced many problems that have a significant impact on the user experience. For example, there was an increased demand for transaction services in the banking system, and with limited branch office hours and difficulties in arriving at branches, they did not provide a pleasant experience for customers (Abuhasan & Moreb, 2021). Digital transformation has proven to be the opportunity to improve business and user experience. Often digital transformation stops at the initial stage due to its complexity of implementing the entire organization system. The reason for this is the lack of resources and support from the environment or society (Nurcan et al., 2020). It is undeniable that in the last few years, digital technologies have fundamentally transformed various industrial sectors around the world and will continue to change them in the future. Digital circumstance has created new customer needs and desires in the automotive industry and involves the customer in the whole process of car production according to their own preferences resulting in tough competition in the automotive industry (Nah & Siau, 2021). In the luxury jewelry industry, the key role played customer knowledge management, supported by digital technology, which enables easier identification of customer needs and thus improves the production of products and services with better performances (Castagna et al., 2020). In the social health insurance sector, digital transformation provides

population coverage and contributes to risk management analytics, optimizing business costs and improving the user experience, and the individual can better participate in self-monitoring and self-care. Analysis of big data together with artificial intelligence provides an opportunity for creators to collect data and use it to formulate business policy; however, in the sea of data, it is important to identify the relevant ones (Nayak et al., 2019). The development of e-commerce, covering almost all industries and increasing the number of Internet users, and thus customers, requires companies to devise various strategies to achieve customer loyalty and improve their user experience. The e-commerce user experience should be considered as a strategic process in order to achieve customer value, satisfaction, loyalty, competitive advantage, and differentiation (Prabowo et al., 2021). The industries mentioned were the subject of research in the analyzed articles. The analysis of industries showed that prominent industries are closely related to the status and prestige of customers.

4. LIMITATIONS AND FUTURE RESEARCH

Limitations in this paper relate to the number of articles included in the analysis of problems arising from the presence of digital technologies in marketing processes and their impact on elements of the marketing mix. Future research is planned to address the identified limitations. So, in future research, an additional search of relevant databases in order to obtain a larger number of secondary data sources for analysis will be made. The analysis would provide a more comprehensive analysis of industries that, under the influence of digital technologies, find it more difficult to manage customer experience and loyalty. Future work will focus on recommendations for resolving problems in marketing processes influenced by digital technologies, especially processes related to touchpoints of contact in the customer journey. The potential of digital technologies that are used to support customer journey tracking processes, how they can contribute to addressing identified problems, and improving marketing processes will be explored. Furthermore, the research will include an analysis of activities supported by contemporary digital technologies in certain phases of the customer journey, in order to improve their experience and increase loyalty. The need for further research is recognized, given that this preliminary report has indicated a lot of problems in marketing processes with the presence of digital technologies that can make it a difficult competitive struggle and retain loyal customers.

5. CONCLUSION

The digital transformation paradigm, with all technological and business opportunities, has contributed to many benefits in business processes but also pointed to a lot of problems if it is not managed competitively and collaboratively. In order for companies to remain competitive under the constant influence of digital innovation, they need to identify key elements that contribute to creating value for customers. The essence of creating competitive advantages can be evident from the above problems in the research, which indicate that investing in internal marketing in terms of people and the sustainability of the process ultimately contribute to creating a loyal circle of customers. The focus should be on defining the most relevant touchpoints of contact on the customer journey and how, with the ubiquity of technology, to adapt key elements of processes and people to make a difference in the customer experience. Changing consumer habits and a new competitive environment are forcing companies to quickly adapt, change and improve the processes of their customers so as not to lag behind in a market that is overwhelmed by alternative products and services.

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APPENDIX

Problem code	Problem description
P01	Information security and cyber security which affects customers concerns, questionable safety and security based on internet of things in data transport of customer
P02	Lack of knowledge on how to use digital technologies of customers and companies, smes are not able to follow technological dynamics
P03	Demanding way of performing operations with digital technologies in physical branches
P04	Adapting and devising different strategies to retain and increase the number of customers, the digital strategy of organizations is not sufficiently focused on creating value for customers, changes in marketing and sales management and vision
P05	Selection and implementation of technologies to increase the experience for customers in the physical space, implementation and updates of digital technologies in physical space
P06	Integration and coordination skills of introducing digital technologies into processes
P07	Acceptance and neglect of digital instruments that can be useful in processes
P08	Complete commitment to the customer in the development of his individual product requires a lot of resources
P09	Problems of scarcity of resources caused by reality cultural problem, smes typically did not have dedicated resources to monitor the evolution of the digital market, the digital divide in the society
P10	Ethical problems arising from the massification of data capture
P11	Future consumer behavior is difficult to predict due to high competition in the digital world
P12	Advertising, marketing and other sales activities do not have such an impact on the loyalty of existing customers
P13	The problem of proper application of digital technologies at touchpoints of contact with customers, the complexity of defining relevant points of contact with customers
P14	The lack of support from information technology vendors in the decision-making process for choosing adequate digital systems, a lack of support when it comes to activities that require input from the environment, lack of willingness of customers to participate in research for the benefit of the company
P15	Lack of adjustment and adopt more updated tools (e.G., Email marketing, banner advertising, advergames)
P16	Lack of knowledge and analysis of the degree of alignment between the tools and practices supporting customer knowledge management processes
P17	Questionable technological contribution for companies and customers in complex supply chain systems, increased use of digital technology may not lead to greater value that customers perceive
P18	Lack of knowledge about the impact of technology on the quality dimensions of service
P19	Digital projects related to improving the customer experience often remain at the starting point due to complexity
P20	Insufficiently researched customer expectations about what technologies they should be provided with in the buying process
P21	Difficult establishment of marketing, sales and service business model that guarantees long-term economic, social and environmental sustainability
P22	Investment costs in digital technologies
P23	Insufficient utilization of the results of digital transformation
P24	Too much fluidity in data silo management and complexity in accepting services may not give the desired results and therefore innovating user experiences
P25	A lack of interfaces on channels like search engines, more unknown platforms and other websites such as special interest websites for customers
P26	A lack of information about customers – a holistic view on the customer is not possible, only an approximation

Customer Buying Behaviour in International E-commerce through Empirical E-shop Data

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Abstract: *The article deals with customer e-loyalty. The main objective of the research was to investigate customer buying behaviour, hence customer e-loyalty in e-commerce, and the implications of this for e-shops. Specifically, it concerns how customers behave at e-shops, how often they buy from the e-shops and what kind of revenue they bring to the e-shops. First, the theoretical background of the research is presented, based on some studies. The theoretical discussion proceeds from the broader context of loyalty. The core of the theory is e-loyalty. Secondary research and its results are then characterized. The subject of the research is the analysis of empirical e-shop data related to the manifestations of behavioural e-loyalty. Indicators informing about the proportion of loyal customers on the main variables of interest, concerning the total number of all customers, the number of visits to the e-shop, the number of transactions and the sales volume, were evaluated. Also, the subject of the research is a company operating e-shops in selected countries and its customers. The research covers a total of 13,418 customers. The results obtained contradict the claims of some authors that e-loyalty is one of the key factors for the success of e-shops and that e-loyal customers generate a substantial part of the volume of purchases and sales.*

1. INTRODUCTION

It is not easy to build long-term relationships with customers in today's highly competitive market. Doubts about customer loyalty are common, yet companies are striving to strengthen it. What does the situation look like in the emerging e-commerce industry? Leaders in the online environment believe that companies need loyal customers for economic reasons because acquiring new customers online is not cheap. Few repeated purchases threaten firms' profit goals, so firms are trying to improve the creative potential of the Web and offer some value to their customers. Even the best e-commerce model design may not work well if there are no loyalty rules and monitoring.[3]

The authors of this article intend to explore customer e-loyalty. The paper aims to present ongoing research results related to selected areas of customer relationship management, specifically e-commerce loyalty. The article first presents a brief theoretical discussion and the current state of knowledge of the studied issue. Then, the methodology of the empirical research and its results are characterized. Secondary research is devoted to customer behaviour in e-commerce. The subject of the research is a company operating e-shops in selected countries and its customers, as well as the analysis of data concerning the manifestations of behavioural loyalty.

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2. CURRENT STATE OF KNOWLEDGE

Marketing is dynamically evolving from transactional to relationship marketing. The emergence of the concept of relationship marketing is influenced by the ever-increasing competition and struggle for customers and market saturation (Lošťáková et al., 2017). Associated with relationship marketing is marketing 4.0 and 5.0 (Kotler, 2016, Kartajaya and Setiawan, 2021). A characteristic feature of Marketing 4.0 is in particular the digitalization of marketing activities and the transition to the online environment. Marketing 5.0 combines technology and the humanization of sales and emphasizes predictive, contextual, and agile marketing focused on profitability.

The move to the online environment has meant the emergence of e-commerce and the associated e-loyalty. This market is rapidly developing and growing. The COVID 19 pandemic has contributed to this. Customer relationship management (CRM) is of key importance in relationship marketing and is an integral part of strategic decision making and practical application of various relationship marketing activities (Lost'áková et al., 2017). Loyalty is often associated with the length of the customer relationship, which is the goal of customer relationship management, and the customer value proposition, which conditions the customer's value to the firm (Kumar and Rainartz, 2016). Customer loyalty and its impact on business success has been studied by many Czech and foreign authors over the years (e.g. Aaker, 1991; Reichheld, 1996; Pelsmacker, Geuens, and Bergh, 2003; Lošťáková et al., 2009; Keller, 2013; Blechař, 2015; Kotler and Keller, 2016; Roberts, 2019).

The concept of e-loyalty has also been the focus of many studies by academics and practitioners (Zeithaml et al., 2002; Valvi and Fragkos, 2012). E-loyalty is built on the same principles as loyalty in an offline environment (Learn and Lin, 2003). After all, customer behaviour in the online environment is slightly different. Customers in the online environment in the comfort of their homes are saving time (Andrews and Currim, 2004). In the online environment, there is higher availability of information about goods and firms, and there is more flexibility to compare (Degeratu, Rangaswamy, and Wu 2000; Alba, Lynch, Weitz, Janiszewski, and Wood, 1997). In addition, the choice of goods from all over the world and the possibility of switching from one vendor to another is also appealing (Brynjolfsson, Hu, & Simester, 2011; Yen, 2011; Burnham, Frels, & Mahajan, 2003; Gommans, Krishnan, & Scheffold, 2001). However, it is important to have confidence in its complete respectability, otherwise, the customer chooses another vendor (Reichheld and Schefter, 2000).

There are many definitions of e-loyalty. The definition of e-loyalty is based on the definition of offline loyalty, with the difference that it is loyalty to a specific online retailer (Grondin 2003; Toufaily, Ricard, & Perrien, 2013).

Like loyalty in the offline environment, e-loyalty includes behavioural and attitudinal aspects. Thus, it is not only about repeated purchases, although monitoring them is very important and can indicate the loyalty situation in the firm. It is also about the emotional relationship, preference over other sellers and resistance to competitors' marketing activities, as reported for example by Toufaily, Ricard and Perrien, 2013) in their definition of e-loyalty.

E-loyalty has several dimensions, its building already starts in the pre-purchase phase, then in the purchase and post-purchase phase (Toufaily, Ricard, and Perrien, 2013). This process is influenced by factors such as expectations, service quality and satisfaction (Zeithaml et al 2002; Valvi and Fragkos, 2012).

Part of the metrics used in online marketing is the measurement of loyalty in the online environment. These metrics mainly focus on the success of a website in attracting potential customers and increasing market share. These measurements track the contribution of reliable information on sales revenue, e-commerce and customer actions (Laudon and Traver, 2021).

The consequences of e-loyalty are both behavioural and attitudinal. Behavioural loyalty is manifested by a customer's repeated purchases (purchase frequency). However, it does not provide a comprehensive view of brand or business loyalty (Esmaeilpour, 2015). Attitudinal loyalty is assessed according to the level of relationship and emotional attachment of the customer to the company or brand (Oliver, 1999). Esmaeilpour (2015) talks about emotional attachment to the brand and the company. Roberts (2019) points out that loyalty will decline if firms do not create this emotional bond (Reichheld and Schefter, 2000).

The importance of e-loyalty can be assessed from the theoretical point of view of the authors or from the practical point of view of a particular company and e-shop. The authors' view differs. Similar to loyalty in offline environments, e-loyalty is also considered a key factor with a direct impact on a firm's business performance (Reichheld 2001, Day 2000; Srinivasan, Anderson, and Ponnavolu 2002; Zeithaml, Parasuraman, and Malhotra, 2002; Yun, 2007; Valvi and Fragkos, 2012; Toufaily, Ricard, and Perrien, 2013). However, some authors also see some risks in building e-loyalty. Without knowledge of customers' needs, firms may rather discourage customers with their activities (Fournier, Dobscha, and Mick, 1998). The view of e-shops is also likely to differ, but no comprehensive academic study has yet been conducted to examine it in more detail. An important aspect is the costs that a firm has to spend on building e-loyalty and whether these are spent efficiently (loyalty programs). Rigby, Reichheld, and Schefter (2002) state that some e-shops are not knowledgeable enough in e-loyalty building and thus their efforts may negatively affect the e-shop's profits.

3. METHODS

The main objective of the research was to investigate customer buying behaviour, hence customer e-loyalty in e-commerce, and the implications of this for e-shops. Thus, the subject of the research is customer buying behaviour in e-commerce focused on behavioural loyalty. Specifically, it concerns how customers behave at e-shops, how often they buy from the e-shops and what kind of revenue they bring to the e-shops. Since repeated purchase behaviour is considered one of the key consequences of customer (behavioural) loyalty (Valvi a Fragkos; 2012, Toufaily et al., 2013), customers who have purchased 2 or more times are considered loyal in the research.

The subject of the research is a company that operates e-shops in various foreign markets. The company operates in the Czech, Polish, German, English and Slovak markets in the online environment. The offer of the researched firm includes a specialized assortment. It offers paintings of its motives or motives ordered by the customer.

Based on the current state of knowledge, the following research questions were formulated:
1) What is the buying behaviour of customers?
2) What impact do repeat customers have on e-shop results?

Different methods can be used to investigate customer behaviour, describe and explain it; for example, Valvi and Fragkos (2012) or Toufaily et al. (2013) based their conclusions on literature

research. Srinivasan et al. (2002) or Yun and Good (2007), on the other hand, analysed data obtained by interviewing real customers of selected e-shops. To maximize the relevance of the research, the authors chose to analyse secondary empirical data that describe the customers' behaviour in the e-shop and all the actions taken by the customers. This is because, according to several authors, this type of data provides the most accurate description of reality (Ehrenberg, 1995, Brynjolfsson et al.; 2011, Sharp et al., 2019). Other authors have also argued that real benefits for academia and practice are only achieved when research solves real problems for firms using data on real customer behaviour (Berkowitz et al., 1978, Brennan, 2004, Nyilasy and Reid, 2007, Sharp et al., 2019).

In order to meet the objective, research was conducted on secondary data on customer shopping behaviour at selected e-shops. This data is from Google Analytics, which collects data on customer shopping behaviour at e-shops. The research will be based on empirical data that describes the real customer behaviour on the selected e-shops between 2019 and 2020. Primarily chosen loyalty characteristics are the average number of purchases and the average order value (Keng and Ehrenberg, 1984; Wrigley and Dunn, 1984; Graham et al. 2017). Then, also conversion rate (ratio of number of purchases and total visits), average time per visit and bounce rate (share of visits without any action on the web) will be taken into account in the data analysis since these variables were included in obtained data set. To further elucidate the impact of repeated shopping on e-commerce results, a correlation analysis will be used to express the relationship between purchase frequency and average order value, conversion rate, time on site and bounce rate.

4.   DATA AND RESULTS

In total, the behaviour of 13 416 customers was analysed, who made 54 837 visits, 14 933 transactions and generated 14 701 426 CZK in sales. All e-shops operate on the same e-commerce platform and use the Google Analytics tool to track customer behaviour, from which the data was extracted.

Overall results include the number of customers, number of visits, number of purchases and sales volume. Customer buying behaviour is described by the average number of transactions per user, the average order value, as well as the conversion rate, the average time spent on the site and the immediate abandonment rate.

Except for one e-shop (705 customers), all the lower units registered 1,000 customers (1,299 to 5,628), with total visits ranging from 2,736 to 21,582, transactions ranging from 750 to 6,065, and total sales ranging from CZK 602,138 to CZK 7,123,024. The highest total values for all variables were measured for the Czech e-shop, while the lowest values were measured for the German e-shop (Table 1).

Table 1. Overall values per each e-shop

Country	Customers	Visits	Purchases	Revenue	CR	APF	APV (CZK)	T. p. visit(s)	BR
CZ	5628	21582	6065	7123024	58%	1,08	1170	637	19%
DE	705	2736	750	602138	53%	1,06	805	434	28%
EN	1299	4848	1496	1317733	58%	1,15	879	463	22%
PL	3850	17076	4479	3716367	50%	1,16	830	529	24%
SK	1934	8595	2143	1942164	50%	1,11	901	606	20%
Overall	13416	54837	14933	14701426	54%	1,11	986	574	21%

Source: own processing

As far as customer purchasing behaviour is concerned (Table 1), the values for all e-shops are very similar. The average number of purchases is 1.11, where the highest value of 1.16 was measured for the Polish e-shop and the lowest value (1.06) for the German one. The average order value is 986 CZK, with the highest APV (1,170 CZK) registered by the CZ e-shop and the lowest (805) by the German e-shop. However, the predictive value of this variable may be biased by the price level of individual e-shops, yet the average values differ only minimally from the overall average. The average CR is 54%, with PL and SK e-shops recording the lowest values (50%) and CZ and EN e-shops the highest values (58%), but even here the differences are only in units of percentage points. The average time spent on the website was 574 seconds, with the maximum (637 seconds) recorded by the CZ e-shop and the minimum (434 seconds) by the DE e-shop. BR reached an average value of 21%, the highest value was achieved by DE e-shop (28%) and the lowest (19%) by CZ e-shop, but even here the differences between individual e-shops, and thus the deviations from the average, are almost negligible. Therefore, the results show that the purchasing behaviour of customers across countries is very similar, but most importantly, the average customer does not purchase more than once and for every purchase there are 2 visits to the e-shop.

Table 2. Values of customers who made at least two purchases

Country	Customers	Visits	Purchases	Revenue	CR	APF	APV (CZK)	T. p. visit(s)	BR
CZ	340	2987	777	947446	51%	2,29	1201	655	22%
DE	35	401	80	62571	79%	2,29	791	423	21%
EN	164	1140	361	320608	70%	2,20	883	551	26%
PL	499	3519	1128	934442	71%	2,26	829	571	25%
SK	152	1886	361	345554	52%	2,38	961	503	26%
Overall	**1190**	**9933**	**2707**	**2610621**	**63%**	**2,27**	**959**	**579**	**24%**

Source: own processing

Repeat buyers (Table 2) make up on average only 9% of the customer base, with the highest proportion for EN and PL e-shops (13%) and the lowest for DE e-shop (5%), so 3 out of 5 e-shops have less than 10% of repeat buyers. The average share of visits, purchases and sales of repeat customers is 18%. EN (24%) and PL (25%) e-shops recorded the highest share of repeat customer transactions, while for the others this value ranged from 11% to 17%. The situation is almost identical in terms of sales, where the share of repeat customers in total sales is almost the same as in the case of transaction volume.

Table 3. Comparison of repeatedly purchasing customers' values to overall values

Country	Customers	Visits	Purchases	Revenue	CR	APF	APV (CZK)	T. p. visit(s)	BR
CZ	6%	14%	13%	13%	89%	212%	103%	103%	111%
DE	5%	15%	11%	10%	149%	215%	98%	97%	73%
EN	13%	24%	24%	24%	122%	191%	100%	119%	118%
PL	13%	21%	25%	25%	143%	194%	100%	108%	102%
SK	8%	22%	17%	18%	105%	214%	107%	83%	132%
Overall	**9%**	**18%**	**18%**	**18%**	**117%**	**204%**	**97%**	**101%**	**111%**

Source: own processing

The AVP of repeat shoppers is lower than the overall average, and a closer look reveals that customers who have shopped twice on average spend a slightly lower amount than customers who have shopped only once (Table 3), which contradicts the general claim that repeat shoppers spend more. The proportion of customers who bought twice is 7% on average across markets,

accounting for 11% of visits, 13% of transactions and 12.9% of sales. Customers who have purchased 3 or more times make up a tiny fraction of the total (Table 4). Except CR, which averages 63% for repeat customers (53% for single-purchase customers), the other values describing purchase behaviour for single-purchase customers versus repeat customers are nearly identical.

Table 4. Values of customer divided by number of purchases (all e-shops)

No. Purchases	Customers	Visits	Purchases	Revenue (CZK)	CR	APV	T. p. visit (s)	BR
1	12226	44904	12226	12090842	53%	989	574	21%
2	982	6053	1964	1890140	62%	962	588	24%
3	152	1171	456	404786	73%	888	555	24%
4	36	1084	144	154445	54%	1073	470	28%
5	9	346	45	52410	75%	1165	555	33%
6	6	288	36	38247	65%	1062	528	28%
7	1	22	7	5598	36%	800	202	5%
12	1	297	12	8912	4%	743	545	23%
13	1	315	13	9956	4%	766	525	29%
14	1	68	14	9960	25%	711	167	34%
16	1	289	16	36132	9%	2258	190	9%
Overall	**13416**	**54837**	**14933**	**14701426**	**54%**	**986**	**574**	**21%**

Source: own processing

The effect of the e-loyalty paradigm of repeated purchases on e-shopping performance and customer buying behaviour is almost negligible for the selected e-shops. To confirm this finding, the effect of the number of transactions on the selected variables was tested using correlation (Table 5).

Table 5. Correlation of number of purchases and selected variables

	No. Purchases/AVP	No. Purchases/CR	No. Purchases /T. p. visit	No. Purchases/BR
Correlation	-0,008622071	0,057577288	-0,005634232	0,028061503

Source: own processing

The selected variables include AVP, CR, average time spent on site and BR. No correlation was found for any of the variables, with the highest correlation value (0.058) recorded for the number of transactions and CR.

5. DISCUSSION

One of the most important findings is the fact that on average more than 90% of customers made only one purchase during the period under review, and these customers account for 80% of total purchases and sales. This implies that returning customers are far from constituting a significant share of turnover, which is contrary to the claims of authors who attach key importance to customer loyalty (Reichheld et al, 2000, Day, 2000, Srinivasan et al, 2002, Zeithaml, 2002, Yun and Good, 2007, Valvi and Fragkos, 2012, Toufaily et al., 2013). Other authors who, while not considering loyalty as an intrinsic factor in e-commerce success, nevertheless attribute a significant role to it in generating sales state that returning customers account for approximately 35 to 45% of e-commerce revenue (Yun and Good, 2007). However, for selected e-shops, these figures are approximately half that, averaging 20%. Thus, customer retention yields only a minimal volume of purchases and sales, and e-shops depend on the continuous acquisition of new customers, which is in line with studies by Romaniuk (2011) or Romaniuk

and Sharp (2015). This can be a problem if firms hit the limits of market consumption in a given product category. At the same time, potential retention activities may run up against the average purchase frequency of a given product category of customers, which, if around 1, may indicate that retention efforts will lead to reduced profitability due to cost growth without adequate revenue (Bennett and Graham, 2010). Thus, if we do not know this value, we cannot reliably decide whether and to what extent to pursue customer retention. On average, customers make 2 visits per transaction, which can be interpreted as suggesting that e-stores should focus on remarketing campaigns primarily targeting customers who have visited the e-store once and encourage these to purchase. Up to 20% of customers will leave the e-shop without any action (BR) and these are thus a lost cost if the e-shop does not engage with them further. It is also interesting to note that customer buying behaviour, i.e. conversion rate (CR), average purchase frequency (APF), time on site, bounce rate (BR) and average order value (APV) are very similar across markets. This fact makes it easier for e-tailers to plan their marketing activities, as they can apply similar actions across countries in terms of customer buying behaviour and possibly also plan marketing activities when entering a new market based on this data. When dividing the customers by the number of purchases and subsequent correlation analysis, it was found that the number of transactions does not affect any of the values describing customer purchasing behaviour. Thus, when loyalty is viewed through the paradigm of purchase frequency, it has not been shown to affect customer purchase behaviour. It is also worth noting that the APV of customers who purchased 2 and 3 times is even smaller than the APV of customers who purchased only once, which contradicts the claim of Reichheld and Shefter, (2000) that returning customers spend more money on average. Thus, overall, based on the research results, it can be argued that customer loyalty is not significant for the selected e-stores. In fact, if each customer purchased only once, the e-shops would lose only 20% of their total purchases and sales.

6. CONCLUSION

The key findings of the research as well as the possible managerial implications are as follows 1) 90% of customers make only one purchase 2) customer purchasing behaviour expressed in terms of average order value, conversion rate, time on site and immediate abandonment rate is not related to the number of purchases 3) repeat shoppers account on average for 20% of e-shop sales 4) repeat shoppers spend less on average, but the difference is negligible 5) the number of purchases and customer buying behaviour expressed by these variables are not correlated 6) customers who buy more than twice account for only 1.5% of the total number of customers and 5% of the total volume of purchases and sales 7) customer buying behaviour is very similar across countries. Thus, the general conclusion that customer loyalty, or its behavioural aspects, have only a very weak influence on e-shop performance is contrary to the claims of many authors dealing with the issue. However, it is very important to mention the factors limiting generalization of the conclusions drawn from the research to the e-commerce market. The research analysed e-shops of one brand offering only one product category over 2 years. Thus, the total volume and telling value of the data is not sufficient for generalization. Also, the capacity and situation of the market are not known, so it is not possible to estimate the growth potential of the e-shops, as we do not know the volume of consumption of the product category or the amount or activity of competitors. The marketing activities of the e-shops and their costs are also unknown, so it is not possible to assess the profitability of individual customers or the e-shop as a whole. Thus, the implementation of research that eliminates these limitations can inspire further work by authors dealing with the issue.

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Labour Productivity in the Croatian Hotel Industry

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Abstract: *The main goal of this paper is to assess labour productivity in the Croatian hotel industry. The purpose of this paper is to determine the level of productivity of employees in the hotel industry in order to improve the performance of the Croatian hotel industry. In order to achieve the goal and purpose of this research, many scientific methods have been applied, of which the survey method (N = 452), descriptive statistics methods and cluster analysis methods have been singled out. The main finding of this paper suggests that every other employee in the hotel industry shows a low level of labour productivity.*

1. INTRODUCTION

The hotel industry is a business sector whose main focus is to provide accommodation for people (travellers) who do not have permanent residence in that particular area. It offers services that are realized on the tourist market by selling accommodation as well as special goods and services to tourists and the local population. That is how tourist consumption is realized. The hotel industry is a service industry that includes hotels and restaurants, retail, transport services and destinations (Cerović, Pavia, Galičić, 2005). The hotel industry is an activity that brings high incomes, contributes to economic growth and development of the national economy and is a significant source of employment.

It has been proven that the development of human capital is a vital issue that has arisen in the global hotel industry today and it will continue to be in the centre of interest of tourism and hotel management (Esichaikul and Baum, 1998; Connolly and McGing, 2006; Vujić, 2008, Tepšić 2012), and human capital management in each business system becomes completely different from the previous one (Vujić, 2010). Human capital is considered a key and differentiating element from whose capabilities permanent competitive advantages can be developed (Canizares and Lopez-Guzman, 2010, Črnjar, 2013). It is therefore not surprising that leading hoteliers point out that successful hotels invest in their people (Littlejohn, & Watson, 2004). Accordingly, it seems appropriate to investigate and determine the level of labour productivity in the Croatian hotel industry in order to improve the competitiveness and success of the Croatian hotel industry. Productivity is not only important for competitiveness, but it also measures it.

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2. THEORETICAL FRAMEWORK AND RESEARCH PROBLEM

Productivity is a measure of improving the production process. It is expressed by the relative ratio of output and input.

$$\text{Productivity} = \frac{\text{Units produced (goods, services)}}{\text{Input used (labour, capital)}} \qquad (1)$$

Only by increasing labour productivity can the quality of life be improved (Pupavac, 2017). There are three key variables to increase productivity: 1) labour, 2) capital, and 3) management. The share of these variables in increasing labour productivity in the United States is clearly shown in figure 1.
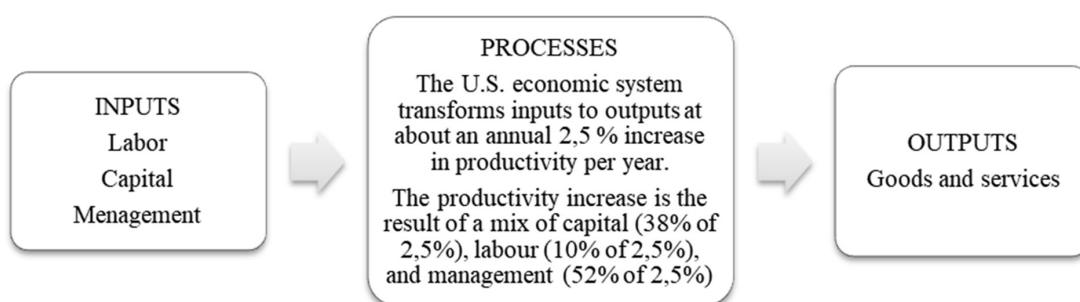
Figure 1. Determinants of labour productivity in the United States
Source: Authors according to Heizer & Render, 2004

Apart from the point of view of the national economy, labour productivity can be observed from the point of view of the economic branch and from the point of view of an individual enterprise. Labour productivity can be expressed in natural and value indicators. When measuring labour productivity, the natural method of production is expressed in natural or physical units of measure. Such an approach is more appropriate for manufacturing companies. In the case of applying the value method, it is necessary to reduce natural indicators to values. The value method of measuring labour productivity can be expressed in two ways, as a ratio of income and invested labour and as a ratio of profit and invested labour. The hotel industry belongs to the group of labour-intensive activities and, accordingly, labour productivity is of special importance for the success of companies in the hotel industry. Labour productivity indicators that indicate the specificity of production and service processes in the hotel industry can be classified into two groups (Avelini Holjevac, 1996; Črnjar, 2003):

- Global labour productivity indicators: 1) amount of performance expressed in equivalent units / average number of workers, 2) amount of performance expressed in equivalent units/number of conditionally qualified workers, 3) number of nights spent / average number of workers, 4) total revenue at constant prices standardized (required) working hours.
- Partial indicators of labour productivity: 1) income from food services (at constant prices) / average number of workers in the kitchen, 2) total number of meals issued / average number of workers in the kitchen, 3) income from food and beverage services (at constant prices) / average number of waiters, 4) number of meals served (number of couverts) / average number of waiters, 5) income from accommodation services (at constant prices) / average number of workers at the reception floors, 6) number of nights / average number of workers at the reception and floors, 7) number of guests / average number of workers at the reception and floors, 8) income from non-board services, at constant prices.

Factors affecting labour productivity are (Avelini Holjevac & Vrtodušić Hrgović, 2012): wages and benefits, motivation, education and training, working conditions, labour standards, planning and organization of work, morals and culture of work.

Due to the high labour intensity, the hotel industry is one of the economic sectors with the lowest level of labour productivity (Table 1).

Table 1. Basic Structural Business Indicators, according to NKD 2007. in 2017.

Non-financial business economy	Number of enterprises	Number of persons employed	Turnover (thousand Kuna)	Value added at factor cost (thousand Kuna)	Apparent labour productivity (thousand Kuna per person employed)	Gross operating ratio (%)
B Mining and quarrying	223	4020	28080815	1058949	263,4	17,6
C Manufacturing	19539	268726	160451137	45725843	170,2	12,1
D Electricity, gas, steam and air conditioning supply	681	15218	37552757	8231347	540,9	15,6
E Water supply; sewerage, waste management and remediation activities	815	24450	8217309	4214041	172,4	19
F Construction	17994	102462	44204145	13962557	136,3	12,8
G Wholesale and retail trade; repair of motor vehicles and motorcycles	35567	228341	249675974	35998719	157,7	6,3
H Transportation and storage	8606	84484	35978340	14871773	176	14,9
I Accommodation and food service activities	19911	105607	29888943	13865807	131,3	21,6
J Information and communication	6891	42364	29380926	13225173	312,2	24,2
L Real estate activities	4796	12838	8187761	3656569	284,8	33
M Professional, scientific and technical activities	25449	75418	27910133	11995182	159	15,7
N Administrative and support service activities	7447	56832	15414188	6142034	108,1	14,2
S95 Repair of computers and personal and household goods	1405	3724	1901811	538046	144,5	11,4

*   Gross operating surplus (EU code 12170) corresponds to the surplus generated from operating activities after the personnel costs had been recompensed

Source: Croatian Bureau of Statistics, 2018

Based on the data in table 1, it can be seen that labour productivity in the sector of accommodation and food preparation and service activities amounts to HRK 131.3 thousand per person, while the gross operating profit rate is 21.6%. The highest labour productivity is in the sector of electricity, gas, steam and air conditioning and amounts to 540.9 thousand or four times more. The highest gross profit rate is achieved by the real estate sector of 33%.

The share of total labour costs in the total revenue of the Croatian hotel industry has been stagnant for years at the level of about 25%. The increase in labour costs follows approximately the same increase in income. Demand for labour is growing from year to year while labour supply is declining. The share of seasonal workers is increasing from year to year and is at the level of 70% of the total number of employees. This is why it is difficult to increase labour productivity in the Croatian hotel industry.

3. RESEARCH DATA AND METHODOLOGY

Data were collected using a survey questionnaire on a sample of 452 employees in the hotel industry. The research was conducted in hotels in Adriatic Croatia in the summer season of 2018. Of the total number of surveyed employees, 179 or 39.61% were male and 273 or 60.39% were female. The average age of the surveyed employees was 30.73 years (SD = 10.4). The youngest employee surveyed was 17, and the oldest was 60 years old. 222 or 49.12% of them worked in their place of residence, while 230 or 50.88% of them worked outside their place of residence. Regarding the educational structure of employees, the largest number of 220 or 48.67% had four-year secondary education, 136 or 30.08% had three-year secondary education and 75 or 16.59% had higher education. Only primary school had 21 employees or 4.65%. According to the type of employment contract, employees with an atypical employment contract predominated (79.97%). This means that only every fifth surveyed employee had an indeterminate contract, or 91 of them.

In order to assess the productivity of employees in the hotel industry, the method of self-evaluation of employees was applied. The labour productivity construct was measured by four questions (Table 2).

Table 2. Operationalization of construct productivity

Literature	Construct	Particles	Ordinal scale type
Employees Self-evaluation (Martin, M. & Whiting, F., 2016., 151)	Productivity	1) How would you assess your work success in the preceding period? 2) What do you think, how would your guests assess your work success? 3) What do you think, how would your colleagues assess your work success? 4) How would your supervisor assess your work success?	Grade (from 1to 5)

The acquired results about the productivity of workers in the hotel business in the Republic of Croatia will be shown as follows in order to ensure scientific objectivity: 1) high productivity — this group consists of employees who gave their job the highest rating and believed that all other participants (guests, co-workers, and supervisors) would rate their work the same, 2) moderate productivity — this group consists of employees who gave their work a grade lower than five and assumed that all other participants (guests, co-workers, and supervisors) rate it the same, 3) low productivity — this group includes employees who received a grade for their work that differed from the grade they expected other participants would give them (guests, co-workers, and supervisors) (Pupavac, 2020).

The *Statistica* program was used for all statistical analyses.

4. RESEARCH RESULTS AND DISCUSSION

The results of employee self-evaluation are given in table 3. Table 3 shows that the surveyed employees think that they would get the best grades for their work from their guests (M=4.25; SD=0,66) and the worst from their supervisors (M=4.07; SD=0,78). Interestingly, all surveyed employees are convinced that no guest would rate their work negatively. This information may lead to the conclusion that employees are convinced that each guest is provided with at least a minimum level of service within the tolerance zone (Figure 2).

Table 3. Descriptive statistics

	Self	Guests	Colleagues	Supervisors
MEAN case 1-452	4,17	4,25	4,11	4,07
MEDIAN case 1-452	4	4	4	4
SD case 1-452	0,72	0,66	0,78	0,78
VALID_N case 1-452	452	452	452	452
SUM case 1-452	1887	1925	1860	1844
MIN case 1-452	1	2	1	1
MAX case 1-452	5	5	5	5
_25th% case 1-452	4	4	4	4
_75th% case 1-452	5	5	5	5

Source: Own research

| Desired Service |
|---|
| Zone of Tolerance |
| Adequate Service |
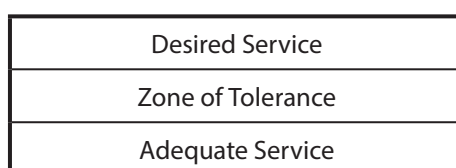
Figure 2. Two Levels of Guests Expectations

Source: Berry & Parasuraman, 1991

A zone of tolerance separates the desired and adequate service level as shown in figure 2. The zone of tolerance is a range of tourist services that a guest considers satisfactory. A performance level above the tolerance zone will pleasantly surprise guests and result in a revisit tourist destination.

Total average grade is 4.15 (SD=0.73) but the grades given to the employees by their supervisors (M=4.07; SD=0,78) and colleagues (M=4.11; SD=0,78) are lower. The employees gave themselves mark M=4.17; SD=0,72 which is 0.2 index points more than the total average mark. The cluster analysis confirmed the grouping of the observed variables in two clusters (Figure 3).
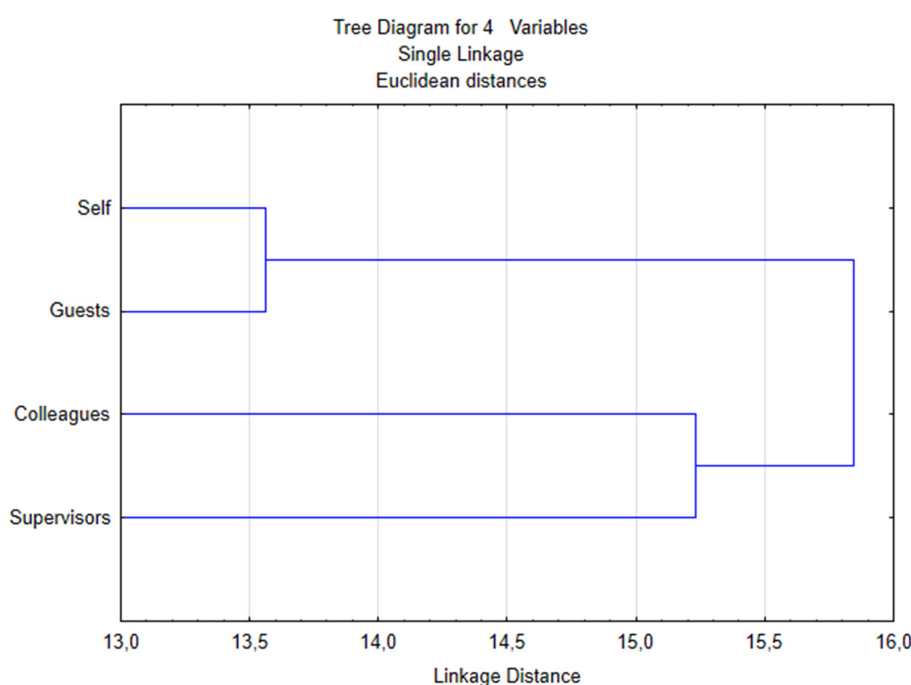
Figure 3. Dendrogram of cluster analysis

Source: Own research

The first cluster consists of variables related to self-assessment of their own performance and assessment to assess guests' performance. The second cluster consists of evaluation-related variables to help work colleagues and superior managers evaluate their performance. The arithmetic means of the first cluster are significantly larger, and the standard deviations from the arithmetic means are smaller than the second cluster.

Based on the collected data, employees were divided into three groups according to the demonstrated labour productivity (Table 4).

Table 4. Labour productivity in the hotel industry of the Republic of Croatia

The level of labour productivity	Count	Cumulative-count	Percent	Cumulative-percent
High productivity	77	77	17,03540	17,0354
Normal productivity	152	229	33,62832	50,6637
Low productivity	223	452	49,33628	100,0000

Source: Own research

Table 4 shows that just 17.03 per cent of employees have a high level of labour productivity, while 33.63 per cent have a moderate level of labour productivity. Low labour productivity affects every second employee or 49.34%.

The obtained results indicate the importance of raising the level of productivity in the hotel industry because, without an increase in labour productivity, a significant increase in wages in the hotel industry is not possible. Low labour productivity in the Croatian hotel industry is the result of inadequate human resource management.

5. CONCLUSION

Labour productivity can be observed from the point of view of the national economy, industry and from the point of view of an individual enterprise. Observing labour productivity from the perspective of the hotel industry is of particular importance for the Croatian economy due to the large role of the hotel industry in creating new jobs and increasing overall employment. Increasing labour productivity is one of the greatest challenges of modern hotel management. Labour productivity in the Croatian hotel industry is stagnating, which could seriously jeopardize the competitiveness of Croatian tourism. The results of the research point to the conclusion that every second employee shows low labour productivity, and only every sixth high labour productivity. Increasing labour productivity in the hotel industry can be achieved by giving a greater role to the human resources department in creating strategies and policies of hotel companies. Hotel companies that want to avoid the trap of low productivity and low wages urgently need to improve their human resources management policies. This can be done through the establishment of appropriate performance standards, measurement and control of labour productivity, improving the functions of planning and obtaining human resources, investing in human resources training, improving the system of rewarding and motivating employees.

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The Effects of the Application of Artificial Intelligence in Material Handling – A Systematic Literature Review

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Adhie Prayogo[2]
László Buics[3]

Abstract: *In this article, the authors are examining the application opportunities of artificial intelligence in the material handling industry. A structured literature review with the help of a mapping study is being conducted in the study to show how the material handling industry can benefit from the implementation of artificial intelligence. The paper will demonstrate how artificial intelligence can assist in transforming material handling processes from manual to autonomous operations impacting greatly the overall efficiency and effectiveness of different industries. The paper is using the Scopus and Science Direct databases to show what are the advantages and the constraints based on the selected articles.*

1. INTRODUCTION

With the continuous development of digitalization, advanced technological improvements, such as artificial intelligence and other Industry 4.0 tools, play a more and more important role in logistical processes, making them more effective and efficient (Bartucz et al., 2021). Artificial intelligence (AI) can be interpreted as a display of intelligence by machines specifically via computer systems. AI is able to perform tasks such as visual perception, speech recognition, and decision making. As an essential part of industry 4.0, AI is having a much bigger role as it has brought about a change in the pattern of the industrial operation driven by this new form of interaction between man and machine. AI techniques such as machine learning and deep learning have very significant and positive impacts on a company and induce immense improvement in a manufacturer's overall performance by turning the tide in the firm's favor once it is properly implemented (Min, 2010; Klump, 2017; Ponis, Efthymiou, 2020, Yuan, 2020; Nota et al., 2021).

One field that is usually introduced by artificial intelligence is material handling. Material handling refers to the operation incorporating how materials and goods are moved, stored, protected, and controlled throughout the industrial processes, including manufacturing, warehousing, and distribution. In order to create a good flow of production processes, material handling assists in providing a smooth replenishment of input material to the production activities as well as moving the semi-finished goods within the plan or transporting the finished products into the warehouse while simultaneously ensuring the safety and timing of the moving products. Besides, it may also focus on supporting the operator while working on a task, particularly the manual one, by implementing several concepts, such as ergonomic, standardization, or lifting methods (Thamer et al., 2018; Zhang, 2019, Dhamija et al., 2020; Ammar et al., 2021).

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Material handling integrates every activity throughout the line, reflecting the importance of it for the plan. Once the processes are slow, interrupted, the other system will be affected as well. As a result, there is an emergence of either maintaining the operation level or significantly elevating the processes through artificial intelligence implementation. With the AI introduction, material handling operations are expected to work faster, safer, easier and more reliable (Kar et al., 2019; Yang et al., 2021).

The article aims to examine the application opportunities of artificial intelligence in the material handling industry. A structured literature review with the help of a mapping study is being conducted in the study to show how the material handling industry can benefit from the implementation of artificial intelligence.

The research question of the article intends to answer is: how the implementation of artificial intelligence can improve the efficiency and productivity of material handling activities and what are the advantages and constraints of the implementation?

The paper will demonstrate how artificial intelligence can assist in transforming material handling processes from manual to autonomous operations impacting greatly the overall efficiency and effectiveness of different industries.

The paper conducts a rapid systematic literature review, using the Scopus and Science Direct databases to show what are the advantages and the constraints based on the selected articles, with a narrative summary, giving an overview of the content of the selected articles and answering the research question.

2. METHODOLOGY

In this article, a rapid systematic literature review is carried out on the application opportunities of artificial intelligence in the material handling industry, following the steps of Figure 1.
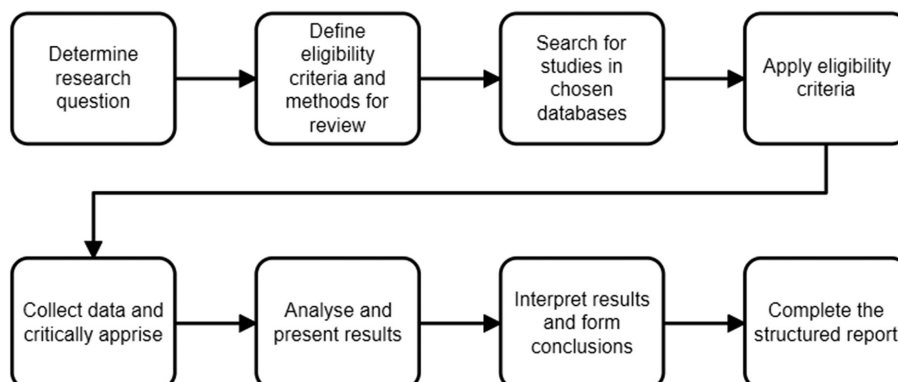
Figure 1. Literature review process steps
Source: Author's own creation

According to literature a systematic literature review (SLR) identifies, selects, and critically evaluates research in order to answer a clearly articulated question. SLR is a review in which a detailed search for relevant studies on a particular topic is performed, and then the ones identified are evaluated and synthesized according to a predetermined and explicit method. A systematic review attempts to gather all empirical evidence that meets predefined eligibility criteria

to answer a specific research question. It uses explicit, systematic methods that are selected to minimize bias, giving more reliable results from which conclusions can be drawn and decisions made (Tranfield et al., 2003; Briner and Denyer, 2012; Denyer and Tranfield, 2009).

Rapid systematic review is a literature review produced using accelerated and streamlined systematic review methods, by applying a narrow search strategy, limiting the number of databases searched, narrowing the time frame for article retrieval, omitting hand searching of reference lists and relevant journals, or limiting the number of reviewers involved in inclusion/exclusion criteria formulation, data extraction and quality assessment (Reyen et al., 2017; Hamel et al., 2020).

The research aims to answer the following research question:

RQ: How the implementation of artificial intelligence can improve the efficiency and productivity of material handling activities and what are the advantages and constraints of the implementation?

In order to answer the research question, a systematic literature review is applied by using the Scopus and Science Direct databases to collect and categorize articles.

During keyword identification, the research also took into consideration the most common synonyms and alternatives of material handling and artificial intelligence. Based on this concept the following keywords were identified and used during the research:

Artificial Intelligence, Material Handling, Machine Learning, Automation, Smart Material Handling, Smart Manufacturing, Smart Warehousing, Productivity, Efficiency, Industry 4.0, AGV, Automated Guided Vehicle, Smart Logistics.

To organize the chosen keywords and to achieve more relevant research results during the database search the PEO (Population, Exposure, Outcome) framework was applied to organize the keywords into the three major categories, as shown in Table 1.

As a novelty, the research applies the PEO framework which is commonly used in medical literature but has fewer examples in other scientific fields. The PICO and PEO frameworks are used to help manage and break down a research question and organize relevant keywords for database searches. But while PICO is mostly used for quantitative searches PEO is used for qualitative searches, which aligns better with the focus of the research (Metzler and Metz, 2010; Bettany-Saltikov, 2012)

Three major questions help us to separate the keywords:
– Population (P): Who are you studying?
– Exposure (E): What is your population exposed to?
– Outcome (O): What is the result of the exposure on your population?

Population is the category in which the research question is generally interested, which is in this case material handling. Exposure is the category that affects the previous in any way. Outcome is the category that specifies the effects of exposure on the population. A combination of two, three, and four keywords were applied during the database searches with the help of boolean characters to generate complex keyword combinations, enhancing the effectiveness of the search for relevant literature. During the initial searches, a limitation arose as the database

of ScienceDirect has a Boolean connector limitation of eight. Because of this, during the search in the case of the ScienceDirect database, only the keyword combination of two was used while for Scopus the combination of three and four keywords was applied.

Table 1. Keywords categorized based on PEO (Population, Exposure, Outcomes)

Population		Exposure	Outcomes
Material Handling	Smart Warehousing	Artificial Intelligence	Productivity
Smart Material Handling	Smart Manufacturing	Industry 4.0	Efficiency
	Smart Logistics	Machine Learning	
		Automation	
		Automated Guided Vehicle	
		Autonomous Guided Vehicle	
		AGV	

Source: Author's own creation

Population is the category in which the research question is generally interested, which is in this case material handling. Exposure is the category that affects the previous in any way. Outcome is the category that specifies the effects of exposure on the population. A combination of two, three, and four keywords were applied during the database searches with the help of boolean characters to generate complex keyword combinations, enhancing the effectiveness of the search for relevant literature. During the initial searches, a limitation arose as the database of ScienceDirect has a Boolean connector limitation of eight. Because of this, during the search in the case of the ScienceDirect database, only the keyword combination of two was used while for Scopus the combination of three and four keywords was applied.

During the preparation of the systematic literature review, the following inclusion and exclusion criteria were formulated:
1. The articles have to be related to the engineering and management science fields.
2. The articles have to be freely accessible.
3. The articles have to be written in English.
4. The articles have to be published between 2010 and 2021.
5. The articles which are present in both databases have to be eliminated to avoid duplication.
6. The articles have to be related to the research question.

3. RESULTS OF THE MAPPING STUDY

The number of collected and selected articles are presented in Table 2, where after the initial search with the different combinations of keywords, each row shows the results of inclusion and exclusion criteria application one by one.
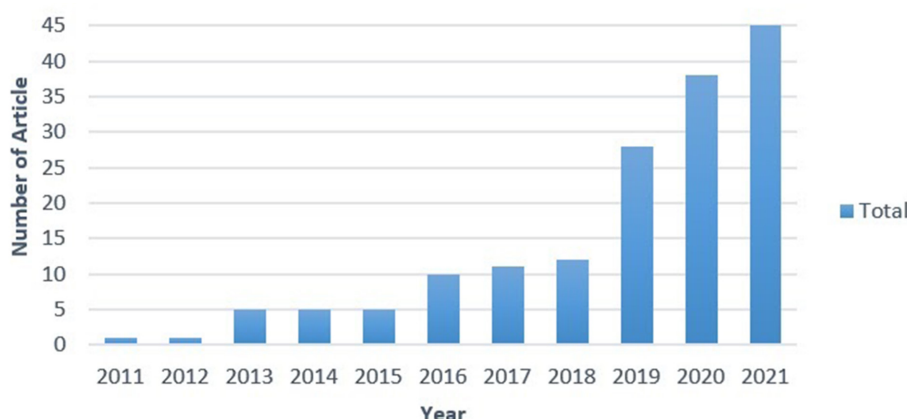
The initial number of collected papers from the ScienceDirect database was 19,247 papers and from the Scopus database was 5,585 studies. After selecting the articles according to the three selection criteria, the paper remained 1122, accounted for 5.8% of total selected articles from the ScienceDirect database, and 813, similar to 15.7% of selected papers from the Scopus Database. Further, a detailed examination of the papers' title and abstract based on the research questions was established, resulting in 169 articles in total from both databases. The removal of 8 duplicated studies gave a result of 161 papers to be reviewed.

Table 2. Details of Article Number Selection

	Keyword Queries in Science Direct				Keyword Queries in Scopus				
	2.1	2.2	2.3	Total	3.1	3.2	3.3	4	Total
Initial Articles	30	6970	12247	19247	363	4409	214	199	5185
SC 1. Engineering and Management Related	23	4910	6527	11460	282	3319	170	157	3928
SC 2. Free Access	11	547	647	1205	122	610	75	69	876
SC 3. Publication Year and Language	11	508	603	1122	120	549	75	69	813
Final Paper After 3 SCs.	1122				813				
SC 4. Related to Research Questions	61				108				
Removal of Duplication Articles	8								
Final Paper Number to Review	161								

Source: Author's own creation

The 161 selected articles were analyzed by the publication year and publication type. As Figure 2 depicts, all studies were published between 2011 and 2021. Low publication numbers were discovered between 2011 to 2015, whereas only one paper in both 2011 and 2012, and five articles from 2013 to 2015. A significant escalation trend happened afterward whilst there were 28 papers in 2019, 38 papers in 2020, and 45 papers in 2021. Figure 3 informed the publication types of reviewed articles. Journal articles were dominant with 81 files, similar to 50% of the total studies, followed by conference proceedings with 69 papers, which accounted for 43%. The remaining are nine review articles and two book chapters.

**Figure 2.** Number of Articles per Year

Source: Author's own creation
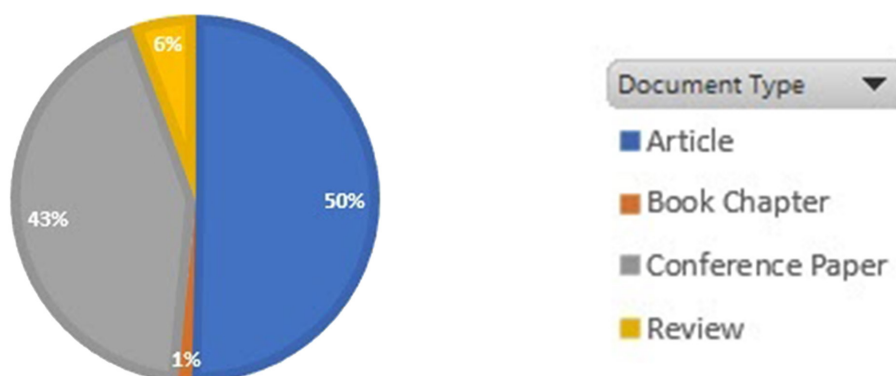
Figure 3. Number of Articles per Document Types
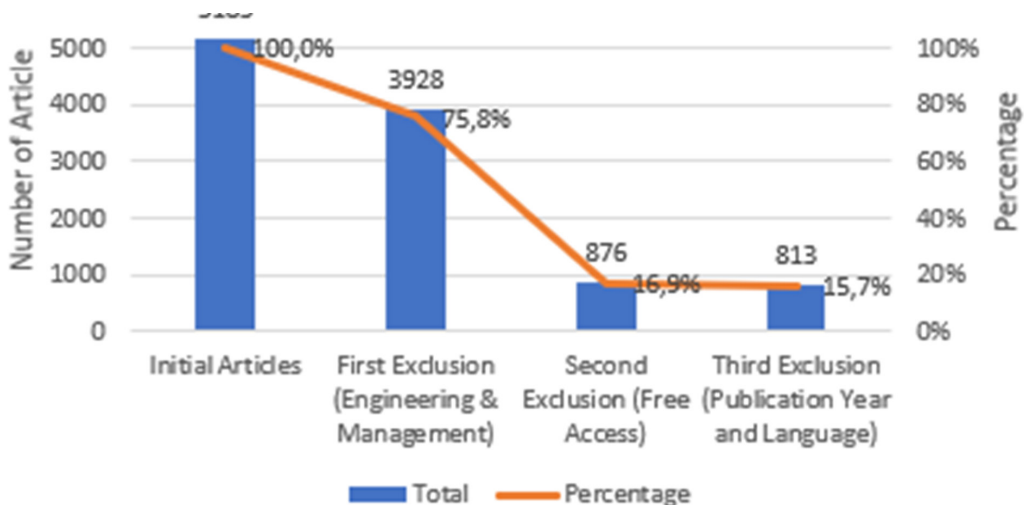
Source: Author's own creation

The number of collected and selected articles is presented in Figure 4. and Figure 5. The initial number of collected papers from the ScienceDirect database was 19,247 papers and from the Scopus database was 5,585 studies. After selecting the articles according to the three selection criteria, 1122 papers remained, accounting for 5.8% of the total selected articles from the ScienceDirect database, and 813, similar to 15.7% of selected papers from the Scopus Database. Further, a detailed examination of the papers' title and abstract based on the research questions was established, resulting in 169 articles in total from both databases. The removal of 8 duplicated studies gave a result of 161 papers to be reviewed.
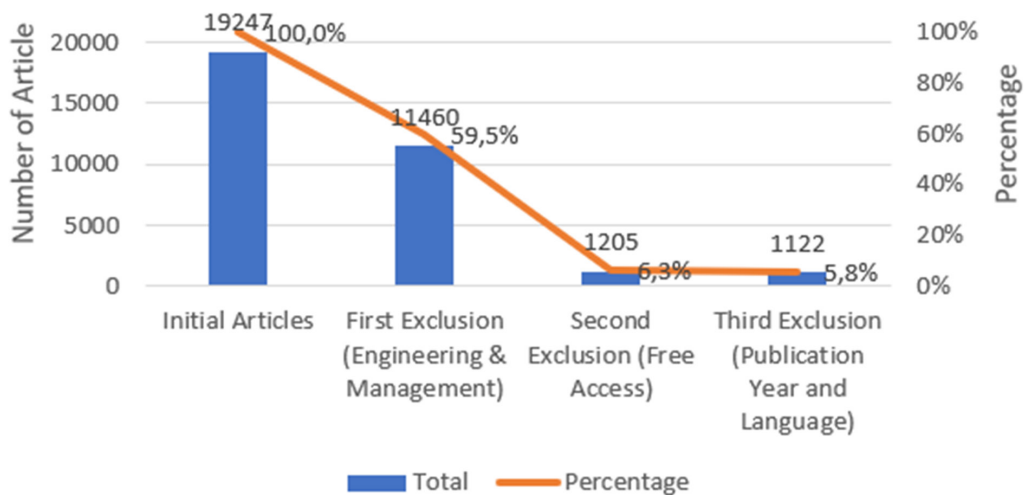
Figure 4. Application of eligibility criteria on ScienceDirect Database Articles
Source: Author's own creation

Figure 5. Application of eligibility criteria on Scopus Database Articles
Source: Author's own creation

4. DISCUSSION

According to the detailed analysis of the remaining 161 papers, a large proportion of the papers are focusing on autonomous guided vehicles. Van Geest et al. (2020) stated that AGV can replace human-operated forklifts by speeding up the material transportation process making it less time-consuming. Such AGV's can be made completely autonomous through proper framework based on AI and supported by self-learning. They also showed a case study from a food industry warehouse

where multiple AGV's are operating autonomously by communicating with each other and with the WMS for order picking and for making the work completely automated.

Toorajipour et al. (2020) talked about two computational models named ABSs (Agent-Based Systems) and MASs (Multi-Agent Systems) which have the ability to simulate the interactions of autonomous machines. These models can help the autonomous agents to perceive the surrounding environment, act autonomously in a collective or individual manner. A study by Mahmood et al. (2021) presented the A* algorithm to search the shortest path of several AGVs. Adopting the framework of Map-Reduce, the experiment proved that AGV's task scheduling and speed control strategy resulted in a feasible and effective conflict reduction in the material handling process. Ong et al. (2020) also discussed path recognition methods, highlighting the effectiveness of flower pollination algorithm (FPA) compared to particle swarm optimization.

Gregor et al. (2017) in co-operation with CEIT have done research and developed an AGV called CEIT Aurora to implement in automotive and electronics industries in order to handle complex logistics tasks which are connected to the most important parts of value chain such as the press department, welding, painting and assembly in VW Slovakia. According to the research done by Weckenborg and Spengler (2019), an AGV system equipped with RFID technology was implemented in the automotive industry to define the direction, speed, stop or move, and activate or deactivate AGV traffic lights in transporting finished goods to the warehouse. As a result, non-value-added activities decreased to a mere 20% from 58% and accelerated the cycle time by 13%. Pedan et al. (2017) showed the implementation of an AGV in a healthcare facility where the works of the AGV were medical supplies, food and laundry transportation, heavy and dangerous medical wastage movement. This was also helping the hospital stuffs in a way where they were being able to use most of their time for patient care.

Similarly, Tai et al. (2016) showed that, with an integrated radio frequency communication system to connect different buildings, doors, and elevators, an AGV system has been implemented in a large Norwegian hospital to transport consumer goods, sterile goods, and others. However, the system faced challenges in interacting with people while using elevators or hallways, leading to the AGV failures. Thus, AGV operating hours were restricted by the operator's attendance and surveillance.

Zhang et al. (2021) proposed a dynamic scheduling method for aircraft assembling industry so that multiple AGV's with the same carrying capacity can combine and communicate with each other to carry out a large material handling task together. Fernandes et al. (2019) stated that it is essential to have a clear idea in the earliest stage of AGV implementation with different stakeholders' discussion while designing the AGV system, avoiding costly and difficult changes. According to Gu et al. (2020), the scheduling of AGVs' movements has to be carefully planned when using them in higher numbers during everyday operations, but if the scheduling optimization is successful it can significantly improve the efficiency according to Farooq et al. (2020).

Javaid et al. (2021) talked about autonomous mobile robots who can help in manufacturing for repetitive operations of high volume with speed, precision and durability and in production for optimum performance, automate routine jobs so that related people can concentrate on more profitable business areas. Alcacer and Cruz-Machado (2019) discussed about adaptive autonomous robots as they can make their own decisions and perform tasks simultaneously in a constantly changing industrial environment without operator's interaction, and these robots can also be used to handle dirty or industrial hazards on an unstructured surrounding without any human involvement. Anastasi et al.

(2021) discussed mobile robots with embedded AI-machine learning that have the ability to calculate and find out the best route inside the plant while operating at a proper speed and can avoid people who are present and working casually in their way. Fragapane et al. (2021) discussed several AI techniques such as vision systems, machine learning, fuzzy logic, neural networks and neuro-fuzzy-genetic algorithms which help AMRs to identify, classify obstacles and reach their destination while avoiding collisions along their path.

Cyber-physical systems related research articles are also common within the remaining 161 papers. Yan et al. (2019) discussed about a cyber-physical system for intra-logistics operation which is based on AI based four-level framework to deal with critical logistics tasks and for intelligent applications to understand information, to make decision and interact. Herterich et al. (2015) discussed AI powered CPS which can bring impact on manufacturing in a good way by optimizing equipment operations, remote control & manage of equipment, predict & trigger service activities, remote diagnostics and replace & optimize of field service.

Deja et al. (2021) discussed the use of UAV in manufacturing especially for material transfers within cells and job shops and the use of UAV can be highly fruitful as they don't occupy space on the ground and return on investment can be high due to low purchase cost of UAVs. Mourtzis et al. (2020) discussed an AI-based algorithm for that which helps human operators with physical load and production engineers to monitor the production status remotely.

Schoepflin et al. (2021) developed a smart material delivery unit for aircraft manufacturing industry that can gather information from the real process, can find out any disruptions in the process and hence can identify any kind of problem that can create structural error in the aircraft because of its ability to collect shop-floor information for long term.

Several of the selected articles are dealing with the application of robots to enhance productivity. Aaltonen and Salmi (2019) talked about cobots (collaborative robots) which can collaborate and work together with humans because of their user-friendliness and help to increase operation efficiency, innovation, improvements in physical and cognitive ergonomics, reduced monotony, and flexibility. A similar result was mentioned by Gonzalez et al. (2019) as the experiment of collaborative robot application based on an assembly task at Volvo Group Truck operations resulted in the acceleration of cycle time. However, the usage of available assist devices to perform rapid and accurate movements might pose slow, awkward, non-responsive, and hard to manipulate characteristics. Despite this Fager et al. (2020) suggested that cobots can be useful from a financial perspective in case of higher commonality order if the implementation challenges and safety issues are eliminated, and Segura et al. (2021) identified the basic components comprising human-robot collaborative systems design, allowing the selection of compatible structural components in order to respond better to manufacturing requirement.

To transport goods, a study by Fragapane et al. (2021) highlighted the experiment of conveyors application equipped with an Artificial Neural Network and vision sensor in minimizing energy consumption. The system allows the conveyor to stop, start, and define the speed automatically based on the loading characteristics, resulting in less energy consumption ranging from 87.5% to 98.5%. Another research by Frommel et al. (2019) attempted to design, integrate and test the implementation of an Autonomous Intelligent Vehicle mounted with a Telescopic Pillar Actuator (TPA) and conveyor system in the linear manufacturing circumstances to eliminate single fixed conveyors because of their high investment cost and shutting down floor space and walkways.

According to the model and simulation of material handling systems by Setiawan et al. (2021), there was evidence that automation-based tasks have significantly better performance than human-based tasks in terms of their value and human force needed. However, several factors before implementing the robot should be considered, including (1) the total cost of ownership, (2) the qualitative factors; the service and support, payment alternatives, equipment effectiveness, and (3) quantitative factors covering the operator's wage, the cost for spare parts and cost for energy consumption, as stated by Schröder et al. (2016). Simulation and case study evidence according to Seha et al. (2017) also suggested that autonomous material handling system integration improves assembly line performance. Ng et al. (2021) also mentioned some challenges of intelligent automation implementation, such as problem dependency and expert reliance issues, cultural readiness and workforce reskilling, issues of integrating with legacy systems.

5. FUTURE RESEARCH DIRECTIONS

As the level of digitalization and the application of Industry 4.0 related technological improvements is increasing in various sectors, advanced technologies such as artificial intelligence, play a more and more important role in logistical processes. The goal of this research was to examine the implementation of artificial intelligence in the case of material handling by conducting a systematic literature review. But what we have seen so far is, the material handling operations are not completely automated yet. The future direction of this research is to extend the review based on the identified major topics and common patterns of the selected articles to conduct a further tailored wider analysis of the existing literature. Moreover, to give fellow researchers a solid ground to think and generate ideas about the complete automation of material handling operations.

6. CONCLUSION

The article aimed to examine the application opportunities of artificial intelligence in the material handling industry. A structured literature review with a mapping study was conducted to examine how the material handling industry can benefit from the implementation of artificial intelligence.

Artificial Intelligence is the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions, while material handling is the process of movement, protection, storage, and control of materials and products throughout manufacturing, warehousing, distribution, consumption, and disposal.

The PEO framework was applied to categorize identified keywords in order to enhance database search effectiveness with the help of boolean connectors in several variations. After the initial searches, 19,247 papers were identified in the ScienceDirect Database and 5,585 papers were identified in the Scopus database. After applying the previously defined inclusion and exclusion criteria 1122 (5,8%) papers remained in the case of the ScienceDirect database and 813 (15,7%) papers remained in the case of the Scopus database. Further, a detailed examination of the papers' title and abstract based on the research questions was established, resulting in 169 articles in total from both databases. The removal of 8 duplicated studies gave a result of 161 papers to be reviewed.

From the remaining 161 articles, a large proportion focuses on the implementation, improvement, and integration of autonomous guided vehicles in various material handling and distribution systems supported by algorithms as optimization methods. Another section of the article deals with the implementation challenges and benefits of collaborative robots, or focuses on the

enhancing of the cyber-physical system for intra-logistics operation with the support of artificial intelligence-based frameworks, aiming to achieve higher performance levels.

Overall the examined papers clearly present that despite the challenges of implementation and optimization hardships, the application of artificial intelligence can assist in transforming material handling processes from manual to autonomous operations impacting greatly the overall efficiency and productivity of various industrial environments.

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