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Annals of *Spiru Haret* University

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Annals of Spiru Haret University. Economic Series is both an online journal and a printed one, which is committed to publish quality research papers submitted by professors, researchers and Ph.D. students in the economic field. It is an **OPEN ACCESS** journal.

The papers should be the results of original research, theoretical and empirical approach under the form of research articles, case studies, and essays.

We welcome papers from professors, researchers and Ph.D. students from all over the world in the attempt of serving as a forum of discussion and a diverse knowledge hub for students and teachers.

Young researchers as Ph.D. students are encouraged to express their views in a special section dedicated to them.

COVERAGE

The areas covered by *Annals of Spiru Haret University. Economic Series* include topics related to Economic Sciences, such as: marketing, management, finance, banking, accounting, audit, international economic relations, trade, business, tourism, administrative data processing, politic economy, commercial law, cybernetics, environmental economics, statistics, ethics in economics, insurance, advocacy & lobby, economic philosophy, econometrics etc.

Each issue has a specific topic that is a subtopic of major journal coverage.

FREQUENCY

The frequency of the journal *Annals of Spiru Haret University. Economic Series* is quarterly.

JOURNAL HISTORY

The journal *Annals of Spiru Haret University. Economic Series* was founded in 2000 at the initiative of two professors from Spiru Haret University: professor Ph.D. Gheorghe Zaman – also corresponding member of the Romanian Academy and professor Ph.D. Constantin Mecu – one of the University's founders and vice-rector.

Between 2004-2010, the journal is headed by professor Ph.D. Constantin Mecu, as editor-in-chief, and associate professor Ph.D. Aurelian A. Bondrea, as deputy editor, both of them vice-rectors of the university.

In 2011, associate professor Ph.D. Aurelian A. Bondrea, rector of the university, takes over the presidency as editor-in-chief and leads the journal until present.

The *Annals of Spiru Haret University. Economic Series* was issued annually, once a year, starting 2000, until 2009.

Since 2010, the *Annals* have a new format, with a four-annual issuance exclusively in English, with both redaction and review conditions comparable to the most rigorous international requirements.

In 2007, *Annals of Spiru Haret University. Economic Series* obtained the B+ quotation from The National Council of Research in Higher Education in Romania, becoming a publication of real scientific interest.

Starting 2009, the review is indexed in REPEC, SSRN and Google Scholar and beginning with 2016 our Journal is under a process of rebranding, the new team trying to rethink the journal indexing strategy in international databases, suggesting a greater external visibility.

Along the years, in the journal pages, the members of the teaching personnel – professors, associate professors, lecturers and teaching assistants – active in six economics faculties and distinct specialty departments, as well as in the Central Scientific Research Institute, functioning within Spiru Haret University, present the results of their scientific research. The journal also hosts many studies of professors, researchers or Ph.D. students from other universities and research institutes all over the world.

The subject of the publication firstly reflects the concern for the modernization of teaching economic science in University: marketing, management, finance, banking, accounting, audit, international economic relations, trade, business, tourism, administrative data processing, politic economy, commercial law, cybernetics, environmental economics, statistics, ethics in economics, insurance, advocacy & lobby, economic philosophy, econometrics etc.

In the published materials, there are analyzed theoretical and practical issues of edification and consolidation of the Romanian market economy, as well as the fundamental directions of the technical and scientific progress, the actual state and ways of its promotion in the Romanian economy, the issue of developing the new world economy, the directions of globalization and contemporaneous economic integration and Romania's participation to these processes. Also, there are hosted articles that refer to different aspects of economic phenomena from all over the world.

The editing team and the scientific advisors are Romanian intellectual personalities – members of the Academy, professors, and specialists in different fields of the practical economic and social activities. In scientific committee have been engaged as reviewers different professors and personalities in economic field coming from economics and academic institutions in our country, such as Academy of Economic Studies Bucharest, West University from Timisoara, The National Scientific Research Institute for Labour and Social Protection Bucharest, The Romanian Court of Auditors, The Body of Expert and Licensed Accountants of Romania – CECCAR, Institute of National Economy and The Economic and Legal Sciences Department from Romanian Academy, etc. Among them, we also find members of the academia, professors and researchers from other countries of the world: Australia, Azerbaijan, Bosnia & Herzegovina, Bulgaria, France, Germany, Greece, Iceland, India, Indonesia, Italy, Lithuania, North Ireland, Norway, Poland, Republic of Macedonia, Republic of Serbia, Russia, Slovenia, The Netherlands, Turkey, Ukraine, United Kingdom, etc.

As a response to the public interest, the publication is sent to the libraries in Bucharest and Romania, as well as to other universities and economic faculties abroad.

For the journal's cover we used photos from the following sites:
https://pnl-portugal.com/
www.shutterstock.com
www.wordclouds.com

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FOREWORD

We believe that a competitive business environment is essential for resilient, sustainable and long-term growth. A surprisingly strong recovery in the first half of this year boosted economic activity in emerging markets and developing countries in the Europe and Central Asia region, with the regional economy expanding more than expected, registering an economic growth of 5.5 % in 2021, according to the latest edition of the World Bank's Regional Economic Update (ECA Economic Update), launched in Washington on October 5, 2021.

The recovery was largely driven by a strong recovery in exports in the first half of this year, as eurozone activity rebounded, commodity prices rose sharply, and domestic demand recovered due to vaccination and support packages. However, the growth of exports could slow down as global and regional spread of the more contagious COVID-19 variants, which, in turn, also slowed the recovery of domestic regional demand.

In 2022, the World Bank estimates a slowdown in regional growth of up to 3.4% as domestic and external demand stabilize and the pandemic stimulus is diminished. However, the outlook remains extremely uncertain, given the continuing pandemic, especially in the context of unequal access to and reluctance to vaccine. The regional recovery has been accompanied by a rapid acceleration of inflation and remains vulnerable to financial stress, which could be triggered by a sharp tightening of external financing conditions or a sharp rise in political uncertainty and geopolitical tensions.

"The pandemic continues to shape the economic outlook for Europe and Central Asia. However, as vaccination rates in the region increase, decision-makers can now focus on ensuring that post-pandemic recovery is inclusive, resilient and sustainable. Ensuring a competitive business environment that facilitates entrepreneurship and promotes the dynamism of the private sector are important for long-term economic growth," said Anna Bjerde, Vice President of the World Bank for Europe and Central Asia in October 2021.

An analysis of "Competitiveness and Business Recovery after Covid-19", using data from World Bank corporate and "Business Pulse" surveys, found that the pandemic had a profound and varied impact on companies. On average, companies in the region recorded significant decreases in monthly sales and the number of full-time employees. By May of this year, one in four companies expected to have outstanding debts in the next six months. Smaller, newer businesses, as well as those run by women, have not yet seen their sales improve since their initial decline.

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Crises can be devastating for many companies, but they often have a good side, reallocating resources from less productive companies to more productive ones. There is also evidence of this in Europe and Central Asia, especially in countries with more competitive markets. Indeed, firms with high pre-crisis labor productivity recorded significantly lower declines in sales and employment than firms with low pre-crisis productivity. More productive firms have also been more likely to adapt to the crisis, increasing online activity and remote work.

"The role of competition is important. Being associated with dynamism, competition stimulates companies to innovate, forces the most productive to grow, while facilitating the exit of the least productive, "said Asli Demirgüç-Kunt, Chief Economist at the World Bank for Europe. and Central Asia. "In countries with more competitive markets and stronger competition policies, this reallocation to productive firms has been even greater."

Many governments have implemented comprehensive policy support programs to respond quickly to the initial economic crisis. These policies immediately provided support to companies and workers who were protected from the worst effects of the crisis. While the number of government beneficiaries has varied widely from country to country, on average 50% of firms reported receiving government support in response to the economic crisis of the pandemic.

In general, based on surveys of World Bank, less productive firms were more likely to receive government support, larger firms were more likely than small firms to receive support in the form of deferred payments and tax exemptions, and support measures. were granted to companies regardless of their level of innovation prior to the crisis.

As economies enter the stage of economic recovery, it will be important for authorities in all countries to phase out, but as soon as possible, broad support measures and focus on encouraging a competitive business environment, which is essential for strong recovery, resistant to future crises, as well as for long-term sustainable economic growth.

Most countries in Europe and Central Asia can improve both the institutional framework and law enforcement for a highly competitive environment, including public policy reforms needed to strengthen insolvency and dispute resolution, to facilitate the market entry of new firms, and to improve the ability of the financial sector to provide credit to the business sector.

In the current context, the authors found forums for discussions and debates and have written articles for the current issue trying, as far as possible, to look at some solutions for the problems facing the new world state of economy. Whether or not they succeeded in responding to the challenges, we leave it to you to determine.

In the first scientific paper published in our present issue named **THE RELIABILITY OF DATA-DRIVEN INTERNET OF THINGS SYSTEMS, Slavko POKORNI** said that the goal of this paper is to show that reliability in the data-driven Internet of Things (IoT) must be taken into account. The reliability of data-driven IoT is a complex problem because such a system is comprised of hardware, software, human and data. The reliability

of each of these elements is shortly analysed, and the equation for the reliability calculation of a data-driven IoT system is proposed. Artificial intelligence is also included. Reliability is connected with availability and maintainability, and this is also explained. This paper is written mainly using two references recently published by the author of this paper**.**

In the second paper of this issue, the authors **Maria ANDRONIE, Luminita IONESCU** and **Irina DIJMARESCU** are talking about **HOW CHATBOTS WILL IMPACT PUBLIC SECTOR AND ACCOUNTING.**

The digital transformation of accounting will affect the daily activity of companies and will profoundly impact the employment landscape. The scope of this research is to present the components of the high-level architecture for public service chatbots and the usage of chatbots in the public sector. The last part of the research is analyzing how chatbots will impact accounting and how digitization of work will have an effect on jobs.

Artificial intelligence is expanding and there are many benefits of using chatbots in the public sector for user interface, dialog management, interaction recording, and filtering and feedback from the customers. In the last decade, there has been a significant rise in interest for artificial intelligence, non-humanoid robots, chatbots, and encryption. Chatbot technology could speed up communication between advisers and clients/citizens, and more recently between accountancy and public authorities.

Several European countries have implemented chatbots for providing public services in order to respond to the increasing demand of information from citizens towards public administration. The European Union encourages the use of open data portals for taxes and reporting purposes, but also for improving the quality of public services while increasing public sector efficiency. The chatbot network could improve the European public system in the near future and boost economic growth.

Rodica PERCIUN and **Nelli AMARFII-RAILEANU** made a research on **INDUSTRY 4.0 VERSUS TRADITIONAL ECONOMY IN REPUBLIC OF MOLDOVA.** They made an interesting case study about the **s**igns of progress in the digitalization of economic processes over the past decades that have led to the definition of the fourth industrial revolution called "Industry 4.0".In a context where countries of the world either implement the tools of Industry 4.0 in business or set out Industry 4.0 as a development strategy, we are concerned about the extent to which Republic Moldova economy is ready to implement new digital tools and informational challenges. The research aims to highlight the environment necessary for capitalizing on the innovations of Industry 4.0 to ensure sustainable development.

The article examines international experience in the field of economy digitalization versus Republic Moldova experience, contains the analysis of the legal framework, the diagnosis of the economic indicators regarding the ICT implementation in the Moldovan economy, and international good practices in the field of Industry 4.0.

The research was conducted within the State Program 20.80009.0807.22 Developing the circular economy mechanism for the Republic of Moldova.

Sonja VUJOVIĆ, Tamara RAĐENOVIĆ and Tanja VUJOVIĆ wrote a very interesting paper about **THE APPLICATION OF AUGMENTED REALITY IN PROMOTING HOTELS AND TOURIST ATTRACTIONS OF THE CITY OF NIŠ.** In the era of digital transformation, especially during the corona virus pandemic, there have been changes in the way the tourist offer is presented to potential buyers. This has been especially contributed by information technologies that enable bringing the tourist destinations and hotel facilities closer to consumers. It is the aim of this study to identify the opportunities and challenges offered by augmented reality in terms of creating personalized consumer experiences, tourism development, and greater visibility of the hotel and its facilities in the global market. The intention of the authors is to fill the gaps in knowledge and raise the awareness of the value of augmented reality for tourism. Based on the research conducted in the City of Niš, it was concluded that the current application of augmented reality in the promotion of hotels and tourist attractions in the City is insufficient and recommendations are given on how to use the benefits of augmented reality in tourism promotion.

Elena GURGU, Raluca-Ileana ZORZOLIU, Luminita PISTOL, Ioana-Andreea GURGU, Camelia UNGUREANU and **Gica NAE** in their paper entitled **THE RELATIONSHIP BETWEEN BIG DATA-DRIVEN TECHNOLOGIES AND PERFORMANCE MANAGEMENT STRATEGIES APPLIED TO COMPANIES IN THE HOSPITALITY, TOURISM & TRAVEL INDUSTRY** discussed about big data-driven technologies that the tourism industry has adopted along the way, especially in recent years, as well as the top trends based on artificial intelligence that radically transform travel in the future. The big data-driven technologies of the future in the tourism industry, which are essentialy based on artificial intelligence - AI, augmented reality - AR, Machine Learning - ML, virtual reality - VR and the Internet of Things - IoT, are those that have dictated new trends in efficient management strategies at the level of companies operating on the tourist market. Here we tried to bring arguments, with figures and statistical data taken from international statistics, but we also appealed to the opinions of several authors from around the world who wrote in the last years in their articles published in prestigious international journals on the impact of new information technologies on increasing the turnover in tourism, increasing the sales of tourist packages, diversifying the tourist offer to customers or easier ways to find the perfect destination, to make a reservation easier or to pay for a tourist service in much more advantageous and faster conditions. All this represents the role of companies' efforts and their strategic management, which is more efficient and adapted to the requirements of the constantly moving and evolving market, a tourist market that has largely moved to the online environment and is increasingly helped by software and robotization transformations, such as virtual assistants, computer programs for image analysis, search engines, imaging recognition systems, robots, autonomous cars, drones or IoT. However, it can be seen that despite the promise made by AI, many travel companies do not realize yet the full potential offered by big data-driven technologies.

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Svetlana NOVAKOVIĆ CAREVIĆ, Jasmina BAŠIĆ and Irina DIJMARESCU wrote an interesting research about **AI-ASSISTED DIAGNOSTICS IN HEALTH MANAGEMENT.** Healthcare suffers too much pressure in a context where there is no room for experimentation or mistakes, given the fatal consequences and unpredictable outcomes. This paper aims to present the specifics of health management and usage of artificial intelligence to improve work performance, job satisfaction, and, most importantly, patients' health. This is achieved through the introduction of an artificial intelligence system in healthcare facilities.

Elvin MAMMADLI has an exciting paper about **THE ROLE OF ARTIFICIAL INTELLIGENCE IN BUSINESS MANAGEMENT SYSTEM.** The concept of artificial intelligence is accepted as one of the important research areas in the field of computer engineering and the driving force of technology since the first half of this century. Artificial intelligence is a research area that aims to examine and formulate mental functions related to intelligence in humans with the help of computer models and to apply them to artificial systems. According to a broader definition, artificial intelligence is computers equipped with human intelligence capabilities such as acquiring information, perceiving, seeing, thinking and making decisions. Although important developments in the field of artificial intelligence (AI) have been achieved today, the level of research is still in the incubation phase. With each passing day, artificial intelligence researchers introduce new inventions and innovations that will help redefine artificial intelligence. Some even say that Artificial Intelligence is an absolute concept that cannot be defined by looking at these developments.

Miljan PELEŠ, Svetlana JEVREMOVIĆ, Aleksandar SIMOVIĆ and Aleksandra HADŽIĆ made an interesting research about **THE POSSIBILITIES FOR DEVELOPING AND IMPLEMENTING A MOBILE APPLICATION FOR RECOGNIZING THE SHAPE OF THE ENVIRONMENT, TEXT, AND READING QR CODES USING THE ANDROID CAMERAX FRAMEWORK AND THE MACHINE LEARNING KIT.** The advancement and development of digital technologies have resulted in the need to network various devices at the application level. Wireless communication between devices via the Internet has opened a plethora of possibilities for enhancing user capabilities. We are witnessing dizzying changes in computer technology, and we can conclude that the device's purpose is no longer narrowly defined. The mobile phone is evolving into a personal computer, innovative features are being added to today's televisions, and cameras can process and send photos. These are merely a few examples of universal electronic devices. Of course, for the device to perform all these functions, adequate hardware infrastructure integrated into the device itself is required, as is the fundamental software component that connects user operations and the components themselves - the operating system. This paper's operating system under consideration is the Android operating system, which is currently the most popular operating system for smart devices.

Milica JEVREMOVIĆ, Hana STEFANOVIĆ, Dušan STOJAKOVIĆ and Nada STALETIĆ, are having an interesting paper called: **CAN WE PREDICT THE**

EFFECTS OF USING THE INTERACTIVE FEATURES OF THE WEBSITE? This paper aims to determine the effects expected on users after introducing interactive features in the website. For this purpose, three models by Song, Liu and Wu were compared, which gives this paper an extraordinary precision and depth of research on the given problem. The paper's contributions are reflected in a comprehensive, detailed review of previous research on interactivity, the importance of using the website and showing the specific effects expected from users after introducing interactive website features. Furthermore, the paper's contribution is reflected in recognising the importance of site interactivity in job search/training courses/internships. Finally, users who used the interactive site compared to non-interactive sites had a significant increase in activity.

Roxana-Daniela PAUN, in her paper entitled **OVERVIEW OF SOME LEGAL ASPECTS OF TECHNOLOGIES BASED ON ARTIFICIAL INTELLIGENCE** is talking about artificial intelligence who is a challenge of the new decades, more current than ever, that can help man or replace him. The decision belongs to those who decide, through their research, how much independence new human-created technologies create. Beyond the strictly scientific aspects that invented and developed artificial intelligence (AI) some aspects of ethics, morality, and last but not least legal. There are already debates on this topic online, where opinions are divided between conservative issues and innovation at any cost. Fear against new can resist, although the man is already accustomed to assistance (Shazam, Waze, personal assistants). If AI is already replacing the musician who performs, for example, Beethoven's symphonies, how far can this technology evolve and what would be the limits to which man cannot replace it? The present study proposes a brief analysis of some legal aspects that must be considered with the large-scale application of AI-based technologies, from the perspective of respect for human rights and fundamental freedoms, on the one hand, but also responsibility in AI. (Who is responsible and what would be the limits of liability for AI.)

Valentin KULETO, Milena ILIĆ, Aleksandra HADŽIĆ and Katarina RAKETIĆ, in their paper entitled **THE IMPLEMENTATION OF EXTENDED REALITY IN HIGHER EDUCATION, EXAMINING STUDENTS` AWARENESS** are describing documents and confirms the benefits of applying extended reality (XR) into Higher education. Challenges that occur in the comprehensive reality (XR) domain (such as virtual reality (VR), augmented reality (AR), and mixed reality (MR)), as well as their causes and solutions, will be further discussed. The upcoming chapters will include perspectives from technology, design, human factors, and various technologies and ideas. XR is primarily or exclusively focused on the display, as it does not include other modalities such as audio, haptic, smell, or touch. Therefore, the primary focus will be on the benefits of using XR, though other disciplines that may intersect with Higher Education, where appropriate. As a whole, the study aspires to provide a comprehensive overview of the XR challenges, opportunities, and future trends that will be applied in educational institutions.

Primary research in the form of survey research (exploratory research) that included 83 subjects showed a high awareness of XR among students of chosen HEI and usage of this

technology in students' daily lives, and whether they use XR depends on the age of the survey respondents. To determine whether there was a correlation between the use of augmented reality and the age of the survey respondents, non-parametric statistics based on the ranks of observations - Spearman's correlation coefficient - were used. IBM SPSS statistical data processing and analysis software was used to calculate Spearman's correlation coefficient. Based on the sample observations and the inference statistics used, it cannot be asserted that there is a direct correlation between the use of augmented reality in everyday life and the age of the survey respondents. However, the results showed that a high rate of respondents is aware of XR (78,31%) but if they use this technology in their daily lives, are almost evenly distributed: use it in daily lives 34,94% of survey respondents do not use it 33,73%) and Maybe (not aware of the same) 31,33% survey respondents.

Marija Nikolic TOSOVIC and Violeta JOVANOVIC, in their paper entitled **THE ANALYSIS OF ENTREPRENEURIAL INTENTION OF MANAGEMENT STUDENTS IN THE TIMOK REGION - OVERVIEW OF ATTITUDES AND OPINIONS** are talking about the sector of small and medium enterprises and entrepreneurs (SMEs) could play a key role in further national economic growth of Serbia through employment, increasing competitiveness and exports, but also in solving the problem of unequal regional development.

One of the most economically and demographically underdeveloped regions in Serbia is the Timok region. This region is also characterized by reduced investment activities in the SME sector. Increasing the attractiveness of the region for new entrepreneurs and investors and increasing the competitiveness of local entrepreneurs will create new, attractive and stable jobs which will further help to retain qualified people in the region. This paper gives a voice to future bearers of economic activity in this specific region, and represents the first research on entrepreneurial attitudes, opinions and intentions of young people in this part of Serbia.

199 students of the final years of Bachelor and Master Studies of management in the Timok region participated in the analysis of entrepreneurial intentions. The obtained research results indicate that students have an entrepreneurial intention and that people from their immediate environment have a mostly positive attitude towards entrepreneurship. Respondents believe that they possess necessary theoretical knowledge and skills, but not practical ones. The results of the research point to the necessity of shifting the focus of education from a strictly academic to a practical level, to the connection of educational institutions with the economy, to the better connection among entrepreneurs themselves, and to an urgent need for the activation of entrepreneurs' associations.

Strahinja ĐORĐEVIĆ, Svetlana JEVREMOVIĆ, Jovana TOŠIĆ and Nina STOJANOVIĆ in their paper entitled **SMART HOUSE WEB APPLICATION: DESIGN AND IMPLEMENTATION USING JAVA EE, MVC FRAMEWORK AND ARDUINO MICROCONTROLLER** are talking about the automation of the environment as an outcome of hectic modern life has resulted in applications that would simplify and

facilitate everyday life. This paper aimed to explore the possibilities of designing and implementing the web application "Smart House", which would make it easier for all users, especially those with limited or disabled mobility, to control the device in the house. In the initial part of the paper, the technologies used to develop the web application "Smart House" is theoretically processed.   The research is illustrated with diagrams and tables. Documentation on application design and implementation is processed by Larman's method. At the same time, theoretical analysis of used technologies refers to the literature of authorities in the field of research of advanced concepts of Java, Java EE platform and Arduino microcontroller open-source development system, which allow modularity and ease of modification. The research examines cases of using the application when the actor is a user, and on the other hand, cases of using the application when the actor is an admin. Further, the system operations that need to be designed are observed. This is followed by the application implementation process, in which testing is performed simultaneously, which is the last and final phase of software system development to facilitate troubleshooting.

Victoria IORDACHI, in her paper entitled **SMART CITY DEVELOPMENT BY SUSTAINABLE DIGITAL TRANSFORMATION**, is talking about smart city concept who is getting an increasing interest for municipalities representing one of the solutions for solving various city problems starting from urbanization problems and ending with environmental challenges. In these conditions, approaches to urban development management are gradually revised and are increasingly relied on advanced technological solutions, digitalization and platformization. Today, the digital upgrade of cities is becoming a central political choice for many countries, because it achieves, on the one hand, savings and efficiency in the operation of its services and in the management of its problems and on the other hand, speed and transparency in decision making. This paper aims to analyse the role of smart technologies in promoting sustainability and smart city concepts, as well as to establish a relationship between these two concepts. For these there have been applied methods of scientific investigation like analysis and synthesis of specific literature in the domain of circular economy, smart city, smart technologies, induction and deduction, critical analysis of materials.   Sustainable development is based on the interaction of three aspects that are interdependent and mutually reinforcing. These are the economic, social and environmental aspects of a development. Thus, the circular economy concept can provide new, more impactful solutions to the smart city systems through new mobility, improving energy efficiency, smart environmental solutions.

Viorica POPA and **Mihail CIOBANU**, in their paper called **USING SMART DIGITIZATION IN HAZARDOUS WASTE MANAGEMENT** are talking about the global information society who is growing at a fast pace. At the same time, the increase in purchasing power, urbanization and industrialization in many developing countries have led to an increase in the quantities of products placed on the market and respectively purchased, thus generating large volumes of toxic waste. Thus, digitization and connectivity are critical to help achieve the Sustainable Development Goals, the transition to an increasingly

digitalized world also involves multiple risks due to irrational consumption of resources and mismanagement of waste. In our view, the problem of hazardous waste management is possible by implementing modern and smart digital technologies in waste management, and by implementing waste digitization will improve the health of planet Earth, will reduce the negative impact of pollutant emissions on the environment, will restore essential ecosystems to ensure our long-term sustainability. Thus, the use of waste as a resource is necessary to reduce the need to extract new resources. This study was developed within the State Program 20.80009.0807.22 Development of the mechanism for the formation of the circular economy in the Republic of Moldova.

Olga TIMOFEI, in her paper entitled **THE AWARENESS OF THE CIRCULAR ECONOMY PRINCIPLES IN MOLDOVA'S COMPANIES** is talking about the circular economy who is a new approach to the responsible and cyclical use of natural resources, where the economy should aim at minimizing the impact on the environment and stimulating the economy. Solving environmental issues in tandem with promoting sustainable growth has never been more current than it is today. One of the essential stages of the transition to a circular economy is the improvement of waste management, which is primarily due to limited global natural resources and the need to reduce their consumption. The Republic of Moldova, similar to other countries in the world, annually it produces huge amounts of waste, a significant share of which goes to companies and enterprises. In order to hold economic agents accountable in recent years, certain steps have been taken by public authorities, but they have remained without visible impact on the situation in the field. Because the adaptation of such a circular economy model is done at different levels, including at the level of individual, whether owner or employee of a company, we decided to conduct their survey in order to determine awareness of the principles of the circular economy of those who are involved in the real sector of the country`s economy. The results of the interview clearly showed that the greatest efforts in the field of raising awareness, empowering companies are yet to be undertaken, and the transition to a circular economy in the Republic of Moldova will take some time.

Velinka TOMIC and **Svetlana ANDJELIC**, in their paper entitled **THE PRODUCTION OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES IN THE REPUBLIC OF SRPSKA** are talking about reducing greenhouse gas emissions by at least 55% by 2030 requires higher shares of renewable energy and greater energy efficiency in an integrated energy system. The RS produces electricity from different sources. The Thermal power plant "Ugljevik", a relatively small plant, emits unimaginable amounts of dangerous sulphur dioxide. Bearing in mind the share of energy from fossil fuels, the question for the RS is how to provide enough energy to future generations? The development of the RES production in the RS is a crucial challenge for policymakers nowadays. This transformation will improve our health and well-being, create jobs, generate investment and innovation, reduce energy poverty and dependency on energy imports and strengthen the security of supply.

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Milena ILIĆ P, Nevenka POPOVIĆ ŠEVIĆ, Marko RANKOVIĆ and Rocsana BUCEA-MANEA-TONIS, in their paper entitled **COMPETITIVENESS AND INNOVATION. CASE STUDIES FOR SERBIA AND ROMANIA** are talking about non-technological innovation that comes from sectors with the capacity of applying knowledge provided by foreign companies and trade partners. Green procurement proved to be an essential factor that stimulates innovation and economic resilience. It is often found in companies in South-Eastern Europe, social responsibility, a high level of competencies, and agile operational management. Romania made critical green procurement and agile management steps to impact productivity with a low footprint on the environment positively. On the other hand, Serbia could not access FP7funds to invest in R&D and eco-innovation, reflected in a low Global Innovation Index Ranking. The paper addresses competitiveness and innovation within the case study model of Serbia and Romania, explores similarities and differences, and makes recommendations. Competitiveness and innovation are observed within the context o circular economy.

Mustapha Sina ARILESERE, Banji Rildwan OLALEYE, Adeoba Adepoju ASAOLU and Ehijiele EKIENABOR, in their paper entitled **DIGITAL ELECTRONIC PAYMENT AND BANK PERFORMANCE IN NIGERIA** are talking about digital electronic payment techniques that are being a financial technological innovation, and its impact on banks performance in Nigeria. The study adopted an expost-facto research type with a time series collected on a quarterly basis covering a period of 2009 to 2020. Entirety of study was 21 deposit money banks quoted on the Nigerian Stock Exchange. Data collected were obtained from Central Bank of Nigeria (CBN) Statistical bulletin and analyzed with Error Correction Model (ECM). The study revealed that digital payment by way of mobile banking; automated teller machine and internet banking have significant influence and positively related to bank financial performance, suggesting that they were cogent technological changes factors enhancing bank performance. Meanwhile, Point of Sale (POS) or debit cards had a negative significant influence on bank performance. The study has provided some useful insight into factors that can continue to enhance the influence of the nexus between digital electronic payment means and banks' performances.

Esther Olanrewaju SANYA and **Oluwatoyin Paul OLALEMI,** in their paper entitled **ORGANIZATIONAL FACTORS ON ENTREPRENEURIAL DEVELOPMENT IN SELECTED MICRO-FINANCE BANKS IN OYO STATE, NIGERIA** are talking about the influence of organizational factors on entrepreneurial development in selected micro-finance banks in Oyo State, Nigeria. Leadership style, job security, communication/ information, and staff training were used as a dimension of organizational factors, which was used to determine the entrepreneurial development among the micro-finance bank in Oyo State. The study employed a descriptive survey research design. The target population of this study comprises all employees in the microfinance banks in Oyo State. A random sampling technique was used to select 925 for the study. The questionnaire was used as an instrument for data collection. Statistical Package for Social Sciences (SPSS) version 21

was used to analyze the data collected. Regression analyses at a 5% level of significance were used in the analyses. The study's findings show that organizational factors reveal a significant joint contribution of the independent variables (information/communication system, leadership style, job security and staff training) to predicting entrepreneurial development.

Also, information/communication system, leadership style, job security and staff training are significant predictors of Entrepreneurial development. The findings show that information and communication system (β = .626, t = 6.444, P<0.001). Followed leadership style (β = .288, t = 2.11, P<0.001), Job security (β = .144, t = 0.621, P<0.001). Lastly, staff training is had a significant predictor of entrepreneurial development in selected Micro-finance banks in Oyo state, Nigeria. The study concluded that organizational factors enhance the entrepreneurial development in selected Micro-finance banks in Oyo state, Nigeria. Micro-finance management should use continuous transformational leadership style practices to sustain high employee commitment and organizational effectiveness. Also, micro-finance should apply both transactional and laissez-faire leadership styles from time to time depending on the situation of things at the workplace as there is no particular leadership style that is one-size-fits-all but depends on the situation at hand.

Mustapha Tosin BALOGUN, in his paper entitled **CORPORATE IDENTITY AND CORPORATE WEBSITE: QUANTITATIVE EVIDENCE FROM SELECTED BANKS IN NIGERIA,** is talking about the research establishing the mediation of corporate identity and corporate website who is still at its infancy. Researchers have established the necessity to have stakeholders' confidence through the creation and maintenance of functional website, while others concluded that it is an organisational strategy for success in the market place. The failure of Nigerian banks to have a univocal corporate identity definition and understanding of how to construct a corporate website that can communicate desired corporate identity for stakeholders confidence hold sway. This study examined how banks in Nigeria developed their corporate identity through their corporate website. The theory of social construction was used to discuss the relationship among corporate identity and corporate website. A quantitative approach was adopted using questionnaires to customers of three selected banks based on their international status. 520 copies of the questionnaire were distributed to selected customers of the three banks who use electronic banking applications via the corporate website. 473 copies of the questionnaire were returned and found useful for the study giving a 79% response rate. Data were analysed using correlation analysis. Findings revealed that the banks use their website to disseminate generic, distinctive, transformative and innovative corporate personalities. Also, there is a significant relationship between corporate identity and corporate website (r=0.616; P=0.000). Based on these findings, Management of firms should strive for higher commitment and guarantee from the stakeholders through a continuous communication and feedback using the websites that offer quality and timely information that maximize their welfare and wealth. There is a need for firms' management

to pay adequate attention to the nature of corporate identity that will be reflected by their websites in terms of culture, ethos and philosophy guiding their operations and expectations. Further studies can consider other aspects of corporate websites that can influence corporate identity and image in Nigeria while the use of websites in promoting corporate identity and image should be encouraged as a means of creating deeper deliberations on how several measures of corporate websites can influence the development of corporate identity and image.

Iuliana Petronela GÂRDAN, Daniel Adrian GÂRDAN, Claudia Gabriela BAICU and Daniel Constantin JIROVEANU, in their paper entitled **A SYSTEMATIC VIEW REGARDING BUSINESS RETHINKING IN THE CONTEXT OF SUPPLY CHAINS SUSTAINABILITY,** are talking about the crisis generated by the pandemic that has challenged the hospitality industry on multiple layers. We are not talking only about the reduced number of customers and instability of the tourists flows, apart of the total lockdown from the beginning of the pandemic, but, we are referring to the managerial and marketing capabilities of hospitality companies to deal with profound changes along their supply chains. The present paper proposes a systematic review aimed to highlight the main directions in which the scientific literature from the field is analyzing the complex issue of hospitality supply chain sustainability implementation. Authors have been selected only articles from journals, conferences or books indexed in the last five years within Web of Science databases. The results of the analysis are showing that implementation of sustainability related principles along the supply chains, combined with a proper sustainable human resources management and a special view upon the customer relationship management offers to the hospitality field companies a certain sum of strategic instruments in order to cope with the huge challenge imposed by the pandemic. The future business models adapted entirely to a post-pandemic economy should emphasize a sustainable type of consumer behavior and a supply-delivery chain based on intelligent" out of the box" collaboration between organizations along the chain.

Sanusi Nureni ALAKA, Sunday Stephen AJEMUNIGBOHUN and Mustapha Tosin BALOGUN, in their paper entitled **ASSESSEMENTS OF SOCIO-ECONOMIC AND DEMOGRAPHIC FACTORS INFLUENCING INSURANCE BUYING BEHAVIOUR AMONG SMALL AND MEDIUM-SIZED ENTERPRISES IN LAGOS, NIGERIA,** are talking about socio-economic and demographic metrics that are important yardsticks in the behaviour pattern of an individual. They influence the behavioural attitude of people to perceive the image of insurance as an intangible, inseparable, variable, and transferable product. Therefore, this study aimed at assessing the effects of socio-economic and demographic factors on insurance buying behaviour, with specific reference to the perceptions of selected SMEs in Lagos, Nigeria. The study adopted a cross- sectional survey research design. The study population consisted of the total number of registered SMEs recorded in Lagos State at 11,666. Thus, a single-stage cluster sampling technique was employed in the questionnaire distribution and data collection

processes. A total of 386 copies of questionnaire were distributed, of which 243 were found usable which represented a 63% response rate. The major statistical technique employed was multivariate regression. This study confirms the importance of socio-economic and demographic factors in the behavioural evaluation of insurance purchases in Lagos, Nigeria. This study recommended that insurance providers in Nigeria should attempt to tailor insurance products in a lovable and affordable manner to SMEs' operators/owners in a bid to sharpen their socio-economic and demographic risk attitudes. More so, SMEs operators should try to shift their desire to manage the thrust of risk-off to the insurance providers for adequate business, economic and financial security. Given this implication, similar studies should be carried out in other industries in this country.

Happiness Ozioma OBI-ANIKE and **Wilfred Isioma UKPERE**, in their paper called **DEMAND FORECASTING AS A VERITABLE TOOL FOR HIGHER MANAGERIAL EFFICIENCY IN INDUSTRIES IN NIGERIA** aimed at exploring the benefits of demand forecasting and portrayed it as a veritable tool for increasing managerial efficiency in industries in Nigeria. The study is an effort to show that the utilisation of demand forecasting could become a veritable way of minimizing wastages, thereby maximizing profits, recovering and reviving of Nigeria's ailing and moribund industries. In Specific terms, limestone production and sales in Nigeria was used for a practical illustration. In doing this, the least squares approach and t-test statistics were used to analyse limestone production and sales in Nigeria from 2001-2010. Projections were also made for limestone production and sales from 2011-2014. 2011 was used as a base year to compare projections with actual realizations for limestone production and sales data. It was found that there was no significant difference between the projected and real values for the limestone production and sales in the base year, thus, re-affirming the efficacy of demand forecasting. It was therefore recommended among other things that managers rely strongly on demand forecasting throughout their operations.

Babalola Rapheal ADESUNLORO, Isiaka Kolawole EGBEWOLE and G.M. ADESUNLORO, in their paper named **THE EFFECT OF INVENTORY MANAGEMENT ON THE PERFORMANCE OF MANUFACTURING FIRMS IN NIGERIA,** made a research of some selected quoted manufacturing firms, where inventory management were captured by inventory turnover, inventory conversion period and manufacturing firm size and return on asset was used in measuring performance. Study reveal the existence of a relationship between inventory management and performance of selected quoted manufacturing firms in Nigeria. In conclusion, it can be asserted from the result that inventory management is an engine device that drive the performance of manufacturing firms in Nigeria. Inventory turnover and manufacturing firm size positively influence the performance of manufacturing firms. Also, increase in inventory turnover and firm size affects and enhances performance of manufacturing firms in Nigeria. This study recommends that management of the manufacturing firms should embrace effective inventory management practices such as inventory turnover and inventory conversion

period, which can improve performance. In addition, management of the firms must develop a working strategic policies and guidelines principle on inventory management to control the staff and endeavor that optimal inventory levels are held, by this costs will be minimize and performance maximize.

Raluca Ionela CRETOIU, Anca UNGUREANU, Adrian UNGUREANU, Ana Maria MIHALI and **Silvia RASCU PISTOL,** in their paper called **NEW TYPES OF BUSINESS DEVELOPED IN THE PANDEMIC,** are talking about the impact that COVID-19 had, especially on business, although it could not be anticipated, was a real challenge for entrepreneurs, from which they had to learn, and were determined to develop their creativity, coming up with solutions. and proposals for survival. The pandemic has opened up a number of opportunities for business owners to meet the ever-changing needs and demands of consumers. Opportunities are identified and exploited only by those entrepreneurs who think ahead, who eventually become successful entrepreneurs later. According to the United States Census Bureau, more than 4.4 million new businesses were created in the United States in 2020 - the largest number of new businesses recorded to date. The emergence of several types of business that developed in the pandemic was possible precisely due to digitalization and the evolution of technology.

Snežana ŽIVKOVIĆ, Ivana ILIĆ KRSTIĆ, Aleksandra ILIĆ PETKOVIĆ, Marija STOJILJKOVIĆ and **Miodrag MILENOVIĆ,** in their paper called **JOB SATISFACTION OF NURSES DURING COVID-19 PANDEMIC** are talking about job satisfaction of medical workers who is an essential element of providing healthcare services. Ample empirical evidence supports the cause-and-effect relationship between employee job satisfaction and patient security and quality of care provided. This paper considers the job satisfaction of nurses during the Covid-19 pandemic with regard to their years of employment, age, professional education, job position, possibility of advancement, relationship with the superiors, and organization of work. A standardized survey with a job satisfaction scale was used for data collection. The survey was completed from 23 June to 13 July 2020 by 27 out of the 50 nurses working at the Covid-designated hospital in Leskovac, Serbia. The results showed that the employees with fewer years of employment were more satisfied than their more experienced co-workers. The results on the entire job satisfaction scale showed that 2.6% of the respondents were very dissatisfied, 28.3% neither satisfied nor dissatisfied, while only 9.3% were very satisfied with their job. One of the main reasons for such response distribution is the lack of career advancement options. This research found that organizational commitment, job satisfaction, and years of experience are significant predictors of successful work for the nurses.

Raluca ZORZOLIU, Mariana IATAGAN and **Elena GURGU**, in their paper called **THE ECONOMIC CRISIS CAUSED BY THE COVID 19 PANDEMIC** are talking about the fact that in the midst of wave 4 of the pandemic, the demand for commodities seems unbridled, and the value of stock and real estate assets reaches record after record. On the other hand, container bottlenecks in the world's ports, production syncopes against

the background of the crisis of raw materials, components and microprocessors, or the explosion of energy prices in Europe are less bright aspects of the period we are living in. The pandemic is not coming to an end, but since the fall of 2020, when most of the movement restrictions have been lifted, the world's population has pivoted unseen from thrift to excess. Inflation at the end of the year will be more than double compared to the last quarter of 2020, according to the NBR projections. According to some analysts, such as Valentin Tătaru, the chief economist of ING Romania, inflation could reach 6% already this autumn. The injection of money into the economy, in theory, should only begin from now on, after the approval of the National Recovery and Resilience Plan (PNRR). The almost EUR 30 billion that would help areas such as health, education, energy, energy, construction and transport over the next six years, as well as the capital market, should be a safety net in the most pessimistic scenarios. However, the labour crisis, the resolution of which is not even in the medium term, is the real time bomb that can undermine economic growth and, by extension, the absorption capacity of European funds. The areas with high shortages of specialists are well known – construction, HoReCa, medical services and technology.

Joel ISABIRYE, in his paper entitled **THE BEHAVIORAL THEORY OF THE FIRM: FOUNDATIONS, TENETS AND RELEVANCE,** is talking about the fact that has for over fifty years shaped a section of economic thought on the nature and functioning of the firm. In this paper, this theory is reviewed with a focus on its foundations, tenets and relevance. The paper posits that the Behavioral Theory of the Firm set out to distinguish from previously known analytical models of the firm. It drew in an interdisciplinary model and explored the firm in more diverse ways than before. The foundations of the theory, its tenets and relevance are discussed. Often traced to Richard Cyert and James March, whose A Behavioral Theory of the Firm (1963) text seemed to commence this theory, the evidence shows that their seminal work was one of several other contributions to its development. What is not in dispute is that the seeds for a Behavioral Theory of the Firm were sown at the Carnegie Mellon University in or around the mid-20th century. Broadly the Behavioral Theory of the Firm conceives the firm as a unit of production with goals, and a dominant coalition that harmonizes different interests of its stakeholders into those goals.

Stella Ogechukwu OKEZIE, Rose ALICHI, and **Michael Chidiebere EKWE,** in their paper named **BOARD CHARACTERISTICS AND CORPORATE SOCIAL DISCLOSURE OF LISTED FIRMS IN NIGERIA,** examined board characteristics and corporate social disclosure of listed firms in Nigeria. Five (5) years' time series and cross sectional data from 2016-2020 was sourced from the annual financial reports of the firms in the study. Diagnostic test was done on the data and panel least squares regression method of data analysis was employed. The results indicated that board size and frequency of board meetings have no significant effect on corporate social disclosure while board independence was positive and significant for corporate social disclosure of listed firms in Nigeria. On the basis of these findings, the study recommended that independence of the board should be sustained in order to achieve a higher degree of corporate social disclosure that will promote better environmental well- being for all.

Foluso Philip ADEKANMBI and **Wilfred Isioma UKPERE,** in their paper called **PERCEIVED ORGANIZATIONAL CULTURE, CO-WORKER SUPPORT, WORK PERFORMANCE, AND EMPLOYEE DEMOGRAPHICS AS CORRELATES OF ORGANIZATIONAL COMMITMENT,** investigates the perceived organizational culture, co-worker support, work performance, and employee demographics as correlates of organizational commitment within Nigeria's manufacturing industry. The current sample was taken from ten manufacturing organizations in Oyo and Lagos States of Nigeria. Data retrieved were analyzed and presented in tables. Nevertheless, this paper applied a cross-sectional survey approach, of which the survey forms were randomly disseminated. However, out of 500 surveys, 476 were suitable for investigation and analyzed with Statistical Packages for Social Sciences (SPSS vs. 27). The objectives of this paper were to find out if there are correlations between perceived organizational support, co-worker support, work performance, employee demographics, and organizational commitment and to determine how organizational commitment can be enhanced and made consistent within Nigeria's manufacturing sector. The present results established a strong and significant positive correlation between perceived organizational culture, co-worker support, work performance, employee demographics, and organizational commitment within Nigeria's manufacturing industry. Therefore, the management of manufacturing industries should ensure a good and consistent strategy that makes employees committed to organizational culture, encourage support among co-workers and increase better work performances.

Samuel A. OGUNLADE, Stephens S. MOBOLAJI and **Wilfred Isioma UKPERE,** in their study called **A PERCEPTION STUDY OF SEABORNE CARGO INFRASTRUCTURAL CAPACITY IN LAGOS PORT COMPLEX,** analysed the seaborne cargo infrastructural capacity in Lagos Port Complex. The research adopts expository research design, with Lagos Port Complex as the sample frame. 230 questionnaires was administered using purposive sampling technique. Mann Withney U-test was used for the analysis. The research reveals that Port infrastructural capacity based on infrastructural adequacy or inadequacy is of moderate effect in the stance of 'adequacy of port storage facilities', 'port-oriented traffic', 'obsolete handling equipment' and 'level of workforce' of r-value |-0.210|, |-0.207|, |-0.245|, |-0.212| respectively. Therefore, it can be said that the port infrastructural capacity of the Lagos Port Complex (LPC) is relatively poor considering eleven (11) independent variables, where only four (4) have moderate effect on infrastructural adequacy of the port and the remaining seven (7) were of no statistical significant effect on infrastructural capacity of the port.

Haradhan Kumar MOHAJAN, in his paper entitled **CRADLE TO CRADLE IS A SUSTAINABLE ECONOMIC POLICY FOR THE BETTER FUTURE** is talking about the cradle to cradle (C2C) concept that is correlated with circular economy (CE). The C2C notion means; products should be without producing any waste. It is considered as a biometric procedure to design the products and materials in healthy ways. The C2C model is sustainable for present and future generations. In the past few years, C2C concept has

grown wide interest among the nations of the world and the demand for environment friendly products has been increasing day by day globally. During the 20th and 21st centuries environment friendly and C2C certified products are increasing around the world. The C2C notion is based on the idea of non-waste production systems that do not harm the environment. Within the C2C framework, two distinct metabolisms: the biological metabolism and the technical metabolism are identified. In the study the development of C2C approach around the world is discussed. As the global natural resources are decreasing; C2C becomes new efficient strategy in production arena. Sustainable products, healthy materials, responsible consumption, and environmental responsibility are essential issues for the 21st century. The objective of C2C is the production without waste and elimination of the harmfulness from the products. C2C inspires that all products to be manufactured with alternative materials. This article tries for the successful implementation of C2C in the society.

Abiodun Samuel ISAYOMI and **Temitope Sade AKINTUNDE,** in his paper entitled **THE EFFECT OF GOVERNANCE ON GROWTH OF SHADOW ECONOMY IN WEST AFRICA** is talking about the fact that engagement in shadow economy activities doubles as a survival strategy against distortional government interventions resulting in unfavourable socioeconomic conditions and as an impediment to growth and development in developing economies. This study provides scientific evidence of the aspects of governance which minimize the size of the shadow economies of 15 West African countries from 1996 to 2019 using panel autoregressive distributed lag (pooled mean group estimator). Shadow economy (% of GDP) was used as the dependent variable while control of corruption; government effectiveness; voice and accountability; regulatory quality, rule of law and political stability were the used as measures of governance. The result revealed significant long run effect of all the measures of governance (except government effectiveness) on the size of shadow economy in West Africa. However, only control of corruption and rule of law were found to have significant negative effect on the size of shadow economy in West Africa.

Cleopas FORE and **Wilfred Isioma UKPERE,** in their paper called **AMELIORATING ADVERSE EFFECTS OF GLOBALISATION ON EMPLOYMENT RELATIONS IN ZIMBABWE** are talking about the fact that globalisation has been associated with accelerated deregulation and withdrawal of government from the workstation, (Sweeney, 2004). The advent of globalisation has forced organisations in Zimbabwe to deal with implications such as loss of market, response to competition, technological and legislative changes. A conundrum that have witnessed a change in human resources policy, employee compensation, business strategies among others. These changes have also resulted in massive shift in employment relations between employers and t employees and relations between employees and their unions. Subsiquent to this background, this article's objectives are to identify challenges occasioned by globalisation on employment relations in Zimbabwe and proffer mechanisms to

ameliorating the adverse effects of globalisation. A qualitative phenomenological research was adopted making use of interviews, researcher field notes and memoirs to gather data on participants' experiences. Results were analysed using Nvivo 10 and manual coding. Results identified six main challenges namely (1) strife between employers and employees (2) dwindling employee democracy (3) employee marginalisation (4) increased disputes (5) general dissatisfaction of all parties and (6) disunity among unions and workers. The study recommended four mitigating strategies namely contextualising globalisation; making use of training and education; increased employee involvement; and use of dialogue and communication. If these factors are considered a fair globalisation can be achieved.

Jati KASUMA, Nelson LAJUNI, Ahmad Faizul BENJAMIN, Hiran PRASANKAN, Halimin HERJANTO and **Dio Caisar DARMA,** in their paper called **THE EFFECT OF SPIRITUALITY ON ISLAMIC LEADERSHIP** they are talking about the fact that islamic studies have sparked a lot of interests among different cultural backgrounds and no longer foreign to the world community. Among issues that have gained attention among scholars was spirituality from the Islamic standpoint. Therefore, this study attempts to explore the connection between Islamic spirituality (belief, rituals and repentance) and its influence on Islamic leadership effectiveness. The study contributes to the new knowledge pertaining to Islamic leadership in management by integrating the Islamic tradition with contemporary literature whereby Islamic spirituality constructs were developed from the Islamic tradition sources that correspond to leadership studies from contemporary literature. Using a purposive sampling of non-probability technique, the survey data used for this empirical research was drawn from Muslim employees working in uniform bodies in Sarawak, Malaysia. Most of the respondents hailed from support group scheme of service and there are three uniform bodies involved in this research namely the Malaysia Royal Customs Department, Malaysia Royal Police and Malaysia Royal Navy. Employing multiple regression analysis and using SPSS and Smart PLS software, the study tests several hypotheses that the components of Islamic spirituality were exerted to have statistically mixed influences on Islamic leadership effectiveness. The study found four out of seven hypotheses were indeed supported. The findings did provide a better understanding of the roles of Islamic spirituality on Islamic leadership effectiveness amongst three uniform bodies in Malaysia.

Babalola Rapheal ADESUNLORO, Isiaka Kolawole EGBEWOLE and **Mary Oluwatoyin OMOTOYINBO,** in their paper called **DIRECT TAXES AND FIRM PERFORMANCE: EVIDENCE FROM SOME SELECTED QUOTED COMPANIES IN NIGERIA (2009-2018)** examined the effect of direct taxes on the performance of export companies in Nigeria. In the light, this project work examined the effect of the major variables of direct taxes i.e. Company Income tax (CIT) and Education tax (ET) on the profit after tax of the selected export companies in Nigeria, using a 10 years' panel data from 2009-2018. The method of analysis was ordinary least square techniques. The findings show that Company Income Tax and Education Tax do not have significant relationship
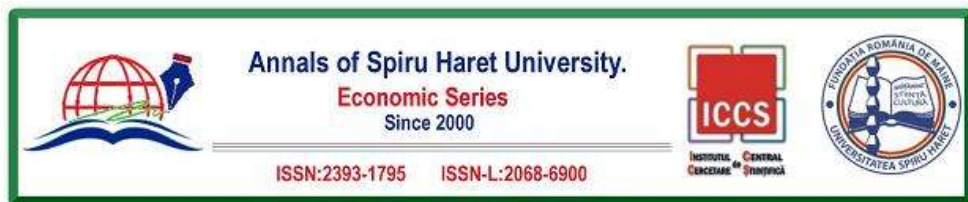
with the performance of the selected export companies (Lafarge Wapco Ltd., Nestle Nigeria Plc. and Oando Nigeria Plc) with the p value of < .941 and .715 respectively. Based on the findings of the study, it was concluded that Government should create an enabling environment for the export companies to trade which will invariably improve their performance and in the long-run statutory taxes can be paid without any stress. This study hereby recommend that there should be stringent penalty imposed on any corporate body who indulge in any form of tax malpractices irrespective of states, so also the companies should be encouraged to carry out more social responsibilities other than paying taxes, since direct taxes paid by these organizations do not have any significant effect on their profitability.

We hope that our journal issue caught your attention and made you read it. Also, we strongly believe that all the articles are interesting and deserve to be appropriated by those who are interested in understanding the specific issues of the global economy.

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Research is the breath of the future. Let's shape the world together!

Associate Professor Elena GURGU, Ph.D. in Economics
ASHUES Deputy Chief Editor

ACADEMIA PAPERS

THE RELIABILITY OF DATA-DRIVEN INTERNET OF THINGS SYSTEMS

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Abstract

*The goal of this paper is to show that reliability in the data-driven Internet of Things (IoT) must be taken into account. The reliability of data-driven IoT is a complex problem because such a system is comprised of hardware, software, human and data. The reliability of each of these elements is shortly analysed, and the equation for the reliability calculation of a **data-driven** IoT system is proposed. Artificial intelligence is also included. Reliability is connected with availability and maintainability, and this is also explained. This paper is written mainly using two references recently published by the author of this paper.*

Keywords: *reliability; availability; maintainability; Internet of Things; data-driven; data.*

JEL Classification: C02, Y20

Introduction

In the 1950s, theories and practices of reliability began to emerge, and the Internet of Things (IoT) first started at the end of the last century. IoT is very complex and with many dependencies; as a result, new demands are placed on reliability research and education [Pokorni, 2016; Pokorni, 2019].

Everything on the Internet of Things (IoT) is interconnected and can communicate with each other usually without the need for human intervention. Due to the human element, the IoT relies on the reliability of both hardware and

software in addition to human reliability. This calls for a discussion of these relationships.

A data-driven IoT system is more complex because data are an essential component of this system. So, the reliability of data must also be taken into account.

The issue of IoT availability and reliability is examined from the standpoint of the traditional reliability assessment method, which makes use of MIL-HDBK 217 in [Pokorni, 2019]. The reliability of data-driven IoT will be discussed in this paper.

1. Data-driven Internet of Things

Being data-driven means that all decisions and processes are based on the data. This is most evident in the field of big data [Technopedia, 2021]. It is connected with data science, data mining, etc. The term data-driven is used in many fields, also with the Internet of Things.

Being based on data means using data, and using data means at least collecting and analysing data. And this implies using some kind of communication. To achieve this, we as a person or organisation use technology (different devices, networks, software, Internet of Things, etc.), and anything of these can fail. Of course, we want to avoid failure and resolve it if they happen, and this is the task of reliability.

Before analysing reliability, we will, in short, explain the Internet of Things.

2. Internet of Things

The Internet of Things (IoT) aims to transform human society toward becoming intelligent, convenient, and efficient with potentially enormous economic and environmental benefits. Reliability is one of the main challenges that must be addressed to enable this revolutionised transformation [Xing, 2020].

The Internet of Things (IoT) is seen as the next step in the Internet's development. IoT is being driven by three main factors: miniaturisation of electronic components, rising electronic component costs, and a shift to wireless communications.

Many real-time monitoring applications, such as e-healthcare, home automation systems, environmental monitoring and industrial automation, will be transformed by the Internet of Things (IoT). This includes the economy as well.

The Internet of Things (IoT) and its applications and supporting hardware platforms have become a hot topic in academic and practitioner communities in recent years due to improvements in Internet connectivity and advances in smart

personal computing devices. The scale of IoT deployments can range from personal wearable to city-wide infrastructures, with the ability to deploy IoT systems in many different scenarios [Zhu et al., 2018; Pokorni, 2019].

The Internet of Things (IoT) is unquestionably complicated. An IoT system includes hardware, software, and human involvement on occasion [Pokorni, 2019]. So, the reliability of IoT depends not only on hardware but also on software and human reliability. And reliability is connected with availability and maintainability. Let us first define reliability, availability and maintainability.

3. Definition of reliability, availability and maintainability

It wasn't until the 1950s that reliability theory and practice began to take shape. Reliability means the likelihood that an item will meet certain standards of performance and deliver the desired results within a specified time period under specific environmental conditions.

A system's availability is measured by taking into account the component's reliability as well as the system's ability to be maintained. Availability is defined differently by different people, and it is calculated differently as well.

For instance, the probability that a system (or a component) will be operational at a specific point in time is defined as instantaneous availability (also known as availability).

Reliability and availability are the same for an unrepaired component or system, but availability is greater than reliability for a repaired component or system [Pokorni, 2014].

Maintainability is linked to both reliability and availability. Maintainability must be taken into account during the design phase of the IoT in order to achieve optimal cost over the IoT's lifespan.

Maintainability is now defined as an intelligent system's ability to be easily uncoupled, fixed, and modified without interfering with the system's normal operations or functionalities in any significant way. When evaluating the IoT system's maintainability, look for components that can be easily replaced if something goes wrong. IoT systems must be able to complete maintenance tasks effectively, efficiently, and with satisfaction, before they can be described as highly maintainable [Thomas & Rad, 2017; Pokorni, 2019].

Repairing the system changes availability from reliability. The following relation can be used to calculate availability (inherent availability) [Pokorni, 2014]

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$$A = \frac{MTBF}{MTBF + MTTR} \qquad (1)$$

where
- *MTBF* is mean time to failure, and
- *MTTR* is mean time to repair.

For example, replacing an exhausted battery in an IoT device can reduce availability if the IoT system is supposed to work during the replacement.

Now we will analyse the reliability of a data-driven Internet of Things system in more detail, keeping in mind that the system is composed of elements: hardware, software, human and data.

4. Reliability of data-driven IoT elements

Unreliable sensing, processing, and transmission can lead to erroneous monitoring data reports, long delays, and even data loss, which reduce people's interest in IoT communication and their confidence in data. To keep pace with IoT's rapid growth, it needs a high level of reliability [Prasad & Kumar, 2013].

So, if the organisation is based on data-driven IoT, then the reliability of such a system depends on IoT components (elements) and data.

4.1 IoT hardware reliability

Until now, military manual MIL-HDBK-217 has been primarily used to calculate the reliability of electronic devices. In 1961, the first version of this product was created (version A). More than 80% of engineers still use MIL-HDBK-217 to calculate reliability, despite its shortcomings. Other standards for calculating reliability exist in the industrial and commercial sectors, of course. MIL-HDBK-217 has been replaced by RIAC's 217PlusTM methodology and a software tool, but it is no longer available for free. Unlike the previous MIL-HDBK-217, this one is considerably more difficult to understand [Pokorni, 2016].

In addition to this, determining hardware reliability has a number of challenges. Elerath & Pecht (2012) state that there is no standard method for creating hardware reliability predictions, which means predictions vary widely in terms of methodological rigour, data quality and the extent of analysis and uncertainty. Documentation of the prediction process is often not provided. The IEEE has responded by creating a standard in 2009 called IEEE Std.1413 (Standard Framework for Hardware Reliability Prediction). The IoT consists of a variety of

hardware with varying levels of quality and reliability. The commercial hardware often lacks established reliability and lacks any data on the failure rate or the mean time to failure (MTTF), or the mean time between failures (MTBF), making it difficult to calculate exact reliability.

4.2 IoT software reliability

The reliability of the software as a product is an important criterion to consider. Software reliability assessment models abound, but none is universally accepted [Kapur, 2014; Pokorni, 2016]. Except for that, software reliability requirements are rarely, if ever, adequately specified. This is especially true for the Internet of Things (IoT). The issue is exacerbated by the fact that software is fundamentally different from hardware. Software reliability is not a time-dependent function, despite the fact that it is a probabilistic one. It's also true that methods for predicting software reliability aren't routinely implemented in software engineering practices. Software and reliability experts must work together to take the necessary steps to include software in the system's reliability case [Kapur, 2014; Pokorni, 2016].

The real problem with dependable software is when a feature that's critical to the system doesn't work. When people hear the phrase "failing safe," they often think it means "never failing." Because they share the same goal of creating secure and dependable software, software safety and reliability are natural partners. Again, software and reliability engineers must work together. The basics of software reliability and its reliance on software safety are, however, rarely taught in educational institutions or by industry professionals. [Pokorni, 2014].

Enhancing reliability by redundant software presents a unique set of challenges because it differs from hardware in that the error appears in every copy [Pokorni, 2014].

4.3 IoT human reliability

As we stated in the introduction, a human can be involved in the IoT system. So, human action can influence the reliability of the IoT.

Accident prevention and damage reduction are two key components of human dependability. These things can happen when working with data in addition to hardware and software alone. Whether or not people decide to act has an impact on the technological systems in which they live. Frequently, disasters and major system failures are the results of a series of decisions or actions taken by one or more people while using, maintaining, or fixing a technological system. As long as

these potential consequences are significant, reliability engineers working with others (such as risk managers, environmentalists, and life safety engineers) can have a significant impact on the outcome. [Pokorni, 2016]. Human error in working with data can also have significant consequences.

There are different approaches and models to human reliability [Pokorni, 2016].

System failures cannot be completely prevented by procedures, rules, codes, standards, or laws, but in the author's experience, they can be reduced by those same measures.

Human reliability has always been an important consideration for this author, and as a result, it is included in all of his textbooks [Pokorni, 2014].

4.4 Reliability of data

In order to build trust in data, it's critical that it's reliable, which means that it's complete and accurate. Data integrity initiatives, which are used to maintain data security, data quality, and regulatory compliance, have as one of their primary goals the assurance of data reliability [Talend, 2021].

Business leaders need reliable data to make reliable decisions. So, in data-driven organisations, data reliability is of crucial importance. Data reliability is not the same as data validity. The reliability of the data is based on the validity, completeness, and uniqueness of the data. Because of unreliable IoT, data can be missing, incomplete and/or corrupted.

4.5 Reliability of artificial intelligence

Artificial intelligence (AI) is being applied more and more in various fields, and data-driven IoT is not an exception.

Even artificial intelligence (AI) can go horribly wrong. As with human reasoning, artificial intelligence (AI) has the potential to fail in the same way if it tries to replace human intelligence with machine intelligence. Then why do people make mistakes in their reasoning (erroneous conclusions, decision-making)? Or, can we bring up the issue of AI's dependability or how to prevent AI failures [Pokorni, 2021]?

This is an important question that attracted the attention of ISO/IEC. In [ISO, 2020], there are surveys of topics related to the so-called trustworthiness in AI systems, including the following: (1) approaches to establish trust in AI systems through transparency, explainability, controllability, etc.; (2) engineering pitfalls and typical associated threats and risks to AI systems, along with possible mitigation techniques and methods; and (3) approach to assess and achieve

availability, resiliency, reliability, accuracy, safety, security, and privacy of AI systems. In this document, trustworthiness is defined as an ability to meet stakeholders' expectations in a verifiable way, including the characteristics of trustworthiness such as reliability, availability, resilience, security, privacy, safety, accountability, transparency, integrity, authenticity, quality, and usability.

Just like any other product, AI requires maintenance to remain robust and valuable.

4.6 Is there anything else?

Yes, there is. The failure rate of hardware and software is only one factor in determining IoT reliability. Other factors include protocols and energy efficiency (green), standardisation and other influences, such as, for example, security, etc.

Let us mention something about protocols. A reliable protocol in computer networking refers to a protocol that informs the sender if the delivery of data to the intended recipients was successful or failed.

Reliability depends on the type of users. Different users can expect different levels of reliability and availability. So, approaches to designing an IoT system can be different depending on the types of users. And this also stands for data-driven IoT.

Google service availability targets are typically determined by the function they provide and their market positioning. There are a number of things to think about [Alvidrez, 2017]: What level of service can customers reasonably expect from your company?

- Exactly what level of service can customers hope to get from you?
- Is there a direct link between the revenue generated by this service and the revenue generated by our customers?
- Is this a for-profit or non-profit service?
- What level of service do competitors provide if they exist in the market?
- Is this service geared toward individuals or businesses?

5. Reliability of data-driven IoT system

Because of the complexity of the data-driven IoT system, and because the IoT includes hardware, software, sometimes humans, and data-driven IoT system includes data, we suggest assessing the reliability of the data-driven IoT system by changing the equation from the [Pokorni, 2019], to next

$$R_S(t) = R_{HW}(t) R_{SF}(t) R_H(t) R_D(t) \tag{2}$$

where R_{HW}, R_{SF}, R_H and R_D are reliability of hardware, software, human and data subsystem, respectively.

The above formula is valid if failures of hardware, software, human and data subsystems are mutually exclusive.

Due to the IoT's obvious complexity, finding an analytical solution for the reliability of such a complicated system is difficult, if not impossible.

Our recommendation is to use simulation to test the IoT's reliability because of its complexity. We simulated a few complex systems and found that the results were insightful [Pokorni & Janković, 2011; Pokorni et al., 2011].

If artificial intelligence is implemented in a data-driven IoT system, it can be treated as a subsystem also and included in equation (2) in the same way as other subsystems.

Conclusion

Reliability assessment and the analysis of the data-driven Internet of Things elements and system require knowledge from many different technical and other areas and teamwork.

Data-driven IoT system is complex and includes hardware, software, sometimes humans, and also data. The reliability of all these elements must be taken into account. Artificial intelligence can also be a component of this system, and its reliability must be analysed.

Reliability of the data-driven Internet of Things is not always of the primary concern in IoT practice, but understanding reliability can help in case of failure, i.e., where to look for a failure, and how series consequences of failure can happen during decision making because of incomplete or corrupted data.

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HOW CHATBOTS WILL IMPACT PUBLIC SECTOR AND ACCOUNTING

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Abstract
The digital transformation of accounting will affect the daily activity of companies and will profoundly impact the employment landscape. The scope of this research is to present the components of the high-level architecture for public service chatbots and the usage of chatbots in the public sector. The last part of the research is analyzing how chatbots will impact accounting and how digitization of work will have an effect on jobs.

Artificial intelligence is expanding and there are many benefits of using chatbots in the public sector for user interface, dialog management, interaction recording, and filtering and feedback from the customers. In the last decade, there has been a significant rise in interest for artificial intelligence, non-humanoid robots, chatbots, and encryption. Chatbot technology could speed up communication between advisers and clients/citizens, and more recently between accountancy and public authorities.

Several European countries have implemented chatbots for providing public services in order to respond to the increasing demand of information

from citizens towards public administration. The European Union encourages the use of open data portals for taxes and reporting purposes, but also for improving the quality of public services while increasing public sector efficiency. The chatbot network could improve the European public system in the near future and boost economic growth

Keywords: *chatbot; economy; accounting; education.*

JEL Classification: C88, E02, M41, I25

Introduction

The paper offers an interesting scenario, particular aspects of digital culture and artificial intelligence, the position of chatbots in the economic context and how chatbots are one of the most popular uses of this new technology. Digital culture became important for public entities and public sector accounting, due the flexibility and sustainable stakeholder impact. Artificial intelligence will impact public sector and supports public services to improve policy challenges, and to respond to citizens' expectations across public service efficiency, inclusiveness, convenience and sustainability. Thus, chatbots could improve public service delivery by being able to answer frequently asked questions and conduct transactions, relieving staff from mundane tasks (Noordt, C, Misuraca, L., 2019).

According to the Annual Report from World Economic Forum 2021, technology governance could provide solutions during the pandemic. Thus, the Centre for the Fourth Industrial Revolution acted as an important accelerator in the last year, on directions such as: Big Data, Artificial Intelligence, the internet of things, data policy, drones autonomous vehicles, blockchain, etc.

The driving force of digital transformation

The digital transformation is imperative in the public sector and has empowered users and providers and made it possible for them to choose how to access or deliver a service, how to communicate, when to engage on policy areas or issues, which social groups to join or business areas to invest in, and how to participate more actively in local, national or even global challenges (OCDE, 2019).

All over the world, governments are implementing digital transformation projects and initiatives in order to deliver beneficial digital services which improve the lives of citizens. In our opinion, governments and state agencies have an enormous

opportunity to implement digital tools, Artificial Intelligence (AI) and robots to optimize public sector management, service delivery, and overall state capacity, which can lead to transparency and accountability. Also, citizens expect governments to offer public services that are designed with a user-driven perspective and adaptable to different user profiles (OCDE, 2019). In the last decade, the digital transformation projects and initiatives became a priority for businesses and public administrations, and the development of digital transformation also aims to set up true European data space and facilitate safe access to and storage of large datasets and energy-efficient cloud infrastructure1. The spending of digital transformation technologies and services could be observed in figure no. 1.
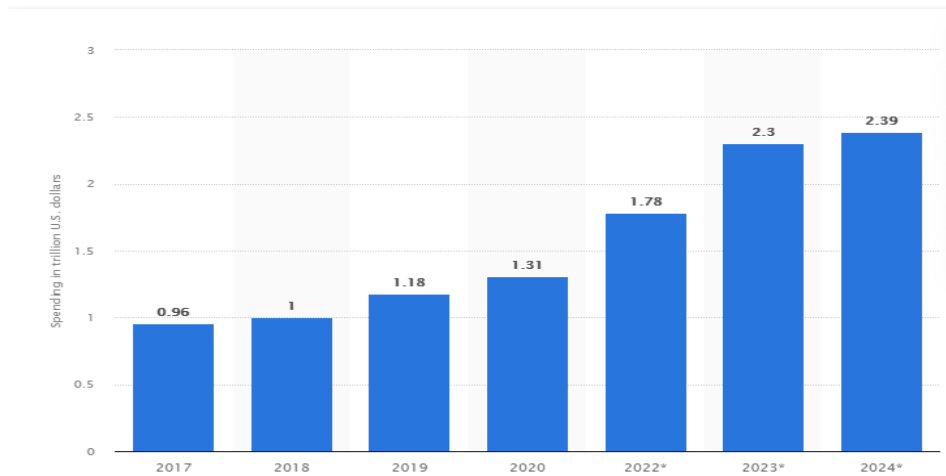
Fig. 1. Spending on digital transformation technologies and services worldwide from 2017 to 2024
Source: https://www.statista.com/statistics/870924/worldwide-digital-transformation-market-size

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[1] https://digital-strategy.ec.europa.eu/en/activities/artificial-intelligence-digital-programme

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The digital transformation in private and public sector is accelerating due to the COVID-19 pandemic. According to a global survey published in July 2021[2], more than 90 percent of respondents think that the COVID-19 pandemic sped up digital transformation processes in their organizations, as we can observe in figure no. 2.
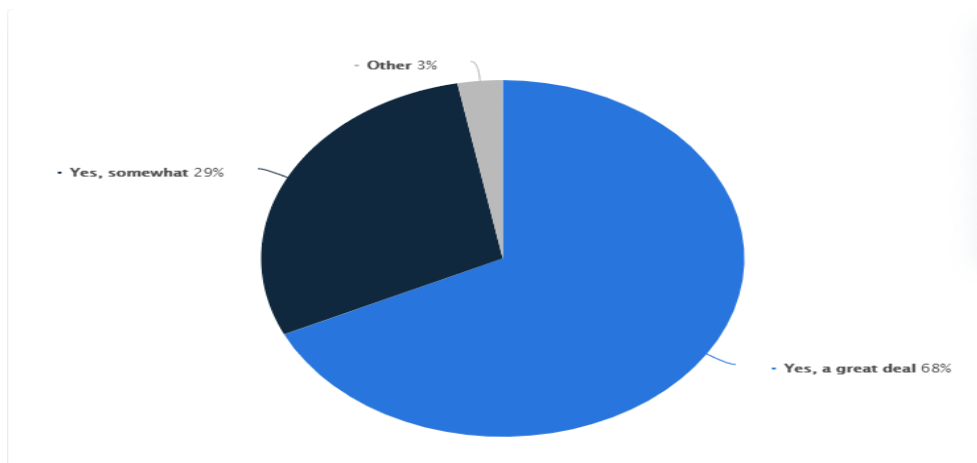
Fig. 2. The COVID-19 pandemic speeding up digital transformation
Source: /www.statista.com/statistics/1200465/covid-digital-transformation-global

We observe in the figure above that many respondents are interesting in the new technology because digital transformation is becoming necessary to the human life in general. In the last few years, more citizens and customers are requesting digital public services delivery and digital products, because the digital age has brought forth the quest and desire for greater public engagement and spaces for collaboration in our societies and economies (OCDE, 2019). As a consequence of the COVID-19 pandemic, more than half of customer interactions and companies' products and services became digitalized, compared to just a third right beforehand.

The Chatbot Implementation in Government

Digital transformation is connected to workforce transformation and Chatbot-technology in public administration. Recently, have been noticed a big interest in

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[2] https://www.statista.com/statistics/1200465/covid-digital-transformation-global

public sector innovation and Artificial Intelligence (AI), because digital technologies play an indispensable role in public digital transformation. In the last decade, the digital transformation in public administration has revived the potential of Chatbots. Early Chatbots were limited in their functionalities as they were only able to respond to simple queries, but recently, the Chatbots could perform complex tasks and host more human-like conversations (Noordt, C.; Misuraca, G. 2019).
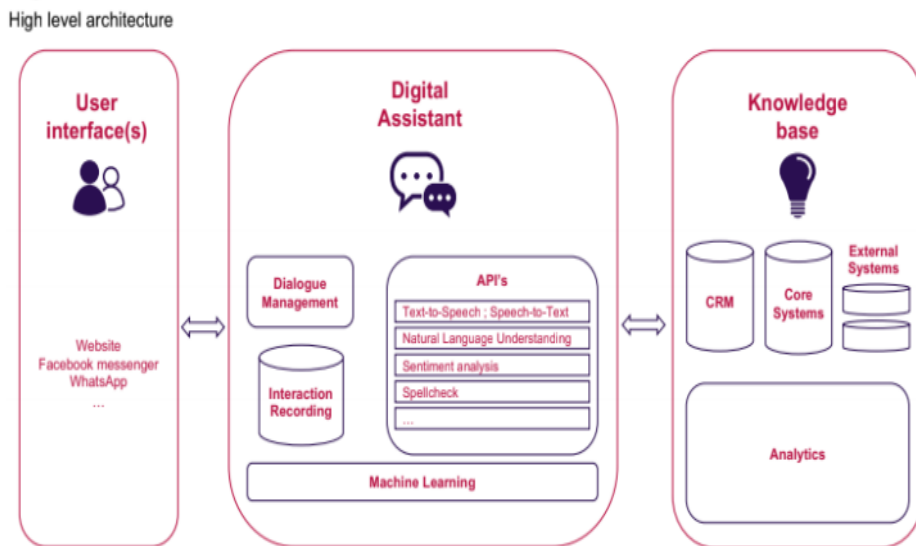
Fig. 3. The chatbot architecture
Source: https://joinup.ec.europa.eu/sites/default/files/news/2019-09/ISA2_Architecture%20for%20public%20service%20chatbots.pdf

Chatbot is a virtual assistant, a conversational agents, or a software application used to conduct an on-line chat conversation via text or text-to-speech, in lieu of providing direct contact with a live human agent[3]. Chatbot is an online application that can help users solve problems without a human advisor and respond faster and more accurately. Chatbot is related to disruptive technologies and gaining

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[3] https://en.wikipedia.org/wiki/Chatbot

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popularity, organizations are forced to reconsider the channel enablement strategies and for sure the related architectural approach (Khan, R. 2017). The Chatbot is part of digital culture and useful for better way of doing business in the future world. The Chatbot has been developed because the public entities must respond to a lot of calls and emails from the citizens (Noordt, C.; Misuraca, G. 2019). We present the chatbot architecture in figure no. 3 above.

According to the Future of Jobs Report 2018 from World Economic Forum 2018, the digital transformation and new technologies, including automation and digitization, create new high-quality jobs and rapidly shift the frontier between the work tasks performed by humans and those performed by machines and robots. Also, digital economy and new technology can harm workers on average or even all workers (Caselli, F.; Manning, A. 2019).

Table no. 1. Chatbots advantages

Low costs for implementation and maintenance
Lower the barriers to contact
24/7 available
Greater efficiency then humans
Simple interface with citizens
Instant response to any query
Eliminating discrimination

Source: Author's own work

The European governments have a particular interest in Chatbots in order to improve the public service delivery. Chatbots can be trained exponentially faster than humans can, they are 24/7 available and react instantly to user queries, also the

Chatbots could lower the barriers to contact or ask public administrations for help4. One of the most important advantages of using Chatbots is about saving resources by the decrease in user queries to human operators (e.g. through the helpdesk).

The need for the Chatbot is increasing because is a global push to digitize public services on the European Union member states. In the last decade, the European Union encourages the use of open data portals, starting from the implementation of the European Data Portal to foster transparency of the Public Sector5. Training a chatbot happens considerably faster and on a larger scale than via human training, and many countries consider Chatbot technology perfect to fit in the Digital Single Market Strategy. Some European countries implemented public services based on Chatbots, such France, UK, Finland, Portugal and soon a European network of public service chatbots will be developed.

The Chatbot in Accounting

Chatbot is transforming finance and accounting services in European Union and improving finance, banking and accounting processes. Invoice processing, procurement and purchasing processes can be a complicated process and involves many time-consuming and numerous personnel in finance departments. Chatbots in accounting could be trained to identify the accounting codes that should be assigned to each type of invoice and can automatically update the necessary systems of record. Also, Chatbots in accounting can be used to help scan and process new documents and to quickly and easily find existing electronic documents.

Chatbots are already have been used in the accounting industry for answering customer's inquiries. Many accountancy firms are using a Chatbot program to communicate with a customer over text to answer a number of questions they may have. Chatbot in accounting is developed as a virtual accounting assistant for tens of thousands of customers. Chatbot and AI is developing the company's cloud-based accounting software and improving financial reporting and financial management. The first Chatbot used in accounting was Pegg, very popular for checking expenses and track receipts for small business (figure no. 4).

Accounting firms can implement chatbots to initiate conversations with stakeholders seeking assistance on taxes, fees, and other services, turning them from potential customers into business partners. Chatbot in accounting can manage costs

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[4] European Commision- ISA2_Architecture for public service chatbots, p. 9

[5] https://data.europa.eu/en

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for better payments and positive cash-flow, according to the schedule of contracts. In this case, Chatbot will contribue to automate back-office functions through the use of cloud technology. The emerging uptake of chatbots for social and emotional purposes entails opportunities and concerns regarding non-human agents as sources of social support Brandtzaeg, P.B.; Folstad, A.; Skjuve, M.B. (2021).

PEGG: Our digital assitant

Say Hello to Pegg

Pegg 😎

Figure no. 4 Accounting Chatbot Pegg, UK
Source: www.sagecity.com/tags/Pegg

Conclusion

Chatbot technology had a significat impact of public sector and accounting. In the last decade, Chatbot became a a cloud-based human capital management system for midsize for the public sector and small businesses. In our opionion, global interest in Chatbots is growing due the multiple advantages for public sector, accounting, finance and banking, and soon will be implemented in education and service industry.

Digital technology is an important tool for the successful transformation of processes, interactions, transactions, technological evolutions, for regional and global economic and social progress all over the world.

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INDUSTRY 4.0 VERSUS TRADITIONAL ECONOMY. REPUBLIC OF MOLDOVA CASE STUDY

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Abstract
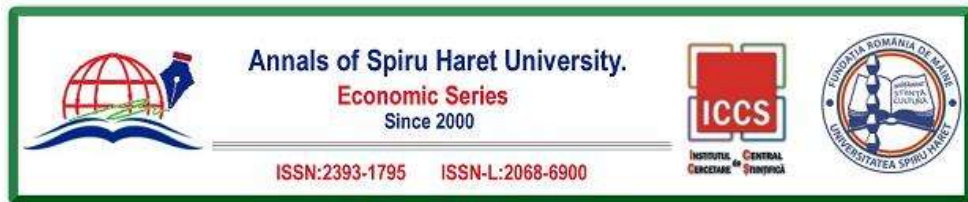
Signs of progress in the digitalization of economic processes over the past decades have led to the definition of the fourth industrial revolution called "Industry 4.0". In a context where countries of the world either implement the tools of Industry 4.0 in business or set out Industry 4.0 as a development strategy, we are concerned about the extent to which Republic Moldova economy is ready to implement new digital tools and informational challenges. The research aims to highlight the environment necessary for capitalizing on the innovations of Industry 4.0 to ensure sustainable development.

The article examines international experience in the field of economy digitalization versus Republic Moldova experience, contains the analysis of the legal framework, the diagnosis of the economic indicators regarding the ICT implementation in the Moldovan economy, and international good practices in the field of Industry 4.0.

The research was conducted within the State Program 20.80009.0807.22 Developing the circular economy mechanism for the Republic of Moldova.

Keywords: industry 4.0; digitalization; economic growth; circular economy; ICT; Global Innovation Index; ICT Development Index.

JEL Classification: E01, E2, L1, L5

Introduction

Industry 4.0 is a political, economic, and social challenge for the entire world, the aim of which is to absorb digital innovations in products, processes, and business models. Many developed countries in Europe, America, and Asia have included the concept of Industry 4.0 in their strategic development programs for the coming decades. Europe, for example, will invest more than € 1.3 trillion in the development of virtual technologies for 15 years.

Many companies in Europe, the USA, and Asia have already entered the race to adopt and implement Industry 4.0 in their businesses.

In developed countries Industry 4.0 has been shown to have the capacity to increase the productivity and competitiveness of business. In principle, there is research in the field, which considers digital technology an effective tool to face the challenges of the information age. The development of internet technologies, communication channels, and digital platforms has driven the emergence of public information systems and global industrial networks beyond the boundaries of enterprises. By interacting, these systems and networks have a transformational impact on all sectors of the modern economy, leading to a new era of industrial automation, the fourth industrial revolution.

The country analysis shows that the criteria for evaluating the efficiency of Industry 4.0 are still less studied, and the structured and systemic implementation of these technologies in national economies for many countries is not fully finalized. However, there are already international studies (Ustundag A., Cevikan E., 2018; Verdouw C., Wolfert J., Beulens A.,., Rialland A., 2016; Washlster W., 2012), which finds that such methods as the organization of "cloud", artificial intelligence, management, and control information systems, the "blockchain" (Byström H., 2016; Christiansen B., Yüksel Ül., 2017), being capitalized by the economic entities will generate, consequently, the efficiency of the management in all the activity sectors.

At the same time, more and more research show that the implementation of Industry 4.0, digital technologies, and innovations in the economy are considered the main criteria to increase the efficiency of production and to drive economic development to a higher level. In this regard, in this paper, we aim to investigate the given topic concerning the situation in the Republic of Moldova, especially that the sustainable development of the economy is identified as one of the basic national strategic development priorities and is crucial for ensuring economic growth.

The importance of ICT for economic growth and sustainable development is presented in the studies conducted by the World Bank, Boston Consulting Group, in the works of the International Labor Organization, International Telecommunication Union, analyzed in this paper.

1. Results and discussion

1.1. International context of Industry 4.0

To quantify the potential global impact of Industry 4.0, *The Boston Consulting Group* in the Report*: Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries* analyzed production prospects in Germany in several areas such as productivity, revenue, employment, investments, producers, integration of production and logistics processes, etc. For example, the results of the trend analysis show that Industry 4.0 leads to increase productivity in all sectors from € 90 billion to € 150 billion. Productivity improvements on conversion costs, which exclude the cost of materials, ranging from 15% to 25%. Industrial equipment manufacturers achieve an increase in productivity from 20 to 30% (Geissbauer R., Lübben E., Schrauf S., 2018).

According to the BCG report, Industry 4.0 leads to revenue growth. Manufacturers' demand for improved equipment and new data applications, as well as consumer demand for a wider range of increasingly customized products, have led to further revenue growth of around 1% of Germany's GDP. In the analysis of the impact of Industry 4.0 on German production, it was found that the growth it stimulates will lead to a 6% increase in employment over the next ten years. Demand for employees in the mechanical sector could increase even more - by up to 10% over the same period.

However, different skills will be required. In the short term, the trend towards greater automation will lead to the dismissal of workers, of the low-skilled, who perform simple, repetitive tasks. At the same time, the increasing use of software, connectivity and data analytics will increase the demand for employees with skills in software and information technology development, such as mechatronics experts with software skills. This skills transformation is one of the core challenges of Industry 4.0.

In the investment segment, the adaptation of production processes to incorporate Industry 4.0 will require manufacturers, in the next ten years, to invest between 1-1.5% of their revenues in digital technologies. The estimated benefits in Germany illustrate the potential impact of Industry 4.0 for global production. Industry 4.0 will have a direct effect on manufacturers and their workforce, as well as on companies that supply intelligent production systems.

Other estimated cost reductions include 30% for labor costs, operating costs, and expenses over five to ten years. Integrated production and logistics processes will not be more cost-effective but will reduce cycle times by up to 30%. Adopting these technologies will require an increase in investment of about 35%.

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Industries and countries embrace Industry 4.0 at different rates and in different ways. Industries with a high level of product variants, such as the automotive, food, and beverage industries, benefit from more flexibility that can generate productivity gains, for example, and industries that require high quality, such as be semiconductors and pharmaceuticals, will benefit from improvements based on data analysis, which reduce error rates.

Countries with highly skilled labor can capitalize on more automation, combined with increasing demand for higher labor. However, many emerging markets, with a young and technologically intelligent workforce, could also jump at the opportunity and even create completely new production concepts.

To actively shape transformation, system manufacturers and suppliers must take decisive steps to capitalize on technological progress. They must also address the need to adopt appropriate infrastructure and education.

International statistics (Statista, 2019) and forecasts show that enterprises' overall spending on IT and software technologies increased several times from 2009 to 2019. In 2018, software spending reached 391 billion US dollars. In the same year, spending on the global information technology market to 3.683 billion US dollars, while IT services, the second largest segment in the field of communications services, to 1003 billion US dollars.
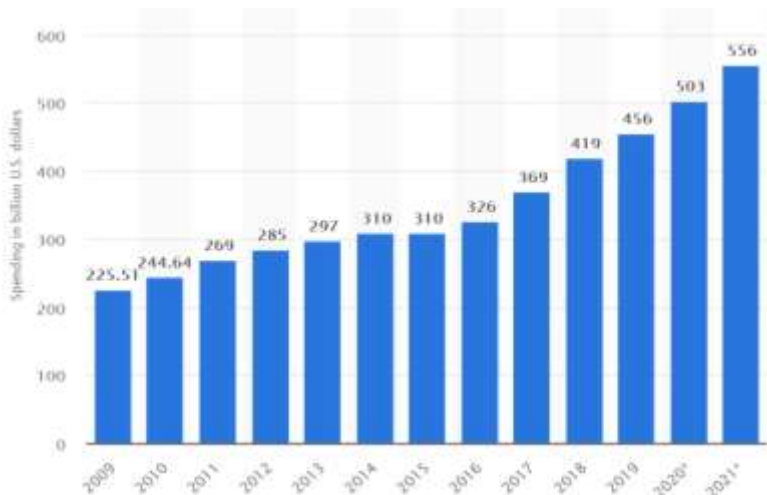
Fig. 1. Evolution of global spending on IT and Software (2009-2021)
Source: Statista, 2019

According to the analysis carried out by the Statista portal, in 2020, it is estimated that IT and software expenses for enterprises will amount to approximately 503 billion US dollars worldwide. The software market has seen a high level of growth in recent years, with revenues doubling in the decade between 2009 and 2019. Recent forecasts suggest that this rapid expansion trend will continue in the coming years, with market revenues reaching 556 billion by 2021.

With year-on-year growth, often exceeding 10%, the enterprise software market is the fastest-growing segment in the IT industry. Enterprise software aims to meet the needs of organizations, addressing the efficiency of their core business processes. Many enterprises software sub-segments, such as business process management software, enterprise resource planning software, and customer relationship management software, have developed in massive markets in recent years.

According to the statistical portal OECD Stats (OECD, 2018), in 2017, 87.32% of German companies have websites and use IT resources in business, in France, this index is 66.53%, in the United Kingdom - 83.63%, and in Finland - 96.28%

The analysis of the Industry 4.0 implementation and the good practices in the field of business digitalization in different sectors of activity demonstrates that the transformation of the economy begins with the integration of production and logistics processes and the corresponding IT systems. The integration of these processes includes the exchange of data on products and production within the enterprise, as well as with customers and suppliers. Suppliers are the beneficiaries of the exchange of design and supply chain data. Communication in the production process is done in real-time between people, machines, components, and products.

Digital systems currently owned by international companies are evolving rapidly, and information is stored in the cloud to increase availability and accuracy. All this allows greater flexibility in changes (both anticipated and unexpected) in the production process.

German, French, and Dutch companies are investing in automated systems for monitoring machine manufacturing processes and controlling jobs. These systems use data integration to automatically change the manufacturing process. Raw material suppliers can automatically adapt their processes based on new orders from the manufacturer, maximizing just-in-time logistics, reducing logistics and operations costs.

The European Union Action Plan for the Circular Economy provides for the implementation of information technologies for waste reduction and recycling at the stage of product design, production, consumption, and processing of waste. In this context, Industry 4.0 must ensure the flow of resources through waste recycling and intelligent resource consumption.

The potential of digital technologies and the concept of the circular economy, promoted by European policies for the future development of society, will catalyze the implementation in the business environment of innovative models, based on a close relationship with customers, customized series products, a participatory and collaborative economy, facilitated by the Internet of Things, large volumes of data, blockchain technology, and artificial intelligence.

The development of entrepreneurship and SMEs according to the principles of the circular economy, from the European perspective, will provide the population with high-quality and safe products at affordable prices, which can be reused in production processes. New product-as-service business models will provide sustainable services and digital solutions that will enhance the quality of life, create new jobs by updating knowledge and skills.

1.2. The national ICT framework

Analyzing the situation regarding the ICT implementation in the economy, the Republic of Moldova has an extensive infrastructure of information technologies. The International Telecommunication Union (ITU, 2019) examined the indicators of access and use of ICT in 2019 and certified that the situation in our country is better in compared to the CIS average and close to that of Central and Eastern European countries, however, ICT is not a defining element for the business organization.

The findings made by IUT are presented in the Innovation Strategy of the Republic of Moldova for the period 2013-2020 "*Innovations for competitiveness*".

For the analysis of IT knowledge and its application in entrepreneurial practice, the Global Innovation Index 2012 (IGI, 2018) (INSEAD, 2018) is applied, which allows the international comparison of innovation results, as well as the Innovation Union Scoreboard.

According to the findings made in the Innovation Strategy of the Republic of Moldova, "*the positions of the Republic of Moldova are insignificant in terms of online presence*". The number of higher-level generic web domains per 1000 people in the Republic of Moldova is only 2.0 units, compared to 2.9 units / 1000 people in the CIS and 22.3 / 1000 people in Central and Eastern Europe. It speaks of a low presence of Moldovan companies and organizations on the Internet, which is a key barrier to the promotion of national products (National Strategy for Innovation, 2020).

According to the same document, the rapid expansion of ICT use is taking place, increasing the level of digitization by 10 percentage points contributes to increasing the country's score in the Global Innovation Index by 6 percentage points.
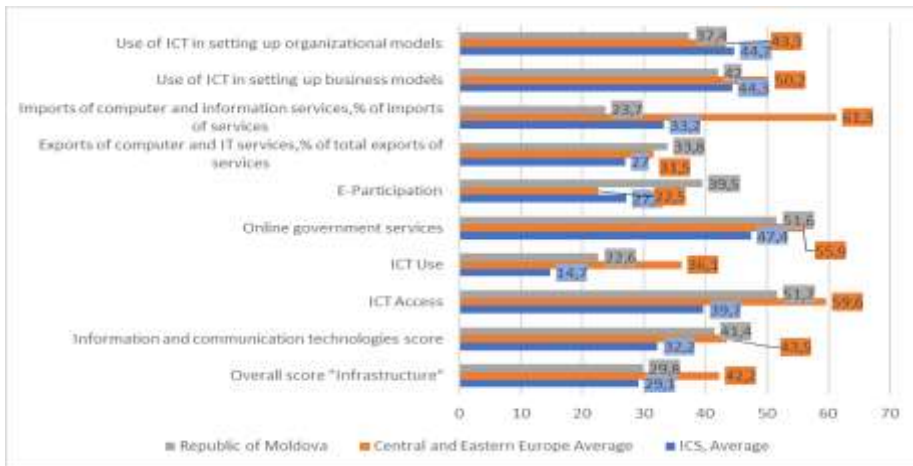
Fig. 2. Comparative analysis of the components of the Global Innovation Index:
Republic of Moldova, CIS, Central, and Eastern Europe
Note: The IGI scores are the result of normalizing indicators on a scale from 0 to 100, with
higher values indicating better results or higher inputs.
Source: based on the data INSEAD, Global Innovation Index, IGI 2018.

For the sustainable development of domestic enterprises in the digital economy, the use of ICT is essential. Ensuring access and support in the ICT implementation will stimulate competitiveness and generate innovations to transform economic processes. Baltic countries' development strategies, for example, are based on considerable investment in ICT, the promotion of information culture at the level of enterprises and households, and the increase of competitiveness on the international market through innovative technologies.

According to the report of the International Telecommunication Union (ITU, 2018), in the Republic of Moldova, there are many advantages for the development of the ICT sector, namely: relatively low labor cost, a high general level of information infrastructure, services market IT is dynamic and developed, with high-speed internet and high accessibility to mobile services. Also, national ICT legislation is aligned with the legal framework of the European Union, and ICT policies are evolving, benefiting from the existing infrastructure with a focus on the development of innovative entrepreneurship.

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The facilities of the tax system have favored the development of outsourcing in the field of ICT and have created advantageous conditions for the development of these types of services. The capitalization of ICT-based innovations, as support for economic development, is supported by state policies.

The adaptation degree of ICT in the economy can be estimated by analyzing several indices, proposed by the International Labor Organization in 2016, for the analysis of the business environment in the Republic of Moldova (International Labor Organization, 2020).

1. **Network Readiness Index (NRI)**, this index is intended to estimate society's capacity to use ICT to increase the level of development and competitiveness of developed and developing countries. The evolution of this index for the period 2015-2019, compared to several countries in the world, is presented in figure 3.
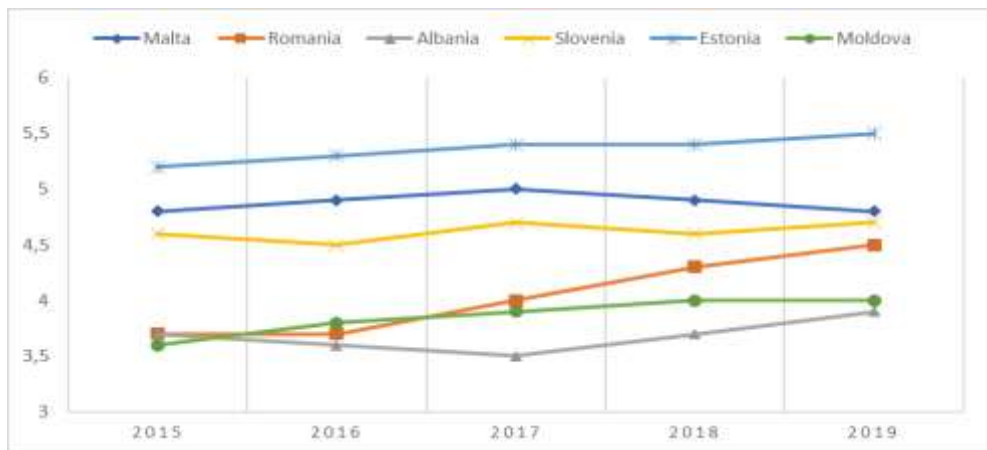
Fig. 3. Network Readiness Index (on a scale of 1 to 6)
Source: International Labor Organization, 2020

As a result of the analysis, the top of the countries with the most favorable climate for innovation and technological adoption is Estonia (5.5 points), followed by Malta (4.8 points), Slovenia (4.7 points), and Romania (4.1 points). The Republic of Moldova was close to the lower limit with an index value of 3.78 in 2015 and an insignificant increase in 2019 to 4 points.

2. **Number of internet users and mobile subscriptions.**
According to the Tcdata360 Database platform of the World Bank, in 2018, in Moldova, 71% of the population used the Internet. In the comparison countries, the situation was similar: Estonia (87.24%), Malta (77.29%), Slovenia (75.50%), Albania (66.36%), and Romania (69.50%) (World Bank and IFAD, 2018) (see Figure 4).

3. **ICT Development Index**. This index compares developments in information
Technology and communications. The ICT development index is aggregative and contains 11 indices that characterize the degree of use and relevant skills, such as households with a computer, the number of internet users, and literacy levels. This Index is applied in international practice as a benchmarking tool at the global, regional, and country-level (see Table 1) (IUT, 2018).
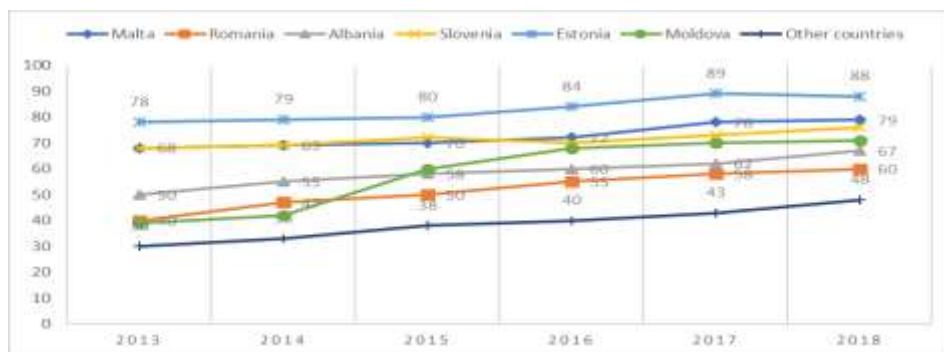
Fig. 4. Internet users (population share, %)
Source: World Bank and IFAD, 2018

The use of information technologies and the Internet is of crucial importance for the innovation process by ensuring the efficient and inexpensive dissemination of existing innovations and enabling companies to implement them in practice. Also, as practice shows, the Internet "educates" consumers, who, being more informed, become creators of innovations.
Another document on the digitization of the Moldovan economy is the National Strategy for the development of the information society "*Digital Moldova 2020*".

According to this document, the Government of Moldova considers as priority directions of the Strategy for building the information society "increasing the competitiveness of economic actors and creating new jobs by exploiting the opportunities offered by new information and communication technologies in the development of electronic commerce, modernization of business, finance and human resources management, promoting new products and services ".

Table 1. ICT Development Index

Country	2012	2013	2015	2016	2017
Moldova	4,74	5,72	5,81	6,21	6,45
Estonia	7,28	7,68	8,05	8,16	8,14
Slovenia	6,76	7,13	7,23	7,2	7,38
Albania	4,11	4,72	4,73	4,9	4,14
Romania	5,35	5,83	6,11	6,23	6,48
Malta	7,25	7,25	7,52	7,65	7,86

Note: the score given is from 1 to 10, the country with the highest ICT development index has the highest score.

Source: International Telecommunication Union, ITU, 2018

Although our country is ranked 7th in the world by the speed of the Internet, and ICT has reached the level of 10% of GDP - all these are the characteristic elements of the third industrial revolution and not the Industrial Revolution 4.0, which requires the use of robots, artificial intelligence, Cloud computing, blockchain in industrial production.

An analysis of the use of robots in the Moldovan industry shows a very low level. Robots require colossal investments, but also knowledge for their handling and maintenance, which are lacking. Even the major industrial manufacturers, which in recent years have invaded the country's economy, automotive companies, manufacturers of wiring, car parts, and accessories, use labor that is currently cheaper than robotic. At the same time, the automation of production processes will reduce the number of jobs and the withdrawal of these companies from the country, which will happen very soon.

According to the "*Digital Moldova 2020*" Strategy, "building a future for the country is inconceivable without a digital strategy that creates opportunities for innovation and development based on information and communication technologies (ICT), and entrepreneurs and government institutions to maximize the use of government data. for the benefit of services for citizens".

The data of the National Bureau of Statistics show that the investments, costs, and expenses of enterprises for IT in 2019 were non-essential and represent 4.7% of GDP in current prices (National Bureau of Statistics, 2020).
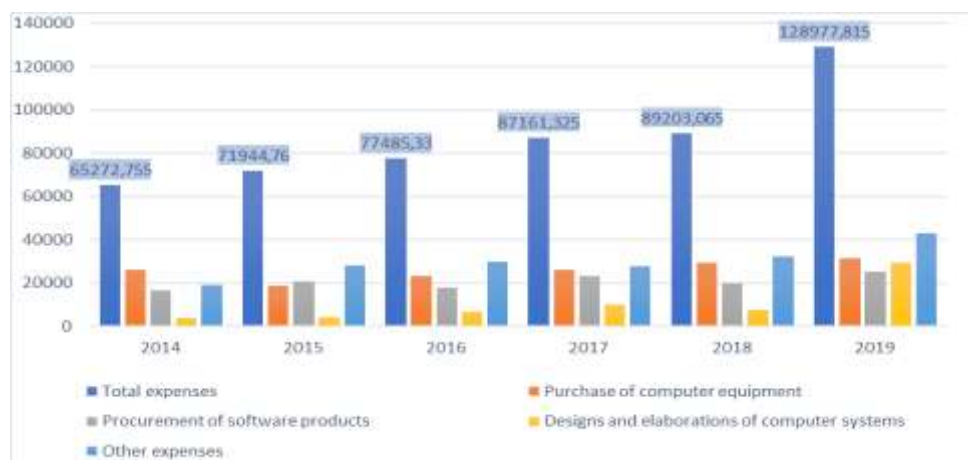
Fig. 5. The expenses of legal entities for information technologies, by categories of expenses, in total by the economy, in 2014-2019, thousand EURO
Source: based on NBS data

Analyzing the dynamics of expenditures for information technologies in the period 2014-2019 in total by economy we can conclude that although the dynamics of these expenditures is positive for the entire analyzed period, the largest share in total belongs to the expenditures for the purchase of computing equipment (40% of the total expenditures in 2014 and 24.33% in 2019), the share of expenditures for the procurement of software products decreased from 25.5% in 2014 to 19.6% in 2019, at the same time the share of expenses for designs and elaborations of information systems registered a considerable increase from 5.6% in 2014 to 22.9% in 2019.

The decrease in the share of expenses for the purchase of computer equipment in favor of the purchase of software and information systems demonstrates the tendency of economic entities to invest in digital products and information systems for business.

The largest share of investments in ICT belongs to information and telecommunications activities (24.7% of total expenditures for information

technologies in 2013 and 29.3% - in 2019) and financial and insurance activities (16.5% of the total in 2013 and 20% - in 2019). The share of investments in ICT in the manufacturing industry reached the level of 3.8% in 2013 and 3.76% in 2019, and in agriculture of 0.24% in 2013 and 0.31% in 2019.

In the first decade of 2000, the process of creating government information platforms began. Currently, the e-Government Agency is active in the Republic of Moldova, incorporating over 40 e-Transformation subprojects, building a sustainable platform for modernization of public services and innovations in governance (e.g., *Msing, Single Public Service Platform, e-Civil Status, e-Invoice*, etc.), with a total budget of $ 22.4 million.

The IT sector remains one of the main strategic areas of the national economy, with a contribution of 7% to the country's Gross Domestic Product (2019), and the study conducted by the National Association of ICT Companies showed that 9.9% of companies in this sector develop IT products, and 37.4% - products and services. According to the study carried out on the sectors of the national economy for which IT services and products are developed the agri-food sector accounts for only 2.2% of the portfolio of IT services provided for the national economy, the largest share being 31.9% financial-banking, retail (30.8%) and entertainment (27.5%).
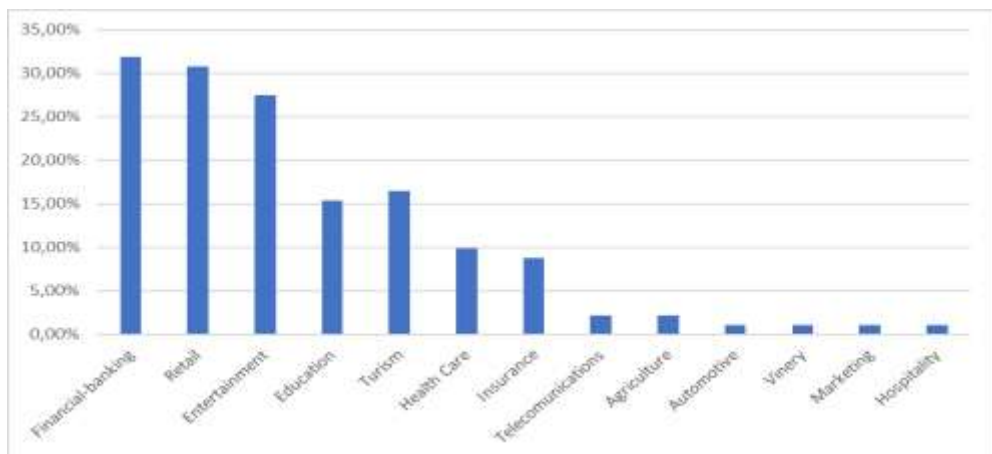
Fig. 6. IT services portfolio by sector of activity
Source: National Association of ICT Companies, 2020

Table 2. SWOT analysis of the implementation of Industry 4.0 tools in the national economy

Strengths (S)	Weaknesses (W)
▪ the existence of a skilled workforce in the IT field; ▪ the existence of communication networks, ▪ the existence of high-performance Internet infrastructure; ▪ implementation of institutional projects: biometric passport, e-Declarations system, digital map, "e-Government", etc. ▪ the existence of master's programs in robotics, TUM; ▪ the existence of robotics courses for young people; ▪ the attractiveness of the economy for foreign investments; ▪ existence and development of the automotive industry in the Republic of Moldova (the most attractive field for Industry 4.0); ▪ the existence of collaboration relations with the German industry, the promoter of Industry 4.0.	▪ lack of specialists with competencies in the specific fields of Industry 4.0; ▪ lack of a coherent government program in the field of Industry 4.0; ▪ lack of scientific research (with some exceptions) in the field of Industry 4.0; ▪ lack of financial resources and IT investments. ▪ lack of interest of the financial-banking sector in financing the activities specific to the Industry 4.0 field ▪ lack of specialists in the digitization of production processes; ▪ lack of skilled labor in interdisciplinary fields, specific to Industry 4.0 (computers-sensory-mechanical technologies-materials-production organization), etc.
Opportunities (O)	Threats (T)
▪ development of digital skills, retraining of the workforce; ▪ increasing the productivity and competitiveness of national products; ▪ increasing investments in human capital development; ▪ increasing investments in Industry 4.0 technologies; ▪ adapting to the world and European trends in the digitization of production processes.	▪ security of personal data and information; ▪ increasing the risk of cyber-attacks; ▪ reduction of jobs, as a result of automation and robotization of production processes; ▪ lack of qualified staff for the IT field.

Source: elaborated by the authors

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Investments in computerization, although growing year by year, are mainly costs and expenses for ICT services and the purchase of computers, very few companies invest in digital technologies, software, automation, and robotics of activities.

Unlike the technologically advanced countries, in the Republic of Moldova, there is no discussion about the Industrial Revolution 4.0. (There are only a few articles in the popular and press literature, as well as publications at specialized conferences). Industry 4.0 is intensely promoted by multinational companies located in the Republic of Moldova (*Microsoft, FBS Group, Endava, Star Lab*) and international audit companies (*PricewaterhouseCoopers, KPMG, Baker Tilly Klitou, and Partners,* etc.).

Following the analysis, we identified, through the SWOT method, the strengths, and weaknesses, as well as the risks, opportunities to implement Industry 4.0 tools (see Table 2).

The main expectations from the implementation of Industry 4.0 innovations and the digitization of the entire chain of industrial processes are materialized in the optimization of production processes and resource consumption by using artificial intelligence in production processes and connecting production equipment to the network. The use of "app-store" and "cloud" applications as new concepts in management will streamline and optimize the decisions made. All this will generate increased productivity, reduced technological process time, reduced waste, customer satisfaction, increased quality, and reduced cost of manufactured products.

Currently, the Republic of Moldova is at an early stage of developing an innovation ecosystem. The country's economy has key characteristics that are its strengths to continue to progress in its transition to an innovative development orientation.

Conclusion

In conclusion, we have identified the following conditions that need to be reinforced to bring Republic Moldova economy into line with the international and European digital space:

1. Define an Agenda for Industry 4.0 in the Republic of Moldova.

2. To include the Industry 4.0 concept in the National Development Strategy of the Republic of Moldova.

3. To include the Industry 4.0 concept in the National R&D and Innovation Program.

4. To promote Industry 4.0 in Academia.

5. To develop interdisciplinary courses at the level of colleges and universities in curricula with the approach of Industry 4.0.

6. To promote and finance studies in the field of machinery technology, machine tools, and production systems, industrial engineering, mechatronics, robotics, data instrumentation and acquisition, telecommunications networks and software, computers, information technology, etc.;

7. To motivate the involvement of Moldovan companies in the Industry 4.0 Agenda

8. To interest banking institutions in financing initiatives in the Industry 4.0 Program.

9. To access and actively participate in European platforms and agencies of interest in Industry 4.0.

Industry 4.0 offers enormous opportunities for innovative producers, system suppliers, and entire regions. But, as with previous revolutions, Industry 4.0 is also a serious threat to those in difficulty. With changing business models, economic and qualification requirements, we could see major changes in top positions, both at the company, regional and international level.

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THE APPLICATION OF AUGMENTED REALITY IN PROMOTING HOTELS AND TOURIST ATTRACTIONS OF THE CITY OF NIŠ

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Abstract
In the era of digital transformation, especially during the corona virus pandemic, there have been changes in the way the tourist offer is presented to potential buyers. This has been especially contributed by information technologies that enable bringing the tourist destinations and hotel facilities closer to consumers. It is the aim of this study to identify the opportunities and challenges offered by augmented reality in terms of creating personalized consumer experiences, tourism development, and greater visibility of the hotel and its facilities in the global market. The intention of the authors is to fill the gaps in knowledge and raise the awareness of the value of augmented reality for tourism. Based on the research conducted in the City of Niš, it was concluded that the current application of augmented reality in the promotion of hotels and tourist attractions in the City is insufficient and recommendations are given on how to use the benefits of augmented reality in tourism promotion.

Keywords: *augmented reality; promotion; personalized experiences; hotel industry; tourist attractions.*

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JEL Classification: M31, O33, Z32, Z33

Introduction

By adopting a new way of life, work and behavior, during several waves of locks due to the global corona virus pandemic and accepting the new "normality" imposed by the "new" everyday life, which required increased use of ICT, digital technology has been fully integrated into the lives of most global population. As a result of the growing awareness of the intensive use of technology, the tourism sector in the coming period may witness changes in passenger behavior. These changes are specifically related to selecting and deciding on hotel or final destination, searching for information, documenting and sharing experiences, insisting on creating personalized content and services. Especially, as the adoption of advanced digital technologies in the tourism industry over the past decade has already been significantly contributed by the general change in the way of life and communication of consumers. In the time after the COVID crisis, attracting attention and interest, creating and promoting a unique and different tourist experience and provoking positive emotions towards tourist products will become vital factors for the recovery and development of stumbled tourism, but also for increasing the attractiveness of destinations around the world. In such conditions, the orientation towards the comprehensive use of opportunities to improve the visitor experience offered by innovative immersive technology, in the form of augmented reality (AR), contributes to increasing the competitiveness of the tourist attraction and the tourist offer as a whole.

AR increases the sense of engagement and can result in improved perception of the experience and the real environment, offering the ability to visualize objects that are not physically accessible in the real-world context and enriching the content and information available to users. Given that the possibility of "testing" the spatial and material components of the tourist offer in the pre-consumption phase mainly contributes to a higher level of harmonization between expected and perceived value for the user [Kosar *et al.*, 2017], it is realistic to expect that in the post-pandemic period, the interest of tourists in the use of immersive technologies will be more pronounced. Therefore, the growing expectations that "digital" guests have of hotels will significantly influence the trends in the hotel industry, which will transform and reshape the hotel industry as a whole to the level of science fiction. By enhancing information of a particular location and raising awareness of

existing facilities and related services it offers (cafes, shops, gyms, tennis courts), AR is not only aimed at creating added value for tourists, but potentially increases turnover by encouraging revenue generation on the spot [Cranmer, 2018]. Moreover, as a method for creating improved, personalized and unusual tourist experiences, and a fuller understanding of local tourist sites and the destination as a whole, AR can be identified as an effective tool for extending the vacation time and stay of visitors in a particular destination, and encouraging the intention to spend more than planned.

The examples of world-famous hotel chains show that the possibilities of applying AR in the hotel industry are multiple and that over time it becomes part of the standard service in hotels. Thereby, AR not only provides a true picture of the hotel itself, its rooms, services and facilities, but increasingly offers numerous related and useful information that personalizes services and creates authentic exciting experiences, while also contributing to the promotion of local cultural and historical sights, traditional gastronomic specialties, the magnificent beauties of untouched nature, wellness centers, and various elements of the tourist offer of a specific destination.

The aim of this paper is to present, to the academic and business community in the field of tourism and hospitality, the potentials of AR, when creating added value for the user both in the pre-consumer and consumer phase of the tourist product, which are already recognized and widely applied by globally present hotel chains and attractive world-famous tourist destinations. The intention is to point out the need for more intensive acceptance of advanced digital technologies in the promotion of hotel and tourist facilities and designing a differentiated offer in relation to the current competition by raising the awareness of the values of AR for tourism. According to the available data large urban centers are determined as the primary destination to which the largest number of tourists gravitate. However, the City of Niš participates in the total number of tourist arrivals with just over 3.5% at the level of the Republic of Serbia. Therefore, the better understanding of AR, and its role in upgrading the visual world with computer-generated content and creating a personalized experience for visitors, is an opportunity for recovery and further development of the hotel and tourism in the post-pandemic period in the City of Niš. The AR, as a significant component of the promotional mix of this destination of southeastern Serbia, which is rich in tourist contents and attractions, is in the function of designing a different offer, provoking a special unusual user experience, and attracting a significant number of tourists.

Theoretical background and literature review

Virtual Reality (VR) is often used as an umbrella term for all types of immersive experiences, including many related terms such as *Augmented Reality* (AR), *Mixed Reality* (MR) and *Extended Reality*. When we talk about VR, we generally mean computer-simulated reality that creates a completely new imaginary environment and allows "immersion" in computer-generated worlds (rooms, cities, universes...) completely closed and isolated from the real physical world. The generally accepted definition describes VR as a computer-generated 3D environment, through which the user can move and communicate with it, resulting in the simulation of one or more (out of the existing five) user senses in real time [Guttentag, 2010; Yung & Khoo-Lattimore, 2017].

The virtual world can have similarities with the real world and can be based on existing geographical areas and places, and it can be a completely unreal, imaginary environment in which the laws of physics that regulate gravity, time and material properties do not have to be respected [Milgram *et al.*, 1994] and which exists separately from current physical reality. While virtual reality creates an artificial world in which the interaction with the virtual takes place through direct manipulation of objects, just like in the real world (by simple observation, but also by interactive modification of virtual environment objects), AR offers an interactive experience upgrading the real user environment. In fact, AR is based on adding elements of a virtual environment - computer-generated multimedia content (text, images, graphics) to the real world so that they act as part of the real world. AR is a way of looking at the real world (via a smartphone camera that creates a visual view of the real world) and "enlarging" that visual world using computer-generated inputs such as static images, sound or videos. Unlike VR, AR magnifies the real world by adding scenes, objects, and textual information to the existing world instead of creating some new non-existent worlds from scratch [Mealy, 2018]. In such an understood AR, computer-generated content can be presented as an "overlay" on top of real-world content, so that there is no possibility of communication between one environment and another. With AR, we become part of the computing environment, not just an external, separate observer with limited interaction. Peddie [2017] emphasizes that AR mixes the real with the simulated or synthetic and projects images and information into the user's field of view, while Azuma [1997] observes and describes AR as reality in which 3D virtual objects are integrated into a three-dimensional real-time environment. As part of the 4.0 revolution, AR allows virtual objects to be superimposed into real-life views

without requiring users to "separate" from reality. This creates the illusion of the existence and presence of digital content in a real environment.

While VR blocks real-world sensual experiences, because by removing information from the environment, only computer-generated information reaches the human senses and immerses user in virtual and fun 3D worlds [Bonetti *et al.*, 2017], AR allows users to experience enhanced experiences within the physical space [Papagiannidis *et al.*, 2017]. AR is defined as a combination of "real and computer-generated digital information in the user's view of the physical world in such a way as to appear as a single environment" [Olsson *et al.*, 2013, p. 288]. By integrating and aligning real and virtual objects, this immersive technology results in an improved (extended) physical world [Carmigniani *et al.*, 2011]. The difference for the user is determined by the depth of sensual participation and the level of immersion. With AR, the vast majority of what the user sees is still the real world, while with VR the user is completely immersed in the virtual environment [Yung & Khoo-Lattimore, 2017, p. 6].

In recent years, a hybrid has been created, called mixed reality, which provides the possibility of interaction between the real world and digitally magnified content. In AR-based MR, the content of the digital world is no longer passively placed on top of the real world. Instead, digital objects appear to be part of real physical space, and one can even communicate with them as if they were actually there. As Schwab simply illustrates [2018], virtual reality (VR), augmented reality (AR) and mixed reality (MR) are versions of an immersive audio-visual set of technologies that allow people to move into a virtual environment or add virtual elements to their real environment. Moreover, their immersive nature blurs the lines between the computer-simulated and the real world.

When dealing with the notions of reality, it is necessary to look at *augmented virtuality* (AV). AV is essentially the reverse of typical AR and represents the advancement of the virtual world with real-world images, texts, and models. Thus, while AR refers to a predominantly real environment enriched with digital objects, AV refers to a predominantly digital environment in which there is some integration of real-world objects [Mealy, 2018, p. 13].

In the context of the concepts of virtual and augmented reality, the division and definition of reality is best illustrated by the Milgram continuum or the *Reality-Virtuality continuum*. The very concept of a continuum represents the scale between the real world on one side and the virtual world on the other, opposite side of the continuum. Milgram and associates, defined augmented reality back in 1994

as the central part of the continuum between virtual reality (completely synthetic) and a completely real environment. In their paper on mixed reality, the authors (1994) argue that AR and VR should be viewed as lying at different ends of the Reality-Virtuality continuum, where one end consists exclusively of real-world objects and the other end exclusively of synthetic or computer-generated objects (Figure 1).
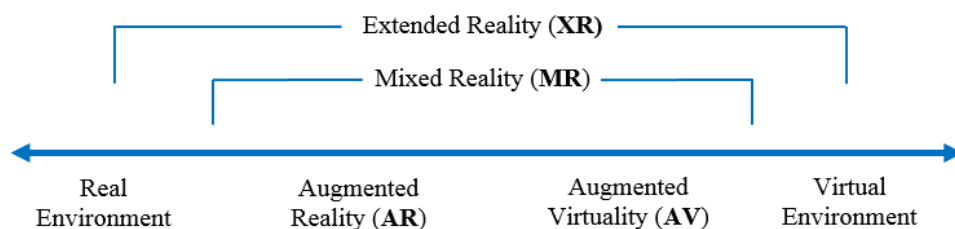
Figure 1. Simplified representation of a Reality-Virtuality Continuum

Source: Milgram. P., Takemura, H., Utsumi, A., & Kishino, F. (1994). Augmented Reality: A class of displays on the reality-virtuality continuum, Telemanipulator and Telepresence Technologies, SPIE 2351, p. 283

VR and AR are often called the "fourth wave" of transformative technologies, after the personal computer, the Internet and mobile computing, which have irreversibly reshaped the old life patterns of most people on the Planet so that they can no longer imagine their lives without them. AR has evolved from laboratory experiment to application in the military, industrial and scientific, primarily medical fields, and is increasingly present in education, architecture, retail, tourism, and hospitality. This advanced technology has soared outside the world of games and into the world of marketing, growing into a significant component of the promotional mix of hotels, resorts, and tourist destinations as a whole.
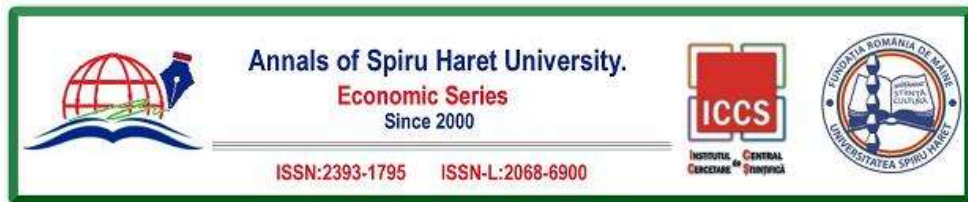
The application of augmented reality in tourism and hospitality
As always when thinking about emerging technologies, and in terms of AR and its impact on future trends and the destiny of tourism and hospitality, the dilemma arises whether the AR revolution will bring significant benefits to the tourism industry or will become its biggest threat. Namely, the essential dilemma is

reflected in the knowledge of whether users will be satisfied with virtual tours of tourist sites or, thanks to the improved perception of the real physical environment, will be inspired to visit new, unknown natural and "produced" tourist attractions and real versions of locations that they have only partially virtually experienced. Can teleporting to any chosen tourist destination in the world and virtual walks through the streets of impressive metropolises or lush, unexplored landscapes of the amazon jungles be a substitute for the experience of actually staying at a particular destination? Although the use of AR technology in the travel and tourism industry is a novelty that initiates new purposes over time, based on past experience it is realistic to predict that the immersive nature of AR and the experience it offers will actually contribute to the future development of tourism and hospitality. Recent studies show that AR is becoming a popular tool to enhance the tourism experience and is reaching a point where it becomes a necessity in creating added value for visitors. In this regard, some authors argue that today many destinations and organizations, if they do not already apply, at least consider the possibilities offered by this new and innovative technology in terms of improving the visitor experience [tom Dieck & Jung, 2017].

By adapting AR applications to the physical and perceptual abilities of users and by offering content with a focus on enriching tourist experiences, the level of visitor satisfaction increases, as well as the probability of positive word-of-mouth propaganda and sharing on social media platforms. Ultimately, this leads to attracting new customers, reaching new target markets, and contributing added value to tourism organizations and hotels. By using the latest technologies, tourists experience an enhanced form of interaction with the attraction offered by the destination, for which it has been found to create unforgettable memories after the experience [tom Dieck *et al.*, 2018]. Thus, by generating exclusive and personalized experiences, AR brings value to both, the end customers and the tourism industry as a whole.

AR enhances navigation applications by adding and integrating digital components (such as arrows) into a real-time real-world environment, creating a special experience and making even travel and walks through the streets of the city where visitors are for the first time attractive and enjoyable. Free navigation applications with detailed instructions make it easier and faster for users to travel to unknown destinations. During the journey to the final destination, the AR *City app* visually displays the travel route at the top of the real-world view via a 3D "cover" of the real environment allowing navigation and exploration of over 300 cities

around the world using AR. In larger cities and metropolises, the updated content of the map provides additional information about real-world places, including the names of streets, buildings, and other local points of interest to visitors. Thereby, special emphasis should be placed on the navigational and orientation advantages of AR. The company has introduced the possibility of visual search in its application, which allows users to "unlock" information about the object of interest by pointing the camera of their mobile device at the identified object [Mealy, 2018]. In this way, tourists independently, in accordance with their interests, map natural, historical and "produced" sights that they want to get to know and create a personalized tour map. Moreover, AR as the best tourist guide, allows tourists to access information on the go (in real time) and make an on-site decision about what to visit next. Without the need to blindly follow the crowd, as in the case of guided tourist tours, the user can point the smartphone camera at the restaurant and immediately get reviews or insight into the menu with a rich selection of different types of local and national dishes or point the tablet at a historical landmark that caught his attention while touring the city and find out the story it is hiding in a short time. Thus, the *Historic Cities of England app* is a virtual tour guide that, along with visuals, "compensates" for information on various tourist destinations and artifacts that users can explore while on site.

The instructions, computer-generated in a real physical environment, also solve the language problems that many people face in an unknown location. *Google Translate* is a powerful example of an AR application that translates characters, menus, and other text-based items into more than 30 different languages. It is enough that, after simply opening the downloaded application, direct the camera of the device to the text you want to translate, and you get the current translation digitally placed on top of the original block of text [Mealy, 2018]. Signposts, signs, and menus that were nothing more than strings of unrecognizable, incomprehensible and obscure hieroglyphs become immediately readable in the language of choice of the user of the application. *Google Translate* also enables automatic translation of audio into the language of the destination visitor. In this way, the visually and audio "magnified" physical reality makes tourists feel comfortable during the trip, and language barriers become a thing of the past.

Art galleries and museums are also constantly striving to keep pace with the coming technological changes, finding new and interesting ways to enrich museum exhibits housed in a real physical environment with digital objects and textual information. Some museums have offered additional "background" stories for the

exhibited paintings, along with information about the lives of the creators of the works of art or the historical figures who are on them. One of the interesting applications for AR is the *Museum of Stolen Art (MOSA)* in Hertogenbosch in the south of the Netherlands. The exhibits in the museum are on the list of the most precious stolen artifacts of human civilization, and the artistic initiative was to give people the opportunity to enjoy art that was deprived to the world and to become acquainted with the circumstances under which the exhibited "artifacts" were stolen. Similarily, the permanent exhibition of the *Legacy of sculptor Nikola Koka Janković* in Kragujevac, in 2020, in an innovative and unusual way, by applying AR, brought the audience closer to the content through a virtual narrative about the artist's creative beginnings, his inspirations, and famous people who he immortalized in his works [Rebronja, 2020].

Even some hotel restaurants have not remained immune to AR. Namely, in 2017, the Michelin-starred restaurant and bar, located on the 24th floor of *Tower 42* in London, *City Social,* introduced revolutionary changes in the way cocktails are consumed by launching the world's first AR cocktail menu, *MIRAGE*. With the digital reincarnation of cocktails, this application immerses guests in a vibrant world in which excellent tasted cocktails, made from top alcoholic beverages from the world's leading companies, "become interactive art". Inspired by the style and spirit of different artistic epochs, each of the 12 cocktails is dedicated to a specific artist or age, with the basic idea of presenting "art through the centuries" with this specific menu. Hence, *Van Gogh* (1853-1890), *Warhol* (1928-1987) and *Banksy* (1974) are reflected in the innovative menu of this bar. The dedicated app, which can be downloaded from the *Apple* or *Google app* store, aims to transform the perception of cocktails, coloring surroundings with vivid animations in a futuristic take on mixology [WBB, 2021]. Interactive artistic animations that offer a unique visual experience, while enjoying the consumption of your favorite delicious cocktail, can be captured with a photo or video and shared on social networks.

The world-famous hotel chains, *Starwood*, *Marriot Hotels & Resorts* and *Holiday Inn*, by using extensive AR technology, have managed to differentiate their offer from the competition. However, investing in AR could bring revolutionary changes in business, revenue, and shaping a personalized user experience for small hoteliers as well. The application of AR contributes to the improvement of the user experience of potential consumers in the pre-consumer and consumer phase of the tourist product. In the pre-consumption phase with a virtual demonstration of architectural design, a visual and aesthetic image of the hotel product, a virtual tour

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of the hotel interior (starting from the reception lobby, layout of bedrooms, restaurants and social rooms, and recreational opportunities offered by the hotel (pool, spa, gym)), as well as the presentation of the manner and conditions of food preparation, the awareness of potential guests increases. Also, they acquire a more realistic idea of the facility, its content and services, and finally, all these have a positive effect on increasing the level of reservations. Of course, it is not only about the faithful representation and presentation of the hotel itself, layout, dimensions and design of its rooms and apartments, services and accompanying facilities. It is also about providing location information, which as an integral part of the overall hotel offerings, contributes to affordability and availability of existing tourist resources, traffic infrastructure, sports and recreation centers, and other catering facilities important for creating a personalized experience of the potential consumer, and making their final decision regarding the reservation in the hotel. With the help of the Portal to *Paradise app*, *Marriott Caribbean & Latin America Resorts* provide consumers with the opportunity to explore and "visit" eight beautiful resorts in one of the most exclusive locations in the Caribbean and Mexico, that they may not have thought of before or the ones they have always wanted to see. Going beyond the typical image gallery on the resort's website, this AR app "puts" consumers directly to their desired destination in such a realistic way that they can almost smell the ocean and hear the sound of the waves in front of the hotel window. The opportunity to "step" into accessible resorts, "walk" on sandy beaches, rooms, restaurants and swimming pools and experience immersive experiences, encourages potential consumers to decide, from the level of planning and simple dreaming of vacation, to book a trip and discover by themselves the exclusivity of the hotel's facilities and the exotic beauty of the Caribbean and Mexico [Taylor, 2018]. Similarly, *Marriott Hotels* combine futuristically redesigned hotel lobbies with futuristic AR ads in *Wired* magazine. When consumers scan an ad with the *Blippar app*, the AR function impressively enlivens the page with a video that in an innovative way offers an intriguing view of the places to visit and the top catering offer of this hotel chain [Borison, 2021].

Since the need and search for data and information does not stop even after the arrival of tourists at their final destination and in the selected hotel facility, AR applications can also contribute to the improvement of the user experience in the consumption phase of the tourist product. After downloading the hotel application, AR ensures the availability of most necessary information (24/7), in terms of solving the issue of service and maintenance of rooms and instructions to facilitate

navigation and smooth circulation within the hotel: to restaurants, swimming pools, exchange offices, souvenir shops, gyms, conference halls, laundries, etc. In this way, it enables turning every moment of the stay in the hotel into an interesting and unforgettable experience, which is sometimes the most relevant for creating a unique and personalized experience. In this way, hotels and resorts have the opportunity to provide their guests with more information on request, improving their overall experience, which they are likely to share and recommend to others.

AR applications allow tourists, even outside the hotel environment, to be exposed to useful information that, as computer-generated content, improves the perception of physical location and tourist attractions. So, for example, The *Hub Hotel* from the British resort *Premier Inn* has made AR compatible with the wall maps it places in hotel rooms. When viewed via a smartphone or tablet, wall maps include additional information about some local places of interest, which serve as a kind of information tool for tourists. The hub has its own *iPhone* and *Apple Watch app*, which in addition to serving as a room key for hotel tenants, includes climate control, TV and light control, breakfast ordering and accommodation unit maintenance [Killham, 2015].

Imagine one being able to walk the streets of *Naissus,* the birthplace of the Roman emperor Constantine the Great (*Constantinus Magnus*) located on the river banks of the Nišava, not far from its confluence with the southern Morava; or exploring the remains of the unique imperial residence of the *archeological site of Mediana*, without actually leaving the comfort of a home; or to peek into the picturesque remains of the turbulent history of Niš, inside the massive stone walls and the *Stambol Gate* of the imposing *Fortress,* located in the very center of the City. Imagine that by traveling into the past one can revive the antique baths of the former *Naissus* and in preserved part of the street with the basilica of that time "municipium" stop in front of the luxurious *Palace with an octagon* whose magnificence is spoken of by richly decorated floor mosaics; or to step into the era of the Ottoman Empire at the very entrance to the Fortress, and with digitally added textual information, photographs and videos about *Bali Bey's mosque, hammam* or *gunpowder warehouses,* by revealing traces of oriental ornamentation and architecture, learn all about their creators and donators; or to witness, next to the *Ossuary Memorial* and the *Gate of Death,* about the heroic struggle of one nation for liberty from the worldwide conquerors and occupiers. Imagine that by traveling to some ancient, past epochs, one can get to know different countries and empires to which Niš belonged during its long history. Imagine that at the

beginning of *Kazandžijsko sokače*, the only preserved street of the former Niš bazaar, that has retained the spirit of old architecture, one can get acquainted with the life and work of *Stevan Sremac* and *Kalča*, the hero from his book *Ivkova slava*; or that on *Čegar*, *The Skull Tower*, *Bubanj Memorial Park*, *Monument to the Liberators of Niš,* one can reconstruct the past, understand the significance of historical sites and events that took place there, and thus enrich its knowledge and experience. Imagine one being able to enjoy the beauties of Niš monuments of the nature by discovering the under-explored underground world, the extraordinary beauty of rare cave jewelry and the secrets of the *Cerjan Cave* or exploring habitats with great diversity of plant and animal species (37 bird species, 226 vascular plant species, 5 amphibian species, and 7 reptiles species) in the area of *Lalinačka slatina*; or to take a pedestrian zone along *Obrenovićeva Street* to visit shopping malls and in one of the many bars at the end of a dying day on the Niš quay feel the atmosphere of nightlife and discover the soul of one of the oldest cities in the Balkans. Imagine that with a virtual visit to the hotel one can get a realistic idea of the object, design, style and dimensions of its rooms, the proximity of existing tourist sites of its interest, restaurants, museums, galleries, theaters or riding grounds, hiking, extreme sports, and create a personalized tour of the City in accordance with its own preferences. These are the possibilities that AR provides.

Data and methodology

Since the data on the number and structure of accommodation facilities and hotels in the City of Niš are different depending on the data source, for the purposes of this research, the data of the Tourism Organization of Niš (*TON*) are used, according to which there is one 5-star hotel (Ambasador) with 165 beds, 7 4-star hotels (New City Hotel, Best Western Hotel My Place, Hotel Ideo Lux, Art Loft, Garni Hotel Zen, Niški Cvet, Tami Residence) with a total of 610 beds, 10 3-star hotels with accommodation capacity of up to 769 people (Crystal Light, Complex Vidikovac, Crystal Ice, Hotel 018 In, Garni Hotel Eter, Garni hotel DuoD, Garni hotel Panorama Lux, Garni hotel Sole, The Regent Club, Hotel Marica), and 4 hotels with 2 (Uni Elita Lux, Garni hotel Consul accommodation, Garni hotel Svrljižanka, Zeleni Vir) and one star (Extra Lion MD, Garni hotel Lotos, Rile Men, Konak DuoD) with a maximum capacity of 171 and 232 beds, respectively [TON, 2021].

In order to determine whether and to what extent the technologies based on virtual and augmented reality are applied, for the purpose of this study the websites

of 26 hotels in Niš are analyzed. Additionally, as regards methodology, the representatives of TON were interviewed by phone. Further, a survey questionnaire was applied to examine the AR in the hotel industry in the City of Niš, to which the contacted respondents answered by phone. The interview was conducted on a sample of 26 managers in the analyzed hotels.

Results and discussion

Based on the conducted research, it is noticed that only three hotels offer a virtual tour through the facility (these are 4 * hotels) or 11.54% of all hotels that are on the list of the Tourism Organization of the City (Figure 2). The obtained research results lead to the conclusion that the AR is still not sufficiently represented in hotels in the City of Niš and indicate the lack of application of immersive technologies in the promotion and attraction of potential consumers of hotel content. This conclusion is also referred by the fact that by contacting TON representatives, the interview revealed that the City of Niš in terms of "improving" visibility and additional provision of information about local attractions, does not currently apply AR which would provide tourists with the opportunity to personalize content and experiences during, tourist or business, stay in the City.

- Hotels that offer the possibility of a virtual walk through the facility
- Hotels that do not offer the possibility of a virtual walk through the facility
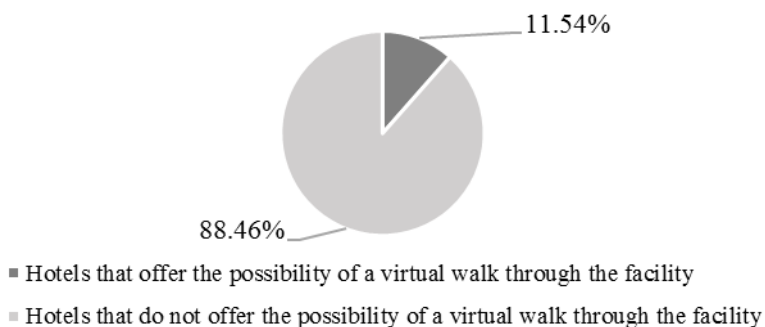
Figure 2. The structure of Niš hotels based on the application of a virtual visit to the facility in %

When hotel managers were asked about the way of advertising, they answered that so far all hotel promotion took place through their own websites and the website of the Tourism Organization of Niš, through social networks, which were

mostly directly linked to hotel websites (*Instagram, Facebook, Twitter, LinkedIn*), local television, and radio stations. In this regard, it has been revealed that the managers of the three hotels, following global trends in the hotel industry and keeping pace with emerging technologies, in promoting the content and offer of "their" hotels, provide the opportunity for a virtual walk and virtual presentation of the aesthetic appearance of the facility, environment, and interior.

When asked about new technologies (VR and AR), all respondents emphasized that they are familiar with the mentioned technologies, and as a reason for "ignoring" their implementation, all respondents agreed that the biggest problem is actually the limited budget they have, especially in the situation when social distancing and restriction of movement brought into question the operation and survival of the tourism industry on a global scale. However, since none of the respondents had the opportunity to "try" and experience the immersive experience of AR, it remains unknown whether the corona virus pandemic affected the delay in the application of advanced innovative technologies or the level of awareness of the possibilities offered by AR, both in the pre-consumption and in the consumption phase of the tourist product, is still at a low level when it comes to Niš hotels and the City in general.

The ability to concentrate attractions, facilities and services in a convenient, accessible place is essential to create a competitive tourist destination and attract a significant number of tourists [Kotler, 2014]. However, the availability of attractiveness without their tourist valorization is no longer sufficient, nor it is crucial for creating competitive success. Moreover, in order to successfully position and create a competitive advantage, "a tourist destination must offer tourists greater value than its rivals, and for the same efforts that tourists invest, or the same value with less invest effort" [Mrkaić Ateljević, 2019, p. 4]. Tourist destinations, hotels or restaurants, become obsolete, uninteresting and undesirable over time for modern, increasingly sophisticated and informed travelers. "Rejuvenation" of the destination is a necessity and points to the importance of continuous introduction of innovations that in tourism can not only represent a "cosmetic change" or expansion of the product line, but a way to increase the value of tourism products and tourist experiences while maintaining profitability in tourism and hospitality [Milićević, 2016]. It is evident that AR in the tourism sector of the City of Niš is not recognized as an innovation worth investing in and that the key economic benefits of applying the concept of AR have not been identified when designing the tourist offer.

Based on the aforementioned, it is obvious that the City of Niš has not used the comparative advantages at its disposal for the development of various types of tourism, like city, congress, transit, rural, eco, adrenaline, and adventure tourism. It is clear that the Tourism Organization of Niš, City authorities, the Office for Local Economic Development, hoteliers and the entire business community in the tourism sector should make significant efforts in the forthcoming period to raise the perception of Niš as an attractive tourist destination. Additionally, they should raise awareness of the potentials of advanced immersive technologies in the form of AR in the tourism industry, and by its implementation contribute to the promotion of rich cultural and historical heritage, local tourist attractions, and local gastronomy.

Conclusion

The futuristic technologies of the fourth industrial revolution forced all stakeholders in tourism to change the way they become and remain competitive. With AR, new ways of competition have been established, which are reflected in the offer of fully personalized, authentic, exciting and educational experiences, which ultimately leads to higher attendance of tourist destinations and hotels and increased consumer satisfaction with the offered tourist content. Therefore, it is necessary for the tourist and hotel industry in Niš to realize the importance of applying AR to create unique and different websites and design a unique offer tailored to the various interests and preferences of potential tourists. By embracing the latest advanced technologies and implementing them, hotels and tourist destinations are becoming more visible to a growing number of digital guests who, thanks to a digitally enhanced perception of the real physical environment, can be inspired to visit real versions of locations they have only partially virtually experienced. Hence, investing in AR should not be viewed as a cost, but as a profitable investment, which by creating added value for tourists potentially increases turnover, encouraging the generation of income on the spot.

Transforming conventional print media and common image galleries on the websites of the hotel and the Tourism Organization of Niš into interactive multimedia and entertainment AR platforms is certainly in the function of attracting new, but also repeated arrivals of tourists to the hotel websites and facilities. Additionally, AR is intended to motivate digital guests to replace the previous virtually shaped experiences with the direct consumption of the tourist offer of the City and its surroundings. At the same time, the accessibility and ease of use of AR applications contributes to creating unforgettable experiences.

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The lack of readiness for changes and walking on well-trodden paths certainly will not contribute that Niš, as an attractive and promising destination, enters the tourist map of the Balkans and Europe. Given that the accelerated development and diffusion of digital technologies will eventually intensify the benefits and values offered by the AR to the hotel and tourism industry, it becomes clear that its role in promoting hotels and local tourist attractions at the City level must not be ignored. Especially, as the immersive nature of AR, and unusual experiences which offer, contribute to the "rejuvenation" of the destination, and hence to the increased attraction of tourists and improved attractiveness of the tourist offer of the City and nearby localities. Therefore, our main recommendation is that in future tourism development strategies of the City of Niš, the concept of AR should be recognized as a significant component of the promotional mix capable of creating a basis for transforming existing resources into attractive and popular tourist destinations.

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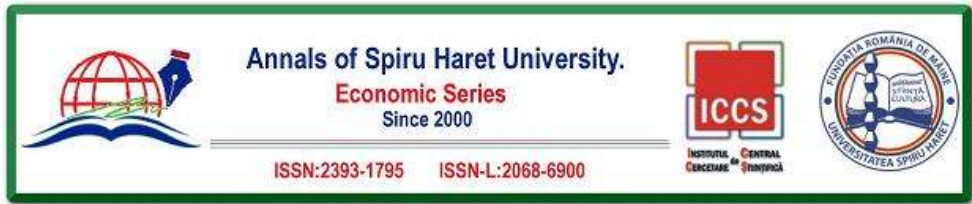
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THE RELATIONSHIP BETWEEN BIG DATA-DRIVEN TECHNOLOGIES AND PERFORMANCE MANAGEMENT STRATEGIES APPLIED TO COMPANIES IN THE HOSPITALITY, TOURISM & TRAVEL INDUSTRY

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Abstract
In this paper we will discuss about big data-driven technologies that the tourism industry has adopted along the way, especially in recent years, as well as the top trends based on artificial intelligence that radically transform travel in the future. The big data-driven technologies of the future in the tourism industry, which are essentialy based on artificial intelligence - AI, augmented reality - AR, Machine Learning - ML, virtual reality - VR and the Internet of Things - IoT, are those that have dictated new trends in efficient management strategies at the level of companies operating on the tourist market. Here we

tried to bring arguments, with figures and statistical data taken from international statistics, but we also appealed to the opinions of several authors from around the world who wrote in the last years in their articles published in prestigious international journals on the impact of new information technologies on increasing the turnover in tourism, increasing the sales of tourist packages, diversifying the tourist offer to customers or easier ways to find the perfect destination, to make a reservation easier or to pay for a tourist service in much more advantageous and faster conditions. All this represents the role of companies' efforts and their strategic management, which is more efficient and adapted to the requirements of the constantly moving and evolving market, a tourist market that has largely moved to the online environment and is increasingly helped by software and robotization transformations, such as virtual assistants, computer programs for image analysis, search engines, imaging recognition systems, robots, autonomous cars, drones or IoT. However, it can be seen that despite the promise made by AI, many travel companies do not realize yet the full potential offered by big data-driven technologies.

Keywords: *tourism; high-performance strategic management; information technologies; artificial intelligence – AI; augmented reality – AR; Machine Learning – ML; virtual reality – VR; Internet of Things – IoT.*

JEL Classification: Z32

Introduction

The tourism and travel industry is radically affected by the Internet and mobile technologies. Here are some of the important changes that will occur in the travel industry in the near future. In 2018 there were 4 billion Internet users, of which over 3 billion using social networks. In this context, an important thing to emphasize is that in influencing user decisions, friends are twice as influential as celebrities and opinion makers.

Information technology is becoming a basic component in the field of tourism, where adaptation to new information technologies is achieved at an accelerated pace. We expect in the coming years a massive impact of deep learning technologies and chatbots systems.

Also, virtual assistants for making reservations (for airlines and hotels) will become a common element in the tourism industry. We will be increasingly discussing real-time travel assistance, based on artificial intelligence – AI.

Modern tourism also needs modern technologies. In tourism, you must always keep up with all the latest technology to have satisfied customers. The use of AR, VR or IoT, AI or voice search has become essential for premium services offered to tourists passionate about information technology.

In tourism, the interaction with each client is important. A satisfied customer will return to an accommodation unit, will visit that place in other seasons, on other occasions. In order to meet the expectations of customers and their requirements, tourism actors have had to adapt and learn to use and make available to those who cross the threshold several modern technologies.

In fact, Big Data Technologies is the software used that incorporates data extraction, data storage, data sharing and data visualization, the comprehensive term includes data, data framework, including tools and techniques used to investigate and transform data. In the high perception of anger in technology, it is widely associated with other technologies such as Machine Learning, Deep Learning, Artificial Intelligence and IoT, which are much improved.

In our oppinion, Big Data technologies can be divided into two categories:

1.Big Data Operational Technologies, indicating the amount of data generated daily, such as online transactions, social networks, or any data from a particular company, used for analysis by software based on big data technologies. It acts as raw data to power big data analytics technologies. Some cases that describe Big Data Operational Technologies include booking tickets online for flights, railroads and more.

2. Big data analysis technologies, refering to the advanced adaptation of Big Data technologies, which is a bit complicated compared to operational Big Data. Real investigation of massive data, which is crucial for business decisions in tourism industry, is part of this technology. Some examples covered in this field are weather forecasting and time series analysis.

The revolutionary technologies that have changed the whole world and many sectors of activity have finally reached the important accommodation units in various countries. They have begun to change the way a hotel works, the way it is managed and the way communication between the client and staff takes place.

The tourism industry has adopted them on the fly and integrated them into the offers made to customers in order to develop an excellent experience every time tourists arrive in accommodation units and even before (Jahani, A., Kalantary, S., & Alitavoli, A., 2021).

The ability of artificial intelligence to perform tasks that have traditionally required human cognitive function has made it particularly useful for those in the

travel industry, as implementing AI can save time and money for travel companies, while eliminating human error and enabling fast execution. of tasks at any time of the day (Lv, H., Shi, S., & Gursoy, D. , 2021).

Figure 1. Salient features of big data
Source: https://www.analyticssteps.com/blogs/top-10-big-data-technologies-2020

Most hotels and resorts rely heavily on providing excellent customer service to build their reputation, and AI technology can help with this in a wide variety of different ways (Mariani, M., & Borghi, M., 2021). For example, artificial intelligence can be used to improve personalization, adapt recommendations, and ensure fast response times, even in the absence of staff.

Artificial intelligence has advanced to the point where it is regularly used to assist and communicate with customers, "learning" from each of these interactions and thus improving future interactions. Moreover, AI can help with tasks such as data analysis, calculations and problem solving, all of which can be valuable to hotel owners.

1. Special Reviews
In recent decades, the impact of technology on travel has become even more significant due to the application of new IT services, leading to the growth of the online travel market and the increase of the digitalization of the tourism industry (Carlisle, S., Ivanov, S., & Dijkmans, C. , 2021). An important achievement in the past of the online travel experience dates back to the 1960s, when the first global distribution system (GDS) was introduced. GDSs are online networks that connect large service providers - such as airlines, hotels, or cruise lines - with service

providers, such as travel agencies and online travel agencies. By having access to basic provider data, such as the number of seats or hotel rooms available, GDSs allow distributors to access such information, helping customers book multiple travel services simultaneously. In 2019, the business segment of Amadeus distribution systems, one of the most famous GDSs in the world, generated revenues of approximately 3.5 billion US dollars. However, due to the impact of the pandemic coronavirus, Amadeus revenues worldwide on this segment fell sharply in 2020 (Marta, B., Melnyk, I., & Baran, R., 2021). Attacched we have a statistic of revenue of selected GDS from 2017, taken from Statista.ro. The global distribution system Amadeus generated a revenue of approximately 5.81 billion U.S. dollars (4.85 billion euros) in 2017. The revenue of Amadeus has been consistent between 2014-2017, remaining above 4.1 billion U.S. dollars. The revenue of Sabre on the other hand, has seen quite large growth, increasing by almost one billion U.S. dollars in the same period of time (please see Figure 2).
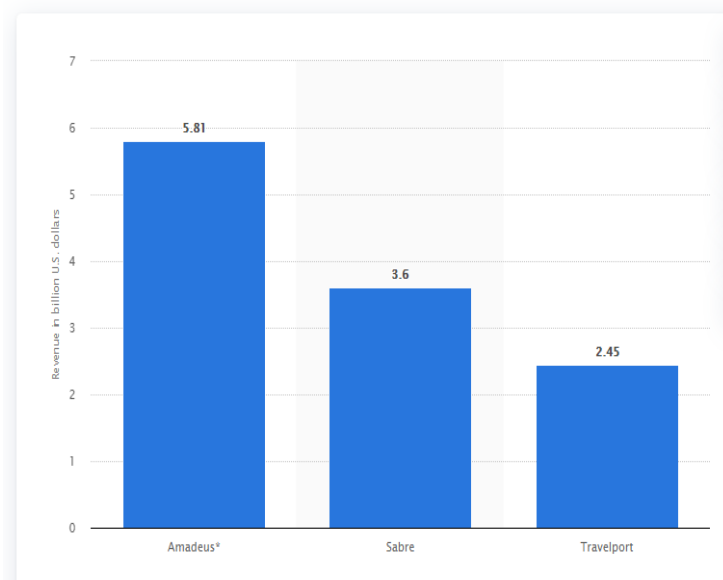
Figure 2. Revenue of selected global distribution systems in 2017 (in billion USD)
Source: https://www.statista.com/statistics/303916/revenue-of-the-leading-global-distribution-systems/
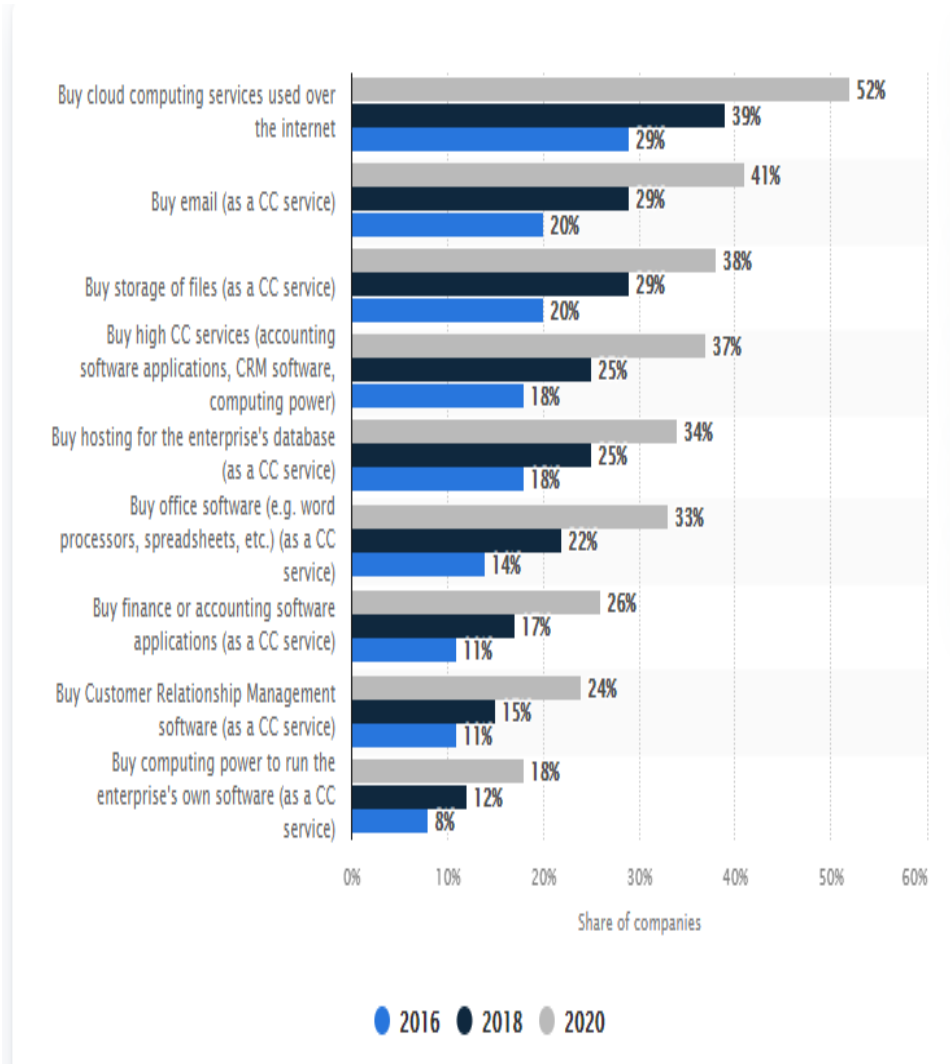
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Figure 3. Use of cluod computing services among travel agencies, tour operators and related activities in the European Union (EU27) from 2016 to 2020, by cloud service
Source: https://www.statista.com/statistics/1231753/travel-agencies-cloud-computing-services-eu/

Technological trends shaping travel and tourism include cloud computing, which is used to access, manage and store data online. According to a 2020 study, more than half of European travel agencies and tour operators bought used cloud computing services on the internet, while only 29% did the same in 2016. According to Figure 3, the use of cloud computing services among travel agencies, tour operators, and related activities in the European Union (EU 27) increased from 2016 to 2020. As of 2020, roughly 52 percent of travel agencies and similar enterprises in the EU bought cloud computing services used over the internet. Meanwhile, about 41 percent of surveyed companies bought emails (as cloud computing services) in that year.
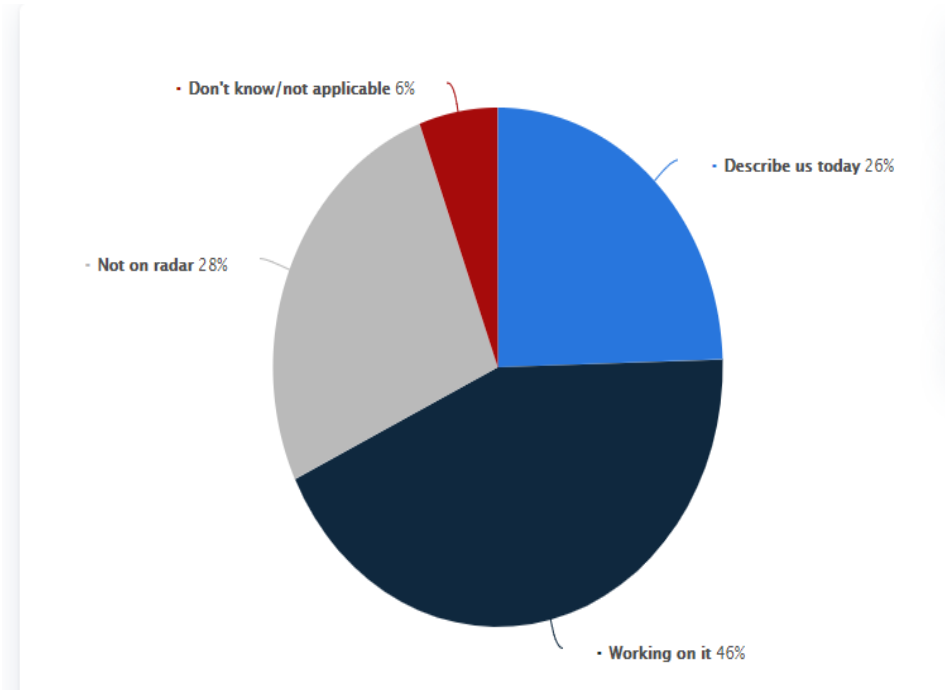
Figure 4. Usage of chatbots that enable guests to make general inquiries, bookings or similar services among travel and hospitality companies worldwide in 2020
Source: https://www.statista.com/statistics/1231768/travel-hospitality-companies-using-chatbots-worldwide/

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A December 2020 survey focused on the use of chatbots among travel and hospitality around the world suggested that this type of software could also play an important role in the future, with about 46% of the surveyed marketers and IT professionals claiming to be working to implement chatbots in the future to allow guests to ask general questions, to make reservations or for other similar services (see Figure 4). Virtual agents and chatbots were also among the main AI services implemented or planned by airports by 2022. (Huang, A., Chao, Y., de la Mora Velasco, E., Bilgihan, A., & Wei, W., 2021)

As the coronavirus pandemic (COVID-19) disrupted normal travel, interest in using information technology to revive travel and tourism has grown since 2020, as shown by the idea of introducing COVID-19 digital travel passports (Perić, M., & Vitezić, V., 2021). Global research in 2020 found that travelers from Thailand were most convinced that technology would be important in minimizing human interactions during the COVID-19 pandemic, while Germans were much more skeptical (Li, X., Law, R., Xie, G., & Wang, S.,2021).
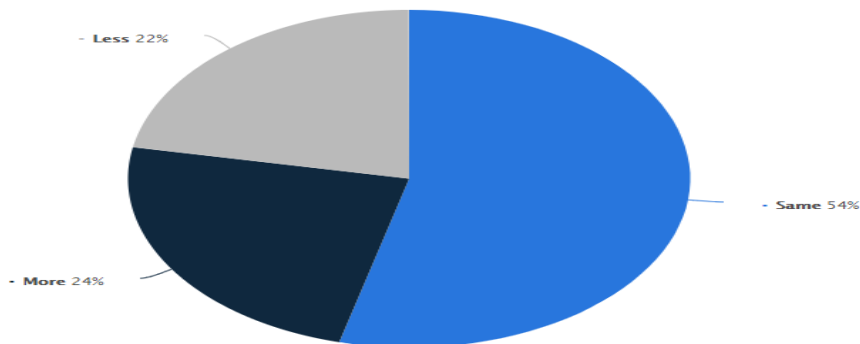
Figure 5. Number of Travel apps downloaded in 2018 compared to 2017
Source : https://www.statista.com/statistics/1050978/people-downloading-travel-apps-compared-to-previous-year/

In terms of technologies that would increase travel confidence, mobile apps that provide notifications and alerts during the trip, as well as contactless payments, were among the favorites, according to a November 2020 survey by Statista. When it comes to the future, technology is looking to be an important part of how we

function as a society. This also reflects on the travel industry, which is adapting to the new demands of the traveler by anticipating their future technological needs (Hu, M., Xiao, M., & Li, H., 2021). Mobile devices and the apps they run are a large part of these needs. According to the source, 24 percent of respondents downloaded more travel apps in 2018 than in the previous year. (see Figure 5)

2. **Artificial Intelligence - determining technology of the future in tourism**

Consumers of tourism services and the way they travel has changed a lot in recent years due to the increasing use of new information technologies. (Figure 6)
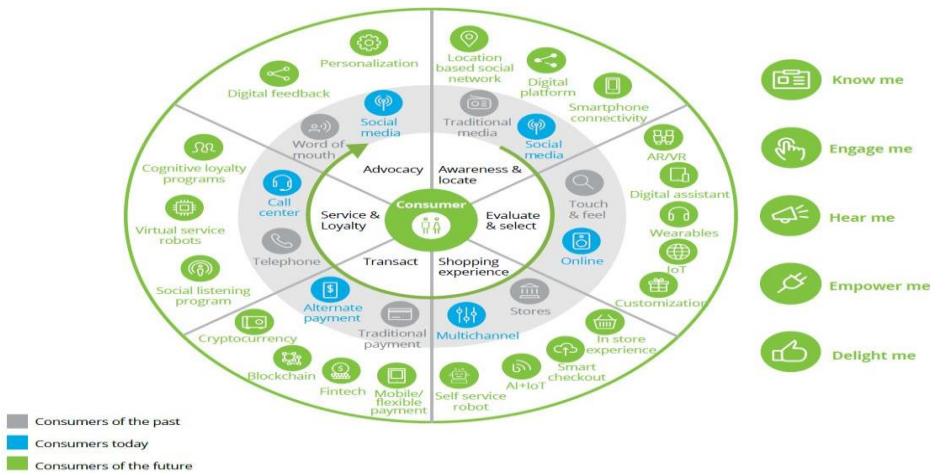
Figure 6. Big data-driven consumer insights
Source: Deloitte.com, Li, Harry Zhou, Future of consumer series: Big data-driven consumer insights

The need for people to travel faster, safer and more efficiently fueled the invention of extraordinary technological solutions. At present, it is more than obvious that the solution to get out of the current tourism crisis is to make massive use of Artificial Intelligence (AI) in tourism.

The concept of artificial intelligence or AI is often discussed, but it can be a little harder to define. In essence, it refers to computers or machines that perform tasks that would normally require human intelligence to perform them. This could

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be, for example, decision-making or speech recognition and interpretation (Vitezić, V., & Perić, M., 2021).

Artificial intelligence has been around for decades, but only relatively recently have computers, robots, and other machines become advanced and reliable enough to perform complex tasks without assistance. The concept of AI is strongly linked to the ideas of automation, in which the processes are carried out with little or no human intervention (Jabeen, F., Al Zaidi, S., & Al Dhaheri, M. H., 2021).

In the modern era, it is an accepted fact that tourism companies collect and store large amounts of data. This can help tourism companies enable AI intervention in its day-to-day operations so that data-enabled machines perform tasks ranging from data analysis and problem solving to speech translation, direct messaging, and improved personalization during the customer journey.
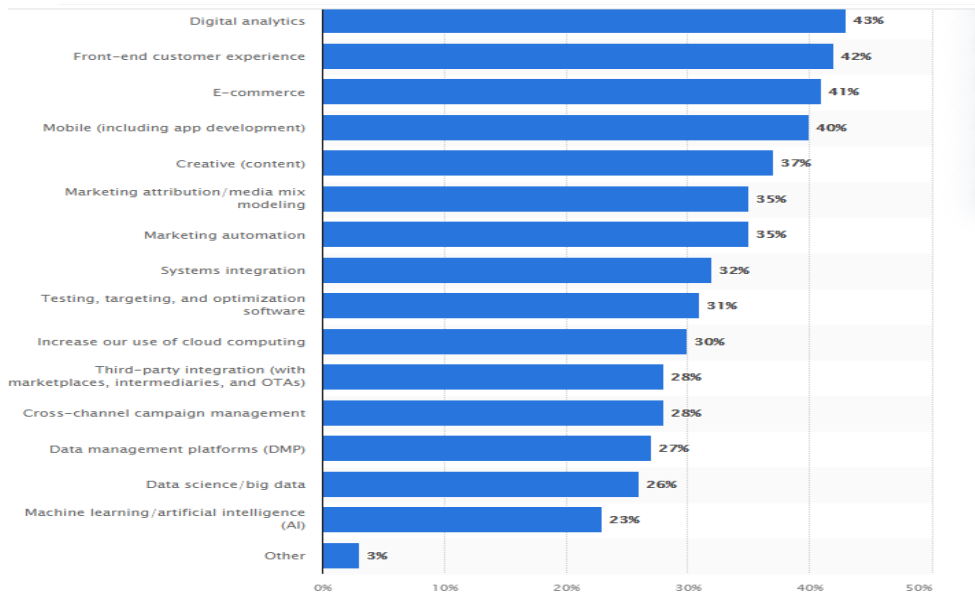
Figure 7. Main areas of digital strategy travel and hospitality companies are focus on over the next 12 month worldwide in 2020
Source: https://www.statista.com/statistics/1249384/digital-strategy-of-travel-hospitality-companies-worldwide/

The increasing speed of technological innovation in all industries has been a catalyst for the digitalization of the hospitality industry. In 2020, executives in the global travel and hospitality industry were surveyed on the areas of digital strategy that they would be focusing on most over the next 12 months. The majority of respondents, 43 percent, stated that they would be focusing most on digital analytics. Meanwhile, only 23 percent of respondents stated that they would be focusing on machine learning/artificial intelligence. (see Figure 7)

In what that follows we tried to emphasize the new technologies hotel guests wanted. As a result of the coronavirus (COVID-19) pandemic, many travelers have become more aware of the need to avoid health risks when traveling. In 2020, the share of travelers who believe accommodations will need to use the latest technologies to make travelers feel safe was 63 percent. During that same year, a poll was conducted to determine the global share of hotel guests who would use an app to open the door of their hotel room. The results indicated that a large majority of respondents, 73 percent, would prefer to use an app to open the door of their room. (see Figure 8)
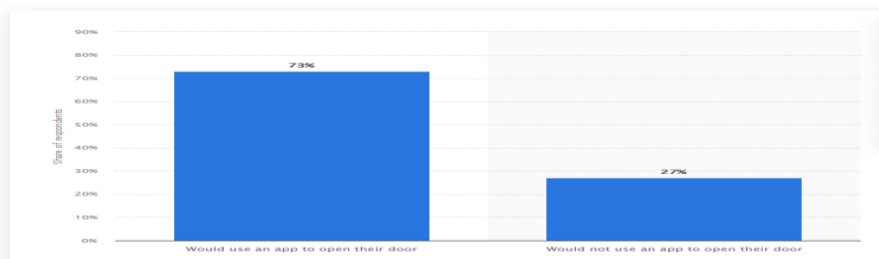
Figure 8. Share of hotel guests that would use an app to open the door of their hotel room worldwide in 2020
Source: https://www.statista.com/statistics/1189913/hotel-guest-app-usage-to-open-room-door-2020/

In 2020, the share of travel and hospitality companies with an individual or team directly responsible for digital transformation worldwide varied considerably. When surveyed, approximately 27 percent of respondents that were executives in the global travel and hospitality stated that their organization had a cross-functional team for digital transformation, while 16 percent of respondents stated that they either had a third-party partner, such as a consultant or agency, or no one responsible for digital transformation. (see Figure 9)
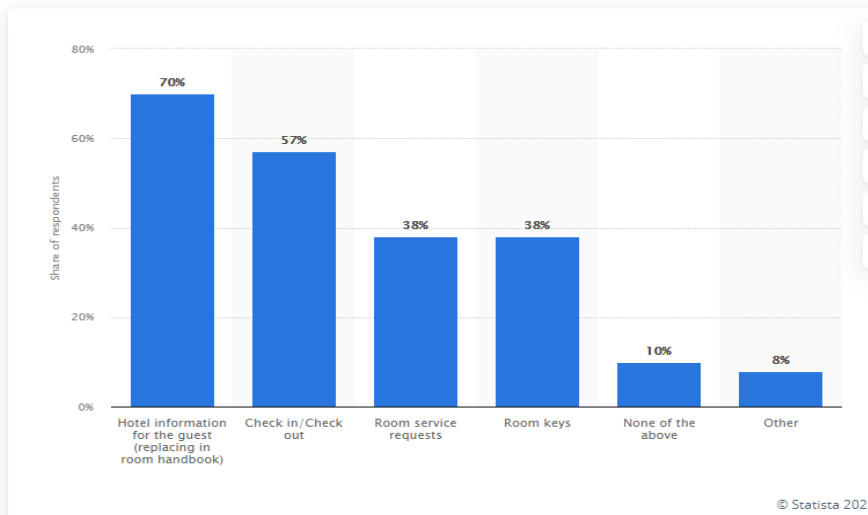
**Figure 9. Main aspects of the guest experience hoteliers are looking to digitize
worldwide**
Source: Statista

Over the past two decades, digitalization initiative of the travel and tourism
industry has been seen increasingly across most industries worldwide. This has
resulted in the emergence of the online travel market and a consumer demand for
digital travel services. The online travel market includes services such as online
travel agencies (OTAs) – which allow tourists to book travel services
autonomously online – and travel review websites. Meanwhile, consumers are also
looking to more digital experiences when they are traveling. This can include
options such as virtual tours of a desired destination or accommodation, as well as
mobile integration solutions, like using an app to check-in to a hotel room. The
coronavirus (COVID-19) pandemic could also play a key role in accelerating the
digitalization of this sector, with social distancing and hygiene concerns making
consumers keener to use digital rather than in-person services. In this respect, a
July 2020 study found out that more than 60 percent of travelers worldwide
believed in the importance of technology to minimize human interaction when
traveling .(see Figure 10)
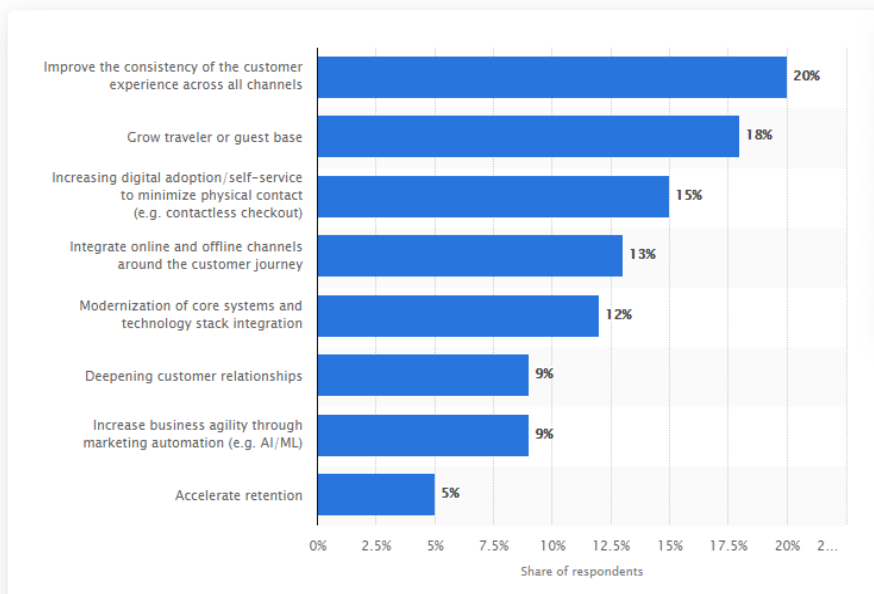
Figure 10. The main areas of focus for digital initiatives in a tourism company in the year ahead
Source: https://www.statista.com/statistics/1214169/digital-initiatives-in-the-tourism-industry-worldwide/

When it comes about share of mobile and digital sales in the travel and hospitality industry, we can raport to a Statista December 2020 study focused on the digital trends in the travel and hospitality industry worldwide. When asked about digital sales, roughly a quarter of the survey sample stated that mobile and digital sales accounted for 50 to 74 percent of their company's total sales in 2020. Meanwhile, 17 percent of respondents claimed that digital sales consisted of 10 to 24 percent of their organization's total sales in that year. (see Figure 11)

That is why artificial intelligence (AI) is considered the "technology that determines the future of tourism". In simple terms, artificial intelligence (AI) in tourism refers to systems or machines that mimic human intelligence in tourism decision-making, to perform various activities in the field of tourism, and which can be iteratively improved based on the information that collects them. In other words, AI in tourism is the ability of a machine to imitate human functions in the

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tourist area, such as reasoning, learning, planning and creativity (Vitezić, V., & Perić, M. , 2021).
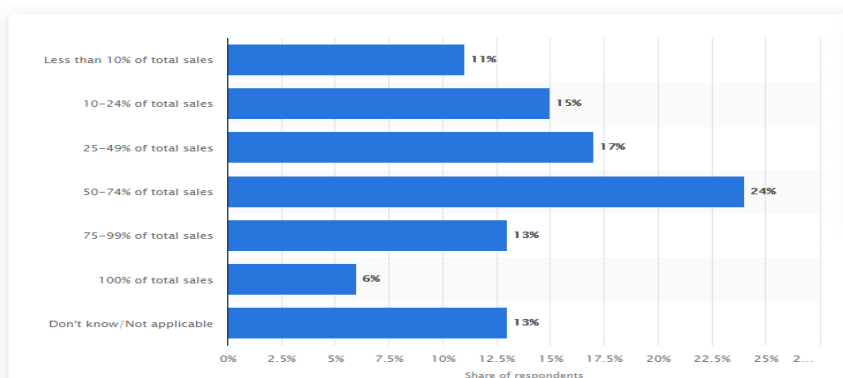
Figure 11. Percentage of sales in a tourism company generated by mobile and digital channels
Source: https://www.statista.com/statistics/1214295/mobile-and-digital-sales-in-the-global-travel-and-hospitality-industry/

AI adapted to the tourism industry allows technical systems to perceive the environment in which it operates, to process this perception and to solve problems in the tourism field, acting to achieve a certain objective imposed by a tourism company. The computer receives the tourist data (already prepared or collected through its own sensors, such as a video camera), processes it and reacts. The AI systems in tourism are able to adapt, to a certain extent, their behavior, analyzing the effects of previous actions and operating autonomously.

IA refers more to the processes and functionalities for thinking and analyzing extraordinary data from the tourist area, than to a certain format or function. Although AI inspires images of high-performance, human-looking robots that will conquer the world, AI is not meant to replace human beings in tourism. Its purpose is to significantly increase human capacities and contributions to tourism in general. This makes AI a very valuable asset for business in the tourism sector.

AI has become a generic term for applications that perform complex tasks that once required a human contribution, such as online communication with customers or the game of chess. The term AI is often used interchangeably with its

subdomains, which include machine learning and in-depth learning. However, there are differences between these terms. For example, Machine Learning (ML) focuses on building systems that can learn or improve their performance based on the data they process. Although all Machine Learning systems are AI, not all instances of AI are Machine Learning. (Le, T. H., Arcodia, C., Novais, M. A., & Kralj, A., 2021).

To get the full value from AI, many tourism business managers make significant investments in data science teams. (Tsuda, H., 2021). Data science is an interdisciplinary field that uses scientific and other methods to extract value from data, combining functionalities in areas such as statistics and computer science with business knowledge, to analyze data collected from multiple sources.The travel industry is adapting to the new demands of the traveler by anticipating their future technological needs. According to the Statista source, 68 percent of travel brands will reportedly be investing in business intelligence or predictive analytics by 2019, while the remaining 32 percent of travel brands do not intend to do so. Who will have made the right decision? We will have to wait and see. (See Figure 12)
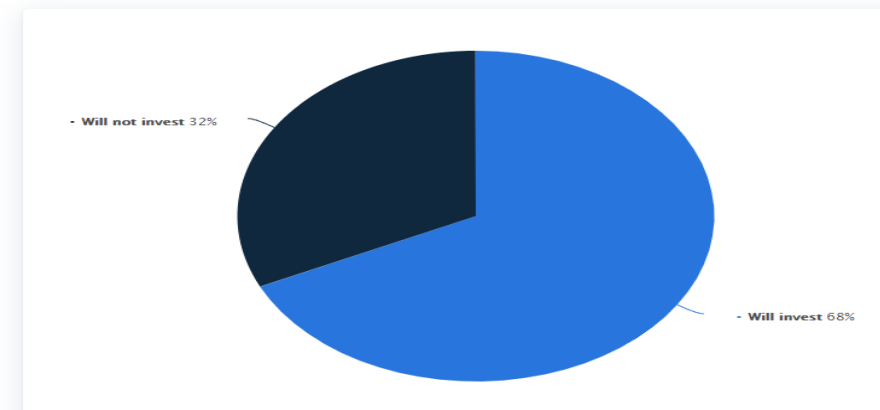
Figure 12. Share of travel brands that want to invest in business intelligence or predictive analytics in 2019
Source: https://www.statista.com/statistics/1050953/business-intelligence-predictive-analytics-travel-brands-investing/

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AI technology improves the performance and productivity at the management level of a tourism company, by automating processes or activities that once required human intervention. AI can also give meaning to data on a scale that no human has ever been able to do. This functionality can bring substantial benefits to the tourism business. For example, many travel companies around the world use machine learning to provide a level of customization that helps companies grow their customer base by more than 25% (Le, T. H., Arcodia, C., Novais, M. A., & Kralj, A., 2021).

Most travel companies have made data science a priority and are investing heavily in this area. Managers of many travel companies around the developed world have ranked analysis and business intelligence as top technologies for their organizations. They see these technologies as the most strategic for their companies and therefore they attract the latest investment.

AI has a significant value for most functions, businesses and fields of activity in the field of tourism. This includes general and tourism-specific applications, such as:

• Using transactional and demographic data to anticipate how much customers will spend during their relationship with a tourism business (or the value of the customer collaboration cycle)

• Price optimization based on customer behavior and preferences.

Based on the findings of a study conducted by Harvard University professors - Harvard Business Review, tourism organizations mainly use AI for:

• detect and deter security breaches (44%)

• solve users' problems related to technology (41%)

• reduce the activity of managing tourist packages or flights (34%)

• to evaluate the internal conformity in the offer of tourist packages by the approved and approved tourist agencies (34%)(Joe McKendrick, 2021).

The role of artificial intelligence in the business world has grown dramatically in the last decade, and in recent years, in particular, they have been adopted and much more widespread, including in the tourism industry. Below are the most significant ways in which information technology is currently implemented in the field of tourism (Zhang, F., 2021).

The most important types of AI used in the tourism industry generally refer to:

1. Software: virtual assistants, computer image analysis software, search engines, imaging recognition systems

2. Built-in AI: robots, autonomous cars, drones, the Internet of Things (Chen, S. X., Wang, X. K., Zhang, H. Y., Wang, J. Q., & Peng, J. J., 2021)

Those who develop artificial intelligence for the tourism industry have the following major directions of action regarding the part of Software IA:

• Communication with tourists through chat boxes. Chat bots use AI to more quickly understand the problems of tourism customers and to provide more effective answers to tourists' questions. Chat bots use natural language processing to understand customers, to ask questions, and to get information. These chat bots learn over time, so they can add more value to tourist interactions. (Zhang, Y., Li, G., Muskat, B., & Law, R., 2021). ChatBots and TravelBots are again very useful when customers want quick information and answers to typical questions. These little programs or scripts already have preset answers and are able to interact and turn into real tourist guides. For hotels and other companies in the tourism industry, one of the most interesting uses of artificial intelligence is to provide online customer support through Chatbots and Online Customer Service. In particular, it has already been widely adopted in order to feed chatbots on social platforms as well as instant messaging applications (Wang, N., 2022).

Used in this way, AI is able to answer questions and provide valuable information to customers, even when a customer service representative is not available. Customers are demanding faster and faster response time on online platforms, and artificial intelligence allows companies to deliver times that would be impossible for people.(Huang, B., & Hao, H., 2021).

Example: Sam, smart travel chatbot!

• Face-to-face customer service - artificial intelligence and speech recognition. While the use of artificial intelligence to power online customer service is now relatively common, one of the emerging trends is that technology is also being used for face-to-face interactions with customer service. Crucially, it has the ability to reduce queues at information or reception offices and to improve overall efficiency. An example of this technology in action is the AI robot "Connie", which was implemented by the hotel chain Hilton Palace Hotel. This robot uses artificial intelligence and speech recognition to provide tourist information to customers who speak to it. Each human interaction also helps to teach the robot, improving the quality of all future communications. Example: Meet Connie, the first Hilton Hotels concierge robot (Fleischer, A., & Felsenstein, D., 2004).

• Through Machine Learning (ML) the operations that involved the presence of a large number of people and their intervention are completely automated, there is

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no need for investment in training programs, there is no need for so much staff. Many tasks can be assigned to Machine Learning so that everything goes faster (Le, T. H., Arcodia, C., Novais, M. A., & Kralj, A., 2021).

• Smart assistants in the tourism area use AI to analyze essential information from large text data sets, but also to improve programming in tourism (Hamid, R. A., Albahri, A. S., Alwan, J. K., Al-qaysi, Z. T., Albahri, O. S., Zaidan, A. A., ... & Zaidan, B. B., 2021).

• Search engines can offer automatic recommendations to tourists for TV shows with a tourist touch, depending on the viewing habits of tourists (Mariné-Roig, E., 2017).

• Data center monitoring. IT operations teams in a travel company can save huge amounts of time and energy on monitoring systems by placing all data on web pages, applications, database performance, user experience, and logs on a single cloud-based data platform, which automatically monitors thresholds and detects anomalies.(Ali, F., El-Sappagh, S., & Kwak, D., 2019).

• Data processing and analysis. Performing business analysis without an expert. Analytical tools with a visual user interface allow people without technical knowledge to easily query a system and get an easy-to-understand answer. Technologies, applications and devices based on artificial intelligence (AI) in the tourism industry have long been highly mature in the tourism market. The possibilities and developments that are based on it generate heated discussions. Whether it is human-machine communication, the analysis of large volumes of data and texts or the assessment of situations: the use and capitalization of AI systems in the tourism industry is seen by analysts and IT market leaders alike as a decisive factor for sustainability and competitiveness of companies in the tourism industry. And yet, despite the clear potential and benefits of AI, its productive use in tourism companies and tourism business processes is still rarely found in comparison (Wu, L., Kang, J. E., Chung, Y., & Nikolaev, A., 2019).

Finally, it is important to understand that AI applications in the tourism and tourism industry are not limited to customer service. In fact, one of the most popular and effective uses is to collect and interpret data to draw conclusions about customers, business practices, and pricing strategies.

The key advantage of artificial intelligence in this particular field is its ability to sort huge amounts of data quickly and accurately, where the human equivalent would take much longer and could contain more errors. For example, the Dorchester Collection Hotel used AI to sort customer feedback from surveys,

reviews and online surveys and to build a clearer picture of current opinion in real time (De Carlo, M., Ferilli, G., d'Angella, F., & Buscema, M., 2021).

Many travel companies are now wondering how they can use the technical possibilities of artificial intelligence to create values in the field of tourism and what is the right way to start to gain the necessary experience in the tourism industry.

Starting from the particularities and requirements of each tourist company, we can reflect the current possibilities of artificial intelligence and develop recommendations for action based on the analysis of utility and necessities.

In tourism, the 360 ° communication with the client, the analysis and the work with the documents, as well as the analysis and forecasts based on the data regarding the tourist packages are in the foreground (Zougagh, N., Charkaoui, A., & Echchatbi, A. , 2021).

From the AI category incorporated in the tourism industry we find robots. Robots are very useful in tourism, and if they have artificial intelligence they can improve quality and performance, reduce costs, offer the same quality services as when you already have qualified staff for those tasks. They can be at the reception in hotels, on planes, they can be the perfect housekeeper in hotel rooms and they don't even need a monthly salary and hours of rest. (Kazandzhieva, V., & Filipova, H. , 2019).

3. New information technologies adopted and developed in the tourism industry
3.1. Artificial Intelligence (AI) and Virtual Reality (VR) in the tourism industry - artificial intelligence program algorithms

New technologies have also appeared in the tourism sector, which hopes to take advantage of the "gold mine" of personal data online, through automated and customized hotel rooms according to customer preferences and virtual reality glasses that can be used as a tourist brochure. (Figure 13)

In the hotels of the future, there will no longer be receptionists, but a mirror equipped with the facial recognition function. Once the customer has been identified, the camera instantly adapts to all the wishes made by him during the booking procedure: temperature, bright ambiance, reproductions after Picasso or Van Gogh in digital frames hanging on the walls. Even the door lock is smart: it opens and closes via the Whatsapp application in the customer's phone. If some of the hotels already offer versions with simpler functions, that room, intended for

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luxury hotels, integrates the latest discoveries in the field of voice recognition functions, allowing for example the customer to order pizza in 40 languages. The mattresses, equipped with sensors, record the smallest movements of the client, allowing hotel employees to bring him coffee immediately after waking up (Koo, B., Curtis, C., & Ryan, B., 2021).
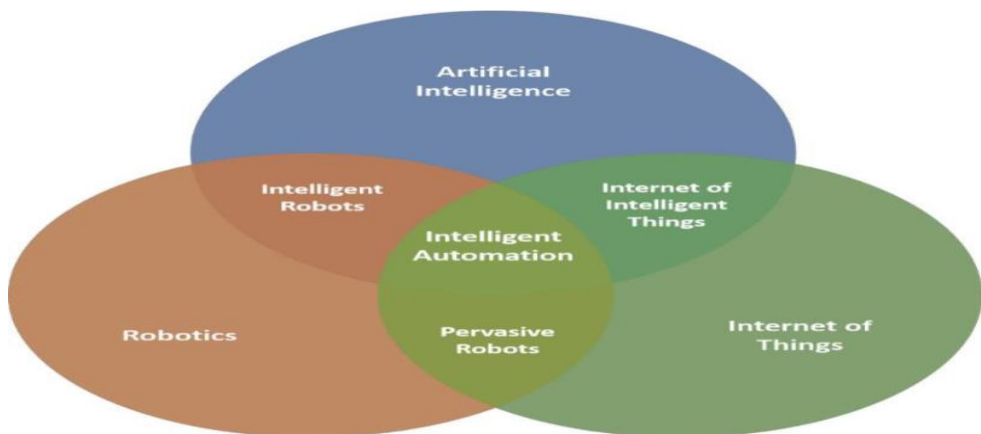
Figure 13. Automation in tourism industry
Source: Tussyadiah, I.P. (2020). A review of research into automation in tourism: Launching the Annals of Tourism Research Curated Collection on Artificial Intelligence and Robotics in Tourism. *Annals of Tourism Research, 81*, 102883.

Beyond the special appearance of these gadgets, artificial intelligence promises hotel managers an extremely intimate knowledge of customers. The technology will allow hoteliers to know the customer's needs before he becomes aware of them. This knowledge is reinforced by the personal data provided when booking online, but also after the customer arrives at the hotel, thanks to the "beacon" technology - authorized in some countries - which consists of a beacon that allows the detection of places where smartphones are in the hotel or in the city.

Fueled with that essential data about tourists, the algorithms of artificial intelligence programs identify the customer's habits, in order to retain him by giving him a tailor-made reception or by selling him additional products. If the algorithm knows that when you come with your wife to the hotel, you do not have dinner at the restaurant, but order dinner in the room, he will offer you a special

menu in the room and a bottle of champagne. But if you come with your family, it will offer you a discount on the children's menu. (Lee, M., Kwon, W., & Back, K. J. , 2021).

In addition, these technological tools can help improve productivity in the hotel. All purchases can be automated. For example, if a large group of Britons arrives, the system knows it will have to order more bacon.

The manufacturers of high-tech gadgets in vogue, virtual reality (VR) glasses, are also trying to enter the tourism sector. At the stands set up in the salons of some tourist companies, those interested can "visit" the streets of Marrakech or walk part of the route followed by the faithful during the pilgrimage to Santiago de Compostela.(Kusdibyo, L., Brien, A., Sutrisno, R., & Suhartanto, D., 2021).

At the moment, we are in a still incipient phase with VR technology in tourism. Although they are presented with virtual reality, industry professionals say 'what a wonder', but do not buy it. It is not yet one of the priorities in their marketing budget (Huang, M. H., & Rust, R. T. , 2021).

But, for example, the Palladium hotel chain, based in the Balearic Islands, has nevertheless embarked on this adventure: its managers no longer bring brochures to present their establishments in front of the representatives of travel agencies, but VR glasses. Video files are available for each hotel in the group, allowing you to visit rooms, pools and restaurants.(Flavián, C., Pérez-Rueda, A., Belanche, D., & Casaló, L. V., 2021)

Travel agencies know the hotels much better in this way and said that this device will help them to sell accommodation more easily, making sure that tourists appreciate the possibility to view the hotel rooms on a real scale. this makes it much more difficult to cheat with VR glasses. Although VR glasses are available at fairly affordable prices (between 50 and 600 euros), video files produced in virtual reality can cost from 2,000 to 150,000 euros. has already made several VR videos. Tourism is associated with experiment, with sensitivity. Virtual reality cannot replace the taste of local cuisine or the smell of the ocean. But it gives us the opportunity and the desire to explore more (Lu, J., Xiao, X., Xu, Z., Wang, C., Zhang, M., & Zhou, Y., 2021).

3.2.Augmented Reality (AR) and Virtual Reality (VR) in tourism.
The two modern technologies are used both in creating a marketing content and in improving the experiences that customers have in accommodation units or when choosing hotels, guesthouses, for example. Not only hoteliers use the two types of

realities to show tourists what the hotel rooms look like, but also the airlines. Many airlines already have VR inside the planes, so any tourist who wants to travel by plane to the holiday destination will see how comfortable his place is and how the atmosphere on the plane is. (Phaosathianphan, N., & Leelasantitham, A., 2021). This is how ticket sales increase, but also the trust in the company increases significantly. Travelers can see in advance what they will receive, evaluate, know what they like and what they don't and can quickly decide whether to choose that airline or not.

IoT (Internet of Things) in tourism. The Internet of Things is a relatively new concept, which presupposes the existence of an interconnectivity between several devices connected at the same time to the Internet and between them. Many companies in the tourism industry have realized the importance of IoT and have begun to actively use this concept and associated technologies. (Shaw, S., Rowland, Z., & Machova, V., 2021). For example, Lufthansa comes to the aid of tourists who are always afraid of losing their luggage at the airport and are stressed or anxious. With a single link accessed from the company's application, customers can immediately see where the luggage is in real time and can prevent any problems, so they are more relaxed. And in the hotel IoT is very useful and is already used in many parts of the world, so everything in a room, from the bar, refrigerator, lights, TV will be interconnected and easy to use without much effort (Kang, J., Guo, X., Fang, L., Wang, X., & Fan, Z., 2021).

3.3. Cloud computing in the tourism industry

The hospitality and tourism industry are ideal candidates for using cloud solutions. Although there may be a lot of other software packages as services available (SAAS), we focused exclusively on three basic applications: e-mail, web conferencing with communications and web portal hosting. To illustrate all the advantages of moving information from a tourism company to the cloud requires a few examples. From a breakfast to a separate hotel chain to a mc breakfast internationally and geographically; from an Indian casino to a multi-billion dollar Las Vegas resort; from a family-run restaurant to hundreds of cafes around the world; all channels in the hotel industry can benefit from the use of some form of cloud services.(Kapuruge, M., Colman, A., & Han, J., 2011, October)

Regardless of the type of business in the hospitality industry, cloud computing or SaaS can offer a wide variety of technology solutions and cost-effective ways to implement business applications. The key to implementing cloud technologies is to

research and educate business decision makers in choosing the right tools for business needs. Not every cloud solution is best for a company, but with any good technology comes the need to compare other products and make the right decisions. Cloud services are just one solution out of a wide range of options. (Kruja, A. D., Hysa, X., Duman, T., & Tafaj, A., 2019).

4. A performing type of strategic management in the tourism industry, based on the technologies of the future

4.1. AI - strategic imperative and competitive advantage in the tourism industry

AI is a strategic imperative for any tourism business that wants to achieve greater efficiency, new revenue opportunities and increase customer loyalty. It is fast becoming a competitive advantage for many tourism organizations. With AI, tourism organizations can achieve more in less time, create personalized and compelling customer experiences, and anticipate business results to boost profitability. But AI is still a new and complex technology. To get the most out of it, tourism company managers need expertise in how to build and manage scalable AI solutions. A successful AI project requires more than just hiring a data expert. To ensure the success of AI, tourism organizations need to implement the tools, processes and management strategies appropriate to their own activities (Ivanov, S. H., & Webster, C. , 2017).

4.2. The importance of AI for organizations and efficient management in the tourism industry

Some AI technologies have been around for over 50 years, but the increase in computing power, the availability of huge amounts of data in the tourism industry and the new algorithm have led to major advances in the AI industry in the tourism industry in recent years. Artificial intelligence is considered a central element of society's digital transformation and has become a priority for the EU (Vrbka, J., & Rowland, Z., 2019, April).

Future applications are expected to bring huge changes in tourism, but AI is already present in our daily lives in the tourism industry.

The central principle of AI in the tourism industry is to reproduce - and then overcome - the way people perceive and interact with the world. This is fast becoming the foundation of innovation. Supported by various forms of Machine Learning, which recognize data models to allow predictions, AI can add value to any tourism business by:

• providing a more comprehensive understanding of the abundance of available data

• Relying on predictions to automate certain activities in the tourist area that are overly complex or routine (Kazandzhieva, V., & Filipova, H.,2019).

4.3. Factors that stimulate the adoption of AI in the practice of efficient strategic management

The development of AI in the complex tourism activity is stimulated mainly by the following three factors:

• Economical pricing and high-performance computing features available immediately. The abundance of computing power in the cloud allows easy access to economical and high-performance computing power. Prior to this development, the only computing media available for AI were not cloud-based and had prohibitive costs (Cheng-Hua, T., Shyh-Jer, C., & Shih-Chien, F., 2009).

• Large volumes of data are available for training. AI must be trained on a large volume of data to make accurate predictions. The emergence of different tools for data labeling, the ease and accessibility with which tourism organizations can store and process both structured and unstructured data, allow several tourism organizations to build and train AI algorithms. (Oday, A., Ozturen, A., Ilkan, M., & Abubakar, A. M., 2021)

• Applied AI capabilities offer a competitive advantage. Tourism organizations are increasingly recognizing the competitive advantage of applying AI information to their business objectives and making it a priority at the tourism company level. For example, the specific recommendations provided by AI can help tourism organizations make better decisions faster. Many of the features and functionalities of AI can lead to lower costs, reduced risks, faster time to launch tourist offers on the market and much more. (Al-shami, S. A. H., Al Mamun, A., Ahmed, E. M., & Rashid, N.,2021).

And here are some of the common myths encountered by company managers about AI solutions for the enterprise environment in the tourism industry. While many travel companies have successfully adopted AI technology, there is also quite a bit of misinformation about AI and what it can and cannot do for a tourism industry company. Here are five common myths about AI in the tourism industry:

• Myth no. 1: AI solutions for tourism companies require a self-development approach. Reality: Most travel companies adopt AI combining internal and external solutions, ready to implement. The development of internal AI allows tourism

companies to adapt to unique business needs; pre-developed AI solutions allow tourism companies to streamline implementation with an immediately available solution to solve common tourism business problems.

• Myth no. 2: AI technology in the field of tourism will provide magical results immediately.

Reality: The path to AI success in tourism requires time, careful planning and a clear idea of the results that the tourism company wants to achieve. The tourism company needs a strategic framework and an iterative approach to avoid providing a random set of disconnected AI solutions.

• Myth no. 3: AI technology for tourism companies does not require people to run it. Reality: AI technology for travel companies does not mean that robots take control. The value of AI technology lies in the fact that it improves human capabilities and frees the employees of the tourism company, so that they can deal with more strategic activities. Moreover, AI technology needs people to provide the right data and work with it correctly.

• Myth no. 4: The more data in the field of tourism, the better.

Reality: AI technology for travel companies needs smart data. In order to obtain the most efficient information for the tourism business from AI, the data must be of high quality, up-to-date, relevant and enriched.

• Myth no. 5: AI technology for tourism companies only needs data and models to be successful. Reality: Data, algorithms and models are just the beginning. But an AI solution must be scalable to meet the changing needs of the company and the tourism market. To date, most AI solutions for companies operating in the field of tourism have been developed by data experts. These solutions require extensive manual configuration and maintenance and are not scalable. To successfully implement AI projects, any tourism company needs AI solutions that adapt to new requirements as the company progresses with AI.(Suvetha, M., Swathi, S., Rani, M., Vinoth, S., & Suriya, R., 2018).

4.4. Creating the right organizational culture about AI in the tourism industry

Achieving maximum AI results in tourism and avoiding problems that slow down successful implementations require the implementation of a team culture that fully supports the AI ecosystem in tourism. In this type of environment:

• Tourism analysts work with data experts to define issues and objectives

• Data engineers manage the data and the basic data platform so that they are fully operational for analysis

• Data experts prepare, explore, visualize and model data on a data science platform

• IT architects manage the basic infrastructure needed to support data science at scale, either on-premises or in the cloud

• Application developers implement models in applications to build data-oriented products. Best strategic management practices to maximize AI in the tourism industry. (Imron, M. A., Munawaroh, U. I., Farida, R. D. M., Paramarta, V., Sunarsi, D., Akbar, I. R., ... & Masriah, I. , 2021).

Following the example of the Harvard Business Review, we believe that some recommendations can be made to start with AI at the level of a travel company:

• Applying the functionalities of AI to those activities in the tourism field that have the largest and fastest impact on the revenues and costs of a tourism company.

• Using AI to increase productivity with the same number of people, instead of eliminating or adding a number of employees.

• Start implementing AI in the back office, not in the front office (in large tourism companies, IT and accounting departments will benefit most from the support of AI solutions).

4.5. Adaptive intelligence in the practices of high-performance strategic management in the tourism industry

As AI functionalities in the tourism field have been transformed into mainstream operations at the level of a tourism company, a new concept is being developed: adaptive intelligence in tourism. Adaptive intelligence applications in tourism help tourism organizations make better business decisions by combining the power of real-time internal and external data with decision-making science and highly scalable computing infrastructure. These applications essentially make any tourism business smarter. This will allow tourism companies to offer their customers better products, recommendations and services, all of which produce better results in the tourism business. (Musavengane, R., & Woyo, E., 2022).

4.6. Structured, intuitive and efficient management of documents in the tourism industry

In the case of using systems for document management or for processing documents and procedures, users in the field of tourism periodically express their desire for very simple search options. Especially tourist users who work only occasionally with the systems or who frequently search through different contents

need a very intuitive search possibility. By using AI-based services in tourism, for example, possibilities can be offered for formulating a search desire in the natural language - and hence a search structured according to certain types of packages, destinations, vacations, small trips, etc. "Show me a Christmas tourist offer" can be uniquely identified by a trained component, as well as the introduction: "Send this holiday offer to tourist X for verification" (Stelnik, E. V., Kiyashko, Y. A., & Lysikov, P. I., 2019, March).

4.7. Super-applications: a great potential for business management to increase travel sales of tourism companies

The idea of a travel super-application has been circulating for some time. We believe that this idea will take shape in the next few years, for two reasons - the open source / API / partnership landscape means that it is possible to integrate all flows into a super-application, and customers in the tourism industry are getting used to this idea.

When booking.com asked 12,500 travelers from nearly 30 countries, 57% said they wanted "a single app for all your planning, booking and travel needs." (Mingrui, Y. A. N. G., & Eunyoung, K. I. M. , 2021, March).

To some extent, the super-application already exists in the Asia-Pacific region, where e-commerce and messaging companies such as WeChat, Alipay and Meituan in China, Line in Japan and PayTM in India have built multi-purpose applications from which users can buy and pay for flights and hotels in the same way you order packaged food, a taxi or buy a shirt (Han, Q., Novais, M. A., & Zejnilovic, L., 2021).

It should be noted here that travelers also like the idea of a super-application, so the tourism industry should start thinking about the best way to offer this.

4.7. AI technologies can increase passenger loyalty by demonstrating efficient management

Travelers live in a world where they use multiple devices and use a multitude of channels, where access to travel content is widespread and fragmented, where consolidation is low, and where value is more important than price. In this context, loyalty to a particular brand or destination, when there are so many alternatives just a click away - seems to belong to another era (Singh, B. , 2021).

But information technology can be used to encourage the loyalty of today's travelers. Even grassroots initiatives, such as ensuring that customer data platforms

are prepared for returning visitors, can create a loyal customer base, simply by letting them know what's on offer. (Höpken, W., Eberle, T., Fuchs, M., & Lexhagen, M., 2021).

Reward loyalty is a key element of the airline industry - the frequent mentality of the air mile collector still exists. Airlines use co-branding credit cards as a way to keep their travel and out-of-travel expenses in their sphere of influence, while online travel agencies use variations of "book ten nights and get one for free" for their programs reward (Leong, L. Y., Hew, T. S., Lee, V. H., & Ooi, K. B., 2015).

4.8. Information technology used to customize end-to-end travel for the consumer

Giving travelers what they want is an effective way to encourage loyalty through repeated bookings. Customization only works if data can be captured, analyzed, and operated in a way that allows the right product to be displayed to the right customer at the same time. It should be noted here that loyalty is delicate, but retaining customers is better than trying to win new ones. (Zhou, F., Wu, H., Trajcevski, G., Khokhar, A., & Zhang, K., 2020).

4.9. Innovative payment methods and alternative methods of payment in tourism - choices of a successful management in tourism.

Travel is a big ticket purchase process, and consumers expect the payment process to be perfect, fast and secure. With a selection of credit and / or debit cards in the physical wallet and applications such as PayPal that make up the digital wallet, travelers expect to be able to choose how to pay for flights and hotels.

Expenses at the destination are a different matter - entry to museums, taxi or subway fares - tend to be smaller, spontaneous purchases. But again, consumer preferences dictate how tourism companies operate at the destination, especially when these destinations attract an international audience. One reason behind Uber's global expansion is that the app serves as a de facto digital wallet for transportation when users are away from home. Comfort comes first.

Most international hotel chains have realized that Chinese shoppers will want to use Alipay. However, there are more than 300 different ways to pay travelers. The fintech sector - financial technology - helps providers by providing payment gateways and easier access to the platforms that travelers use (Almeida, F., Almeida, J., & Mota, M., 2019).

Travel agents - whether retail, business or online - have a role to play in helping travelers understand how payments work when they arrive at their destination.

It should be noted here that if the guest cannot pay for the product and service offered when the offer is made, there is no point in offering it.

4.10. Efficient and personal communication with tourists - a new type of tourism management

By using Natural Language Processing (NLP) technology in the tourism industry in combination with dialogue systems, ChatBot systems - also called Conversational Interfaces - have been developed for recording a message of complaints from tourism companies or tourists or for signaling and registration of Servicedesk requests (Li, Y., 2021). In order for these solutions not only to be a query, but also to achieve the highest possible utility in the tourism sector, other AI-based microservices have been used, such as image analysis, emotion analysis, language identification. By interconnecting to the systems for oral communication in tourism, the scope can be increased and additional users can be integrated. The use takes into account the transfer of requests to existing specialized applications, as well as aspects related to scalability and security. In conclusion, an important step in the direction of 360° communication with customers in the tourism industry becomes possible.

4.11. Using AI and ML (Machine Learning) for communicating with tourists - a new type of efficient management

Airlines, hotels and travel agencies must be available 24/7 on any channel the customer wants to use at that time. WhatsApp, Facebook and WeChat messaging applications, among others, have appeared almost out of nowhere and now have billions of users around the globe, according to technology company Amadeus. (Yu, H., 2021).

Like many new technologies, messaging applications have started as a way for people to interact. But now these applications provide a way for tourism companies to converse directly with consumers. Facebook told their investors that they have more than 10 billion messages sent between people and companies every month.

Increasingly, the interactions between consumers and companies are automated, powered by a chatbot. Chatbots in the airline industry began as automated FAQ pages, a tool that could further increase the efficiency of customer service teams by preparing a chatbot to identify and answer the most obvious questions (Chuah, S. H. W., & Yu, J. , 2021).

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The landscape of chatbots is changing, and chatbots are able to "learn" much more (See Figure 14). Connecting chatbot technology to internal data sources and layering in some machine learning systems allows robots to improve over time, learning more about how to best answer the questions they receive.

AI in Travelling

Online Customer Service and Chatbots

Specialized Smart Apps

Prediction Systems

Fraud Detection

Facial Recognition

Data Processing and Data Analysis
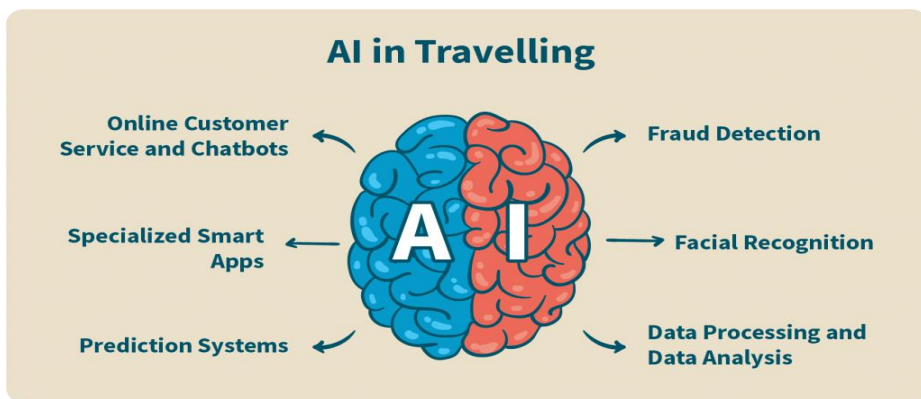
Figure 14 - Use of AI in tourism industry
Source: Anastasia Borodinests, AI for Tourists: Going on Vacation with a Robot Hand in Hand, https://www.qulix.com/about/ai-for-tourists-part-1

As a result, a chatbot that can answer frequently asked questions in the FAQ lists is now elementary. Many travel companies now use bots for the sale of high-end products and cross-selling. It is also worth noting that, more recently, ChatBots are learning how to help customers book and manage travel. "(Melián-González, S., Gutiérrez-Taño, D., & Bulchand-Gidumal, J. , 2021).

4.12. Voice technology in tourism. Voice assistants for transforming travel in the future

Accuracy rates for speech recognition and natural language processing have been over 95% for several years. Today, products such as Google Home, Amazon Alexa, and Apple's HomeHub, as well as those offered specifically for the Chinese market, have made conversation with a computer a way of life for tens of millions of people.

When these people travel, they expect a similar environment. Amazon has developed Alexa for Hospitality, aimed at large hotel and vacation rental chains. It

"simplifies tasks for guests, such as playing music, ordering towels, controlling the temperature or lighting in the room, finding local restaurants and attractions, calling and even check-out." (Bittendorfer, T., Bunt, J., Grunder, L., Riedel, D., Magnus, B., & Salzlecher, T., 2019).

Open systems, APIs and partnerships are the big technological trends that allow voice recognition to become operational in hotels, improving the customer experience and at the same time opening up the chance for top-level product sales, cross-selling and merchandising. Amadeus has an interest here, working with companies such as Volara, which has developed proprietary software that integrates with natural language processing platforms to create a special tool for the hospitality industry (Chen, Y., & Meng, X. , 2013, November).

It should be noted here that as digital voice-based interactions become commonplace in homes, travelers will expect similar services from their travel providers.

Voice searches instead of the classic ones, by typing have started to be very popular in the tourism industry. Clients are beginning to have voice interactions with personalized virtual assistants, and almost all devices and lights in a room can be activated vocally.

Also through voice searches, the tourist can request services, can communicate directly with the hotel staff and can call wherever he wants, can schedule a spa session, etc. Voice searches and virtual assistants for voice search are already a trend that the tourism industry takes from more and more seriously. (Rozumowski, A., Schäfer, W., & Klaas, M. (2020).

4.13. The importance of the tourist company's presence in Social Media for maintaining and increasing sales.

Social media greatly influences the decision to book the trip. Travel photography has an existence almost as long as the photo itself. Today, smartphone cameras allow anyone to take and post photos while on a trip. It frames, clicks, loads, and then shares. Specific photo sharing platforms such as Instagram and Pinterest host billions of images. "#Travel" has been used almost half a billion times on Instagram alone (Egarter Vigl, L., Marsoner, T., Giombini, V., Pecher, C., Simion, H., Stemle, E., ... & Depellegrin, D., 2021).

As in the case of chatboats, travel companies must use these platforms, because that is where their customers are. Instagram has about 500 million daily active users, 80% of whom follow the activity of at least one company (Sun, B., 2021).

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Images have always inspired travel, and many companies now connect their booking engine to an image or use the super-sophisticated addressing of platforms provided to reach specific audiences viewing specific images. These advertising products will become more sophisticated over time as platform owners try to monetize users. It should be noted here that photo platforms are not only inspiration, but can generate conversion to tourism, producing the desire to travel, to see, to feel, etc. (Jansson, A. , 2018).

4.14. Sustainability and responsible travel for a strategic and efficient management

Tourism and aviation face a major PR crisis for consumers in the coming years - the struggle with the perception that the tourism industry is the negative player in the climate crisis scenario. No one in the tourism industry is ignorant of their responsibilities to the planet, but travelers not only question the response of travel agencies in times of crisis, but also take into account the sustainability factor when choosing how and with whom they will travel. (Van Rheenen, D., 2017).

Sustainable Travel Report 2020 revealed that 55% of its global sample of respondents has become much more concerned in the last twelve months about the impact of their journey on the environment. The Swiss bank UBS found that one in five Western passengers agreed to fly less because of environmental issues, in particular, but not exclusively, based on the idea of "shame to fly". And, as in the booking.com poll, UBS noted that travelers' interest in such issues has intensified in recent months (Rahmadian, E., Feitosa, D., & Zwitter, A., 2021).

The tourism industry needs to pay attention to this, because travelers are following its reaction. Excessive tourism activities are a central element in the conversation about sustainability. The tourism industry plays a role in supporting the attempts of popular destinations to limit the number of visitors, while ensuring that those travelers have other alternatives in their vicinity. (Van Rheenen, D., 2017).

It should be noted here that many customers believe that traveling is harmful to the planet. However, the tourism industry must provide factual information about the impact of travel and find ways to travel without pollution.

Conclusion

The great struggle in the tourism industry right now it is about the travel agent of the future and the implementation of specialized technology. Following the

development of Artificial Intelligence software, it seems that the position of travel agent will disappear in the future, being replaced by the tourism consultant. After eighteen years of success, OTAs are thriving, as are most offline agencies. Offline agencies have survived the evolution because they have adapted their business models and instead of avoiding information technology, they have embraced the idea of evolution.

What the experts did not take into account, when they claimed that the function of travel agent will also disappear, is that OTA has no human touch. In a digital age, customers now have more desire than ever to be able to get advice. Successful travel agents have therefore focused their efforts on customer experience and building long-term relationships with them, using technology. The 21st century travel agent is - and will continue to be - a concierge, consultant and confidant, using a variety of tools, from social media to online messaging services, to communicate with customers. As a result, consultants are becoming more and more integrated into the daily lives of their clients, providing information about travel, this being the modern version of the human touch that clients want.

Successful consultants also realize the need for customization, integrating technology to help them do so. Thus, without tools such as a sophisticated CRM that ensures that sales and marketing tactics are personal and properly targeted, success is far from being achieved.

For success, travel agency managers need to implement specialized technology to help agencies focus on what they do best! To sell an experience, not a tourist package!

Benefits and challenges of operationalizing AI in the field of tourism are now very clear and concise. There are many success stories that demonstrate the value of AI in tourism. Tourism organizations that add Machine Learning and cognitive interactions to traditional tourism business processes can significantly improve their user experience.

However, there are some obstacles. Few tourism companies have implemented AI on a large scale, for several reasons. For example, if they do not use cloud computing, AI projects are often expensive in terms of computing power. They are also difficult to build and require much sought-after expertise, but little is available. If tourism companies know when and where to incorporate AI, as well as when to turn to a third party, then they will be able to reduce their difficulties.

The emergence of AI-based solutions and tools in the tourism field means that more travel companies can take advantage of AI at a lower cost and in less time. AI

ready for use in tourism refers to solutions, tools and software that have either built-in AI functionality or automate the algorithmic decision-making process in tourism. AI ready for use in tourism can be anything from standalone databases, which are automatically repaired with machine learning, to predefined models that can be applied to a variety of data sets, to solve challenges such as image recognition and text analysis. This can help tourism companies achieve faster time to value, reduce costs and improve customer relationships.

But, unfortunately, nowadays we can see some barriers to achieving the full potential of AI in the tourism industry. Despite the promise of AI, many travel companies do not realize the full potential of Machine Learning and other AI functions. Ironically, it seems that the problem lies largely in people. Inefficient workflows can slow down tourism companies in obtaining the full value of AI implementations.

For example, data experts may have difficulty obtaining the resources and data they need to build machine learning models. He may have trouble collaborating with teammates. And they have many different open source tools for management, while application developers sometimes have to completely re-encode models that data experts develop before they can incorporate them into their applications

With a growing list of open source AI tools, the IT sector ends up spending more time supporting data science teams, continuously updating their work environments. This problem is exacerbated by limited standardization in the way data science teams want to work.

Finally, the executives of a tourism company may not have an overview of the full potential of their company's AI investments. As a result, they often do not provide sufficient guarantees and resources to create an interactive and integrated ecosystem, which is necessary for AI to be successful.

But, we say, in order to remain competitive, every tourism organization must embrace AI and build an AI ecosystem. Regarding this aspect of the introduction of AI and robots in the tourism industry, 61% of Europeans have a favorable opinion about the introduction of AI and robots in everyday life, but 88% of them say that these technologies require more careful strategic management. , especially in the tourist area (Eurobarometer 2017, EU 28)

Tourism companies that fail to adopt AI under certain conditions in the next 10 years will lag behind. Although some tourism companies may consider them to be the exception, most travel companies do not have the in-house talent and expertise to develop the type of ecosystem and solutions that can maximize AI capabilities.

In order to develop the right management strategy and access the right AI tools, tourism companies must look for an innovative partner with deep expertise in the field and a comprehensive AI portfolio.

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AI-ASSISTED DIAGNOSTICS IN HEALTH MANAGEMENT

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Abstract
Healthcare suffers too much pressure in a context where there is no room for experimentation or mistakes, given the fatal consequences and unpredictable outcomes. This paper aims to present the specifics of health management and usage of artificial intelligence to improve work performance, job satisfaction, and, most importantly, patients' health. This is achieved through the introduction of an artificial intelligence system in healthcare facilities.

Keywords: *artificial intelligence; predictive analysis; health management; health sector.*

JEL Classification: I18

Introduction

Lack of access, cost, waste, and an ageing population are global challenges facing healthcare systems. To name a few significant effects of pandemics like the

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coronavirus (COVID-19) one, shortages of personal protective equipment, insufficient or inaccurate diagnostic tests, overburdened clinicians, and imperfect information sharing are common. More importantly, a healthcare crisis like COVID-19 or the emergence of HIV in the 1980s exposes our health systems' flaws. As healthcare crises exacerbate current issues, we can reimagine and realize new care and back-office systems.

There is no magic solution or technology such as artificial intelligence (AI) that fixes healthcare totally, nor a single technology that resolves all banking, retail, automotive, tech, or other industry problems. Existing healthcare systems are immensely complex, and several structural and functional revision attempts have failed. Complex healthcare systems cannot be repaired, but this paper proposes to rethink how we create productive instruments, experiences, and intelligent systems using data for doctors, nurses, healthcare workers, patients, and healthcare facilities. AI is ready to transform every aspect of healthcare from customer experience and hospital care to cost reduction in healthcare [10].

The Synergy of the Artificial Intelligence and Healthcare

It is long overdue to utilize new technologies in healthcare because of how badly they are needed now. People in healthcare need intelligent systems to aid them because they cannot process the constantly growing complex data AI, machine learning, and deep learning have proven solutions to offer; when implemented, these solutions can improve diagnoses and treatment recommendations while also freeing up time for experts to make better decisions. In addition, by improving the existing process for obtaining more accurate patient data and having automated work help with the less-informative administrative jobs, medical staff can have more satisfying jobs while using this to improve personalized treatment plans for their patients [2].

AI can usually do a specific set of tasks better than humans because there is no fatigue, moral reasoning, or design error when applied to the healthcare industry. This results in better outcomes—patients and employees will benefit [11].

Patients, physicians, and administrators alike will benefit from these technologies, enhancing the patient care system and streamlining many office procedures. Nevertheless, scientific research has shown the benefits of these technologies: early diagnosis of diseases and avoid further consequences. Since algorithms can detect cancer tumours more efficiently than radiologists, this should be viewed as a positive because algorithms can access data about clinical trials

with detailed information and instructions, whereas if radiologists were the only ones conducting these tests, the resources needed to invest in them would be more significant in terms of money, time, and energy. At the moment, the possibilities of AI in healthcare are considerable. [3]

A general lack of satisfaction with work today is evident in the research and by what we observe in most respondents: They say they are even more dissatisfied with work today than they were five years ago. We should introduce new technologies and relieve human resources to make smarter decisions based on evidence. Is human life, every day, at their mercy? More than 36% of those who believe there is no difference in their work now than before clearly recognize the need for a significant overhaul. [3]

AI is a phrase to describe something that improves cognitive ability with the addition of technology. Machine learning is a subdivision of AI and focuses primarily on algorithms that gather information based on data. Traditional statistics cannot perform those functionalities. In addition, research has shown that theory and experimentation are not the only components of research.

It is a well-known fact that cardiothoracic surgeons are ecstatic to accept the implementation of (AI) and machine learning (ML) to assist them in their surgical procedures. Over the years, experts have improved risk prediction and patient recovery outcomes by utilizing new technologies that support their impressive response efforts. While some think of prophecy as the end-all, be-all of intuition, the options for predicting future outcomes are more numerous than one might believe. Detection of anomalies in medical data is a tool surgeons can use to their advantage in the operating room. There are numerous options available to them, including various risk models. To figure out what is going to happen, you must identify and examine the predictive factors. In addition, the benefits of ML are found in discovering hidden links that the human eye and today's advanced analytics tools are both unequally successful in finding. [8]

ML offers a multitude of advantages. In order to treat patients effectively, doctors must choose from many different types of treatment methods and algorithms. Employees in medical institutions are sceptical about the use of new technologies because of the absence of education. Before they see the direct results of their implementation, they can be worried about implementing the technologies. This is understandable since it shows incompletely processed data, the model learning from algorithms in the operating room or what might be inaccurately predicted treatment and procedure outcomes.

The algorithms in question are not a total mystery, though they can learn from data and are good at detecting error-causing patterns and errors caused by human mistakes. Rather than being a detriment to their job performance, it should motivate professionals to learn new technologies alongside each other and share that learning with patients. AI, known for its power to drive tremendous development, has drawn scepticism regarding its capacity to innovate without succumbing to bias. It is common to see AI touted as a "cure-all" solution, only to see such benefits stripped away by concerns about its ability to remain free of bias in healthcare and other domains. [8]

In order to avoid discriminatory treatment, there is a process of new model development going on right now that makes sure patients will not be discriminated against based on gender, race, or some other variable when they receive treatment. Despite these issues, every patient will have a tailored treatment plan because humanity has battled for equality through the years. It is not the right time for algorithms to encourage discriminatory behaviour; instead, their job calls for working together to help others. It is impossible to completely understand how the model developed a particular prediction, given the simple terms. It is essential to be aware of the source of your data and the context under which it was acquired to confirm that your model's results are correct [13].

When the analysis uses poor data quality — i.e., to correct extreme values — it could result in wrong predictions, creating complications that were not intended. Although the model can overcome these issues with a high degree of success, there are concerns that the ML algorithm will not solve problems with the data. [6] Low interoperability models must be given robust tests in light of this. The models need to be examined thoroughly and, before using them, we need to understand the data and eliminate any bias.

This is the only way to ensure that they do not create undesirable and dangerous patterns (to say, templates), considering they guide important decisions that will have life-altering consequences. Compared to the humans they serve, intelligent models have access to more significant volumes of data. By using more data, trends can be observed, leading to real-time predictions for each patient. These trends are built from a significant amount of data, but time series patterns also make it possible to discern how patients respond to treatments.

This strengthens the idea that we should all concentrate on bettering our work's design instead of eliminating all present work arrangements. Many institutions, like ours, are trying to figure out how ML and AI will impact the operating room:

everything from ML assisting in surgery to machines performing surgeries on their own. This development work is being performed given today's advancements in the field. Potential errors are decreased, and thus the procedure results will be more compelling examples of excellent cardiovascular care. As mentioned, the primary goal of predictive analytics is to project future results based on the current data used to store models. Forms of predictive analytics can be seen in the example of cardiac surgery. Siemens Healthineers has developed a solution to read Chest CT automatically produce a medical report containing valuable clinical images and quantifications. [2]

AI-Rad Companion enhances the accuracy of the imaging diagnosis through algorithms. Apart from this, it improves routine tasks and thus facilitates the employees' daily responsibilities, focusing on solving significant problems. AI-Pathway Companion, designed to optimize patient care, is another excellent solution that this company has created. It works by collecting all the patient data, establishing the diagnosis and best course of treatment. This type of long-term diagnostic decision can help doctors better understand patients' needs and help patients learn the context of choices. [7]

In addition to solutions for which the development process is ongoing, standard procedures also stress the importance of using new technology to enhance doctor-patient relationships. Further criteria for necessary clinical research and optimized choice in personalized therapy are established—the Society of Thoracic Surgeons (STS). Consequently, the American Academy of Cardiology's National Cardiovascular Data Registry (NCDR) uses statistical models for similar purposes. [1]

Different ML algorithms, classification and selection methods are used for the prognosis and prediction of diseases. K. Kourou et al. proposed predictive models based on different techniques of supervised ML, including support for vector machines, Bayesian networks and artificial neural networks, and decision-making bodies. They are intended to predict patient outcomes and create further treatment models for high-risk diseases. [4] Sindhu et al. are using six techniques of classifying the thoracic surgery process - Naive Bayes, J48, DEO, OneR, Decision Stump and Random Forest. In conclusion, the Random Forest technique has been determined to provide the best classification accuracy at all percentages [9].

One study included an analysis of four ML techniques (Naïve Baies, Simple Logistic Recovery, Multilayer Perceptron). The results show that the technology for logistical regression is generally better or at least more competitive than the other four ML techniques, which had an accuracy of 84.53% [5].

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Conclusion

People have never had the opportunity of a more significant role in healthcare than the one provided by the proliferation of personal healthcare gadgets, intelligent medical equipment and intelligent wearables with sensors that monitor the vital signs of people. Add AI to these technologies, combine them with ambient sensory spaces, and prescribe to improve personal health. Invisible computing is emerging as we now see AI in our daily lives, and it is needed to be even more present in health care facilities [12].

Efforts to implement AI in healthcare care offer great hope of improving general processes and procedures. Given the timeless progress and accelerated development of AI, it is likely that a "machine" or program will at some point "read" radiology and pathology images. The main challenge in healthcare is not whether new technologies can improve everyday life but whether their implementation in daily clinical practices will provide an outstanding response. Given the complexity of the data, these challenges must at some point be overcome.

In addition, the complexity of decision-making goes beyond the capacity of the human brain. Therefore, regardless of their professionalism at work, medical personnel need to invest in education and training–for 5-10 years to gain the experience of using AI in clinical practice. Applying AI as a medical aid will not leave people without jobs. On the contrary, it will help employees themselves and patients. Over time, this synergy will increase employee motivation, improve patient treatment personalization, and use new technologies for the common good.

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN BUSINESS MANAGEMENT SYSTEM

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Abstract

The concept of artificial intelligence is accepted as one of the important research areas in the field of computer engineering and the driving force of technology since the first half of this century. Artificial intelligence is a research area that aims to examine and formulate mental functions related to intelligence in humans with the help of computer models and to apply them to artificial systems. According to a broader definition, artificial intelligence is computers equipped with human intelligence capabilities such as acquiring information, perceiving, seeing, thinking and making decisions. Although important developments in the field of artificial intelligence (AI) have been achieved today, the level of research is still in the incubation phase. With each passing day, artificial intelligence researchers introduce new inventions and innovations that will help redefine artificial intelligence. Some even say that Artificial Intelligence is an absolute concept that cannot be defined by looking at these developments.

Keywords: *artificial intelligence; business; computer; human; management.*

JEL Classification: M10

Introduction

It can even be said that each of the studies on Artificial Intelligence raises more new questions than answers. In this regard, Manvin Minsky, the pioneer of
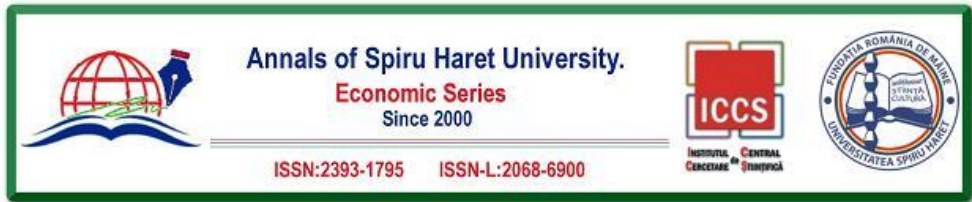
Artificial Intelligence studies in the MIT (Massachusette Technical University} research group, states that Artificial Intelligence is like a "moving horizon". Although studies on Artificial Intelligence have been on the agenda since the 1960s, artificial intelligence applications are enormous. Due to the need for computer power, the efforts of most of the researchers to reveal something new in this field have been inconclusive.

It is predicted that artificial intelligence will change our world more than most people think today. Artificial intelligence gives machines the power to see, hear, taste, smell, touch, speak, walk, fly and learn. This means businesses can develop entirely new ways to interact with their customers, offer them smarter products and service experiences, automate processes, and improve business performance. (Marr, Bernard ve Matt Ward (2019))

Research methodology

This study was conducted to analysis impact of Aİ for business management process by using descriptive method and secondary and primary data. In the application part, the the effect of Aİ on performance of business management system were tried to be measured. In theoretical part, literature review was analysed and then practical effect of this study was discussed in the context of review secondary data. And results was focused to analyze how effective of AI for business management process in different context.

Theoretical perspectives of motivation and its scope

Today, thanks to the cheap and powerful computers provided by the developments in computer technology, it has become economically possible to conduct large-scale research in the field of artificial intelligence. As a result of this, significant developments have already been achieved in expert systems, a sub-field of artificial intelligence, and it is observed that the business world benefits from expert systems in the decision-making process. (http://members.tripod.com/~Bagem/bagem/index.html) With today's technology, it does not seem possible to handle this issue. Not only fear, but also joy, longing, etc. This example shows us what can be computerized and what cannot be computerized. One of the most important issues is the difference between reason and intelligence. Animals can be as smart as humans, and in some ways even more intelligent than humans. But they have no mind. They make decisions only in the world (feelings, emotions, abilities, etc.) they have created based on the information they have. Most of the time, they

also make mistakes. For example, people never think of living together with predators in forests.

But chickens live in the regions where people live at the expense of frying in a pan. They also produce protein for the person who will fry them and produce eggs on time. Would they do this if they were smart? Yes, the robot will be made. The robot will be able to learn. The robot may have thinking abilities. He will be able to develop himself and create new knowledge on his own. He will be able to adapt himself to the environment he is in. Although he cannot do some of these now, it is possible to do it in the future. Technological developments give many lights on these issues. But it will not be possible for a robot to have intelligence. One of the reasons for this is that the different factors of the mind cannot be defined mechanically. The mind is an event related to the soul and the heart. It is not just a function of the brain. Intelligence, on the other hand, is a mechanical faculty under the umbrella of reason. It works based on knowledge. It is possible to computerize it. It will also be possible to improve. The difference between mind and intelligence is so subtle that it requires a lot of thought. (Yapay zeka ne kadar yapaydır?,Kasım 2002)) In his article, the views that deeply examine the idea that computers can think and oppose this idea (for example, machines cannot think because human nervous systems can work according to analog principles, computers can only work according to digital principles; or, machines cannot think because thought and consciousness are not specific to human-made devices, but only to God-made creatures. , etc.) under nine main headings, it is possible to think of Turing as the creator of artificial intelligence. The term "Artificial Intelligence" itself belongs to John McCarthy, the creator of LISP, the most widely used functional programming language in the field. The most important feature of the entrepreneurship period we are in is the attempts to adapt it to the needs of the real world, which will be taken out of the laboratory of artificial intelligence.

What can be said to be new here is the emergence of wider areas of use, thanks to more economically suitable software and equipment, of users whose needs were met with traditional processing methods. The basic program developed for Artificial Intelligence is the LISP program developed by John McCarthy in 1957. Unlike programs such as Basic, Fortran, Cobol, and Pascal, LISP is also concerned with other detailed topics such as sentences, rules, names. For LISP users, the main equipment is the so-called LISP machine or symbolic processor. This symbolic processor is a kind of computer system and a logical system designed to effectively and efficiently support the development and implementation of artificial intelligence programs. (HARP Akademileri Komutanlığı Yayınlarında, Mart-1996)

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Comparing Artificial Intelligence and Natural Intelligence

The potential value and future horizons of AI can be more clearly perceived by comparing AI with natural intelligence in some areas:

a) Artificial intelligence is more permanent: Natural intelligence may change over time as employees change places, or people with natural intelligence may forget the information they have. Artificial intelligence, on the other hand, is permanent and it is not lost or forgotten as long as computer systems and programs do not change.

b) Artificial intelligence can be easily copied and broadcast to large audiences: In the case of natural intelligence, transferring a specialization from one person to another requires a long apprenticeship. Even if this is achieved, expertise cannot be fully transferred to the other person. But if information is inserted into a computer system, it can easily be copied from one computer to another and its use can be expanded.

c) Artificial intelligence can be obtained more cheaply than natural intelligence: In many areas, the purchase and use of computers can be obtained much cheaper in most areas than human training and use.

d) Artificial intelligence as a computer technology is completely consistent, there is no inconsistency in it: On the other hand, nature intelligence is unstable, variable and irregular. This is due to the nature of man, who is the owner of natural intelligence.

e) Artificial intelligence can be documented: Decisions made by the computer can be easily documented by following the activities of the system. Natural intelligence is difficult to reproduce. For example, a person cannot reach a decision he has reached again after a certain period of time; He may not remember how he came to this decision and what assumptions he started from. Despite all this, there are situations and areas where natural intelligence is superior to Artificial Intelligence. We can show these examples.

Artificial Intelligence (AI) and Conceptual Framework

Although the concept of artificial intelligence (AI) has been examined more frequently in recent times, it was actually the famous English mathematician, computer scientist and cryptologist Alan Mathison Turing, who was first recognized in 1950 as one of the greatest pioneers of modern computer and information sciences, both theoretically and practically. and Intelligence", in other words, it was mentioned in the article "Computer Machines and Intelligence". The

"imitation/imitation game" that Alan Turing developed in this article has also been referred to as the "Turing test" in today's literature. In this test, Turing put forward a criterion for whether machines and computers can think, in other words, "Can machines think?" It can be said that the first steps have been taken about the functional definition of artificial intelligence. (Turing, Alan M. (1950); Russell, Suart ve Peter Norvig (2016)). However, the term "artificial intelligence" was first used on August 31, 1955, by American computer and information scientist John McCarthy and her team's proposals for the 1956 summer project of Dartmouth University in Hanover, New Hampshire, USA. (AI Magazine, 27 (4), 12-14; Sterne, Jim (2017)). There are many definitions proposed in the literature about what artificial intelligence is. Each of them is important in that it reflects different features of the related phenomenon. Most, however, are centered around the concept of creating computer software or behavior-capable machines that we would consider intelligent. It is also difficult to define artificial intelligence in general, but different definitions have been made with different approaches. Nadimpalli (Nadimpalli, Meenakshi (2017)) stated that artificial intelligence is "exclusive technologies that process processes such as machine learning, natural language processing, perception and reasoning". According to Shankar (Shankar, Venkatesh (2018)), in its simplest form, artificial intelligence means "software, algorithms, systems or machines that make up artificial intelligence". More generally, it is used to denote a set of tools that can increase the intelligence of a product, service, or solution. According to Sterne (Sterne, Jim (2017)), artificial intelligence is "to make a computer behave like a human in general". According to Akerkar (Akerkar, Rajendra (2019)), artificial intelligence "decision-making, learning and self-suggestion, in other words, the ability to instill knowledge depends on previous experiences and acting very diligently". According to Kaplan (Kaplan, Jerry (2016)), the essence of artificial intelligence is "the ability to make timely generalizations based on limited data." The wider the field and structure of the artificial intelligence application, the faster the processes such as perception and reasoning work with a smarter behavior. In the research report of IBM and NRF, (https://cdn.nrf.com/sites/default/files/201901/The%20coming%20AI%20revolutio n.pdf) artificial intelligence is expressed as "the ability to think logically, remember information, learn and identify new information in machines through data discovery".

Table 1. Artificial Intelligence Definitions in Four Different Categories

Thinking Humanely	**Thinking logically**
"Excitement to make computers think It is a new effort. . . They are intelligent machines that think close to the full and real senses." "Decision making, problem solving and learning It is the automation of activities associated with human thought, such as."	"It is to develop mental skills using computer models." "In the field of computing to enable perception, reasoning, and the like. is to examine."
Acting Humanely	**Acting Logically**
"Creating machines that do functions that require intelligence when done by humans. is art." "Computers are better than humans right now. It is the work of getting them to do what they are."	"Computer intelligence is the study of designing intelligent agents." "Artificial intelligence (AI) is an effort to exhibit intelligent behavior through artificial neural networks."

Source: Russell, Suart ve Peter Norvig (2016), Artificial Intelligence: A Modern Approach (3. Baskı), Essex: Pearson.

Artificial neural networks

In order to understand the modern machine learning techniques that are at the center of the artificial intelligence system, it is useful to get an idea about the artificial neural network. Artificial neural networks, together with artificial intelligence, is another topic that has been frequently examined and discussed both in the scientific world and by many practitioners recently. An artificial neural network contains a number of computational units (cells or neurons) and are connected to these units by a series of one-way data links. (Krycha, Karl A. ve Udo Wagner (1999)). The relationship between artificial neural networks and biological neural networks is a subject that attracts attention in the scientific community. In order to understand how biological brains work, some researchers in cognitive neuroscience/neuroscience are trying to directly understand the actual structure of brains and emulate them on a computer. But most AI researchers don't

care if the software they develop actually mimics the biological brain, as long as it solves the practical problems of interest (Kaplan, Jerry (2016)).

Artificial Neural Networks (ANN), inspired by the way the human brain works, consists of a structure that works in parallel, transmits and receives information to each other. Artificial nerve cells, which are connected to each other in the form of a network, are used for problem solving. The values of the connections that provide the flow of information between the cells are shown with relations, and the learning ability and intelligent behavior of the system are provided by using connection values. (Tekin, Mahmut (2008); Zontul, Metin ve Ayhan Yangın (2017); Kaplan, Jerry (2016)). The artificial intelligence platform "IBM Watson", which is very popular in this field, compares a piece of information with an existing data set to process it. In this process, it works by adhering to deep learning algorithms and artificial neural networks. The more data the system is exposed to, the more it learns and the more effective it becomes over time. An artificial neural network can also be expressed as a complex "tree" of decisions that the computer can make to reach an answer or a solution. (Marr, Bernard (2016)). The use of artificial neural networks has recently been increasingly used in management, marketing and retailing. Among these application types, it can be expressed as market forecasting, consumer preference forecasting, tourism marketing, buyer and seller relationship analysis and market segmentation analysis. (Alon, Ilan, Min Qi ve Robert J. Sadowski (2001)). In order to understand artificial intelligence and how it works, the artificial intelligence system can be shown as a whole in a big structure that includes big data (Big Data), machine learning and artificial intelligence functions as in Figure 1. (Shankar, Venkatesh (2018)).

Artificial intelligence in Sales and Customer Relationship Management

The question of how best to analyze and use individual customer data is an important issue on the agenda of managers. In the current era of big data, most businesses can learn about customers and the market. Still, smart companies are striving to get more information at every possible customer touchpoint. These touchpoints include communication between customers and businesses of all kinds, such as customer exchanges, information provided by the sales force, service and support calls, web and social media site visits, satisfaction surveys, credit and payment interactions, market research studies. By using customer relationship management (CRM) to better understand customers, businesses can provide a higher level of customer service and develop deeper customer relationships.

Businesses can use customer relationship management to identify high-value customers, target them more effectively, cross-sell the company's products, and create recommendations tailored to specific customer needs. (Kotler, Philip ve Gary Armstrong (2018)). Artificial intelligence is already penetrating the sales funnel significantly, including writing emails, managing calendars, and managing leads. However, at the center of all these activities of artificial intelligence should be improving customer relations. Amazon's Alexa, Apple's Siri, and Google's smart personal assistant serve users to answer questions, make suggestions, and perform actions on web services. Chatbots, which provide communication with audio/voice or textual methods in artificial intelligence sales, marketing and customer service areas, are used intensively through chatbots. According to the Gartner research firm, most new generation customers demand self-service. These new generation customers are against putting an intermediary person for a job or service that they can do on their own. Artificial intelligence has a key role in the development and effective use of the customer relations platform. (Smith, Anthony (2018)). Retail businesses use artificial intelligence to determine and implement growth, new revenue sources, profitable customer relationship management and strategies. AI can help automate routine sales, serve as a virtual assistant, dynamically segment customers, and personalize recommendations. To take full advantage of AI in today's retail environment, customer relationship management strategies need to be region-specific, time-specific, and channel-specific, as well as customer-specific. (Shankar, Venkatesh (2018)).

Artificial intelligence applications in In-Store Customer Experience Management

According to Schmitt, (Schmitt, Bernd H. (2003)) customer experience management is "the process of strategically managing a customer's entire experience with a product or a company". According to Grewal et al., (Grewal, Dhruv, Anne L. Roggeveen ve Jens Nordfält (2017),) customer experience includes all the stages that the customer comes into contact with from the moment he interacts with the shopping, good or service. Customer experience management represents a business strategy designed to manage the customer experience. It represents a strategy that provides a win-win value exchange between the retailer and its customers. Torlak and Altunışık (Torlak, Ömer, Remzi Altunışık ve Şuayıp Özdemir (2006)), stated that consumption is not only a functional benefit-oriented activity, but should be considered in the context of the general consumption

experience, where emotional and aesthetic elements are also taken into account. Varinli (Varinli, İnci (2012)), stated that experiential marketing is the method with the highest return on marketing investment for a brand.Grewal vd.'nin (Grewal, Dhruv, Anne L. Roggeveen ve Jens Nordfält (2017)) According to Grewal et al., customer experience and customer loyalty are among the most important goals of managers. It is also cited as one of the most important agenda and challenges in the coming years.

Creating a superior customer experience seems to be one of the main goals of today's retail environments. Retailers around the world have embraced the concept of customer experience management, and many have associated it with their mission statement. For example, Starbucks' success relies on creating a distinctive customer experience for its customers. (Verhoef, Peter C., Katherine N. Lemon, A. Parasuraman, Anne Roggeveen, Michael Tsiros ve Leonard A. Schlesinger (2009)). Customers' past experiences, store atmosphere, service interface, and store brands all play an important role in their future customer experience. Customer experience can be expressed as a holistic retailer response, taking into account the customer's subconscious, feelings, emotions, social and physical factors. (Grewal, Dhruv, Anne L. Roggeveen ve Jens Nordfält (2017)). If consumers are better understood, customer satisfaction and retail sales performance will increase. (Puccinelli, Nancy M., Ronald C. Goodstein, Dhruv Grewal, Robert Price, Priya Raghubir, ve David Stewart (2009)) Retail is not just about selling products, it is also directly related to experience. Because new consumers tend to acquire entertainment, education, emotion, loyalty and more information outside of normal shopping. (Deloitte (2015)). The consumer's in-store experience can be enhanced with an AI-based humanoid robot concierge (who welcomes customers) or robotic sales representative interacting directly with customers. An AI-based robot can help customers find what they're looking for or point them in the right direction. (Shankar, Venkatesh (2018)). Artificial intelligence-based robots are being adopted and actually used by some retailers to improve efficiency, in-store experience and customer service levels. Lowe's, the leading company of home improvement and DIY store retailing in the United States, uses the artificial intelligence-based "LoweBot" robot, which it started to use in the store, by communicating with customers, enabling them to more easily find the products they are looking for in the aisles, scan them and get information about the stock status of the product. In Russia, Lenta has implemented the "Promobots" robot, which will provide supermarket customer service, in the store. (Deloitte (2018); Gülşen, İzzet ve

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Şuayıp Özdemir (2018)). A similar artificial intelligence application, the electronics retail leader amazon.com, has recently introduced the "Amazon Go" application with the shopping slogan "grab & go" (Grab & Go). Customers enter the store with the "Amazon Go" application they download to their smartphones. He buys the products he needs during the shopping process and leaves the store. In other words, he leaves the store without waiting in line or scanning the products at the checkout. The shopping amount is also automatically sent to your amazon account. All these processes are performed using advanced artificial intelligence, computer technology, sensors, and advanced learning algorithms. (Gülşen, İzzet ve Şuayıp Özdemir (2018)).

Artificial Intelligence in Customer Service and Payment Management

Customer service is all activities done for customers to improve the customer experience. Customer service is more important than ever. Businesses have realized that the product or service offered in the fierce competition environment is not sufficient on its own. Another area where AI can be useful is in customer service. Customer service is very important to retailers because more than half of all consumers, especially the millennials born between 1980 and 2000, tend to leave the retailer altogether in case of poor customer service. (Shankar, Venkatesh (2018)). Chatbots, which provide communication with artificial intelligence, audio/voice or textual methods, provide retailers with the benefit of increasing both efficiency and satisfaction in the customer service experience. Working 24x7, retailers can provide a strong customer experience by eliminating waiting times through this system. Another area where AI is improving in the context of customer service is payment processing. PayPal's artificial intelligence system, for example, uses a deep learning model based on years of digital transactions to proactively detect and prevent transaction fraud. (Shankar, Venkatesh (2018)).

Artificial Intelligence Applications and Benefits

Artificial Intelligence Applications and Its Benefits When the literature on the subject is examined, it can be said that artificial intelligence applications benefit businesses operating in all sectors. However, the benefits of artificial intelligence, which is the subject of the study in this section, mostly to retail businesses and consumers, are compiled from the relevant literature and shown in Table 2 below.

Table 2. Benefits of Artificial Intelligence Applications in Retailing

Benefits to Retailer Business	Benefits to the Consumer
• Can automate processes • Increases efficiency and reduces costs • Increases sales • Provides competitive advantage • Improves customer satisfaction, loyalty and shopping experience • Provides supply chain and logistics optimization • Provides improved sales and stock management • It can make faster and more effective decisions on the collected big data. • Provides digital marketing optimization • Creates an unified channel experience • Provides real-like retailing in the virtual environment • Provides recognition of customers entering the physical store through face recognition and mobile technologies. • Provides personalized marketing activities in the physical and electronic store environment • Faster service and reduces customer waiting times in store • Provides more efficient and improved workforce allocation	• It can do unmanned shopping 24 hours a day, 7 days a week, anytime, anywhere and in any way. • Get service and shopping experience through chatbots, which are chatbots that communicate with audio/voice or textual methods. • You can do your shopping faster • Get an improved shopping experience • Provides improved service and convenience • Receive personalized marketing messages, coupons and price discounts • Be aware of suggestions, additional information and similar product information • Get a real-life shopping experience in the virtual environment without going to the physical store • Before purchasing products, you can see their appearance and functions in a virtual environment close to reality • It can reach its needs more easily with improved shelf layout and stock management. • The low costs that technology provides to the retailer can also be reflected in the product prices. • Over time, as the retail industry adopts artificial intelligence, it will provide different benefits.

Source: Gülşen, İzzet ve Şuayıp Özdemir (2018), "Technological Innovations and Applications in Retailing", Journal of Marketing Theory and Applications, 4 (1), 103-138.

When the benefits of artificial intelligence identified in Table 2 are examined, in addition to improved customer loyalty, customer experience, customer satisfaction; It has been determined that artificial intelligence is among the promises of making more informed business decisions, reducing costs, increasing revenues, increasing

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productivity, automating processes and works. According to research results of Infosys, (Infosys(2017)) it can be said that the benefits are similar to the ones in Table 2. In the Infosys research, "What are the benefits you provide in the use of artificial intelligence?" The results in Table 3 were obtained with the question.

Table 3. Proportional Benefits of Artificial Intelligence Applications in Retailing

Reducing costs	%49	Increasing employee knowledge and experience	%27
increase in productivity	%44	Faster service and product delivery	%26
Increase in revenues	%43	Descriptive and predictive analyzes	%24
More informed business decisions	%40	Testing and designing new ideas with consumers	%24
Solve business problems faster	%39	Increasing innovation	%22
Automate processes and jobs	%38	Opportunity to reach more experienced new employees	%11
Creating new sources of income	%35	I am not aware of any benefits	%1.0

As can be seen in Table 3, it seems that artificial intelligence is most effective on costs by automating processes and employing fewer employees at the rate of 49%. In the table, businesses have achieved an increase in efficiency with artificial intelligence applications by 44% and in the third place by 43% in revenues.

Looking at the rest of the table, the benefits of artificial intelligence are very important for retail businesses. It can be said that artificial intelligence applications provide a great competitive advantage to retail businesses both within the organization and within the sector in a sector where competition is very intense, profit margins are very low, and the features that distinguish one product from another are reduced.

Conclusion and Discussion

The business sector has become one of the locomotive industries of the country's economies, which is constantly developing in the light of economic growth and new technologies. Its share and importance in both the global and national economy is increasing day by day. Adopting technological innovations in these businesses is very important for several reasons. Technological innovations can provide businesses with a sustainable competitive advantage in the new economy, as well as the growth of brands and opening up to new markets. Uzkurt (Uzkurt, Cevahir (2017)), Uzkurt's technological innovations show themselves especially in the design, production of a new product or in the provision of technology-related services. Lovelock and Wirtz (Lovelock, Christopher ve Jochen Wirtz (2004)), stated that businesses should have an innovative approach in order to automate processes, reduce costs, provide superior service and experience to consumers, add attractiveness to existing products and develop new service concepts. Renko ve Druzijanic'e (Renko, Sanda ve Mirna Druzijanic (2014)) According to Renko and Druzijanic, retailers can benefit from the implementation of technological innovations both administratively and in terms of reducing costs. Or they can increase their sales through improved customer service. According to Solomon, (Solomon, Michael R. (2007)) radical developments in digital technology are one of the most important factors affecting consumer behavior, and its impact will increase as the number of people connecting to the Internet in the world increases. At a time when digital transformation is increasing rapidly in all sectors, artificial intelligence applications remain at the top of the agenda of innovative enterprises. Retail businesses are not exempt from this phenomenon. The adoption of artificial intelligence has created great excitement for the future in many retail businesses. It is a known fact that the increasing costs of retail businesses, decreasing profit margins and increasingly intense competition force decision makers to discover innovative solutions. In this context, artificial intelligence applications for retail businesses, improved customer loyalty, customer

experience, customer satisfaction; It can be seen as a great opportunity to make more informed business decisions, reduce costs, increase revenues, increase productivity, automate processes and jobs. Artificial intelligence technology, mobile technology and applications that enable the digital transformation of businesses, Internet of Things (IoT), virtual reality (VR), augmented reality (AR), autonomous robots, blockchain, smart sensors, cloud computing, cyber physical systems, biometric and cyber security It can be said that technologies have a very important role in terms of providing holistic solutions. Undoubtedly, on the basis of the success of Amazon.com and Walmart, which are the inspiration for many e-retail business models in the digital economy, understanding consumer behavior, predicting, personalizing, product recommendation, excellent customer experience, fast payment method, stock optimization, supply and logistics, Along with other technologies, artificial intelligence technology plays a prominent role. The electronic retail company Amazon, which started a new era in the retailing sector by using advanced computer technology, sensors and advanced learning algorithms based on artificial intelligence, the "Amazon Go" application of unmanned stores, at least as a prototype, "autonomous retailing is possible". can be taken as an indication that Artificial intelligence applications are a technology that is still developing and adopted by a limited number of retailers. However, with the widespread use of artificial intelligence in the near future, it can be predicted that both physical (offline) stores and electronic (online) stores will create a transformational change or quantum leap effect in marketing activities, operational areas, stock optimization solutions, logistics and supplier relationship management throughout the industry. In addition, it can be said that in the near future, humanoid artificial intelligence-based autonomous expert systems that have the ability to learn, remember, feel, identify and solve problems through data discovery will take place in the near future.

To summarize the result, the possible effects and benefits of artificial intelligence technology on the retail industry are expected to be as follows:
- A higher level of experiential marketing and consumer experience
- Increased customer satisfaction and loyalty
- Media optimization
- Stock optimization
- Stronger supply, logistics, retail and consumer relationship
- Making more informed business decisions
- Higher sales

• Decreased transaction costs
 • Widely integrated channel (Omnichannel)
• Decreasing of traditional retailing
• Increasing autonomous retailing

A digital business platform that will provide more flexible, agile and 24/7 uninterrupted service for new consumers As stated in the report of the Accenture research firm, retailers reduce errors, reduce costs, increase profits, increase profits, reduce errors in transactions that require human judgment, with artificial intelligence-based autonomous systems. provides customer satisfaction, offers differentiated value propositions, and saves employees time for other business areas. (Spitz, Courtney, et. al. (2018)). Based on all these results, in today's market where the macro environment and micro environment are constantly changing, it is a necessity for the marketing management of retail businesses and especially senior managers to read the change well and to have digital awareness in the context of sustainable competition of the business. Digitally conscious organizations can anticipate the promises, benefits, threats and potential impacts of emerging new technologies. Managers with digital consciousness can analyze the internal and external environmental factors of the business better than their competitors, in the light of developing new technologies, and can make the digital business design of the business and the selection of strategies more successfully.

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POSSIBILITIES FOR DEVELOPING AND IMPLEMENTING A MOBILE APPLICATION FOR RECOGNIZING THE SHAPE OF THE ENVIRONMENT, TEXT, AND READING QR CODES USING THE ANDROID CAMERAX FRAMEWORK AND THE MACHINE LEARNING KIT

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Abstract
The advancement and development of digital technologies have resulted in the need to network various devices at the application level. Wireless communication between devices via the Internet has opened a plethora of possibilities for enhancing user capabilities. We are witnessing dizzying changes in computer technology, and we can conclude that the device's purpose is no longer narrowly defined. The mobile phone is evolving into a personal computer, innovative features are being added to today's televisions, and cameras can process and send photos. These are merely a few examples of universal electronic devices. Of course, for the device to perform all these functions, adequate hardware infrastructure integrated into the device itself is required, as is the fundamental software component that connects user

operations and the components themselves - the operating system. This paper's operating system under consideration is the Android operating system, which is currently the most popular operating system for smart devices.

Keywords: *machine learning; Android; QR codes.*

JEL Classification: O14

Introduction

The paper aims to analyze the possibilities of combining the Android CameraX framework with the Machine Learning Kit to create and implement a mobile application for recognizing the shape of the environment, text, and QR codes. To fully describe the technology that will be used for this project, the concept of machine learning (*MLKit*) and *CameraX* software must be introduced. The first section, i.e., the second chapter of this paper, will cover the theory of the Android operating system and a description of the functionalities and libraries used in the project itself. The second section of the paper will cover a theoretical introduction to machine learning (*Machine Learning Kit*), machine learning applications within the Android operating system, and an explanation of all machine learning tools. The third section will explain *CameraX* Framework support in Android systems and introduce the understanding of the solution's implementation. It discusses how to use an Android device's camera and explains how it works.

1. *Android Applications and Operating System*

Google's Android is an open-source operating system based on the Linux kernel. It is intended for various devices, ranging from mobile phones, where it is most prevalent, to smartwatches, fitness devices, home appliances, and televisions. This applicability on a wide range of devices is due to the Android operating system's ability to separate the hardware from its software. Android is based on the direct manipulation of objects on the screen through touch inputs, as evidenced by the appearance of touch screen mobile phones. This chapter will provide a brief overview of Android's history, the structure of an Android application, the operating system's architecture, and system applications. Finally, a brief overview of the libraries used in this project will be provided, followed by a more detailed explanation in Chapters Four and Five.

Using the language, you can create applications for the Android platform in a variety of ways: C/C++, Java/XML, Basin/XML and HTML5.

When the C/C++ programming languages are used for application development, we refer to them as "native applications" (native applications). These are the most fundamental applications. To bring this up to speed, consider the software stack architecture. The software stack is divided into three basic levels:

- HAL (Hardware Abstraction Layer)
- PAL (Platform Abstraction Layer)
- Application Layer (AL)

Native applications run on the platform layer or the layer between the PAL and AL, known as middleware, and serve to translate a user application into a machine-readable language. This approach is required when creating the performance or managing the resources so that only a small number of developers deal with this method of developing applications.

The most common type of Android application is written in the Java / XML or Kotlin / XML language, and it is programmed on the application layer of the software stack. Java is a virtual machine-required language, and Android employs the Android Runtime (ART) virtual machine for this purpose. This virtual machine has been in use since the Android operating system's version 5.0 (Lollipop) replaced the Dalvik virtual machine. The Dalvik virtual machine does not accept standard Java class files and instead uses its format: Dalvik Executable (DEX). In contrast to standard Java applications, which contain multiple class files, DEX consolidates all class files into a single. dex file. The main distinction between the ART virtual machine and the Dalvik VM is that ART translates a substantial portion of the executable byte code into machine native language during installation, so restarting the application does not necessitate a complete translation of the applications.dex executable byte code into machine language. ML (*Extensible Markup Language*) is used to create resource files as well as files that contain some functional data and contracts within the application.

The Android platform is made up of a variety of components that can be divided into six categories:

- Linux kernel
- HAL - A hardware abstraction layer
- Native Libraries (source libraries)
- Android Runtime (executable environment)
- Java API framework

This layered structure is what sets the Android operating system apart. This structure implies that the operating system comprises several layers that build on top of one another. Each layer has specific functions described through its interface to the higher layer; more specifically, each layer implements the higher layer's coupling.

2. *Technology Used for Model Development*

When it is discussed about the programming language for developing Android applications on which this paper is based, it is referred to the Java programming language, which is used to write the source code. It is written in text files with the.java extension, compiled and translated into byte code, then executed using the previously mentioned virtual machine. The difference between Android and regular Java applications is that ART virtual machines do not read traditional bytecode but instead require compiled binary code in the DEX format. .jar Java archives contain both classic.java and compiled. class files. The Android executable environment does not recognize Java archives but bundles all files from a single application in a particular format known as an Android Application Package (APK) file with the extension.

A Java Development Kit (JDK) must be installed on the computer for an Android application to be successfully created. Following that, the Java source code must be translated into a form understandable by ART, which necessitates using a special compiler. Other tools, such as linkers, debuggers, and libraries with built-in functions, are required to run the code. All these components are bundled together under the banner of the Android Software Development Kit (SDK), which consists of the following units: SDK Platform, SDK Tools, Sample Apps, Documentation and Android Support.

Following these prerequisites comes the Android platform's ultimate development environment, an Android Studio application.

Android Studio is an integrated development environment that manages the complexities of developing Android applications. It is built on the IntelliJ IDEA development platform. Android Studio makes it simple to test, debug, and, most importantly, build applications. It does all the work of compiling code into DEX binary format and connecting the code to the JDK and Android API libraries. It includes predefined functions and special libraries for developing Android apps for a variety of devices. It is distinguished by a detailed overview of the possibilities for interaction with the developer, a presentation of the application's structure, and

a comprehensive tool for testing applications. It supports the entire application development process, from the design of the user interface to the software solution and the ability to oversee databases. Android Studio is now regarded as one of the most comprehensive software environments for developing user applications.

This project will use the most recent version of the environment, Android Studio Arctic Fox 2020.3.1, as illustrated in Figure 1.
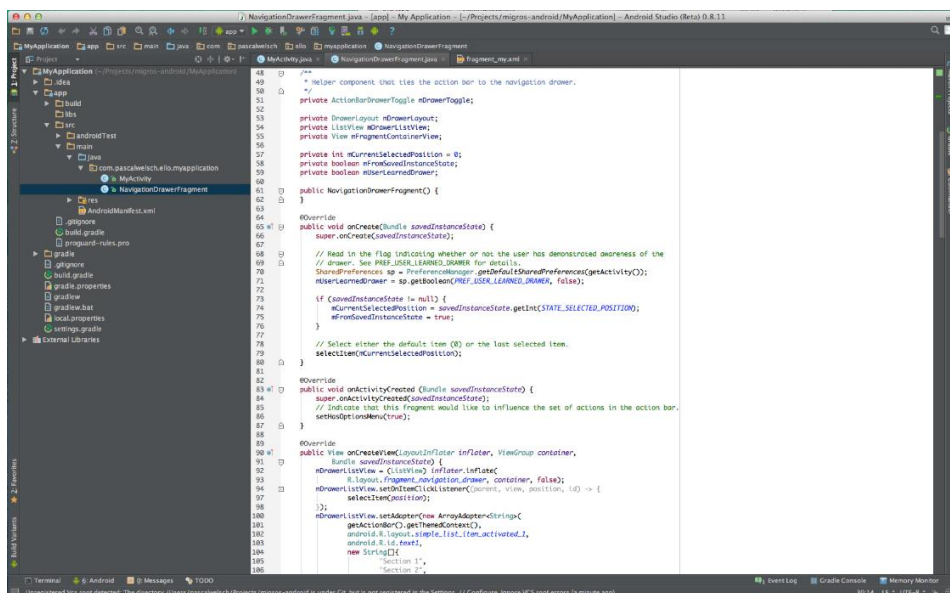
Fig. 1. Android Studio Development Framework

3. *Machine Learning*

At the outset, it will be explained what machine learning is, how it works, and what applications it has. Machine Learning (ML) is a branch of statistics and computer science that enables a computer to learn how to perform a specific task without being pre-programmed.

Machine learning is based on the idea that generic algorithms can show something interesting about a set of data without the need to write custom code for the problem. Rather than writing code, data is fed into the generic algorithm, generating its logic based on the data.

The classification algorithm, for example, is one type of such algorithm. It can store data in various groups. Without changing a single line of code, the same classification algorithm used to recognize handwritten numbers could be used to classify emails as "spam" or "not spam." The algorithm is the same, but different training data are fed into it, resulting in different classification logic.

The machine learning algorithm is a black box, creating its logic based on data. Many of these types of classification algorithms are covered under the umbrella term "machine learning." Machine learning is divided into two categories: supervised learning and unsupervised learning. The main distinction is whether the samples are labelled, whether the computer is told which (for example) images contain the terms we want to recognize or whether we let it try to understand the structure of the input.

Machine learning has a wide range of applications in a variety of industries.

- Text categorization based on topic, expressed feelings and/or attitudes, and the like
- Text machine translation Understanding has spoken language
- Image face recognition
- Segmenting the market
- Observing the use of various applications
- Autonomous vehicles (*self-driving cars*, for example) and many more.

ML Kit is a mobile *SDK* that enables Google's machine learning tool within Android applications. Google's machine learning tool is free, giving developers maximum flexibility in its application.

The ML Kit API is compatible with all devices with an *API* level greater than sixteen, specifically all Android devices running Android version 4.1 or higher. This range enables Google machine learning tools to be used on 99.8% of current devices, effectively covering the entire market.

The ML Kit comprises ten completed APIs that allow you to work with various areas of machine learning. This paper will go over the following APIs: Recognition of text, Face recognition, Detection of body position, Image recognition for selfies, Scannable barcodes, Image tagging, Detecting and tracking objects and Text recognition in digital form.

Android applications that read data encoded in standard bar code formats can be easily created by using the bar code scanning API. Scanning bar codes is done on the user's device and does not require an internet connection.

Bar codes are a quick and effortless way to transfer data from the real world to a mobile application. For example, a 2D format such as a QR code, contact information, or Wi-Fi data can be encoded. When the user scans the bar code, the ML Kit automatically processes the scanned data, allowing the application being developed to provide answers intelligently.

The following reading formats are supported: Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, UPC-A, UPC-E, Aztec, Data Matrix, PDF417 and QR Code.

The barcode scanning API supports scanning all barcode formats simultaneously without specifying which format is required. Marking a specific format, on the other hand, speeds up the scanning process. Figure 2 depicts a processing example.

The following barcode formats are not supported:

• 1D bar codes with only one character ITF bar codes with fewer than six characters

• FNC2, FNC3, or FNC4 bar code formats

• In ECI mode, QR codes are generated

Result		
Corners	(87,87) (612,87) (612,612) (87,612)	
Raw value	WIFI:S:SB1Guest;P:12345;T:WEP;;	
WiFi information	SSID	SB1Guest
	Password	12345
	Type	WEP
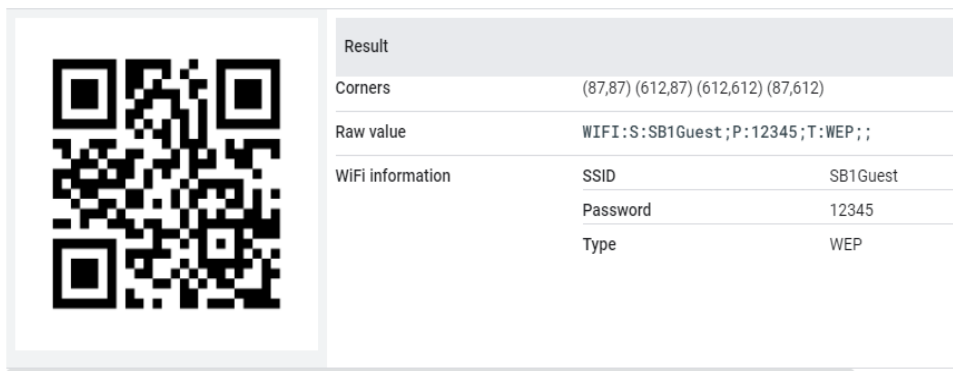
Fig. 2. Example of generation

4. *Camerax Framework*

CameraX Framework is a collection of libraries designed to make working with Android devices' cameras easier. Developing applications that use a camera has always been demanding, but these applications are also the most dynamic on the user side. CameraX allows us to use the API that runs on most Android devices, with background support up to Android 5.0. (API Level 21).

CameraX extends the capabilities of the old Camera2 API, which has been updated to collaborate with the Android camera. Prior to the Camera2 API, the original Camera API was used, which is now deprecated and replaced by the Camera2 API, which is still in use.

CameraX makes all functionalities easily accessible and allows for their implementation in a small number of lines of code. In addition, the old API's compatibility issue with older generation devices has been resolved.

In the following ways, this framework improves the developer experience:

1. Simple to use - CameraX has introduced a new feature in Android called use cases, which allows developers to focus on the tasks at hand rather than configuring the device. There are two fundamental applications:

a. Preview - This function displays the image on the screen (camera view)

b. Image Analysis - Gain access to the processing of individual camera frames and send them to custom algorithms. The ML Kit will be used in the upcoming Android application.

c. Image Capture - Maintains high-quality images.

These use cases are compatible with all Android devices running version 5.0 or higher.

2. Device consistency - Managing the consistency of camera behaviour in an app is a challenging task. Numerous functionalities must be considered, including aspect ratio, orientation, rotation, image preview size, and high-resolution image size. CameraX makes it simple to work with all the cameras, as mentioned earlier behaviours.

3. New camera experience - CameraX includes an optional add-on called "Extensions," which gives you access to the same features and capabilities as the built-in camera app on a specific Android device. In other words, devices with HDR, Night, Portrait, Beauty, and other camera modes can be used with the CameraX API

4.1 Architecture

The architecture of the CameraX Framework will be described in detail below, including its structure, how to work with the API, how to use the lifecycle, and how to combine use cases.

Developers use CameraX to access the device's camera via a "use case." Currently, the following use cases are available:

• Preview - Uses the PreviewView class to display the image on the screen (camera view).

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• Image Analysis - Gain access to the processing of individual camera frames and send them to custom algorithms such as ML Kit.

• Image Capture - Maintains high-quality images.

Usage scenarios can be combined. For example, an application can use the Preview case to show a user an image that the camera sees, the Image Analysis case to determine if people in the picture are laughing, and the Image Capture case to take a picture all simultaneously time.

A few things must be specified when working with the *CameraX* library:

• Use case with the necessary configuration

• How to manage feedback

• Camera execution flow, such as when to activate the camera and when to capture and process data

The set () method is used to configure the usage case, followed by the *build* () method. Each use case has its API, such as the *takePicture* () method in the "Image Capture" use case.

CameraX uses life cycles to determine when a camera should open, when an image capture session should be started, and when to steal to interrupt and shut down camera execution.

When working with an Android camera, the CAMERA permission must be added to the application. Except for devices running Android version 10.0 and higher, *WRITE_EXTERNAL_STORAGE* is required to save images to files. During application execution, permissions must be requested from the user (requesting runtime permissions).

CameraX must meet the following minimum requirements to run on the device:
Level 21 of the Android API

• *FragmentActivity* or *AppCompatActivity* is required for life cycle activities in Android Architecture Components 1.1.1.

CameraX must be included in the *build.gradle* files to be used as part of an Android project.

The following line of code must be added to the project's *build.gradle* file:

```
allprojects {
    repositories {
        google()
        jcenter()
    }
}
```

Fig. 3. Code added to the project's build.gradle file

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The following code must be inserted into the "Android" block:

```
android {
    compileOptions {
        sourceCompatibility JavaVersion.VERSION_1_8
        targetCompatibility JavaVersion.VERSION_1_8
    }
    // For Kotlin projects
    kotlinOptions {
        jvmTarget = "1.8"
    }
}
```

Fig. 4. Code inserted into the „Android" block

Each module that is used must be added to the application build.gradle file:

```
dependencies {
  // CameraX core library using the camera2 implementation
  def camerax_version = "1.0.1"
  // The following line is optional, as the core library is included indirectly by camera-camera2
  implementation "androidx.camera:camera-core:${camerax_version}"
  implementation "androidx.camera:camera-camera2:${camerax_version}"
  // If you want to additionally use the CameraX Lifecycle library
  implementation "androidx.camera:camera-lifecycle:${camerax_version}"
  // If you want to additionally use the CameraX View class
  implementation "androidx.camera:camera-view:1.0.0-alpha27"
  // If you want to additionally use the CameraX Extensions library
  implementation "androidx.camera:camera-extensions:1.0.0-alpha27"
}
```

Fig. 5. Each module that is added to the application build

4.2 *Configuration*

Each use case must be configured to control various aspects of the use case's operations. For example, in the "Image Capture" use case, you can change the aspect ratio and the flash mode.

CameraX automatically configures configuration parameters based on the device on which the application is running. For example, if no resolution has been

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specified manually previously, or if the resolution defined by the developer is unsupported, CameraX will automatically determine which resolution is best to use. The library provides all these features, removing the developer's need to write custom code for each device.

4.3 *Preview* use case

When adding a camera preview to an application, the PreviewView class, a View that can be cut, scaled, or rotated depending on the screen on which it is displayed, should be used.

4.4 *Image analysis* use case

The "Image Analysis" use case (case for image analysis) provides the application with a processor image that is used to process the image (e.g., in combination with the ML Kit). The application performs image analysis on each frame that the Preview use case displays.

Images are processed in such a way that they are sent to the executor, where image analysis begins.

The example code in Figures 6 and 7 demonstrates how to implement image analysis as well as how to connect the use cases for image analysis and camera display with the camera life cycle.

Image analysis can be performed in two modes [14]:
1. Mode of blocking
2. Mode of non-blocking

Calling the *setBackgroundStrategy* () method and passing the *STRATEGY_BLOCK_PRODUCER* parameter activates the lock mode. The image processor receives camera frames in sequential order in this mode. This means that if the analyze () method takes longer than the latency of one frame in the current array of frames, the frames may be out of date because new frames are not forwarded for processing until the method returns a return value.

Calling the *setBackgroundStrategy* () method and passing the *STRATEGY_KEEP_ONLY_LATEST* parameter activates the non-blocking mode. The image processor receives the last available frame that the camera recorded when the analyze () method was called in this mode. Some frames may be ignored if the method lasts longer than the latency of a single frame in the current sequence of frames.

It is necessary to call the image before returning a value from the analyze () method.

To avoid memory filling, use the close () method.

CameraX produces images in the YUV 420 888 format.

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4.5. *Image capture* use case

The image use case was created to take high quality and high-resolution images. There are two ways to invoke the image capture method:

• *takePicture* (Executor, *OnImageCapturedCallback*) - this method saves the downloaded image to the memory buffer

• *takePicture* (*OutputFileOptions*, Executor, *OnImageSavedCallback*) - this method saves the downloaded image in the forwarded file location

Basic image download functionalities are available for use as part of the case for downloading images. For the best image optimization, you need to set the *ImageCapture.CaptureMode* parameter to *CAPTURE_MODE_MINIMIZE_LATENCY*, while for the best image quality, you need to set it to *CAPTURE_MODE_MAXIMIZE_QUALITY*.

The following code shows an example of how to configure an image download application:

```
ImageCapture imageCapture =
    new ImageCapture.Builder()
        .setTargetRotation(view.getDisplay().getRotation())
        .build();
```

Fig. 6. Configuring an image download application

After configuring the camera, the following code generates an image in response to a user action (in this case, a *onClick ()* action):

```
public void onClick() {
    ImageCapture.OutputFileOptions outputFileOptions =
        new ImageCapture.OutputFileOptions.Builder(new File(...)).build();
    imageCapture.takePicture(outputFileOptions, cameraExecutor,
        new ImageCapture.OnImageSavedCallback() {
            @Override
            public void onImageSaved(ImageCapture.OutputFileResults outputFileResults) {
                // insert your code here.
            }
            @Override
            public void onError(ImageCaptureException error) {
                // insert your code here.
            }
        }
    );
}
```

Fig. 7. action onClick()

5. *Practical Application of the Developed Model*

The designed and implemented model for recognizing objects, text, barcodes and faces with the results of successful reading is shown in Figure 8.
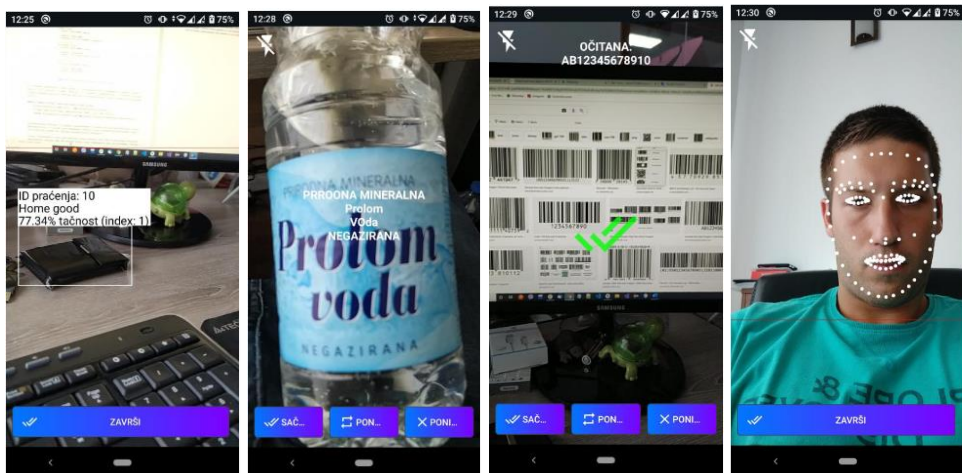
Fig. 8. Execution of key functionalities of the developed model (from left to right: Object recognition; Text recognition; Barcode recognition; Face recognition)

Given the complexity of the realized model, the description of the logic of the realized functionalities will be presented with selected elements of importance. The logic of the application is defined by the AndroidManifest.xml file, which serves to describe the basic information related to the application itself, related to the Android operating system and Google Play. It also defines the permissions that the application uses and registers all external and internal services. The manifest file also serves to register all the activities used in the application, and this is shown below.

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```xml
<activity android:name=".activities.LauncherActivity"
    android:screenOrientation="portrait">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />

        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
</activity>
<activity
    android:name=".activities.IstorijaActivity"
    android:parentActivityName=".activities.MainActivity"
    android:screenOrientation="portrait" />
<activity
    android:name=".activities.FaceActivity"
    android:screenOrientation="portrait" />
<activity
    android:name=".activities.ObjectActivity"
    android:screenOrientation="portrait" />
<activity
    android:name=".activities.TextActivity"
    android:screenOrientation="portrait" />
<activity
    android:name=".activities.BarcodeActivity"
    android:screenOrientation="portrait" />
<activity
    android:name=".activities.MainActivity"
    android:screenOrientation="portrait"/>
```

LauncherActivity contains a nested tag <intent-filter> in which it is defined that LauncherActivity is the entry point of the application, i.e. when the application is launched, this activity will be the first to be displayed. LauncherActivity has one basic function - starting the animation and, after the successful completion of the animation, starting the MainActivity activity. Animations are defined as special XML files located in the anim resource folder. In the onCreate () method of the activity that is called when the activity is created, the animation itself is started, as well as all the necessary variables are initialized. The following is the starting code of the LauncherActivity java class.

```java
public class LauncherActivity extends AppCompatActivity {

    private Animation fadeOut, fadeIn;
    private LinearLayout root;
    private boolean fade;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_launcher);

        root = findViewById(R.id.root);

        fadeOut = AnimationUtils.loadAnimation( context: this, R.anim.fade_out);
        fadeIn = AnimationUtils.loadAnimation( context: this, R.anim.fade_in);

        root.startAnimation(fadeOut);

        fadeOut.setAnimationListener(fadeListener);
        fadeIn.setAnimationListener(fadeListener);
    }
}
```

The demanding logic of the realized model is the logic of reading and processing itself frames from the camera. Each activity that works with the camera is defined separately, and each analyzes the image in its own way. The logics of all activities that work with the camera are very similar so that a characteristic part of the logic for scanning bar codes will be shown, as well as the differences found in other activities.

All parameters used for activities are defined as class fields BarcodeActivity. Objects scanner_view, imagine, flash and last_read after initializations in the onCreate () method point to equivalent View elements within the activity_barcode.xml file. Variables soundManager, foundBarcode, capturedBitmap, DateRead, hasFlash and cameraRunning are used for tracking and maintaining the various conditions required during the execution of activities. Finally, the variables camera, previewView, cameraProviderFuture, and cameraProvider serve to work with the camera. The following are the declarations of the basic variables as well as the onCreate method.

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```java
// camera
private Camera camera;
private PreviewView previewView;
private ListenableFuture<ProcessCameraProvider> cameraProviderFuture;
private ProcessCameraProvider cameraProvider;

// view
private ScannerView scanner_view;
private ImageView imageDone;
private ImageView flash;
private TextView poslednja_ocitana;

// units
private SoundManager soundManager;

private String pronadjenBarkod;
private Bitmap capturedBitmap;
private String datumOcitavanja;

private boolean hasFlash;
private boolean cameraRunning;

@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_barcode);

    soundManager = new SoundManager(getApplicationContext());

    previewView = findViewById(R.id.previewView);
    poslednja_ocitana = findViewById(R.id.poslednja_ocitana);
    scanner_view = findViewById(R.id.scanner_view);
    imageDone = findViewById(R.id.image_done);
    Button sacuvaj = findViewById(R.id.sacuvaj);
    Button ponovi = findViewById(R.id.ponovi);
    Button ponisti = findViewById(R.id.ponisti);
    flash = findViewById(R.id.flash);

    sacuvaj.setOnClickListener(onSacuvajClick);
    ponovi.setOnClickListener(onPonoviClick);
    ponisti.setOnClickListener(onPonistiClick);
    flash.setOnClickListener(onFlashClick);

    cameraProviderFuture = ProcessCameraProvider.getInstance( context: this);
    startCamera();
}
```

Conclusion

This scientific paper addressed both theoretical and practical aspects of the development and use of Android-based applications.

The theoretical section described how the Android software stack functions and how the application layer communicates with the lower layers. It is demonstrated how Android libraries function and how the Android Studio development environment integrates all of this into a single project. The theoretical part of the CameraX library and the ML Kit and its implementation are then explained.

In this paper's practical section, an application was created to demonstrate how the ML Kit works in conjunction with the CameraX library. Scanning bar codes, detecting environmental objects, scanning digital text, scanning faces, creating a database, storing data and images, and so on were all performed. This paper is a functional application incorporating all the above features.

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CAN WE PREDICT THE EFFECTS OF USING THE INTERACTIVE FEATURES OF THE WEBSITE?

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Abstract

This paper aims to determine the effects expected on users after introducing interactive features in the website. For this purpose, three models by Song, Liu and Wu were compared, which gives this paper an extraordinary precision and depth of research on the given problem. The paper's contributions are reflected in a comprehensive, detailed review of previous research on interactivity, the importance of using the website and showing the specific effects expected from users after introducing interactive website features. Furthermore, the paper's contribution is reflected in recognising the importance of site interactivity in job search/training courses/internships. Finally, users who used the interactive site compared to non-interactive sites had a significant increase in activity.

Keywords*: interactivity; website interactivity; perceived interactivity; customer satisfaction.*

JEL Classification: O14

Introduction

The method of today's business implies the use of digital marketing tools in daily communication with consumers. The most commonly used tool for encouraging two-way communication is the company website. The website is the mirror of the company and has a significant impact on creating images in the minds of consumers regarding the company. [Miller 2010; Ryan, Jones, 2009; Reed, J. 2012]. The distinction between the companies is fair usage of digital marketing, i.e. web sites and their adjustments to the users to achieve more significant customers' satisfaction. Many papers have been written on researching the interactivity that can be achieved with the site user. Thus we know that the introduction of interactive features of the website increases the interactivity with the user [Downes, Mcmillan 2000; Liu, Shrum 2002; McMillan, Hwang 2002; McMillan 2002; Liu, 2003; Albert, Goes, Gupta, 2004; Johnson, Bruner, Kumar, 2006; Wu 2006; Song, Zinkhan 2008; Jiang et al. l, 2010, Trevinal, 2014, McLean, 2017, Ye et al., 2017, Islam et al. 2019, Wu, 2019].

The primary goal of this paper is to compare three modules for research of the interactivity written by the authors' Song, Liu and Wu, analysis of the mentioned models and application of the Song model [Song, Zinkhan 2008] to obtain effects on consumers after the applied interactive features of the website. As a result of the research is expected to define specific products that owners can expect to achieve with users by introducing interactive elements into their websites.

1. Literature Review
1.1. Interactivity

Numerous studies have researched the concept of interactivity. Depending on the angle of viewing this concept, authors focus on the process, features, perception or a combination of these [McMillan, Hwang, 2002; Steuer 1992; Rogers, 1995; Johnson et al., 2006; Wu, 2005; Chung and Zhao, 2004; Song, Zinkhan 2008].

The effects investigated by authors in their works mainly refer to the attitude towards websites [Wu 1999; McMillan, Hwang, 2002; Song, Zinkhan 2008]. The attitude towards websites has been conceptualised by numerous authors [Chen, Wells 1999, Wu 1999; Bruner, Kumar 2000; Coyle, Thorson 2001; Bruner, Kumar 2002].

Satisfaction is another outcome of interactivity. Satisfaction is associated with a user's active control over the content, representing a desired psychological state [Yuping, Shrum 2002]. Satisfaction was measured based on research in Fornell et al., adapted by authors Song and Zinkhan (2008). The overall website quality and loyalty are calculated based on instruments used by Song and Zinkhan 2008. Some authors, such as Wu (1999), investigate only the relationship between perceived interactivity and the attitudes towards websites formed by consumers. However, a group of authors observe several effects, such as Song and Zinkhan (2008). They, in their work, also investigate the attitude towards websites, as well as satisfaction, the overall website quality, loyalty intention, and repeat purchase intention. Several authors have identified some of the above effects but have not proven them empirically [Liu, 2003]. Interactivity, vividness, and involvement are the significant factors influencing virtual experience and behaviour, and that involvement and flow enhance product value, which in turn impacts virtual behaviour [Cheon, 2013].

1.2. Website

Many authors have investigated digital marketing, and in their research, they have considered digital marketing tools. They have used various classifications of digital marketing tools, but all authors agree that one of the essential tools is a website [Miller, 2010; Ryan, Jones, 2009; Reed, J., 2012]. Author Ryan puts a website in the centre of the digital world as the most crucial element in the entire digital marketing strategy [Ryan, 2014]. Charlesworth (2014) also mentions the significance of websites for the digital marketing strategy with the statement "you are your website". In addition, the digital presence of service employees on the firm website increases current website service quality perceptions [Herhausen et al. l, 2020].

2. Methods
2.1. Research Design And Methodology

Based on previosu research we realize that the website is the primary tool for communication between company and users and that's the reason for using website in this research. Further, we created same job/ practice/ training course advertisements presented thorughgt interactive and non-interactive website.

Elements of interactivity discussed are reviewed in the works of the author Wu (2005). Interactive websites include features such as the ability to send links to friends, apply for jobs, practice skills, or take training courses online, as well as a

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website map, email hotlink, Online Chat Room, dropdown search menu, website search, and tags. As an added benefit, an interactive website gives users the option to share website content via other social media platforms such as Facebook, Google+, Linked-In, Pinterest, or Reddit, and is integrated with other digital marketing tools such as mobile marketing and e-mail marketing.

Although a large number of authors have been researching interactivity, this work is specific in that it crosses three models for interactive research. Previous research has shown that the impact of interactive characteristics exists but this work goes deeper into the analysis and explores exactly what effects we can expect in users behavious, which is why the following hypothesis is set:

H0: Known effects on consumers are created through the use of interactive website features

The number of actions taken by site users increases when communicating with candidates when using interactive features of the website, leading to the formulation of a new hypothesis if we observe a group of respondents interested in looking for work or any professional training in the form of training courses or internships.

H1 When communicating with job/internship/training course candidates via the website, adding interactive features encourages more people to take action.

2.2. Pre-Test

Before testing, we performed a pre-test which included 350 students of the School of Electrical and Computer Engineering, Belgrade. All the respondents were in the first year of studies. Respondents completed a survey. Based on the given answers, we singled out 120 students interested in looking for a job/ practise/ training course on the website.

2.3. Main Survey

In the primary survey, the students singled out in the pre-testing stage were divided into six groups of 20 students each. Selected students were randomly given an interactive and non-interactive website and a 30-minute time to view the websites obtained.

2.4. Research Instruments

After a given time of 30 minutes, respondents received questionnaires, prepared according to the mentioned works of the author Wu [Wu, 1999], Song [Song, Zinkhan 2008], and Liu [Liu, 2003].

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T-tests for large independent samples were used to compare the responses from people who used interactive and non-interactive websites. The statistical significance ranged from a p-value of 0.05 to a p-value of 0.01. It was necessary to use SPSS (Statistical Package for the Social Sciences) to perform the statistical analysis. 20.

During data processing, it is noted that there are incorect completed questionnaires that have been removed from further processing. This is why the number of respondents decreased from 120 to 99. The number of respondents who used interactive and non-interactive site has been changed to 51 and 48. There is no statistically significant difference between the two groups despite the fact that the number of respondents is not the same in each one. We now know that the groups are uniform in terms of how many people responded, so we can move forward with analyzing the rest of the data.

3. Analysis of results Of Subtest In Research Model

The first step in testing a hypothesis is to establish statistically significant differences between the interactive and non-interactive websites according to subtests. Then a more profound analysis is undertaken by the questions used in the survey which belong to these subtests.

Table 1. Subtests in the research model

	Website type	M	SD	t	p
Attitude towards the website	Interactive	5.7516	1.09106	2.599	**.011**
	Non-interactive	5.1667	1.14854		
Satisfaction	Interactive	4.6797	.93799	2.436	**.017**
	Non-interactive	4.1875	1.07168		
Overall website quality	Interactive	5.5294	1.00206	3.469	**.001**
	Non-interactive	4.7708	1.17128		
Loyalty intention	Interactive	4.7843	1.49444	1.433	.155
	Non-interactive	4.3625	1.43017		

M – Arithmetic mean (average value of variables in the sample); SD – Standard deviation (average deviation of individual variable values from the sample average); t – t-test, p- statistical significance

After performing the analysis, it is established that there are statistically significant differences in the three subtests.

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Table 2. Respondents' answers to questions within the subtests

	Website type	M	SD	t	p
Attitude towards the website					
I think the website is good	Interactive	5.8627	1.21687	1.628	.107
	Non-interactive	5.4583	1.25407		
I think the website is suitable	Interactive	5.8039	1.13172	3.041	**.003**
	Non-interactive	5.0208	1.42156		
I think the website is appealing	Interactive	5.5882	1.38819	1.978	**.051**
	Non-interactive	5.0208	1.46577		
Satisfaction					
I am satisfied with the experience on the website	Interactive	5.4510	1.47396	2.499	**.014**
	Non-interactive	4.7292	1.39512		
This experience of looking for a job online is what I wanted	Interactive	4.7843	1.57878	.692	.490
	Non-interactive	4.5417	1.90138		
This online experience did not go as I had imagined	Interactive	3.8039	1.26522	1.662	.100
	Non-interactive	3.2917	1.77402		
Overall website quality					
The overall quality of looking for a job on a website is	Interactive	5.4706	1.20587	2.397	**.018**
	Non-interactive	4.8542	1.35253		
My feelings towards the website are	Interactive	5.5882	1.08030	3.830	**.000**
	Non-interactive	4.6875	1.25742		
Loyalty intention					
I will encourage my friends and relatives to look for a job on this website	Interactive	4.8824	1.63275	1.596	.114
	Non-interactive	4.3125	1.91474		
I will tell positive things about the website to other people	Interactive	5.1765	1.63347	1.383	.170
	Non-interactive	4.7292	1.58100		
I will continue using the website to look for a job in the future	Interactive	4.7451	1.75320	1.539	.127
	Non-interactive	4.1875	1.85261		
I would recommend this website to someone who asks me for advice	Interactive	5.1176	1.77366	1.043	.300
	Non-interactive	4.7500	1.73205		
I consider this website my primary source of information regarding jobs on the market	Interactive	4.0000	1.66132	.509	.612
	Non-interactive	3.8333	1.58897		

M – Arithmetic mean (average value of variables in the sample); SD – Standard deviation (average deviation of individual variable values from the sample average); t – t-test, p- statistical significance

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- "Attitude towards the website" (respondents who used an interactive website have a higher score, M=5.75),
- "Satisfaction" (respondents who used an interactive website have a higher score, M=4.68) and
- "Overall website quality" (respondents who used an interactive website have a higher score, M=5.53).

Results Of Respondents By Answers Within The Research Model

Look in detail at the respondents' answers within each subtest. You can see questions on which there is a statistically significant difference in the respondents' responses to the interactive and non-interactive sites.

Within the subtest "Attitude towards the website", statistically significant differences occur in the following questions:

- "I think the website is suitable" – the interactive website responders have a higher score (M=5.8) than the non-interactive website responders (M=5.02)
- "I think the website is appealing" the interactive website responders have a higher score (M=5.59) than the non-interactive website responders (M=5.02)

Within the subtest "Satisfaction", there are statistically significant differences in one question only – "I am satisfied with the experience on the website", where a higher score is achieved in the interactive website respondents (M=5.45) compared to the non-interactive website respondents (M=4.73).

Within the subtest "Overall website quality", statistically significant differences are recorded in the following questions:

- "The overall quality of looking for a job on a website is" - the interactive website respondents have a higher score (M=5.47) than the non-interactive website respondents (M=4.85)
- "My feelings towards the website are" - the interactive website respondents have a higher score (M=5.59) than the non-interactive website respondents (M=4.69)

Results of Applied Job/ Practice/ Training Course

From the above survey, it can be concluded that the use of interactive features of a website influences the creation of attitudes towards the website, the satisfaction of users, and the opinion on the overall website quality, while the use of interactive features has no impact on building the users' loyalty to the website.

The use of both types of the presented websites aimed at achieving effects on consumers. The achieved impact on consumers is intended to invite users to a final action, which means applying for a job/ practise/ training course. Table 3 presents

how many respondents used for a job/ practise/ training course, how many advertisements the respondents responded to, and the average number of applications for a job/ practice per observed user.

Table 3. Results of applied job/ practice/ training course

Website type	Interactive website	Non-interactive website	Interactive/ Non-interactive
Number of registered respondents	38	10	3.8
Number of applications for practice/ course/ training course	87	13	6.69
The average number of applications per respondent	2.29	1.3	1.76

From the given table, we can see that the number of registered candidates is 3.8 times higher for the interactive website than for the non-interactive website; the number of advertisements the respondents responded to during the survey is 6.69 times higher for interactive than for non-interactive website users, while the average number of applications per respondent is 1.76 times higher for the interactive than for the non-interactive website.

An interactive website also offers users the possibility of signing up for a mailing list to receive all the news published at the registered e-mail address. Of the respondents who used the interactive website, 15 respondents started the mailing list sign up process. Of 15 respondents who started the mailing list sign up process, seven respondents confirmed the registration via the link obtained by e-mail. In comparison, eight respondents did not ensure the registration. Therefore, their e-mail addresses are not included in the database of registered candidates for receiving additional information regarding the application for a job/ practice/course.

4. Discussion

After conducting research, the results show that when introducing interactive features of the website, we can expect the achieved effects in the form of a positive attitude of users towards the site, greater satisfaction of site users and the

impression of greater quality of the used site. Let us enter into a deeper analysis of these subtests. It is determined that there is a statistically significant difference in the questions "I think the website is suitable", "I think the website is appealing", "I am satisfied with the experience on the website", "The overall quality of looking for a job on a website" and "My feelings towards the website are" where the users of the interactive site gave a higher score. In this way, the first hypothesis, H0, is proved: Known effects on consumers are created through interactive website features. On the other hand, there is no statistically significant difference in the subtest loyalty intention between the respondents who used an interactive website and those who used a non-interactive website.

Further results support the fact that the interactive features of the site increase user activity on the site itself [Yoon, Youn, 2016; Reynolds, Ruiz de Maya, 2013; Wolk, Theysohn 2007; Grant, Clarke, Kyriazis, 2013]. By introducing interactive features into the website in this research, it was also determined that users of the interactive website could be connected to the company in the future by subscribing to the mailing list. In this way, users remain in contact with the company. They can be acquainted with all the news in the company, which leads to the possibility of repurchase and, in the case of this research, returning to the site when re-searching jobs/internships/ training courses. Of the total number of candidates who used the interactive website, seven candidates (approximately 12%) completed the application process; their contacts were in the database, a significant percentage of potential users who will contact the company. As this option is not possible for users of a non-interactive site, it can be seen that the loss of retention of a potential user is significant.

Further in the paper, it is established that on interactive websites for applying for a job/practice/ training course, the percentage of users who took the final action and applied for a job/practice/ training course is 3.8 times higher than the number of non-interactive website users. The number of applications for a job/ practise/ training course is 6.69 times higher for the interactive website than for the non-interactive website.

5. Conclusion

The study, however, contains several limitations. First, due to the validity of the results, the research was conducted in laboratory conditions. Second, the respondents were not in their natural environment in which it would be more pleasant for them to visit the website. Third, respondents also had limited time both to visit the website and complete the survey questionnaire, which could affect the
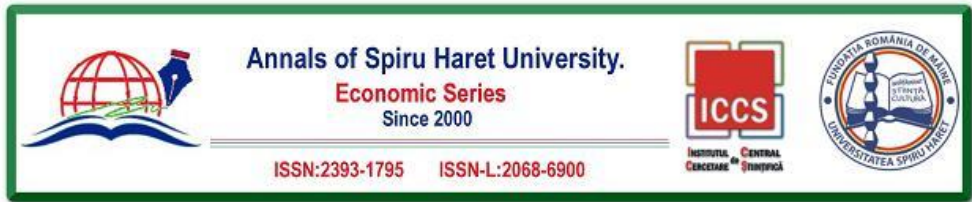
speed and reasoning of the respondents. Finally, the participants in the research are first-year students, which includes only one age group of respondents.

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OVERVIEW OF SOME LEGAL ASPECTS OF TECHNOLOGIES BASED ON ARTIFICIAL INTELLIGENCE

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Abstract

Artificial intelligence is a challenge of the new decade, more current than ever, that can help man or replace him. The decision belongs to those who decide, through their research, how much independence new human-created technologies create. Beyond the strictly scientific aspects that invented and developed artificial intelligence (AI) some aspects of ethics, morality, and last but not least legal. There are already debates on this topic online, where opinions are divided between conservative issues and innovation at any cost. Fear against new can resist, although the man is already accustomed to assistance (Shazam, Waze, personal assistants). If AI is already replacing the musician who performs, for example, Beethoven's symphonies, how far can this technology evolve and what would be the limits to which man cannot replace it? The present study proposes a brief analysis of some legal aspects that must be considered with the large-scale application of AI-based technologies, from the perspective of respect for human rights and fundamental freedoms, on the one hand, but also responsibility in AI. (Who is responsible and what would be the limits of liability for AI?)

Keywords: *illegal behavior; fraud; black market; artificial intelligence (AI).*

JEL classification: K420, K2, K240

Chapter 1. Introduction: European legislative background:

On 15.05.2018, the European Commission adopted the Communication entitled A renewed European agenda for research and innovation - Europe's chance to shape its future. A communication on the future

of connected and automated mobility in Europe is also to be adopted. In both communications, artificial intelligence plays a key role. [1] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - Artificial Intelligence for Europe: COM (2018) 237

In the light of the development of the Internet of Things, the European Commission is committed to examining the possibility of adapting the current legal framework so that it considers new technological developments (including robotics, artificial intelligence or 3D printing), in particular from a civil liability perspective. The Commission then relied on the ability of artificial intelligence to increase growth and productivity, estimating that the combined economic impact of automation of knowledge, work, robots and autonomous vehicles will reach a value of between EUR 6.5 trillion and EUR 12 trillion annually by 2025.

The Council of the European Union recognizes that innovations, including data science, artificial intelligence, or the Internet of Things, could bring new development solutions and encouraged their promotion and local capacity building. The Council also appreciated the role of artificial intelligence in market developments but supported the need to ensure adequate social protection and equal opportunities for all. [2] http://data.consilium.europa.eu/doc/document/ST-14435-2017-INIT/ro/pdf

1.1. In May 2017, the **European Economic and Social Council (EESC)** adopted an own-initiative opinion on the impact of artificial intelligence on the digital single market, production, consumption, employment, and society. In it, the EESC pointed out that the artificial intelligence market is currently around $ 664 million and is expected to grow to $ 38.8 billion by 2025. Given the potential of artificial intelligence for the benefit of humanity, but also its cross-border impact.

1.2. Among the EESC's recommendations are: the development of artificial intelligence only under permanent human control; the adoption of a code of ethics for the development, implementation and use of artificial intelligence; making investments in education in order to work with artificial intelligence, but also to develop skills that cannot be taken over by artificial intelligence; the development of artificial intelligence applications that can benefit society, which promotes the

inclusion and improvement of people's lives, both in public and private, as well as the evaluation of EU legislation and regulations in six areas of interest: transport, dual-use systems, civil liberties , security, health, energy, areas influenced by the evolutions of robotics, cybernetic-physical systems and artificial intelligence. [3] extract from http://data.consilium.europa.eu/doc/document/ST-14435-2017-INIT/ro/pdf

1.3. The conclusions of the European Council of 19 October 2017 called for an urgent approach to artificial intelligence and block chain technologies, while respecting personal data, digital rights, and ethical standards. In this regard, the European Council called on the European Commission to **present a European approach to artificial intelligence by early 2018** and the necessary initiatives to **strengthen the framework conditions**, in order to explore new markets and reaffirm the leadership of its industry.

1.4. At the declarative level, the EU supports the development of AI: In this regard, the Union invests EUR 1.5 billion in artificial intelligence through Horizon 2020. Existing public-private partnerships can attract another € 2.5 billion by 2020. Member States and the private sector should make similar investment efforts, so that by the end of 2020 the total value of investments will be over EUR 20 billion across the Union.

Union funding covers projects in key areas of application, such as health, connected and automated driving, agriculture, manufacturing, energy, state-of-the-art internet technologies and public administrations (including justice). The funding will also strengthen European advantages in the field of artificial intelligence / integrated robotics.

1.5. For the post-2020 period, the Commission proposes to stimulate investment in: improving the pan-European network of centers of excellence in artificial intelligence; research and innovation in areas such as transparent artificial intelligence, unsupervised machine learning, energy and data efficiency; additional digital innovation centers / testing and experimentation facilities; exploiting joint procurement in the field of innovation and creating a data sharing support center that will be closely linked to the on-demand artificial intelligence platform.

2. **Large volumes of data are needed for the development of artificial intelligence.** To this end, the EU is committed to facilitating access to data, in particular non-personal data, such as traffic data, meteorological, economic and financial data or trade registers, industrial data, scientific data, as well as genomic and other data in the field of health, in full compliance with the legislation on the protection of personal data.

3. **Preparing for socio-economic change involves:** developing basic digital skills, as well as complementary skills that cannot be replaced by any kind of artificial intelligence; assisting people whose jobs could undergo major transformations or disappear as a result of automation, robotics and artificial intelligence; training as many artificial intelligence specialists as possible. As such, the Commission has adopted a skills agenda in Europe, recommending to Member States ways to improve it through a skills guarantee, as well as an action plan on digital education that aims to promote digital skills and competences for all citizens.

4. Ensuring an adequate ethical and legal framework

Although the European Union has a strong and balanced regulatory framework on which it can be based the development and use of artificial intelligence, it does not rule out the risk of errors or the use of artificial intelligence for negative purposes.

As such, the Commission intends to bring together all stakeholders so that, by the end of the year, ethical guidelines on artificial intelligence can be developed, in compliance with the Charter of Fundamental Rights of the European Union. The aspects considered concern: the future of work, equity, safety, security, social inclusion, algorithmic transparency.

It is also necessary to reflect on the adequacy of existing rules on security issues and liability issues.

1.6. From those summarized above, taken from the European Commission Communication on Artificial Intelligence for Europe: COM (2018) 237, we can see that there has been a widespread concern since 2018, that all structures, levers have been created, exceeding the declarative level for the delegation to the Member States of the responsibilities related to the implementation of the measures necessary for the accelerated introduction of AI, discreetly drawing the attention of the Member States to issues concerning "the future of work, equity, safety, security, social inclusion, algorithmic transparency". Legislatively, the "European Parliament Resolution of 16 February 2017 containing recommendations to the Commission on civil law rules on robotics"

[4] https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_RO.html?redirect was adopted, by which the Parliament requested the Commission to present, pursuant to art. 114 TFEU, a proposal for a directive on the rules of civil law on robotics, considering several recommendations.

These recommendations include the following: the existence of a common Union-wide definition for different categories of cyber-physical systems, autonomous systems and autonomous and intelligent robots; the creation of a European system for the registration of advanced robots in the internal market; guaranteeing the exercise of human control over smart devices at all times and paying special attention to the possibility of creating an emotional connection between man and robot - especially in the case of vulnerable groups (children, the elderly or people with disabilities).

The principle of mutual recognition in the cross-border use of robots and robotic systems; strengthening financial instruments, including public-private partnerships to support robotics research projects; the implementation of a clear, rigorous and effective ethical framework for the development, design, manufacture, use and modification of robots, complementing the existing national and Union acquis; but also the creation of a European agency for robotics and artificial intelligence, in order to provide the technical, ethical and regulatory knowledge necessary to support relevant public actors; as well as supporting a cross-cutting and technology-neutral approach to intellectual property, applicable to the various sectors in which robotics is used; These are some of the most important recommendations made by the EU Parliament to Member States.

Ensuring a high level of security, protection of personal data and privacy in communication between humans and robots is the latest recommendation, which confirms that AI, included in robots can endanger life, human security, if they are out of control, if they are used by characters hostile to humanity.

However, recognizing the technological evolution that humanity must face, the European Commission must also take into account the consequences of all possible legal solutions, such as: the establishment of a compulsory insurance scheme for certain categories of robots; creating a compensation fund; creating a robot-specific legal personality so that at least the most sophisticated autonomous robots can have the status of an electronic person responsible for repairing the damage they cause.

1.7. Another regulation of AI is Regulation (EU) 2019/1150 of the European Parliament and of the Council from the 20th of June 2019 on the promotion of fairness and transparency for undertakings using online intermediation services. [5] Regulation (EU) 2019/1150 of the European Parliament and of the Council from the 20th of June 2019 on the promotion of fairness and transparency for undertakings using online intermediation services (Text with EEA relevance), PE / 56/2019 / REV / 1, OJ L 186, 11.7.2019, pp. 57-79.

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Chapter 2. Conceptual elements: Intelligence is defined [6] https://dexonline.ro/definitie/inteligenta as the ability to understand easily and well, to grasp what is essential, to solve new situations or problems based on previous experience; cleverness. And artificial intelligence is, according to the same dictionary, the ability of evolved technical systems to achieve quasi-human performance. AI is explained in the diagram below [7]   https://www.oracle.com/ro/artificial-intelligence/what-is-ai/:
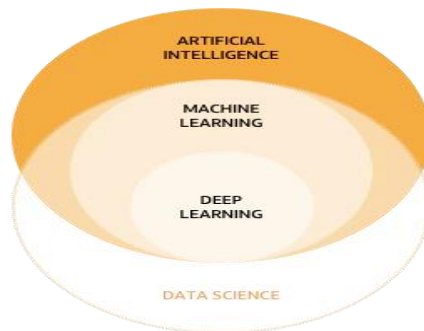
Controversies and divergent opinions: in the specialized literature in Romania, different approaches have already appeared even among legal specialists. Examples are the articles "Artificial Intelligence vs. Human creativity: Perspective on copyright" [8] Article published on 10.05.2021, Marian-Constantin IONESCU, Alexandra-Maria SILION, https://www.juridice.ro/730436/inteligenta-artificiala-vs-creativitatea-umana-perspectiva-asupra-drepturilor-de-autor.html, the use of AI in law [9] https://www.wolterskluwer.com/ro-ro/expert-insights/interviu-viitorul-avocaturii-inteligenta-artificiala-provocare-sau-amenintare or " The impact of artificial intelligence on the legal professions" av. Gabriel-Valeriu Pașcui Cluj Bar. [10] av. Gabriel-Valeriu Pașcui Baroul Cluj- https://www.unbr.ro/wp-content/uploads/2020/09/01_Gabriel-Valeriu-Pascui-Impactul-inteligentei-artificiale-asupra-profesiilor-juridice.pdf

Beyond the different approaches and opinions on the role and importance of AI in modern human life, the legal, deontological, sociological, moral aspects, respectively the interdisciplinary approach is the challenge for the current moment, turning, in my opinion, on which depends the very survival and evolution of mankind, as a whole.

2.1. AI regulation in France and Romania, elements of comparative law:

The CNIL (French Data Protection Supervisor) said in a report that "the debate over whether or not it is necessary to regulate artificial intelligence overlooks the fact that algorithms have been regulated for about 40 years" and gives the following example: the first data protection law in France dating back to 1978. [11] Victor Demiaux, CNIL, How can humans keep the upper hand? The ethical matters raised by algorithms and artificial intelligence the ethical issues, decembrie 2017, p. 45.

In Romania, the first data protection law appeared in 2001 (Law 677/2001) which contained, since then, precise aspects regarding the regulation of artificial intelligence. Therefore, we can see that Romania has had legislation on AI for 19 years. The law was repealed in 2018.

As of May 25, 2018, throughout Europe, including Romania, the General Regulation on Data Protection that repealed the old directive [12] Directive 95/46 / EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals regarding the processing of personal data and on the free movement of such data, OJ L 281, 23.11.1995, pp. 31-50, which, through Article 22, specifically regulates artificial intelligence and human rights in the face of exclusively automatic machine decisions. [13] See also Ruxandra SAVA, When the decision is made by the car… About profiling, rights, and balance in a digital universe, available at legal, link accessed 11.11.2020.

There are other provisions in the RGPD that are applicable to artificial intelligence, such as the right to be informed about the algorithms used (art. 13) - artificial intelligence, the right to rectify or delete your data from a computer system, the right to have access to their own data from a computer system, etc. RGPD is not a law that only protects data protection in the abstract, but by ensuring data protection it contributes to the respect of other fundamental rights and freedoms.

Of course, the RGPD does not use, in a concrete way, the term "artificial intelligence", but the reference to AI is indirectly deduced from the interpretation of the phrase used in the provisions of art. 22, respectively "decision based exclusively on automatic processing".

2.2. A synthesis of RGDPR regulations is made [14] https://legalup.ro/inteli-genta-artificiala-romania/:

1. 22 The RGPD prohibits a machine from making decisions about a person (a decision without human intervention) when that decision may have a legal or significant impact on man.

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2. 13 para. 2. Lit. f) of the RGPD says that the person has the right to be informed about the logic used algorithm and about the consequences of this processing by intelligent systems.

3. 22 para. (3) The RGPD establishes in favor of the data subject two rights regarding the decisions taken by the AI: the right to challenge the decision and to request human intervention.

4. 22 and recitals 71 to 72 of the RGPD state, inter alia, that AI can be implemented with adequate safeguards for the data subject to avoid the less pleasant consequences for fundamental rights and freedoms.

5. 22 and recitals 71 to 72 of the RGPD protect children in particular.

6. 22 and recitals 71 to 72 of the RGPD protect man against discrimination by AI.

Summarizing, more and more the authors who analyze the subject AI find, for example as it did in his paper, that "RGPD focuses only on artificial intelligence that processes personal data, excluding artificial intelligence that processes exclusively non-personal data, and secondly, there is a problem with the effectiveness of this law because there is a power imbalance between those who control such AI systems and those whose data are processed, as the latter may have obstacles in and exercise rights such as the right to appeal or the right to obtain human intervention." [15] Victor Demiaux, CNIL, op.cit., p. 45.

And from here we can see that legal issues cannot be treated separately from ethical issues, as the whole subject requires a multidisciplinary approach, for legal regulation to be effective and truly covering the entire current issue of AI, robotics and in general everything that involves replacing man with the robot, or the machine equipped with AI, to make decisions instead of man, not just to carry out man's orders, or to assist him in his daily work.

2.3. Areas where AI is already present and will be used more and more.

AI is also a challenge for education, especially in the current context, when learning is computer-assisted, when teachers look for new methods of transmitting information in a different way than used until, for education and training to become attractive, adapted to the levels of to whom it is addressed. Starting from the 4 C's: Critical Thinking, Communication, Collaboration and Creativity, the skills that need to be activated more than ever in schools are the ones that will prepare today's students, tomorrow's adults to operate with AI! [16] https://upromania.ro/blog/de-ce-inteligenta-artificiala-nu-poate-inlocui-oameni/

I share the point of view of the author of the article, according to which "Artificial intelligence saves us from repetitive or meticulous tasks. She leaves us more time for the others, she doesn't cancel our jobs. On the contrary, now is the time for every person to diversify their abilities as much as possible, to be prepared in a way that is as versatile as possible in their field. Artificial intelligence gives us space and time to excel and evolve. The reason is that it does not replace us with robots but makes us super people." [17] idem 16

AI has already entered many areas, in which man has already been replaced:

„- in Social Media. Customer support has already been associated with algorithms, such as when you encounter a bot when opening a private message with a Facebook page. This can be a bot for a restaurant that directly suggests questions: do you want to make a reservation? Do you want to know our schedule? Do you want to know if we have vegetarian food? For how many people? From what time? On what name? Have a nice day!

- in eliminating bureaucracy. In the medium and long term, the physical documents will be digitized, and we will move from the folder file to the cloud folder. This will not only affect individuals, but especially any legal institution that processes documents, including retroactively.

- in Marketing & Internet. Database segmentation will never have been more accurate, more targeted ads for each user. That's why we always review ads on the sites we've visited before. And yet, a lot of costs are reduced through this process.

- in Financial. Analyzes, especially in such a rigorous field, based on figures, reports and trends will bring much more progress in our lives, being able to predict much faster and report much simpler. In addition, robots in the banking sector have gradually replaced the employee at the counter, the cashier ... etc.

- In physical work industries, where human accidents can be avoided, or the number of jobs in which physical work can be reduced.

- recruitment and human resources. Just as we receive targeted ads specifically on the Internet (if you don't believe us, look at the ads that someone of the opposite type receives, with a different age and occupation than you), we will also receive automatically returned reports with profiles suitable for our search."

2.4. The evolution of AI towards the machine with consciousness is already a reality confirmed by Prof. David Chalmers from New York University, an expert in mental mechanisms, who states that GPT-3 shows signs of being conscious. "If I'm open to the idea that a worm with 302 neurons is conscious, I'm also open to the idea that GPT-3, with 175 billion parameters, is also conscious." [18] See: art

written by Anca Grădinariu on 01.01.2021: https://www.digi24.ro/stiri/sci-tech/revolutia-ai-un-om-de-stiinta-sustine-ca-inteligenta-artificiala-a-devenit-constienta-1424650

The GPT-3 machine learning system has attracted worldwide admiration for its remarkable ability to generate text with minimal human interference, and today this highly sophisticated technology is showing signs of awareness. (according to the same source) [19] GPT-3 is a model of artificial intelligence that excels in language. This system developed by OpenAI generates text with minimal human intervention, at an extremely fast pace. It can recognize and reproduce word patterns, even before estimating what will follow, thanks to its incredible power obtained with the help of 175 billion linguistic parameters.

In the same context, according to the Financial Times, this form of AI can process 45 billion times more words than a person perceives in his entire life. [20] Sam Altman, CEO of Open AI, said: "We have evidence that it is the first forerunner of general artificial intelligence, a system that will support many, many different applications and can improve any type of software we build. I think through him we see a vision of the future. "I will not claim to have all the answers yet, but I am happy to consume my energy contributing to this evolution," added Sam Altman.

It is obvious that AI, although initially created by man, can surpass it when technology evolves and develops, and at first glance the robot will be victorious, does not sleep, does not get sick, has no creative blockages, and can complete a task in a few seconds.

2.5. Other fields where AI has already been successfully experienced: a: in art, b: in journalism, c. Film and theater screenplays.

a: in art: It has already been shown that AI can even become an artist: "an article on the Singularity Hub portal reveals a new artist or designer - whether it's the visual arts, fashion, music or literature - even fans of his work, he is followed on social media, his new releases are eagerly awaited and then the works are discussed with friends. After careful documentation, it is found that there is no online information about the artist's past. Surprise: the much-loved artist is not a person in the flesh, but artificial intelligence. This is what happened to the clients of Art.Lebedev Studio, a multidisciplinary design company in Russia. The people here claimed that a computer designer was a human person, and no one got caught. They also gave this AI creature a resonant name - Nikolai Ironov - and included it

in more than 20 different projects that involved building a brand logo and fabricating a brand identity. Some of these works have aroused considerable interest from the public and the press and have provoked discussions in online communities, thanks to their unique style. [21] https://www.digi24.ro/stiri/sci-tech/revolutia-ai-un-om-de-stiinta-sustine-ca-inteligenta-artificiala-a-devenit-constienta-1424650. Fans were shocked to discover that this artist is not human, but a creation of artificial intelligence.

b: in journalism: The replacement of the journalist already seems an experienced reality, confirmed by researcher Nina Schick, author of the book "Deep Fakes" and "The Infocalypse", warned that *"deepfake" technology*, which means fake content with artificial intelligence, has become so realistically that no other computer can detect it. "People will never be able to detect these deepfakes. To the naked eye, they are perfect. Now, synthetic content generators have evolved so much that not even artificial intelligence will be able to tell the difference between a real and a fake video, "said the researcher, quoted by Daily Star Online. [22] Idem 21

"That's what happens," she says, "and with texts written by artificial intelligence. Nobody distinguishes them from those written by journalists ".

c. film and theater screenplays. There is an algorithm for anything, even for writing novels or screenplays. With his help, a short film was made that, even if it is not worthy of an Oscar, opens unsuspected possibilities. Will this mean the end of creativity or pushing it into a higher realm, that of artificial intelligence? It remains to be seen. The company OpenAI wrote a short film script, which is not really Oscar, but not very bad. Moreover, it has a reversal in the end.

GPT-3, Open AI's text-generating algorithm, has been making a lot of noise since its launch in June 2021. It was used to post comments on Reddit, to conceive a satirical poem about Elon Musk, and even to compose an entire article for The Guardian. When the system learned to automatically complete images without being specially trained to do so, to translate and solve math problems, some speculated that GPT-3 may be the launch lamp for a system general artificial intelligence. Even screenwriters can be replaced by AI. An example is the 3-and-a-half-minute short film in which a man knocking on a woman's door tells him about the accident in which he was involved. It's hard to anticipate the story, and viewers are surprised by what could be considered an unexpected ending. The students who made the film used a tool derived from GPT-3, called ShortlyRead. They wrote the first lines, then let the artificial intelligence go wild. Everything that follows is based on 175 billion parameters - that is, the associations that the algorithm draws between words and phrases, depending on the data with which it was trained.

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Although critics have commented that the story is a bit strange, they have also acknowledged that there are worse short films written by people! The application is meant to inspire writers who are out of inspiration and can guide them to take their stories in a direction they would not have anticipated, beyond the ethical aspect, namely how much a writer can use a program before it is considered to cheat, to challenge the legal issue of copyright. How much more is the original creation and how many combined algorithms of a software created by man and developed by the system, then automatically. It's not the first-time screenwriters have used a computer. But this is the first time that an artificial intelligence entity manages to write a film without being specially trained to do so. And if GPT-3 can convincingly write a screenplay, what else can it do?

It is undeniable the need to modernize the current society by using technology that has taken in recent years a real and very useful to man. The use of AI in marketing and even in company management is demonstrated by Mailchimp [23] Mailchimp is an American marketing automation platform and email marketing service used by companies to manage their email lists and create email marketing campaigns and automations to send to customers, according to the Wikipedia definition, which uses AI to allow companies to invent marketing campaigns without human contribution. Adobe has launched Sensei [24] Sensei is a Japanese word that, in direct translation, means "person born before another." In common parlance, it means "master" or "teacher." https://ro.wikipedia.org/wiki/Sensei, an AI design assistant. Adobe Sensei uses AI and machine learning to make your task easier, helping you create effortlessly, make informed decisions, and formulate marketing goals for better results. [25] https://www.adobe.com/ro/sensei.html

One-on-one personalization in marketing is becoming a reality, offering, for better results: organizing and managing materials to improve positive return on investment (ROI), engaging the public with personalized offers, subject lines and delivery alignment, the choice more appropriate experience for achieving goals.

The implementation of "Industry 4.0" in the company's management for process automation and data analysis is the reality of the business environment that wants to remain on the market in the current context. Thus, according to a 2018 survey, 91% of business leaders believe that without digital transformation, their company has a high chance of failure. However, only 54% of companies have a strategy in this regard and only some of them consider introducing a BI (business intelligence) system. [26] https://dyntellbi.ro/inteligenta-artificiala-in-managementul-companiei/

MP Varujan Pambuccian claimed that "AI is a very good marketing concept, which managed to bring funding" [27] On the debate "How smart is" Artificial

Intelligence? ", Which was also attended by Alexandru Bălan, research director at Bitdefender, and Vlad Marincaş, one of the founders of the startup InsightOutAnalytics. The debate took place within the series "Romania in Europe", a HotNews.ro initiative, supported by the Konrad Adenauer Foundation. - July 26, 2021- https://www.hotnews.ro/stiri-romania_in_europa-24940655-cat-inteligenta-is-artificial-intelligence.htm- Gabriel Bejan, HotNews.ro. , and among the conclusions of that debate was the finding that AI does not blindly replicate what it has learned, as it offers a collection of algorithms that can search in very large volumes of data, "deep learning" being considered an improvement of this type of algorithms. However, until now, AI cannot decide, except on the basis of algorithms, rules formulated by a person." [28] Idem 27

The challenge for humanity is related to the need for human change that can be and has even been replaced in some situations where routine is applicable, so it will replace many trades based on algorithms that the robot will perform instead of man.

Conclusions

AI continues to grow rapidly around the world, arousing both enthusiasm and concern. Legal files, even providing legal assistance already uses AI, news articles, political analysis, medical assistance in heavy operations, but also surgeries performed on the robot "loaded" with medical software, which will run the implanted program, without entering panic if something unforeseen happens during the operation. Its uses are so numerous that even the creators of the algorithm had doubts whether or not to launch the first version!

Alexis Kirke, an algorithm -based media analyst and film director, believes that we need to get used to the idea that we will use computers more and more in the creative process, especially in cinema. [29] "There is already consistent experience in the field that has been codified by writers, producers, directors and so on. Do you want to reduce the number of adverbs or adjectives in your script? Do you want to make sure that the characters speak differently from each other? Do you want to generate an alternative rewrite, with fewer clichés? There is an algorithm for all this! ” (...) "The future will also offer us the feature film generated by GPT-3. And even if it doesn't win the first Oscar, all screenwriters paid millions in Hollywood should be afraid of AI competition." Actors even began to be replaced in some creations that started from the computer game model and later developed, to test the market and to see the reaction of film consumers, if they can become the future in making films.
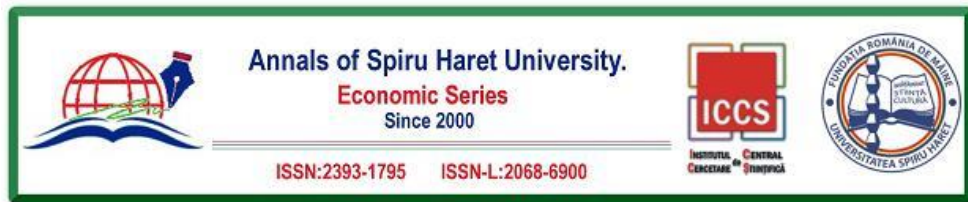
The super-technological future incites some, as a curiosity, unconditionally accepting any mixture of this technology in their lives, others scare and realize the specifics of this future: technology replaces the human soul, which becomes insensitive to the suffering of those around him. The risk of losing our soul in the future exists, this being the very challenge of the future! Aristotle said that ***"Love must be conceived as one soul in which two bodies live.",*** and a French proverb: ***"Hope is the dream of the awake soul."***

Every spiritual activity leaves traces, not only in the soul but also in the body; if aplopexia or age destroy bodily activity, does it mean that the fire of the soul must therefore be extinguished? a rhetorical question of the German writer Jean Paul Fr. Richter urges reflection and a wise decision at this crossroads of humanity! [30] Johann Paul Friedrich Richter (known as Jean Paul), (1763-1825), German writer who imposed the novel on German literature. His work alternates the real plan with the imaginary one, the acid irony with the lyrical effusion, a remarkable stylist, creator of subtle suggestions, atmosphere and portraits of great sensitivity. - https://ro.wikipedia.org/wiki/Jean_Paul

The contamination of the soul is done only between souls of the same kind, said Nicolae Iorga. [31] Nicolae Iorga 1871–1940 historian, literary critic, documentary filmmaker, playwright, poet, encyclopedist, memorialist, art historian and philosopher of history, minister, parliamentarian, prime minister, university professor and Romanian academician. George Călinescu said: "Iorga played in Romanian culture, in the first decades of the twentieth century," the role of Voltaire".

How AI will interfere with the current life of man, but especially how prepared humanity is to give up some activities that were performed exclusively by people in favor of AI, only the future will show us which of the current predictions will come true!

Reflecting on Cicero's words: "A room without books is like a body without a soul", we can draw a parallel: the robot created by AI is like a room full of books, but without the soul. Can AI have a soul? It is a question still unanswered. The future will prove to us, depending on man's decisions and how far AI can be used for the good of mankind and not to the detriment of man, for his total replacement! Albert Camus said that "without work, all life goes to rot. But when work is soulless, life suffocates and dies."

The uncertainty of how AI will evolve in the future also creates dilemmas for jurists regarding the methods of regulating how AI interferes with human life, in

the current legal order, regardless of the legal systems currently existing on the planet.

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[13] See also Ruxandra SAVA, When the decision is made by the car… About profiling, rights, and balance in a digital universe, available at legal, link accessed 11.11.2020.

[14] https://legalup.ro/inteligenta-artificiala-romania/

[15] Victor Demiaux, CNIL, op.cit., p. 45

[16] https://upromania.ro/blog/de-ce-inteligenta-artificiala-nu-poate-inlocui-oameni/

[17] idem 16

[18] See: art written by Anca Grădinariu on 01.01.2021: https://www.digi24.ro/stiri/sci-tech/revolutia-ai-un-om-de-stiinta-sustine-ca-inteligenta-artificiala-a-devenit-constienta-1424650

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[19] GPT-3 is a model of artificial intelligence that excels in language. This system developed by OpenAI generates text with minimal human intervention, at an extremely fast pace. It can recognize and reproduce word patterns, even before estimating what will follow, thanks to its incredible power obtained with the help of 175 billion linguistic parameters.

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[21]   https://www.digi24.ro/stiri/sci-tech/revolutia-ai-un-om-de-stiinta-sustine-ca-inteligenta-artificiala-a-devenit-constienta-1424650

[22] Idem 21

[23] Mailchimp is an American marketing automation platform and email marketing service used by companies to manage their email lists and create email marketing campaigns and automations to send to customers, according to the Wikipedia definition

[24] Sensei is a Japanese word that, in direct translation, means "person born before another." In common parlance, it means "master" or "teacher." https://ro.wikipedia.org/wiki/Sensei

[25] https://www.adobe.com/ro/sensei.html

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[27] On the debate "How smart is" Artificial Intelligence? ", Which was also attended by Alexandru Bălan, research director at Bitdefender, and Vlad Marincaș, one of the founders of the startup InsightOutAnalytics. The debate took place within the series "Romania in Europe", a HotNews.ro initiative, supported by the Konrad Adenauer Foundation. - July 26, 2021- https://www.hotnews.ro/stiri-romania_in_europa-24940655-cat-inteligenta- is-artificial-intelligence.htm- Gabriel Bejan, HotNews.ro.

[28] Idem 27

[29] "There is already consistent experience in the field that has been codified by writers, producers, directors and so on. Do you want to reduce the number of adverbs or adjectives in your script? Do you want to make sure that the characters speak differently from each other? Do you want to generate an alternative rewrite, with fewer clichés? There is an algorithm for all this! " (...) "The future will also offer us the feature film generated by GPT-3. And even if it doesn't win the first Oscar, all screenwriters paid millions in Hollywood should be afraid of AI competition."

[30] Johann Paul Friedrich Richter (known as Jean Paul), (1763-1825), German writer who imposed the novel on German literature. His work alternates the real plan with the imaginary one, the acid irony with the lyrical effusion, a remarkable stylist, creator of subtle suggestions, atmosphere and portraits of great sensitivity. - https://ro.wikipedia.org/wiki/Jean_Paul

[31] Nicolae Iorga 1871–1940 historian, literary critic, documentary filmmaker, playwright, poet, encyclopedist, memorialist, art historian and philosopher of history, minister, parliamentarian, prime minister, university professor and Romanian academician. George Călinescu said: "Iorga played in Romanian culture, in the first decades of the twentieth century," the role of Voltaire ".

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[41] https://ro.wikipedia.org/wiki/Sense

[42] https://dyntellbi.ro/inteligenta-artificiala-in-managementul-companiei/

THE IMPLEMENTATION OF EXTENDED REALITY IN HIGHER EDUCATION, EXAMINING STUDENTS' AWARENESS

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Abstract
This research paper describes documents and confirms the benefits of applying extended reality (XR) into Higher education. Challenges that occur in the comprehensive reality (XR) domain (such as virtual reality (VR), augmented reality (AR), and mixed reality (MR)), as well as their causes and solutions, will be further discussed. The upcoming chapters will include perspectives from technology, design, human factors, and various technologies and ideas. XR is primarily or exclusively focused on the display, as it does not include other modalities such as audio, haptic, smell, or touch. Therefore, the primary focus will be on the benefits of using XR, though other disciplines that may intersect with Higher Education, where appropriate. As a whole, the study aspires to provide a comprehensive overview of the XR challenges, opportunities, and future trends that will be applied in educational institutions.

Primary research in the form of survey research (exploratory research) that included 83 subjects showed a high awareness of XR among students of chosen

HEI and usage of this technology in students' daily lives, and whether they use XR depends on the age of the survey respondents. To determine whether there was a correlation between the use of augmented reality and the age of the survey respondents, non-parametric statistics based on the ranks of observations - Spearman's correlation coefficient - were used. IBM SPSS statistical data processing and analysis software was used to calculate Spearman's correlation coefficient. Based on the sample observations and the inference statistics used, it cannot be asserted that there is a direct correlation between the use of augmented reality in everyday life and the age of the survey respondents. However, the results showed that a high rate of respondents is aware of XR (78,31%) but if they use this technology in their daily lives, are almost evenly distributed: use it in daily lives 34,94% of survey respondents do not use it 33,73%) and Maybe (not aware of the same) 31,33% survey respondents.

Introduction

Today's higher education institutions face increased pressure to deliver outstanding learning experiences to an increasingly diverse student population, as well as exceptional, technology-enhanced teaching. Since XR has gained traction in educational settings, it is well-positioned to address some of these issues. However, the opportunities and challenges associated with students and teachers using virtual tools are all examples of evaluation opportunities (e.g., virtual lab instruments and materials) [Ziker, 2020]. Speaking of virtual, it is essential to emphasise that this term refers to Virtual reality (VR), augmented reality (AR), and mixed reality (MR), which are all terms that are used to explain the same thing. Even though they provide significantly different experiences and capabilities, the relative merits and drawbacks of these systems must be weighed against the requirements of any particular application before they can be considered [Allcoat, 2021).

Without a doubt, technology has improved education over decades in the digital age. The fact that collaborative computer networks were widely adopted in the late 1980s and 1990s quickly gave way to internet-based learning delivery. This new XR interaction between visualisation technology and human perception is

enthralling and can fundamentally alter the dynamics of teaching and learning [The EdTech Podcast, 2020].

As teaching and learning models are continually being tested during the educational path, these ulterior motives that can significantly alter our perceptions of self, time, and free will, should be further examined (Anđelić, Kuleto, 2013). However, using emerging technologies such as XR in higher educational systems raises many ethical and philosophical concerns about data collection, control, and exploitation in the XR ecosystem. In this paper, the primary focus will be on higher educational personalised learning experience, as it is a significant part of the currently developing XR ecosystem.

Even though the shift in computational capabilities used in Higher education is always welcome, ethical guidelines for XR systems that do not jeopardise an individual's rights through various methodologies should always be further discussed. Social conditioning and the physical environment significantly affect people's personal biases and ideas about social connections and self-identity and how they perceive themselves. As a result of digital technologies and information access, our perception of reality has been fundamentally altered [IEE, 2021].

To mitigate the possibility of increased XR impacts, proactive measures such as identifying solutions, establishing standards, and implementing governance-friendly approaches are required. Rather than waiting to see what the future holds, society should consider practical ways to improve the Higher Educational systems right now, and that is our motivation to conduct this study.

The authors, conducted a survey among students of Information Technology School ITS- Belgrade in Serbia, to understand their familiarity with XR and if they use these technologies in their daily lives. Aldo, this research is explanatory, it has its importance and contribution to the body of knowledge. This research and its added value are primarily due to a dearth of studies on using XR among university students in general and Serbian students in particular.

1. Method

The research used the methodology of participant observation, literature review (document analysis) and survey research. Survey (exploratory) research among 83 students of Information Technology School ITS – Belgrade was conducted to understand the level of awareness of XR among students and if age influences XR usage. In addition, the respondents were asked questions identifying their understanding of XR technologies (by recognising basic definition) and their daily usage of this technology:

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1. "Cross Reality or Extended reality (XR) is a catch-all term for technologies that include virtual reality (VR), augmented reality (AR), and virtual worlds (VWs) [Hooker, 2021] "with options: "true ", "false "and "I do not know "and

2. "Do you use Extended reality in your daily lives? With options: "yes ", "no ", and "I do not know".

The variables analysed in this research is given in table 1.

Table 1. Variable analysed

Code	Variable name
Sex	Gender
Age	Age
Schooling	Already completed
Activity	Type of activity
XRUSE	Use XR in your daily lives
XRDEF	Cross Reality or Extended reality (XR) is a catch-all term for technologies that include virtual reality (VR), augmented reality (AR), and virtual worlds (VWs)

The subject of the research is the connection, i.e. the association between the use of augmented reality as a presentation of digital information through the real world and the age of the respondents from the survey sample. The research will focus on discovering a systematic and consistent connection between the levels, i.e. the names of the mentioned variables (the use of augmented reality in everyday life and the age of the respondents from the survey sample). As the answers to the same questions are presented as non-metric (categorical) data, and as such, as measured on the ordinal scale, we can talk about the modalities (names) of the categories to which the observations from the sample belong. The statistical method to be used in the paper will answer four critical questions related to the research of the connection between the use of augmented reality and the age of the respondents from the survey sample:

1. Is there a relationship between these variables? If a conclusion is made based on statistical significance about the existence of a connection, another question arises.

2. Is the direction of that connection positive or negative, i.e. in the direction of change of one variable followed by the same direction of change of another variable or are the directions of their connections opposite.

3. After determining the direction of the connection, the strength of the connection is examined, measured by the appropriate indicator-coefficient, whose measured value indicates either that there is no connection or that there is a weak connection, or that the existence of a moderate or strong connection is determined.

4. The last statement concerns the determination of the type of connection between variables, i.e. whether the connection is of linear type (strength and direction of connection are unchanged for the area of the definition of these variables) or nonlinear type (strength and/or direction of connection between variables change in certain parts areas of the definition of the mentioned variables).

To check the existence of a connection between the use of augmented reality and the age of the respondents from the survey sample, non - parametric statistics based on the ranks of observations - Spearman's correlation coefficient were used [Allen, 2017]. Spearman's correlation coefficient was calculated based on IBM SPSS statistical data processing and analysis software. The null and alternative hypotheses of the test are as follows:

H0: The use of augmented reality does not depend on the age of the respondents.

X1: The use of augmented reality depends on the age of the respondents.

2. Results
2.1. Literature review (document analysis)
2.1.1. Responsible innovation in Higher Education Institutions

Innovative thinking provides students at higher educational institutions with new functional abilities, frequently developing entrepreneurial competencies Simović and Ilić points out the importance of developing digital entrepreneurial competencies, using well-known tools for measuring them, as well as motivating students who have a highly developed potential of digital entrepreneurial competencies, to turn to start their own business [Simović, Ilić, 2021]. Therefore, it encourages the establishment of new businesses, creating new job opportunities, and creating a more prosperous economic future for them. As demonstrated by the development of penicillin, safe drinking water, and sanitation, the ability to innovate has also benefited us economically [Kormelink, 2019]. The same goes for cutting-edge technologies. As a result of the innovations in educational systems, there can be seen many benefits among both students and teachers in various ways.

Whether or not these innovations in higher education are acceptable will depend on how we employ these technologies that we have today. Therefore, we must take responsibility for our creations and recognise that technology is never neutral.

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There are a variety of social implications associated with each new technological development, both positive and negative.

Even though it is acknowledged that it is necessary to conduct a critical and systematic examination of our technologies' commitment to sustainability, privacy, and accountability, our future innovations must not only contribute to solving the most pressing problems in Higher Education Institutions, but they must also be projects that foster consensus around universally held moral values.

Technology and the scientific foundations upon which it is built are far too important to be ignored at this point. It is insufficient to focus solely on the outcomes of decisions. To foster responsible innovation, we must be proactive in ensuring that the values embedded in today's technologies are made explicit and communicated to those using them [Kormelink, 2019]. Even though students can currently participate in XR projects in their spare time, institutions should provide XR access on campus to enable these projects to be successful. In some cases, projects included everything from short-term research projects like developing an augmented reality app for a journalism class project to long-term educational endeavours like creating an app that can teach students to be responsible innovation drivers. Learning that is initiated and directed by the learner is frequently the most effective type of learning. Student access to virtual reality headsets and powerful computers is only possible if educational institutions make these tools available. Students who do not have direct access to these technologies can still access this technology through university computer labs or studios. Having access to technology through a technology lending program is even more advantageous for these individuals. Accessibility and assistance are essential requirements for encouraging development in the XR field while students are on their formal education path [Educase, 2020].

Students' extracurricular activities can also be an excellent way to pique their interest in XR technology when organising an event that will draw a large number of people, such as a virtual reality game night, because students are more likely to get involved in this kind of event, rather than attending seminars or webinars in the age of global pandemic. As with any new medium, it is necessary to develop new methods of evaluating student work. To incorporate self-directed learning into assessments, instructors must rethink their course assignments and program outcome assessment criteria.

2.1.2. Potential of XR

In other words, students and teachers at higher educational institutions are already influenced by virtual and augmented reality innovations. Moreover, implementation

can be seen in various industries, including health-care education, among others. More advanced virtual reality platforms and technologies, such as virtual reality (VR), have been implemented in nursing and medical schools, allowing these devices and platforms to be used to their full potential. Of course, the student's motivation and willingness to work hard are critical to the success of this learning method. Institutes and teachers will understand an increasing number of natural learner profiles through advanced data analytics and the development of highly personalised, enhanced pedagogy. In conjunction with edge computing, immersive visualisation will soon enable this type of personalised learning experience – even live – to be delivered directly to a student's vision. It demonstrates thus that learners' motivation and knowledge retention are strongly correlated, but its true potential lies in its ability to achieve a high degree of personalisation of learning. These data have the potential to revolutionise current educational standards and methods of instruction. However, the program's director should have prior experience with orientation and guiding students through the teaching process to succeed.

It is not uncommon for new methods, products, and technologies to take some time to gain widespread acceptance before they become widely used. Several learning methods, including virtual reality (VR) traditional and video media, were recently investigated by [Allcoat et al, 2018] who found that they were effective. They discovered that virtual reality improved learning and increased engagement, and a higher level of positive emotions in those who participated in the VR experience. Furthermore, it is possible that being in a good mood impacts learning by increasing cognitive flexibility [Seligman et al., 2009]. The researchers have also discovered that positive emotion and high immersion significantly impacted knowledge acquisition in a study they conducted [Olmos-Raya et al., 2018].

By integrating collaborative e-learning, augmented reality (AR). virtual reality (VR]) and mixed reality (MR), the potential of extended reality (XR). can easily be seen. Immersive VR/AR applications combined with collaborative learning enable the "learning-by-doing effect" on deep, comprehensive learning and simulations that engage all five senses [Bucea-Manea-Tonis, 2020].

In the Internet of Things era, e-learning technology and trends [Alfaro, 2021] offers several significant benefits to organisations [Mumtaz, 2017]. Thus far, the best description of XR has been that it enables spatial localisation and experimentation in a variety of subject matter areas while also promoting innovative practices such as informal and ludic activities. In addition, it motivates learning and establishes new value scales.

When it comes to collaboration and deeper learning, XR has an additional advantage due to its capacity to provide broad education. Respondents perceptions of e-learning and XR immersion were gleaned from an online survey that elicited responses regarding respondents perspectives on the impact and influence of virtual technologies on work, study, and social life. The study enrolled all Serbian, Romanian, and Hungarian college students from public and private higher educational institutions. The study collected data on students' perceptions of XR in the context of online learning in three Eastern European countries. Millennials, like their teachers, are enthusiastic about new technologies. Students are busy, constantly moving, and eager to learn and expand their horizons through new experiences. However, these universities have not yet adopted XR technologies [Bucea-Manea-Tonis, 2020].

Researchers from a wide range of disciplines are becoming increasingly interested in the potential of extended reality as a learning tool. For example, in engineering, computer science, and astronomy, measuring learning outcomes and experimenting with virtual reality (VR) are becoming more common [Hamilton et al, 2020]. In addition, medical education is currently being evaluated for its potential to aid in the comprehension of anatomy and the intricate interrelationships that exist between organs [Alfalah et al., 2018].

Further research is needed to determine whether or not extended reality is practical for teaching and learning and how to design effective learning applications [Parong & Mayer, 2018]. The inconsistency of previous XR learning outcome measures may be due to the program's design rather than the medium itself, as previously suggested [Parong & Mayer, 2018]. For positive educational outcomes to be achieved, improved guidance on best practices in virtual reality design must be developed [Jensen & Konradsen, 2018].

By leveraging XR in lifelong learning, the educational system is being transformed in a way that is complementary to the rapid adoption of online and hybrid learning, both of which are critical to the future of work [University of Waterloo, 2021]. Blended and remote education and working will become more prevalent in the future, with augmented and virtual reality solutions providing unprecedented opportunities for training and community engagement in this environment. It is possible to practice difficult situations and high-risk skills safely and repeatedly by utilising XR technology [Inside Higher Ed, 2021].

From higher educational institutions, working students can use the most of XR (and 3D modelling]. that allows them to collaborate with colleagues in the office from a distance by connecting to the office network and gaining access to the computer of another XR device while being able to do all the curriculums and

exams [Inside Higher Ed, 2021].   To put it another way, higher education institutions and industry partners who are committed to ethical innovation and long-term workplace sustainability are seeing unprecedented opportunities for collaborative efforts in the workplace.

2.2. Survey results

The main survey results are displayed in table 2. Most of the respondents are female, 53,01%, while 46,99% are male. Respondents are aged from 18 to 24 years (54.22%) then from 25 to 31 years (26,51%) and 32 to 40 years (19,28). Mainly, respondents have completed Higher education (vocational studies) within 77,11% and high school 22,89%. The respondents are students (master vocational studies). 69,88% or former students (30,12%). Table 2 shows social-demographic characteristics of respondents.

Table 2. Social-demographic characteristics of respondents

Variables	Code %	N
Please choose your gender	**GENDER**	
Male	46,99	39
Female	53,01	44
I do not want to specify	0,00	0
How old are you?	**AGE**	
from 18 to 24 years old	54,22	45
from 25 to 31 years old	26,51	22
from 32 to 40 years old	19,28	16
Regarding your schooling, please choose only one of the options (already completed)	**SCHOOLING**	
High school	22,89	19
Higher education	77,11	64
Regarding your activity, please choose only one of the options:	**ACTIVITY**	
I am a student	69,88	58
I plan to become a student	0,00	0
I am a former student	30,12	25

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The table 3 shows frequency and percentage of answers regarding the research questions referring to knowledge (familiarity) of XR of the respondents and their usage of those technologies. Respondents are aware of XR (78,31%). and not sure (21,69%), and they use this technology in their daily lives (34,94%), do not use it (33,73%) and Maybe (not aware of the same) 31,33%. Almost distributions among survey respondents regarding their usage of this technology in their daily lives can be explained by the fact that Serbia is a mid-income country and that XR technology is still not commonly used and affordable to most.

Table 3. Frequency and percentage of answers of study respondents

Cross Reality or Extended reality (XR) is a catch-all term for technologies that include virtual reality (VR), augmented reality (AR) , and virtual worlds (VWs].	**XRDEF**	
True	78,31	65
False	0,00	0
I do not know	21,69	18
Do you use Extended reality in your daily lives?	**XRUSE**	
Yes	34,94	29
No	33,73	28
Maybe (not aware of the same].	31,33	26

Table 4. shows results of the correlations analysis between the variables XR USE and AGE and results of Spearman's test.

Based on the obtained results from the survey sample, a statistical conclusion is made that there is no connection between the use of augmented reality in everyday life and the age of respondents from the survey sample since the correlation coefficient is not statistically significant at 5% (probability 0.768]. as the sample was obtained from the population of students of technological sciences (information technology) which is also a feature common to all observations from the sample, the claim that the connection between the use of augmented reality in everyday life and the age of respondents from the sample will be further examined by calculation partial (partial) correlation coefficient. Unlike the previously mentioned correlation, the existence or non-existence of which is indicated by the Spearman coefficient, the partial correlation coefficient shows the correlation

between two variables of interest, excluding the influence of the third (or more other) variables. Variables whose influence is removed from the total relationship between two specific variables are assumed to impact the relationship of a certain intensity: from negligibly small influence in the overall strength of the relationship to large that can determine or cancel the relationship. Depending on the number of variables the influence is under control, the partial correlation coefficient can be first or higher. The partial correlation coefficient was calculated based on IBM SPSS statistical data processing and analysis software and presented in table 5.

Table 4. Correlations between XR USE and AGE variables

Control Variables				XR USE	AGE
Spearman's rho	XR USE	Correlation Coefficient		1.000	.029
		Sig. (2-tailed).		.	.768
		N		103	103
		Bootstrap[c]	Bias	.000	.002
			Std. Error	.000	.093
			95% Confidence Interval	Lower	1.000	-.166
				Upper	1.000	.217
	AGE	Correlation Coefficient		.029	1.000
		Sig. (2-tailed).		.768	.
		N		103	103
		Bootstrap[c]	Bias	.002	.000
			Std. Error	.093	.000
			95% Confidence Interval	Lower	-.166	1.000
				Upper	.217	1.000

As the level of the variables of education and current status in education were excluded from the influence of augmented reality in everyday life and the age of the respondents from the influence of the sample, the obtained partial correlation coefficient is of the second order. Therefore, the probability of 0.222 indicates that the null hypothesis cannot be rejected in favour of the alternative, i.e. the conclusion obtained by calculating Spearman's correlation coefficient is confirmed, and that is that there are no statistically significant indications of a relationship between these variables from the obtained survey sample. Thus, the final result is that, based on observations from the sample and after the applied methods of

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inference statistics, it cannot be claimed that there is a specific connection between the use of augmented reality in everyday life and the age of respondents from the survey sample.

Table 5. Correlations and Bootstrap

Control Variables					AGE	XR USE
SCHOOLING & ACTIVITY	AGE	Correlation			1.000	-.123
		Significance (2-tailed].			.	.222
		df			0	99
		Bootstrap[a]	Bias		.000	.002
			Std. Error		.000	.103
			95% Confidence Interval	Lower	1.000	-.312
				Upper	1.000	.084
	XR USE	Correlation			-.123	1.000
		Significance (2-tailed].			.222	.
		df			99	0
		Bootstrap[a]	Bias		.002	.000
			Std. Error		.103	.000
			95% Confidence Interval	Lower	-.312	1.000
				Upper	.084	1.000

3. Discussion

Most of the respondents are female 53,01%, aged 18 to 24 years old, with completed Higher education (vocational studies) and in the status of student (master vocational studies). within 78,31%. In general, respondents are aware of XR (86,75%) and use this technology in their daily lives (34,94%) do not use it 33,73%. Also, 31,33% of respondents, regarding whether they use XR in everyday lives, chose the option "Maybe (not aware of the same)" that implicates that they are unsure if they use AI in their daily lives.

A second-order partial correlation coefficient was obtained because the variables education level and current educational status were excluded from the influence of augmented reality in everyday life, and respondents' age was excluded from the sample's influence. To put it another way, this probability of 0.222 means the null hypothesis cannot be rejected, favouring an alternative, which confirms our conclusion from calculating the Spearman's correlation coefficient: no statistically

significant evidence exists for a link between the variables in the data we collected. Conclusion: Observations from the sample and applied statistical inference methods do not support the claim that augmented reality use in everyday life is associated with respondents' age from the survey sample.

Conclusion

It is not surprising that the research failed to establish a connection between the variables because a strict connection might be a limiting factor. If research shows that the correlation between variables, for example, is negative and strong, we would have a situation in which, for example, our variables of interest (use of XR and age of respondents]. move in opposite directions: with increasing age, the use of augmented reality decreases. Therefore, we should specify that the conclusion made based on the selected sample and characteristics should be added to all existing research as a conclusion that within the sample of information technology students, the variability is explained in such a way, but that further research is needed to make a correct statistical conclusion. the whole population. Of course, determining and testing all types of samples based on which a conclusion about the entire population would be made is expensive and requires huge resources, or testing the entire population without isolation, which is almost impossible to report in most cases. Therefore our statement is in line with sample and limited resources, which represents the limitations of this research study.

Almost even distributions among survey respondents when regarding they usage of this technology in their daily lives can be explained with the fact that Serbia is mid-income country and that XR technology is still not commonly used and affordable to most or that XR is not promoted well enough among the HEI students and that these institutions should explore the possibilities and challenges that introduction of XR in HEI could bring which is the direction of future research.

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THE ANALYSIS OF ENTREPRENEURIAL INTENTION OF MANAGEMENT STUDENTS IN THE TIMOK REGION – OVERVIEW OF ATTITUDES AND OPINIONS

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Abstract

The sector of small and medium enterprises and entrepreneurs (SMEs) could play a key role in further national economic growth of Serbia through employment, increasing competitiveness and exports, but also in solving the problem of unequal regional development.

One of the most economically and demographically underdeveloped regions in Serbia is the Timok region. This region is also characterized by reduced investment activities in the SME sector. Increasing the attractiveness of the region for new entrepreneurs and investors and increasing the competitiveness of local entrepreneurs will create new, attractive and stable jobs, which will further help to retain qualified people in the region. This paper gives a voice to future bearers of economic activity in this specific region, and represents the first research on entrepreneurial attitudes, opinions and intentions of young people in this part of Serbia.

199 students of the final years of Bachelor and Master Studies of management in the Timok region participated in the analysis of entrepreneurial intentions. The obtained research results indicate that students have an entrepreneurial

intention and that people from their immediate environment have a mostly positive attitude towards entrepreneurship. Respondents believe that they possess necessary theoretical knowledge and skills, but not practical ones. The results of the research point to the necessity of shifting the focus of education from a strictly academic to a practical level, to the connection of educational institutions with the economy, to the better connection among entrepreneurs themselves, and to an urgent need for the activation of entrepreneurs' associations.

Keywords: *entrepreneurial intention; management students; Timok region; entrepreneurship.*

JEL Classification: L26, M13, M20, O31

Introduction

In recent decades, the neoliberal concept of economic policy in Serbia has created extremely poor results in all areas of economic and social developments. This implies low global competitiveness, high foreign indebtedness, deindustrialization of the country, high unemployment rates and chronic illiquidity of the companies. There are also undesirable demographic trends, especially within younger population and highly educated people, who go from rural areas to larger cities, and from larger cities to foreign countries. Migration of people from smaller cities to larger ones leads to regional inequality in Serbia. According to the World Bank report "Towards a new social contract", regional inequality in Serbia is quite pronounced and Serbia is among the countries in Europe and Central Asia that have the greatest inequality in relation to which region people come from [Devarajan & Mottaghi, 2015]. Such parameters require the implementation of a new economic policy that would lead to sustainable growth and economic development, eliminate regional disparities, provide the necessary level of investment and provide a favourable environment for the development of small and medium enterprises.

One of the ways to achieve sustainable economic growth is entrepreneurship, which has created positive results in the developed world. Various scholars have identified entrepreneurship as a major factor in every country's economic and social development [Perez-Perez *et al.*, 2021; Nguyen & Duong, 2021; Jena, 2020; Sergi *et al.,* 2019]. Entrepreneurship is crucial in the sense that it improves economic efficiency, brings innovation into labor markets and production, creates new jobs, and enhances employment rate [Ataei *et al.,* 2020]. Innovation and small,

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flexible business entities in which creativity and innovation are implemented faster became a priority in the economy with globalization and rapid changes on the international market. The European Union has already recognized the need for the strategic turnover to this new concept of economic development and has defined numerous key politics with the aim of encouraging entrepreneurship and businesses based on it. According to Ungureanu (2020), micro and small and medium-sized enterprises (SMEs) account for 99% of EU businesses and provide two-thirds of private sector jobs. Also, they contribute more than half of the total added value created by EU businesses [Ungureanu & Ungureanu, 2020].

As seen in the EU example, government policies and education system should be perceived in a way that positively influences attitudes or intentions of entrepreneurs and potential entrepreneurs. Involvement of theory can help create a suitable education system and policies that support creative thinking, stimulate entrepreneurship intention and further the same behaviour [Linan & Santos, 2011]. A bigger number of successful new enterprises would bring the creation of new workplaces, enlargement of incomes, innovation implementation and creation of the economy based on knowledge, thus resulting in the encouragement of the regional and national economic growth and development. Therefore, entrepreneurship can be considered as an engine of a nation's and local region's long-term economic growth.

Entrepreneurship is defined as the process were an individual pursues a business opportunity without regard to the resources he or she currently manages, and as the "art" of translating an idea into a new business ventur [Baringer & Ireland, 2010]. Entrepreneurs recognize opportunity as an unmet market need and translate it into a successful business, starting a new business to meet those needs [Hsieh *et al.,* 2007; Moor *et al.,* 2008].

Research on entrepreneurship has grown significantly in recent years, leading to different sub-fields, such as entrepreneurial behavior [Kraus *et al.,* 2020]. One of the most common dilemmas regarding entrepreneurs is: Are entrepreneurs born or become over time? This question is based on the myth that some people are naturally destined to be entrepreneurs. Although the success of the company is influenced by a large number of factors, such as the economic crisis [Isabirye, 2021], the success of starting a business largely depends on the entrepreneurial intentions of the future entrepreneur and his willingness to "sacrifice" to achieve business goals. The two main factors that can influence the launch of a successful business venture are: entrepreneurial opportunity and individual propensity for entrepreneurship. An

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entrepreneurial opportunity is a favorable set of circumstances that creates the need for a new product, service or business [Baringer & Ireland, 2010].

With emphasis on the unequal regional development in Serbia, as well as the unequal development of entrepreneurship, the aim of this paper is to give a voice to the future carriers of the entrepreneurial activities in this area and to look more detailed at problems and opinions of these residents. The motive of the authors is that the results of this research could help create favourable conditions for a further increase in the level of entrepreneurial intent and activity, which will further result in a reduction of migration from this region.

According to authors' cognition between various previous research on entrepreneurial potential and activities on the student population in the Republic of Serbia [Jovin & Josanov-Vrgovic, 2018; Jovicic-Vukovic & Papic-Blagojevic, 2018; Petkovic *et al*, 2018; Bjekic & Strugar-Jelaca, 2019; Nikolic *et al*, 2017; Djordjevic *et al*, 2012; Rajkovic *et al*, 2020], there is not a single one which specifically concentrates on students from the Timok region.

The subject of this research is to examine personal attitudes and opinions of management students in the Timok region on entrepreneurship through the following research questions:

1. Do students of management in the Timok region have entrepreneur intention?
2. How do students estimate their own entrepreneurial abilities?
3. What is the social assessment of entrepreneurship?
4. How much are students familiarized with measures and bodies, which support entrepreneurship?

Literature Review

Entrepreneurial intention

Intentions, as the single best predictor of behavior [Ajzen, 1991; Ajzen, 2001], are the result of a conscious process that takes time, requires some deliberation, and focuses on consequences [Loewenstein *et al.,* 2001]. In essence, intentions are desires the agent is committed to that are achieved through the execution of a certain plan [Morveli-Espinoza, *et al*., 2019]. In the case of entrepreneurial intention, this desire is to start one's own business [Crant, 1996; Krueger *et al.,* 2000; Krueger, 2009]. Kolvereid emphasize that in entrepreneurship as a multi-step process that leads up to venture creation, intention can be considered as the first step [Kolvereid, 1996]. Molina-Sanchez and Garcia (2020) explain entrepreneurial intention as thinking about entrepreneurial activities and having a positive attitude

about it, Linan emphasise that entrepreneurial intention indicates the effort that the person will make to carry out that entrepreneurial behavior [Linan *et al.,* 2009; Linan *et al.,* 2011], while De Clercq defiend it as a person's aspiration or tendency towards entrepreneurship [De Clercq *et al.,* 2013].

The study of intent to predict a specific type of behavior has a long history in social psychology [Ajzen, 1991; Ajzen, 2002]. Intention is regarded especially significant when it comes to behaviors that are rare, not easy to observe and remote in time, as is entrepreneurial behavior [Krueger & Brazeal, 1994]. Having in mind that the motivation to start one's own business is crucial in this process, knowledge of entrepreneurial intentions is very important. Namely, it is possible to systematically and deliberately affect the increase in the number of entrepreneurs through the development of entrepreneurial intentions at individuals. In this way the positive effect on society as a whole can be realized, so the study of entrepreneurial intention is of great social significance [Nikolic *et al.,* 2017].

To understand the consequences of intentions require that we understand the antecedents of intention (motivational "antecedents" by Ajzen, 1991). Antecedents are various external factors, such as social and personal ones, which influence attitudes [Krueger & Carsrud, 1993]. Attitudes influence intention, which further predict behavior. Therefore, we can say that intentions are used as a mediator or catalyst for action. Much of entrepreneurship is intentional, and, therefore, the use of intention models provides a good means of examining the precursors to business start-up [Krueger, 2000]. Two dominant formal, theory-driven models of intentions are the theory of planned behavior (TPB) by Ajzen and Fishbein and Shapero and Sokol's model of entrepreneurial event (SEE) [Krueger *et al.,* 2000].

The central construct in the TPB is the individual's intention to perform a given behavior under volitional control [Ajzen, 1991]. TPB explains that intention is best predicted by attitude towards the behavior (ATB), subjective norms (SN) and perceived behavioral control (PBC). Therefore, exogenous factors (such as traits, demographics, skills and social, cultural and financial support) indirectly influence intention and behavior. According to Ajzen (1991), the more favorable the attitude and subjective norm and the greater the perceived behavioral control is, the stronger should be the intention of an individual to perform the behavior under consideration [Ajzen, 1991]. Perceived behavioral control plays a pivotal part in the theory of planned behavior; along with the intention towards the behavior, it can be used directly to predict behavioral achievement. While subjective norm and attitude toward the behavior influence the intention, the role of PBC is expected to be more decisive for action [Autio *et al.,* 2001].

According to Shapero and Sokol (1982) human behavior is influential by the displacement, which can be positive or negative [Shapero & Sokol, 1982]. Displacement results in change of the behavior, and a person choose the best result between the alternatives. Based on this model resulting behavior will depend on propensity to act and the relative credibility of alternative behaviors [Peterman & Kennedy, 2003]. Propensity to act is the personal disposition to act upon one's decision and it should be seen as a moderate effect [Krueger, 1993]. Direct effect on alternatives has credibility i.e. starting a new enterprise should be seen as a credible opportunity. Credibility requires perceived desirability and perceived feasibility.

In recent years, research dealing with the concept of entrepreneurial intention has increased exponentially. According to Perez-Perez et al, education and training occupy a significant place on the list of methods to increase entrepreneurial intention. The research results of these authors suggest that students become aware of their need for additional training and the difficulties of entrepreneurship and company management [Perez-Perez *et al.,* 2021].

New business activities are undertaken by those who believe that they have the skills, knowledge and motivation to start a business venture by recognizing the necessary conditions and opportunities [Levi & Autio, 2008]. Educational and structural support factors positively influence the entrepreneurial intentions of students [Linan *et al.,* 2011]. Obtaining adequate skills and knowledge can provoke entrepreneurial intentions of individuals. Literature has shown that entrepreneurial intentions of students are positively influenced by skills and values [Linan, 2008], personal attitudes, perceived support and perceptions of behavior control [Ambad & Damit, 2015], attitudes towards entrepreneurs, entrepreneurial activities and their social function [Veciana *et al.,* 2005].

Rajkovic and associates compared entrepreneurial intentions among students and employees in Serbia. The importance of their research is that it indicates a greater propensity for entrepreneurship among students than among employees. Students should be systematically encouraged for entrepreneurship, by reinforcing the need for achievement and being proactive. However, it is paramount that students, who show a propensity for entrepreneurship, are given appropriate financial assistance and incentives to increase their risk-taking readiness [Rajkovic *et al.,* 2020].

Liu and Zhao investigated family education parental factors of tourism and hospitality students' entrepreneurial intention. Their findings suggest that parents'

attitudes directly affect tourism and hospitality students' entrepreneurial attitude and perceived behavioral control, ultimately impacting these students' entrepreneurial intention [Liu & Zhao, 2021]. Results from the research conducted among students in Croatia and Bosnia showed that support from social environment (such as family and friends) and personal experience in entrepreneurship have significant impact on career orientation towards entrepreneurship [Krneta *et al.,* 2015]. The study conducted in Bosnia supported these results and stressed the need to strengthen the social context and potential support of social capital in the development of youth entrepreneurship [Langer *et al.,* 2016].

Conditions for entrepreneurship development in Serbia

Unemployment of young people is a very serious problem in Serbia. The youth unemployment rate in Serbia averaged 39.53% from 2011 until 2020, and the youth unemployment rate for 2020 was 30.78 % (statista.com). The economic facts and environment in Serbia along with the lack of trust in the system create pessimistic expectations with young people. According to the Global Competitiveness Report, Serbia is among top-ranked countries with the biggest brain-drain in the world, along with Bosnia and Herzegovina, Croatia and North Macedonia[1].

According to the same report from 2019, Serbia occupied the 72nd place on Global Competitiveness ranking out of 140 countries surveyed (7 places better than in 2018). In relation to the surrounding countries, according to the aggregate index that measures global competitiveness, Serbia is ranked better than Montenegro (73rd place), Albania (81st place), North Macedonia (82nd place) and Bosnia (92nd place). Out of the countries of the region, Slovenia is ranked the best (35th place), followed by Hungary 47th, Bulgaria 49th, Romania 51st and Croatia 63rd place (Global Competitiveness Report for 2019).

The look at the two pillars, in the same report, which mark Innovation ecosystems of the country, shows that Serbia holds the high 54th place (according to the 11th pillar of Business dynamism) and the 59th place (according to the 12th pillar of Innovation capability). Nevertheless, within the 11th pillar, Entrepreneurial culture shows that Serbia's rank is 92, and in this sub pillar, Companies embracing disruptive ideas Serbia reached the best, but still low ranking (80th place), and within Attitude towards

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[1] On the scale of 1 to 7 (1= all talented people leaving the country; 7= all talented people staying in the country), BiH scored 1.76, followed by Croatia (1.88), North Macedonia (2.13) and Serbia (2.31).
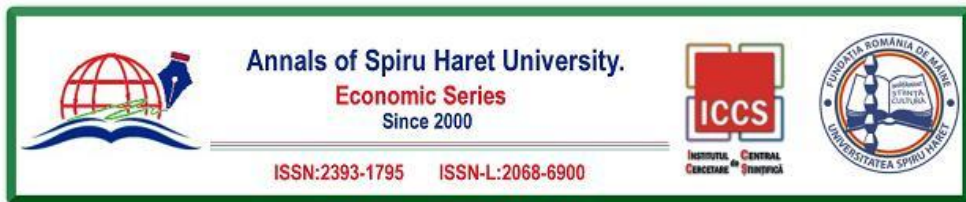
entrepreneurial risk the lowest (107th place) (the Global Competitiveness Report Serbia). This only proves that entrepreneurial culture is not nurture in population, and that Serbian national culture with a high risk avoidance (Hofstede dimension) is not open to accept risk. Within the 12th pillar on the point Research and development, Serbia takes the 55th place. Moreover, the comparation of the data on innovation rankings in the Reports from previous years is encouraging since the Republic of Serbia shows growth of all parameters that concern innovation. We believe that the continuous improvement of the quality of scientific-research institutions, education and cooperation of universities and industry will in the future encourage entrepreneurial culture in the country.

On the list of the World Bank *Doing Business Report for 2020*, Serbia holds the 44th place out of 190, and this is 4 places better than the year before (48th in 2019), but still the conditions to do business in Serbia are not favourable (doingbusiness.org).

The analysis of the institutional situation in Serbia reveals that a lot number of strategies and action plans have been adopted as the systematic support for the development of entrepreneurship, starting with the Strategy for the Development of Small and Medium Enterprises and Entrepreneurship in the Republic of Serbia 2003-2008 with the Action plan 2005-2007, continuing with the Strategy for Support to the Development of Small and Medium Enterprises, Entrepreneurship and Competitiveness for the period from 2015 to 2020 and the Action Plan for the implementation of this strategy for 2015. Alignment with EU entrepreneurship support policy began in 2005, with alignment to the documents such as A Small Business Act for Europe and the principles of the European Charter for Small Enterprises. A Strategy for the Development of Competitiveness and Innovation of Small and Medium-Sized Enterprises for the period from 2008 to 2013 was adopted with the aim of increasing competitiveness and exports, strengthening the capacity of companies and balanced regional development in the Republic of Serbia [Djordjevic *et al*, 2011]. The existence of continuity in the systematic support for the development of entrepreneurship since 2003 is evident, though without a lot of progress in practice and often with just partial solutions not applicable in all regions of the country [Jovicic-Vukovic & Papic-Blagojevic, 2018]. The key problems for SMEs that existed in early 2000 remain today: lack of finance, too much bureaucracy, grey market, lack of information, unfair competition, etc. [Bogetic, 2019].

2016 was declared the Year of Entrepreneurship and this program then grew into the Decade of Entrepreneurship in which, in cooperation with the Ministry of

Economy, the Development Fund, the Development Agency of Serbia (RAS), various programs for starting a business were launched.

As part of its activities, the National Employment Service (NES) has a self-employment support program that includes two areas – educational services and financial support. After successful completion of the NES education, unemployed persons can apply for grants to start their own enterprise (NES, 2019). Since commercial banks consider start-up loans as too risky for financing, young entrepreneurs have only the possibility by the Development Fund and the NES. Unfortunately, these funds are not sufficient and therefore one of the biggest systematic problems in Serbia is lack of financing.

The prevailing opinion in Serbia is that entrepreneurship is popular, but that there are no incentives for development and therefore there is not enough understanding of its importance [Popović *et al.*, 2016]. Compared to other countries in transition, Serbia is less successful in creating new businesses and new jobs. Although great efforts have been made recently to attract foreign investors and create new jobs, this can have both positive and negative consequences. One of the negative consequences is certainly the exploitation of cheap labour. To prevent that, it is very important to invest in the innovation of the nation, to start one's own investments, which means creating opportunities for the development of entrepreneurship and small and medium enterprises. Every entrepreneurial venture that is launched is the result of a certain entrepreneurial intention of an individual or a group of people. Entrepreneurial intentions and readiness of the future entrepreneur to "sacrifice" himself/herself to achieve business goals greatly influence the success of the started business. Therefore, the analysis of attitudes and opinions of the potential carriers of the entrepreneurial intentions in one country or a certain region in a country is very important.

Timok region – basic characteristics and conditions for the development of the SME sector

The Timok region is one of the underdeveloped and economically and demographically depressed regions of Serbia. The Timok region, which consists of eight municipalities in two administrative districts, Bor and Zajecar, covers an area of 7,130 km^2. Although it makes up a little more than 8% of the total area of the Republic of Serbia, according to the results of the last census from 2011, 3.4% of the total population of the Republic lived in this area, i.e. 244,959 inhabitants. The average population density in the Timok region is 34 inhabitants / km^2, which is

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more than twice as less as the national average (81 inhabitants / km²). Although the number of inhabitants was constantly growing in the period after the Second World War until 1961, after 1961 the population decline began in the Zajecar administrative district, and in Bor after 1981 [RZS, 2011].

Regional differences in GVA (gross value added) of the economy, especially industry, indicate that the share of Bor and Zajecar districts is 2.4% in GVA of industry in Serbia (data from the Statistical office of the Republic of Serbia from 2018). The achieved level of development of the Region indicates a lag behind the national average according to the basic indicators. Bor and Zajecar districts in 2018 recorded 75.8% of the average GVA per capita, which indicates the below-average productivity of industry of the Timok region (RS Relations Index = 100). The employment of 268 people per 1,000 inhabitants for the Bor region and 242 for the Zajecar region is below the Serbian average with 305 employees per 1,000 inhabitants [RZS, 2018].

Table no. 1. Number of Citizens in the Bor and Zajecar Regions through the Years

Year	Number of citizens in the Bor region	Number of citizens in the Zajecar region
1948	144,049	173,603
1953	151,973	177,332
1961	160,096	178,623
1971	175,848	172,424
1981	180,463	170,682
1991	178,718	158,131
2002	146,551	137,561
2011	124,992	119,967

Social and state property dominates in the Timok region, while entrepreneurial activities are stagnant. According to the report on the basic business results of the SME sector in 2017, there was a territorial unevenness in the level of SME development by regional areas, measured by the GVA indicator per employee, the ratio of the area with the highest (City of Belgrade) and lowest values (Bor region) was 3.4:1 [RZS, 2017]. The employees in the SMEs of the Region make up 2.1% of the total number of employees in the SMEs of the Republic. The share of SMEs of the Timok Region in turnover in the Republic of Serbia is 1.2%, while their share in the creation of the GVA of the SME sector in the Republic of Serbia is 1.2% [RZS, 2018]. According to the SME Development Index, Bor and Zajecar districts are at the

bottom of the scale in Serbia. In the Timok region, 2.1% of Serbian SMEs operate (1.1% in Bor and 1% in Zajecar district) [RZS, 2018]. The pronounced disproportion in the levels of economic development of the SME sector between the regions is a great development constraint of the Serbian economy in the end.

According to the available data from 2018, there are 6,358 entrepreneurial entities in the Timok region, which employs a total of 8,148 workers [RZS, 2018]. According to the data from the Regional Development Strategy of the Timok region for the period 2011-2018, an average of 300 SMEs are opened annually in the region of Eastern Serbia. The share of young people, up to 25 years of age, among the owners of newly opened SMEs is less than 3%.

The Regional Development Strategy of the Timok region for the period 2011-2018 recognizes the expected benefits from the development of SMEs, such as: increasing the competitiveness of local businesses in regional, national and foreign markets; creating new, attractive and stable jobs that will help keep qualified people in the region; increasing the attractiveness of the region for potential and new entrepreneurs and investors. The goal of the part support to entrepreneurship and investments in the strategy is the increase of the competitiveness of entrepreneurs from the Timok region. To achieve this goal, measures and activities are proposed for the introduction of innovation and innovative approach to entrepreneurship, harmonization of human resources competencies with demand in the regional labour market, as well as improvement of instruments to support existing and new entrepreneurs and new investors. This should be achieved through awareness-raising campaigns among entrepreneurs in the region about the need for innovation; building advisory mechanisms; building managerial competencies (knowledge, skills, motivation); retraining people with inadequate education; supporting local entrepreneurs in penetrating domestic and international markets; providing a site with the appropriate technical infrastructure for the establishment of new investments. The strategy envisages the implementation of various projects such as: "Strengthening competItiveness by raising the innovation of the SME sector in Eastern Serbia", "Support to cluster development in Eastern Serbia", "Improving the work of Business Incubator Centers in Eastern Serbia", "Youth Entrepreneurship", "Harmonization of educational profile with the needs of the economy in the region of Eastern Serbia", "Establishment of a regional revolving fund for the development of women's entrepreneurship", "Improving the work of business support institutions in Eastern Serbia", etc. [RARIS, 2011]. However, despite these activities, the share of SMEs from the Eastern Serbia Region in the total

number of SMEs in Serbia is still very small, which is a constraint for the development of the economy of this region.

Methodology

Final year students at universities are very common sample in the entrepreneurship literature [Esfandiar *et al.,* 2019; Fayolle *et al.,* 2006; Liu & Zhao, 2021]. Research has shown that university graduates between 25 and 34 years old usually show the highest propensity to start their own business [Jena, 2020; Doanh & Bernat, 2019; Choudhury & Mandal, 2021]. Therefore, we selected final-year Bachelor and Master students at at the Faculty of Management in Zajecar, Megatrend University, as our study sample. In the Timok region, higher education is organized through two faculties, Technical Faculty in Bor and the Faculty of Management in Zajecar. We considered particularly management students as the most suitable sample that could develop the intention of starting their own enterprise, due to their formal knowledge. Consequently, the curriculum of the students in our sample includes the courses of entrepreneurship and small business management in their first and second years of the university. The data used for the research were primary and they were collected through a questionnaire. The total number of respondents is 199, because the respondents are only final year Bachelor and Master students. By collecting data in class, we have provided a high response rate. The questionnaire contained questions taken from the Entrepreneurial Intention Questionnaire of Linan and Chen [Linan & Chen, 2009] which were adapted for the purposes of our research. The statistical program PSPP 1.2.0 was used for data processing. The conducted analyses are descriptive statistics and a frequency analysis.

Results and discussion

To study the internal consistency of items in a questionnaire we calculated Cronbach alpha coefficient. Overall reliability for the total of 25 items was 0.90, which is an excellent consistency [Cho & Kim, 2015].

Out of the total number of respondents, 28% are male and 69% female (3% did not answer the question), with an average age of 25 (M = 25.3), the total age range of respondents is from 21 to 48.

Firstly, we asked for a more detailed description of the professional interests of students, i.e. what they would like to do immediately after graduation. The highest marked statement was the one about starting a company (M = 5.20), then working as an employee (M = 4.47), and as the last one the education (M = 4.31). In the

medium and long term, considering all the economic, personal, social advantages and disadvantages as well as job stability, most students decide for paid work (M = 5.37) and then for the job of an entrepreneur (M = 4.99), the work on project is marked the lowest (M = 4.93).

Table no. 2. Results of the Survey

Variable	N	Mean	Std Dev	Minimum	Maximum
Working as an employee	185	4.47	1.94	1.00	7.00
Starting-up a firm	180	5.20	1.86	1.00	7.00
Follow on training and preparation	183	4.31	2.16	1.00	7.00
Salaried work	196	5.37	1.53	1.00	7.00
Liberal	181	4.93	1.55	1.00	7.00
Entrepreneur	185	4.99	1.68	1.00	7.00

When asked if you have ever seriously considered becoming an entrepreneur, 44.72% of respondents answered positively (50.75% answered negatively, while 4.52% of respondents did not answer). Of all men, 47.27% gave a positive answer that they were thinking of becoming an entrepreneur, the same percentage of male respondents gave a negative answer. Regarding female respondents, a slightly higher percentage answered negatively (52.17% answered negatively, 43.48% positively).

While the percentage of those who would not consider becoming an entrepreneur is still high, the results pointed that there is the existence of the desire and intention of management students in the Timok region to start and run their own business. This implies a little dose of optimism, especially compared to the results of some previous research. In the survey, conducted by CEVES, 65% of the citizens answered they wished to work for the salary in the public sector and just 30% would like to start their own business; as expected, the youngest (aged 18 to 29) had the highest percentage of wish to be self-employed (36%) [CEVES, 2014]. Similar were the answers in the survey of young people aged between 15 and 30, in which 57% of them considered employment in the public sector to be safe employment, and even 58% did not plan to start their own business [Građanska inicijativa, 2011].

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Aggregate measure Global entrepreneurship index shows slight improvement by a better placement of Serbia in years, out of 137 countries, Serbia was 79th in 2017, 74th in 2018 and 67th in 2019[2].

However, after completing their education, a very small number of young people really decide to be entrepreneurs, and according to research in the Timok region, that is less than 3% [RARIS, 2011]. These discrepancies between the intentions of young people and the situation that occurs in practice indicate that it is necessary to conduct a more detailed research to analyse what young people face in practice and what the difficulties that deter them from their intentions to become entrepreneurs are.

The existence of entrepreneurial intention between young people could be a significant stimulus in reducing very high youth unemployment. In this regard, integration of theory and practice to raise the development of competencies during the period of higher education through the significant link of universities and labour market is a necessity [Vukovic *et al.*, 2020].

Table no. 3. Results of the Survey

Statement	N	Mean	Std. Dev	Min	Max
I know the necessary practical details to start a firm	196	3.93	1.69	1	7
I know how to develop an entrepreneurial project	196	3.72	1.66	1	7
Opportunity recognition	192	4.64	1.51	2	7
Creativity	192	5.15	1.43	2	7
Problem solving	192	5.06	1.28	2	7
Leadership and communication skills	192	5.31	1.45	1	7
Development of new products and services	192	4.83	1.48	1	7
Networking and making professional contacts	196	5.06	1.35	1	7

In order to answer the second research question the respondents assessed their entrepreneurial skills. Good creativity (5.15) was marked the highest, leadership

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[2] The Global Entrepreneurship Index measures the intensity of the impact of various factors on the development of entrepreneurship in the country. The index consists of three sub-indices that reflect the attitudes, abilities and aspirations of entrepreneurs, as well as fifteen individual indicators. According to this index, the best position is held by the USA, followed by Switzerland and Canada.

and communication skills (5.31), networking and establishing professional contacts (5.06), knowledge of entrepreneurial project development (3.72) and knowledge of practical details for starting a business (3.93) were marked the lowest marked. The obtained results are expected, considering that the research involved final year students of management who should have good leadership and communication skills that are necessary for them to work with people and establish business contacts.

Being an entrepreneur includes a mix of personal characteristics, soft skills, various knowledge and competences. Students can obtain that knowledge and those skills through formal education at university, through informal education at various organised activities and courses, in family and through interaction with role models.

Entrepreneurial education is the task of educational institutions from preschool to the level of doctoral studies (the Danish model from 2010 confirms this). University that an individual attends through the formal knowledge and the environment which it offers has a particularly important role in developing entrepreneurial potential because it represents the last phase of formal education of an individual before entering the labour market [Jovicic-Vukovic & Papic-Blagojevic, 2018]. Education largely influences the individual's wish to continue his/her career in accordance with their experiences, which they learned in educational institutions, and also influences the perceived wish to start a business [Peterman & Kenedy, 2003].

It is interesting that the students in our sample marked higher their soft skills then their knowledge of project development and details for starting a business since the National Employment Service (NES), local municipalities and their youth offices are organizing trainings, which focus exactly on detailed instructions on how to register a business and write an effective business plan. This leads to the conclusion that young people should be more motivated to participate in those kinds of trainings and that trainings should be organised better. Interviewees from previous research note that these programs tend to be too academic, without sufficiently detailed real-life case studies, or with a rare international case studies with no direct implications for Serbia [Bobic, 2017]. Additionally, we highlight the need of a necessary cooperation between official education and economy so that students could acquire more practical knowledge during their studies.

Further, the questions of social assessment were discussed, i.e. how entrepreneurial activity is valued among family (mean 4.44), friends (mean 4.52) and colleagues (mean 4.29), most of the answers were a middle option, so neither worse nor better than other activities and a career.

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When it comes to further questions about the assessment of entrepreneurship in the society, the respondents rated the statements with a grade from 1 for *completely disagree* to 7 for *completely agree*. The statement that entrepreneurial activity clashes with the national culture of the country was on average rated with a medium to lower score (M = 3.87), and the one that the role of entrepreneurs in society is not sufficiently recognized was rated medium to higher (M = 4.75) and the one that entrepreneurial activities are considered too risky (M = 4.58).

Table no. 4. Results of the Survey

	In close family		Among friends		Among colleagues and mates	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Much below others	1	0.5	0	0	7	3.52
Below others	10	5.03	12	6.03	19	9.45
Slightly below others	38	19.10	36	18.09	37	18.41
Neutral	72	36.18	55	27.64	59	29.35
Slightly above others	36	18.09	43	21.61	33	16.42
Above others	14	7.04	32	16.08	21	10.45
Much above others	28	14.07	18	9.05	18	8.96
Missing	0	0	3	1.50	6	3.44
Total	199	100	199	100	199	100

It is interesting that the opinion of students' close environment shows mostly neutral results, i.e. they do not have a strong positive or negative attitude about entrepreneurship. The results of previous surveys show that the attitude toward entrepreneurship in Serbia is mostly negative. According to the results of the survey conducted by CEVES, being self-employed is not very much respected in Serbia, it is after employment in a company with foreign capital, employment in the public sector

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and being a freelancer. Behind the entrepreneur is only an employee in a domestic private company [CEVES, 2014][3]. People fear the risks that may arise, and which, with the good will of the competent authorities, can be avoided, such as regulations that are constantly changing and interpreted differently, and distrust in the justice of the state [CEVES, 2014]. The great riskiness and uncertainty of business environment is confirmed by the results of student surveys on the territory of 16 towns and municipalities in Serbia, and for them private business represents: risk and uncertainty (23.53%), challenge (21.93%), pleasure and self-confirmation 14.90%) [Djordjevic *et al.*, 2012].

The following table shows how familiar students are with business associations and support bodies. Even 28% marked their knowledge about business associations as slight ignorance, and 26% of them marked their knowledge about support bodies with the same category – slight ignorance.

Table no. 5. Results of the Survey

Category	Level of knowledge about business associations		Level of knowledge about support bodies	
	Frequency	Percentage	Frequency	Percentage
Absolut ignorance	21	10.55	21	10.55
Ignorance	29	14.57	43	21.61
Slight ignorance	56	28.14	52	26.13
Neutral	39	19.60	43	21.61
Slight knowledge	34	17.09	15	7.54
Knowledge	9	4.52	7	3.52
Complete knowledge	7	3.52	4	2.01
Missing	4	2.01	14	7.04
Total	199	100	199	100

The level of detailed knowledge of specific measures to support the creation of a company is also very small, the lowest ones are consulting services in favourable terms (mean 2.86), loans under special conditions (mean 3.03), business centres

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[3] In 2014, CEVES organized research with the aim of helping development of entrepreneurship in Serbia based on facts. In the research sample of 1,002 citizens, 87 expert economists and non-economists, politicians, representatives of NGOs and regional development organizations were also included.

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(mean 3.04), training for young entrepreneurs (mean 3.06) and the highest technical support (3.35 mean).

In Serbia access to the financial mechanisms and capital for entrepreneurs is very limited. The government does not have effective programs of entrepreneurship support at national or local levels. There are some initiatives but from the pool of a very small number of partners financing comes mostly from donations. Even though the year 2016 was announced as the year of entrepreneurship, during which a large packet of government programs was realized (ras.gov.rs), entrepreneurs and potential entrepreneurs still do not recognize concrete government help. In the survey conducted in 2016[4] by National Business Chamber of Serbia, just 15% of respondents answered that they were familiar with the government's simulative programs for start-ups.

The analysis of the Regional Agency for Development of Eastern Serbia within the research of existing associations of businessmen and associations related to the development of entrepreneurship in Eastern Serbia shows that out of the total number of associations (44), 2 out of 3 associations in the region are inactive. Further, connections between members in associations are weak and in associations everything depends on the individuals who work in them and their activities (RARIS.Org).

Conclusion

The transition to a market economy in Serbia has not yet created appropriate conditions for the development of entrepreneurship. Declarative support of economic policy makers in Serbia exists, but despite that, the business environment for the development of entrepreneurship is still unfavourable. Obstacles to the development of entrepreneurship are still present, almost as at the beginning of the transition period. In order to ensure the progress of the SME sector in Serbia, it is necessary to move from strategies to the implementation of the strategies, reduce bureaucratic costs and procedures, improve market access, restore confidence in the judicial system of the state, etc.

The Timok region, as one of the underdeveloped and economically and demographically depressed regions of Serbia, can find a solution in the development of entrepreneurship. Some of the positive effects of entrepreneurship development are

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[4] In 2016 PKS organized research with the aim of getting to know opinions and needs of potential and current entrepreneurs. The total sample was 739 entrepreneurs and potential entrepreneurs aged 15 to 35.

solving the problem of unemployment, stopping the migration of young labour force, increasing labour productivity, and adopting innovations.

The increase in the number of entrepreneurs in one region is preceded by an increase in entrepreneurial intent, especially among young university-educated people, who are future bearers of entrepreneurial activities. Therefore, research focusing on the opinions and assessments of young people in one region is necessary. In addition to government institutions, local associations of entrepreneurs, associations of small and medium enterprises and entrepreneurs, as well as public and private universities, international and local organizations and trade unions must play an important role in the process of creating a favourable environment for the development of entrepreneurship in the region. Certainly, education is essential for young people and the formation of their entrepreneurial intentions, i.e. skills and knowledge acquired at faculties in the process of academic education. Only young people who finish the educational cycle with more entrepreneurial skills and more developed consciousness will be more aware of the possibilities and more inclined to self-employment.

The results of the research conducted for the purpose of this paper show that the students of management of the Timok region, as well as their surroundings, do not have a pronounced negative attitude towards entrepreneurship. Almost 45% of them said that they were seriously thinking about becoming entrepreneurs, which is not negligible. When researching their professional interests, i.e. what they would most like to do after graduating from college, out of the claims offered, the highest rating was given to the one about founding a company. Also, the respondents stated that they possessed necessary creativity, leadership and communication skills, as well as the skills of creating business contacts and connections. However, they lack practical knowledge about starting and developing an entrepreneurial project. Formal and informal institutions should include more such courses, but also shift the focus from a strictly academic to a practical level by connecting the economy and educational institutions. Also, the students of management of the Timok region state that they do not know who to turn to for support and help when starting a new business. The situation regarding the passive state and weak activities of the associations that exist in the mentioned territory requires urgent change.

However, what the authors consider as the most alarming problem is a very small percentage of young people in the Timok region who really decide to become entrepreneurs and suggest further research on the difficulties that discourage them from intending to become entrepreneurs.

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SMART HOUSE WEB APPLICATION: DESIGN AND IMPLEMENTATION USING JAVA EE, MVC FRAMEWORK AND ARDUINO MICROCONTROLLER

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Abstract

The automation of the environment as an outcome of hectic modern life has resulted in applications that would simplify and facilitate everyday life. This paper aimed to explore the possibilities of designing and implementing the web application "Smart House", which would make it easier for all users, especially those with limited or disabled mobility, to control the device in the house. In the initial part of the paper, the technologies used to develop the web application "Smart House" is theoretically processed. The research is illustrated with diagrams and tables. Documentation on application design and implementation is processed by Larman's method. At the same time, theoretical analysis of used technologies refers to the literature of authorities in the field of research of advanced concepts of Java, Java EE platform and Arduino microcontroller open-source development system, which allow modularity and ease of modification. The research examines cases of using the application when the actor is a user, and on the other hand, cases of using the application when the actor is an admin. Further, the system operations that need to be designed are observed. This is followed by the application

implementation process, in which testing is performed simultaneously, which is the last and final phase of software system development to facilitate troubleshooting.

Keywords: *Internet of Things; web application; smart house; Java; Servlet; MVC; Arduino.*

JEL Classification: O14

Introduction

Due to the fast way of life, there is a growing need to automate the environment in the modern world. The smart house system can provide control of subsystems such as heating and air conditioning, lighting, video surveillance, alarm system, and electrical devices such as refrigerator, water heater, stove, washing machine and the like [H. T. Lin, 2013]. Additional services include a driving simulator that assesses the driver's ability; smart shutters where the windows have automated shutters that can be adjusted with a remote device; a smart mailbox that notifies tenants every time shipments arrive; a smart water leak detector where sensors in the kitchen or garage aim to detect leaking water and notify tenants; a smart stove that warns the tenant if it is left on, a smart floor where sensors monitor the movement of the occupants; a cognitive assistant who reminds the tenants of scheduled obligations with audio and visual signals or, e.g. taking medication, etc. [Helal, 2005]. Consequently, smart houses are increasingly present to make everyday life easier for people.

The appearance of the smart house system was a consequence of the desire of people to make their life as easy and comfortable as possible. Ten years ago, smart houses looked like an expensive futuristic project and Science fiction idea and, after that, the privilege of exclusively rich people. Today, smart house systems are available to the majority of the population due to reducing IT technologies cost.

The smart house is a group of electronic and electro-mechanical devices that allow the owner to remotely monitor and control the processes in the apartment.

Today, smart house systems are often integrated into the general home information network and connected to the user via the internet. Therefore, IoT (connected systems to the internet) is a critical component of smart houses and building automation in general.

In the book "Towards A New Architecture", Le Corbusier described the futuristic house as "a machine for living in" with numerous connected sensors and

computers. [10]. While Le Corbusier's attitude only applied to materials and construction, the development of technology, in the meantime, also encompasses service automation into modern homes.

The main functions of a smart house are:

●**Maintaining maximum user comfort** in everyday life (monitoring living space characteristics such as microclimate and lighting, as well as automating household chores, such as washing, cooking cleaning)

●**Avoiding security incidents** (burglary, uncontrolled gas leaks, etc.)

●**Efficient and economical use** of electricity and water.

Smart houses can improve energy savings, thermal comfort, health, and safety. Programmed applications achieve control of these systems: "e.g. if the room is empty, reduce the heating to minimum and turn off the light [Callaghan 12] More advanced smart house systems can learn and make self-program based on monitoring user habits, adapting to a person's behaviour.

One of the arguments for adopting such systems is that energy savings can be significant, [Davidsson 98] estimates up to 40% of energy consumption.

Smart house includes three groups of components:

●**Controller -** controls the system in automatic mode according to user settings. The system configuration allows one or more devices.

●**Sensors -** monitor the state of the environment in residential space. (temperature, humidity, movement of people). The sensors send the appropriate signals to the controller, which processes them and issues commands in order to adjust the parameters according to the user's order;

●**Executive devices** perform a specific job or action when they receive an order from the controller. These include air conditioners, ventilation units, sirens, sockets, switches and so on;

Optional equipment is routers, autonomous power supply for devices, network hubs and cables, for the well-coordinated operation of the entire system that functions as a local network. For that user to control the system outside the home, it must be connected to a global information network - the internet.

Short history

The idea of creating an intelligent home system appeared at the beginning of the 20th century at the same time as electrification and the appearance of the first

models of household appliances (vacuum cleaners, washing machines, irons, toasters, refrigerators)

1898. Nikola Tesla invented the first remote control. In addition, the Serbian-American inventor, electrical and mechanical engineer and futurist, made dozens of discoveries in the production, transmission and application of electricity. He invented the first AC motor and developed AC production and transmission technology, without which the technology that drives SmartHome would not be possible.

The first control devices for smart houses were developed and implemented in the 50s and 60s of the last century. For example, the ECHO IV kitchen computer (1966 - 1967) was the first smart device that calculated shopping lists, controlled the Temperature in the home, and turned devices on and off.

Figure 1. Jim Sutherland sits at the ECHO IV computer. (Pittsburgh Post-Gazette, 1966)

In the 1970s, the X10 home control standard, a relatively inexpensive automation system, was developed in the United States and became quite widespread. X10, a home automation platform, sends digital information via radio frequency waves to existing electrical installations. Early users of this technology could remotely control devices in their homes using a command console and modules.

The advent and widespread use of smartphones and tablets, which control home devices, has dramatically accelerated the development of smart house technology worldwide.

Today's smart houses - are more about safety and environmental life. Smart houses are sustainable. Further development of smart houses goes in the direction of developing technologies that learn about user habits.

Figure 2. Schematic diagram of an IoT-enabled smart house depicting the employment of smart sensing devices indifferent utilities (IoT for smart house)

Automation easily controls all devices, thus achieving energy savings and more accessible day-to-day activities. Furthermore, management can be realized using

applications that use the internet as a portable medium, fixed or mobile phone, remote control or dedicated devices, and the implementation methods are combined according to the needs and wishes of users [Radenković, 2017].

The paper deals with the research of designing and implementing the web application "Smart House", with the ultimate goal of achieving significant changes in everyday life and household management and making life easier for users who decide to implement this system. This web application makes the most significant contribution to users with difficulty or disability, allowing them to control the device from a mobile phone or computer. Also, for users who lead a modern lifestyle, automation and remote control of the devices offered by this system can alleviate or at least reduce stress and care at home. By analyzing the literature cited in the paper, the technologies used for the development of the web application "Smart House" were investigated: Java web application programming, advanced Java concepts, as well as the implementation of the server part of the application using Java EE (Java platform for enterprise application development) and controller applications via Arduino microcontroller (open source development system, used to manage other systems and modules).

1. Theoretical framework of research - defining applied technologies

Before analyzing the documentation on the design and implementation of the web application "Smart House", the technologies used during the development phases of the application were analyzed. Then, the paper focuses on the design and implementation of the web application "Smart House" using Java EE components organized on the MVC model and the Arduino platform. In the beginning, the Java EE platform and specific technologies are explained, which make it easier for developers to develop the application and, at the same time, ensure a high level of application security. Then, an MVC pattern is processed, representing an organization of individual parts of the application into components. Each component has a specific role in the application. After that, basic information about the Arduino microcontroller used to control the smart house device is given.

1.1 Java EE

The Java platform for the development of enterprise applications (Java EE) can be divided into four parts that follow the appropriate technologies and services [Vlajić, 2005]:

1. Web technologies used in the development of the presentation level of JEE or stand-alone web application;

2. Enterprise JavaBeans (EJB) technologies used in the development of business logic JEE applications;

3. Java XML technologies for developing applications that process XML documents and implement web services and

4. JEE platform services using all of the listed technologies.

JEE applications consist of JEE components that are installed on various computers. Computers that run components have different roles in the system, divided into the client, application logic, and Enterprise Information System (EIS) levels.

1.1.1 Servlets

Servlets are a popular way to build interactive web applications. It is a server-side component that runs exclusively within a Java virtual machine. Servlets provide a sophisticated way to create a server-side following a standard JEE environment and using a highly portable Java programming language. The role of the servlet consists of receiving and reading detailed data sent by the client (data from the form); receiving and reading implicit data sent by the client (header requests); generating results; sending detailed data to the client (HTML), and sending implicit data to the client (status codes about the header response). Servlet containers are generally components of a web or application server, such as BEA WebLogic Application Server, IBM WebSphere, and Sun Java System Web Server. Servlets are not designed for specific protocols—http Java packages [Jevremović, 2016].

1.1.2 JSP

Java Server Pages - is a java technology for generating dynamic content based on XHTML. MVC uses this technology as the default for generating views, i.e. view part of the application. It contains a set of XHTML and web-oriented UI components that are easily embedded in JSP pages and facilitate user interface development. The basic types of dynamic elements of JSP technology are expressions, scriptlets, declarations, directives.

1.1.3 Java Beans

Enterprise beans are Java EE components that implement EJB (Enterprise JavaBeans) technology. They are written in the Java programming language and represent components that run on the server-side and which, as a rule, encapsulate

the business logic of the application. Enterprise beans are executed within an EJB container that represents the executable environment of the application server [Ball et al., 2006]. Enterprise beans are portable components, so it is possible to put together different applications that will use existing EJB components (reusability). Using Enterprise beans significantly simplifies the development of complex, distributed applications and enables the creation of software components that can be reused when developing new applications.

1.2 MVC

The MVC model is a model architecture and consists of three components: Model, View, and Controller. A model is a component that contains the structure of a business system and its operations; that is, it contains data and data processing operations. The View component provides a user interface through which the user communicates with the system. It also sends the user reports obtained from the model. A controller is a component that is responsible for managing the execution of system operations. It accepts the request from the client, then calls the operation defined in the model and controls its execution.

1.3 Arduino

Arduino is an open-source development system, an electronic computing platform created in 2005 at Ivery University in Italy. The Arduino system is used to manage other systems and modules. The hardware is a simple Arduino board design that includes an Atmel AVR microcontroller and accompanying input-output components. Arduino programming is done in a programming language based on the Wiring language. In essence, it is a C ++ programming language with many facilitations and predefined functions for end-users or developers. The Integrated Development Environment IDE is based on Processing.

The Arduino IDE is written in Java and can be used on programming platforms such as Windows, Linux and Mac. A program written for the Arduino is called a sketch. The syntax of the Arduino IDE is similar to the syntax of the C ++ programming language.

2. Design and implementation of the web application "Smart House."

After researching adequate technologies, detailed documentation preparation followed, including the following phases: specification of requirements, analysis of requirements, design, implementation and testing of the web application "Smart

House". Documentation on the design and implementation of the application was processed by Larman's method.

2.1 Specification with requirements

To implement the smart house system, it is necessary to provide reasonable documentation and instructions for users and a microcontroller and the database and web application. The smart house includes lighting (ordinary and RGB), control of yard irrigation, control of blinds, monitoring of house temperature, and air humidity. In the first phase of preparation of documentation (cases of use based on verbal model), the behaviour of the system will be analyzed when one user and one admin are logged in who administers users, controls access rights and monitors events in the system through logs.
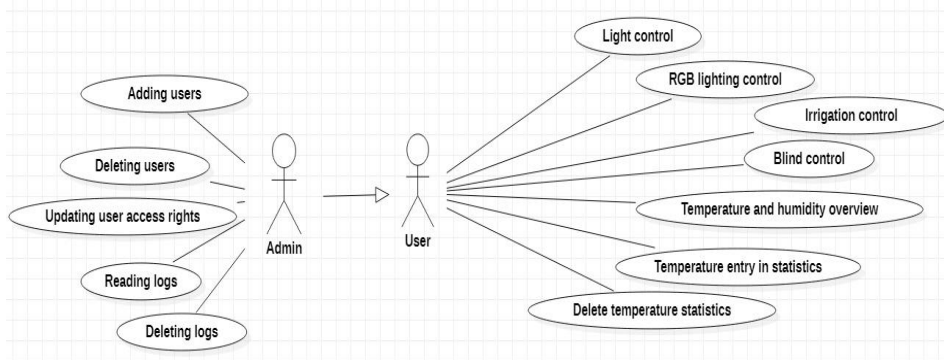
Figure 3. Use-case diagram of all use cases

2.1.1 Use cases

Based on the verbal model, the following use cases have been identified when the actor is a user: light control, RGB lighting control, irrigation control, shutter control, temperature and humidity review, temperature and humidity entry in statistics, and deletion of statistics.

Example - SK2: RGB lighting control
• Name: RGB lighting control
• Actors: User

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• Participants: User and system
• Prerequisites: The system is switched on, the user is logged in, and the RGB lighting control form is displayed
• Baseline scenario:
1. The user enters the colour of the lighting (APUSO);
2. The user confirms the entered parameters and calls the system to make changes (APSO);
3. The system changes colour or lighting mode (SO) and
4. The system displays a colour change or mode (IA) success message.
• Alternative scenarios:
3.1. The system recognizes that the user has entered the same colour or mode, displays a message that no change (IA) has occurred, and
3.2 The system fails to change colour or mode; the user physically checks the lighting condition (ANSO).

Based on the verbal model, the following cases of use were observed when the actor was an admin: adding users, deleting users, reading logs, deleting logs, updating user access rights.

The description of the use cases when the actor is an admin also implies primary and alternative scenarios.

2.2 The analysis
The analysis phase is divided into:
1. System sequence diagrams for SK - user (DSSK1: Light control, DSSK2: RGB lighting control, DSSK3: Irrigation control, DSSK4: Blind control, DSSK5: Temperature and humidity overview, DSSK6: Temperature entry in statistics, and DSSK7: Delete temperature statistics) with the definition of the contract on system operations - user. Contracts are made for each of the observed system operations. Contracts describe the behaviour of a system operation by describing what the operation does, but not how. Thus, one contract is tied to one system operation.

The following system operations that need to be designed have been identified:
• control lights (bulbID, intensity)
• controlRGB (red, green, blue)
• controlIrrigation (percentage)
• check shutters (position)
• read Temperature and humidity ()
• enterStatistics (temperature)

• outlineStatistics (statisticsID)
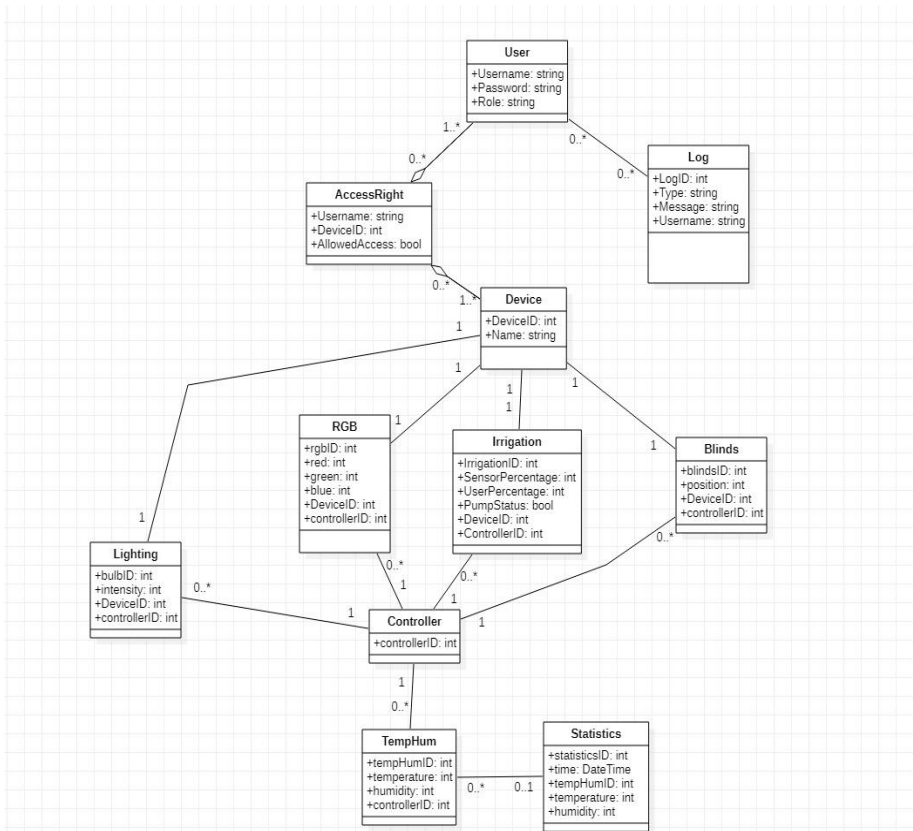
Figure 4. Conceptual model

2. System sequence diagrams for SK - admin (DSSK1: Adding users, DSSK2: Deleting users, DSSK3: Reading logs, DSSK4: Deleting logs, and DSSK5: Updating user access rights) with defining contracts for system operations - admin.
The system operations to be designed are:
• addUser (username, pass)
• user outlines (username)
• readLogs ()

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• obrisiLog (logID)
• update Access Rights (user ID, device ID, right)
3. Conceptual (domain) model created based on data from the functional requirement and use cases.
4. A relational model can be made based on a conceptual model and will design a relational database.
• User (Username, Password, Role)
• Device (EditID, Name)
• Access Right (Username, Device ID, Allowed Access)
Usernamereferences to User (Username)
DeviceID refers to Device (DeviceID)
• Log (LogID, UserID, Type, Message,)
UserID refers to User (UserID)
• Controller (controllerID)
• Blinds (blindsID, controllerID, DeviceID position)
controllerID refers to Controller (controllerID)
DeviceID refers to Device (DeviceID)
• Irrigation (IrrigationID, ControllerID, DeviceID, SensorPercentage, UserPercentage, Pump Status)
controllerID refers to Controller (controllerID)
DeviceID refers to Device (DeviceID)
• RGB (rgbID, controllerID, DeviceID red, green, blue)
controllerID refers to Controller (controllerID)
DeviceID refers to Device (DeviceID)
• Lighting (bulb ID, controller ID, Device ID, intensity)
controllerID refers to Controller (controllerID)
DeviceID refers to Device (DeviceID)
• TempHum (tempHumID, controllerID, temperature, humidity)
controllerID refers to Controller (controllerID)
DeviceID refers to Device (DeviceID)
• Statistics (statisticsID, tempHumID, weather, temperature, humidity)
tempHumID refers to TempHum (tempHumID)

2.3 Designing a web application "Smart House"
The application is divided into two parts, the server part which is implemented using Java EE and the controller part implemented via Arduino. The communication between the controller and the server part is performed via the HTTP protocol, whereby the controller sends requests to the server part to which

the server part responds with messages about the current state in the system, thus maintaining the state of the device set by the user.

The application design process includes creating Sequence Diagrams and collaboration diagrams for system operations - User, according to defined contracts, and then Sequence Diagrams and collaboration diagrams for system operations - Admin. After creating the diagram, the data warehouse is designed based on the software classes of the structure. As a result, tables of the relational database management system are obtained.

Special attention is paid to the design of the user interface - User and the user interface - Admin.

2.3.1 User Interface Layout - User (SK2: RGB Lighting Control)

To illustrate the appearance of the user interface, the case of use when the actor is the user - RGB lighting control was chosen.

Prerequisites: The system is turned on, the user is logged in, and the RGB lighting control form is displayed
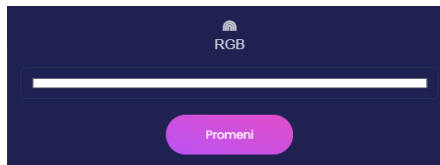
Figure 5. User interface display - RGB lighting control

Baseline scenario:
1. The user enters the colour or lighting mode
2.
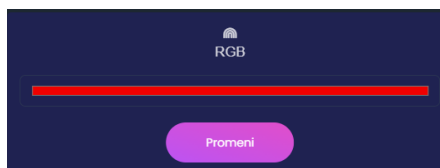
Figure 6. User input display - RGB lighting control

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2. The user confirms the entered parameters and calls the system to make changes

Action Description: The user presses the "Change" button, which calls the system operation controlRGB (red, green, blue, mode)

3. The system changes colour or lighting mode

4. The system displays a colour or mode change success message

Uspesno ste promenili RGB boju

OK
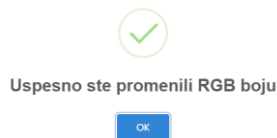
Figure 7. Display a successful change message

Alternative scenarios:

The system recognizes that the user has entered the same colour or mode, displays a message that no change has occurred

Greska prilikom unosa,
neuspesna promena

OK

Figure 8. Display of change failure message

2.4 Web application implementation and testing phase

The "Smart House" web application is implemented in the Java programming language. The "Eclipse IDE" software was used as the development environment. The "MySql" database was used for data storage. The connection between the application and the database is performed and controlled by "mysql-connector-java-8.0.23". Execution of the application is performed on the server "Apache TomCat v8.5".

The microcontroller used during the implementation is a version of the Arduino microcontroller with an integrated network card called "Arduino Node Mcu v3".

The device control code inserted on the microcontroller is implemented in the Arduino programming language, a customized C ++ programming language version. The development environment used to implement the code is "Arduino IDE". During the implementation, testing is also performed, which represents the last and final phase of software system development. Testing was performed after the addition of each new component for easier troubleshooting.

Conclusion

The research presented in this paper presents a detailed and complex process of designing and implementing the web application "Smart House" and the expansive possibilities of its application. The results obtained by this research can be further used and directed in two directions: to examine the possibilities of these platforms and technologies used to design and develop other similar applications that would make life easier for users, and on the other hand, to improve the application "Smart House" by adding new features for users. It is essential to point out that the system can be efficiently improved with easy and quick changes because it is organized in a unique way that allows it a high level of modularity. Some of the ideas for further research and improvement of the web application "Smart House", which appeared during the implementation, are: control of cooling and heating devices, finishing the security of the house by adding an alarm system and sending notifications via email service if an alarm is activated, as well as adding a video surveillance section.

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SMART CITY DEVELOPMENT BY SUSTAINABLE DIGITAL TRANSFORMATION[*]

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Abstract

Smart City concept is getting an increasing interest for municipalities representing one of the solutions for solving various city problems starting from urbanization problems and ending with environmental challenges. In these conditions, approaches to urban development management are gradually revised and are increasingly relied on advanced technological solutions, digitalization and platformization. Today, the digital upgrade of cities is becoming a central political choice for many countries, because it achieves, on the one hand, savings and efficiency in the operation of its services and in the management of its problems and on the other hand, speed and transparency in decision making. This paper aims to analyse the role of smart technologies in promoting sustainability and smart city concepts, as well as to establish a relationship between these two concepts. For these there have been applied methods of scientific investigation like analysis and synthesis of specific literature in the domain of circular economy, smart city, smart technologies, induction and deduction, critical analysis of materials. Sustainable development is based on the interaction of three aspects that are interdependent and mutually reinforcing. These are the economic, social and environmental aspects of a development. Thus, the circular economy concept

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can provide new, more impactful solutions to the smart city systems through new mobility, improving energy efficiency, smart environmental solutions.

Keywords: *smart city; smart sustainable city; circular economy; Internet of Things; urban development; sustainable digital transformation.*

JEL Classification: O33, O44, Q55

Introduction

As populations and urbanization rise in the coming years, many cities may turn to technology and advanced networks to help them manage resource constraints. Problems related to increasing economic and demographic pressures of cities in the modern world poses fundamentally new challenges for urban development. Growing migration, excessive density, transport problems, increasing environmental pressure, changing requirements of residents and businesses to the quality of the urban environment and services provided - this is just a small list of challenges that are faced by modern cities. In these conditions, urban development administration is gradually revising approaches to urban development management, which increasingly relies on advanced technological solutions, digitalization and platformization. Ideally, we are talking about the transition to an integrated digital urban ecosystem that would respond to emerging challenges, contribute to meeting the needs of all participants (residents, businesses, authorities, etc.), and would also provide a more effective integration of individual elements urban infrastructure. To conceptualize such a transition, the term of *smart city* is often used. This concept is interpreted broadly and in different ways, however, in any approach, the key role is assigned to information and telecommunication technologies that help most effectively ensure the current processes of city life and solve emerging problems through the involvement of citizens, business and authorities.

1. Smart City Development

The first mentions of the term smart city date back to the early 2000s [Sikora-Fernandez D., Stawasz D., 2016]. Since then, at the substantive level, this concept has undergone certain changes, but has not lost its relevance. The smart city concept originally described how IT infrastructure can be used to create a virtual city space in the information society [Ishida, T. Isbister, K., 2000]. At the next

stage, the smart city was mainly associated with the strengthening of the role of smart technologies in improving the efficiency of urban development [Van der Meer, A. Van Winden, W., 2003]. Finally, today it is increasingly common to talk about a smart sustainable city (SSC), in which information and communication technologies and other tools, on the one hand, are used to improve the quality of life, the efficiency of the functioning of the city and the provision of urban services, as well as to strengthen competitiveness, and on the other hand, they satisfy the needs of present and future generations without negatively impacting the economic, social and environmental city components [UNCTAD, 2016].
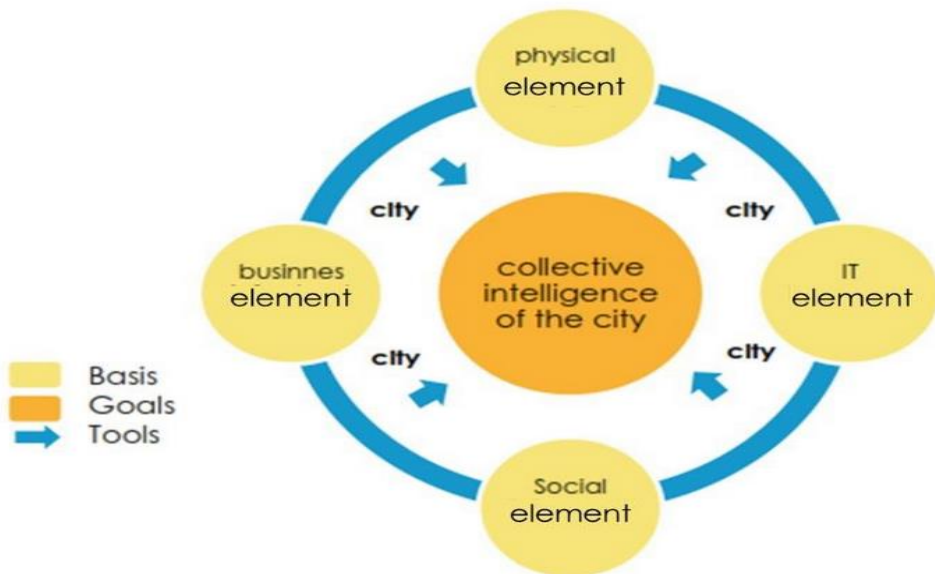
Fig. 1. Smart City Definition Framework

Source: [Fernandez-Anez, V., & Velazquez-Romera, 2015].

It should be noted that all existing concepts and definitions of a smart city emphasize various aspects of the functioning of the urban ecosystem, paying special attention to the development of information technologies, transport and telecommunications infrastructure, initiatives aimed at increasing economic and

political efficiency and allowing the most efficient use of social potential. Thus, smart city systems provide collection, storage and processing of the received data, industry and cross-country analytics, allow predicting the development of situations and the behaviour of individual objects of physical infrastructure, technical systems and social conglomerations, as well as a global distributed multi-level system. Within the processes of smart city development, ICT is used to optimize urban processes, and this optimization is usually achieved by combining various elements and participants into an interactive intelligent system, the driver of which is the technology of the Internet of things (IoT). A big part of this ICT framework is an intelligent network of connected objects and machines, which supposes data transmission using wireless technology and the cloud.

Cloud-based IoT applications receive, analyse, and manage data in real-time to help local authorities, private entities and citizens make better decisions that improve quality of life.

Citizens engage within smart city ecosystems in various ways, by using smartphones and mobile devices and connected cars and homes. As a result, pairing devices and data with a city's physical infrastructure and services can cut costs and improve sustainability. At the same time, by means of IoT, communities can improve energy distribution, streamline trash collection, decrease traffic congestion, and improve air quality.

Despite the fact that there is no consensus on the identification of uniform criteria for the "intelligence" of a city, it is customary at the expert level to distinguish generations that differ in the purpose of using technologies, the level of development of physical infrastructure and technologies (including digital and data transmission), and the level of citizen involvement, as well as other stakeholders in urban development. Thus, world practice allows us to distinguish three conditional phases of development (generation) of smart cities (see figure 2):

SMART CITY 1.0 is characterized by technology providers encouraging the adoption of their solutions to cities that were really not equipped to properly understand the implications of the technology solutions or how they may impact citizen quality of life. The electrification and re-equipment of the physical infrastructure is taking place, isolated IT solutions are being introduced, and a semi-automatic infrastructure is being formed. The main stakeholders are companies that provide technology solutions and services.

SMART CITY 2.0 – in this generation, the local authorities have an acting role in helping determine what the future of their city is and what the role is for the

deployment of smart technologies and other innovations. Thus, city administrators increasingly focus on technology solutions as enablers to solve problems in the fields of health, transportation, the environment and ecology, quality of life. The primary digital infrastructure of Smart City is being formed due to the introduction of Internet of Things technologies, 3G / 4G, broadband and mobile access to the Internet. The main role in the development of the city is assigned to the city authorities, while residents are involved in a limited way.
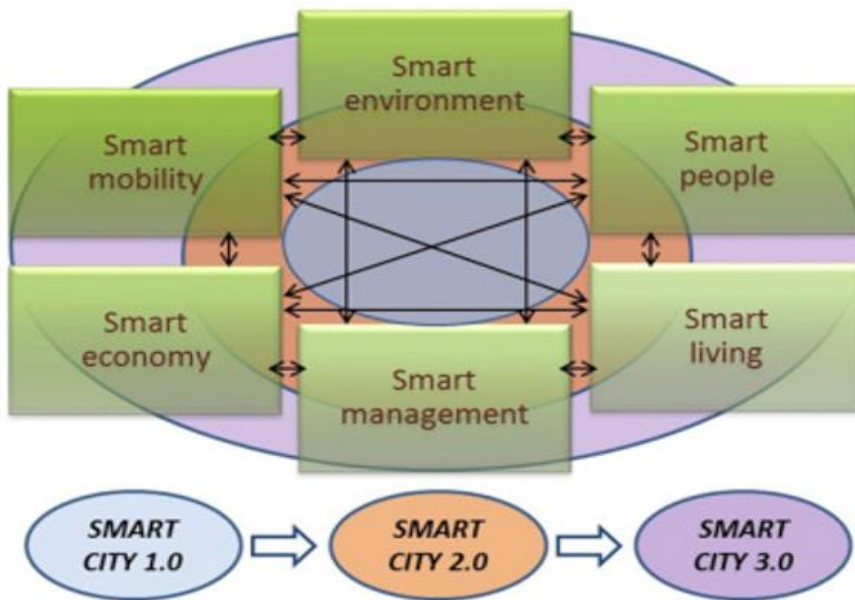
Fig. 2. Smart city concept evolution

Source: [Zawieska, J., Pieriegud, J., 2018].

SMART CITY 3.0 is a highly intelligent integrated city and appears to be grounded more in issues of equity and social inclusion. It is characterized by the combination of technologies that stimulate the development of social integration and entrepreneurship. The emergence of advanced digital services (digital transformation of sectors) and the formation of a fully integrated intelligent

infrastructure that allows real-time collection and analytics of data, implement management of all processes in all areas of the infrastructure. There is a reorientation of urban processes in relation to data flows. This a unified ecosystem promotes citizen engagement, making them active participants in the development of the city.

From a technological point of view, a third-generation smart city is essentially a data-driven city (DDC) – the result of the digital revolution and intense digitalization of society, as well as the high spread of the Internet.

The key elements of the urban development of smart sustainable city system are:

First, the city must be technologically equipped. We are talking about instruments for fixing and collecting data - sensors, video surveillance cameras and similar devices that collect information about various processes (traffic, pedestrian movement, air quality, noise levels, etc.). This data, in turn, can be supplemented with information that is aggregated by other participants in the urban ecosystem (for example, mobile operators).

Secondly, the principle of data openness must be implemented. In general, open data is data generated and owned by public or private entities, provided on a non-competitive, license-free basis for commercial and non-commercial use. Free access to data should be provided not only at the level of interdepartmental municipal interaction - they should also be open for use by citizens and businesses. This approach contributes to greater transparency of processes, and hence a greater level of trust between individual participants in the urban ecosystem.

Third, the data compatibility condition must be met. Decisions on specific development issues often require the simultaneous recording and analysis of multiple data streams. In conditions when most of the collected data is presented in non-unified formats with different storage conditions and often requires manual processing, the issue of introducing standardized approaches, as well as tools for automating the collection, preparation and processing of data, becomes important. Overcoming this challenge depends on whether it is possible to develop and apply a single, "model" architecture for all components of the smart infrastructure that provides work with information. The challenge essentially boils down to the development of a conceptual model of a smart city that would provide the basis for the interaction of its various sectors.

Finally, another requirement for urban data is to provide *visualization interfaces and data access to their end users.*

2. Sustainable digital transformation of cities within the transition ambition towards the circular economy.

The fourth industrial (digital) revolution has the power to dramatically reduce the use of resources and pollution challenges. It is possible through making processes more efficient, as in case of big data analysis, or by simply replacing physical supply chains, as in the case of additive manufacturing. Digital technologies such as 5G, artificial intelligence and blockchain can accelerate and maximise the impacts of environmental measures. Transforming a municipality that has evolved organically for hundreds of years into a smart interconnected ecosystem represents a problematic challenge; at the same time, it demonstrates a significant opportunity for implementing circular economy and smart city solutions for the benefit of its citizens [Srivastav, P., Goldstein, N., 2019]. Thus, the smart city built on the principles of circular economy can unite technology, government, and people within an urban context. Thus, the circular economy concept can help transform cities into climate-smart hubs to save money, lower emissions, and improve living standards.
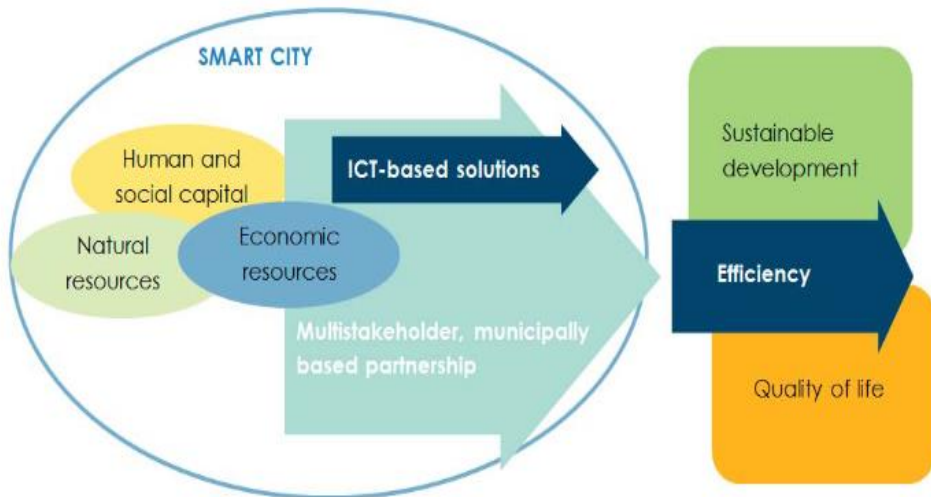
Fig. 3. Goals of a smart city.

Source: [ASCIMER, 2015]

So, as a result of the above mentioned the goals of the Smart City notion can be summarized as shown in figure 3 [ASCIMER, 2015]:

➢ Achieve a sustainable development.
➢ Increase the quality of life of its citizens.
➢ Improve the efficiency of the city as a system

One of the goals of developing a Smart City is to achieve an urban sustainable development. Sustainable development is based on the interaction of three aspects that are interdependent and mutually reinforcing. These are the economic, social and environmental aspects of a development.

Thus, the circular economy concept can provide new, more impactful solutions to the smart city systems:

New Mobility. Modern smart transport technologies in the city are focused on the active use of dynamic and multimodal information. Smart Mobility pursues to offer the most efficient, clean and equitable transport network for people, goods and data. From a technological point of view, the basic solutions for the emerging package are advanced GPS systems, connected and unmanned vehicles, video surveillance and license plate reading, dynamic simulation and traffic management, etc. These systems would mean fewer, better-utilized cars, with such positive side effects including less congestion, less land and investment committed to parking and roads, and the main effects of the introduction of the new technology package will be a decrease in road congestion, a decrease in the negative impact on the environment, as well as a reduction in the energy consumption of vehicles. Development of a smart city transport system, the emergence of new transport services and modes of transport, traffic control and management systems, various path calculation apps improve the traffic situation and increase mobility, as well as reduce the time to cover distances. Some cities use adaptive traffic control systems to optimize road traffic. In Barcelona, these solutions are introduced to reduce the time of arrival at the scene of emergency services by changing the system of traffic signals. According to PwC, such systems have already increased the speed of traffic during evening rush hours by 4%.

Improving energy efficiency. Over the next five years, a package of new technologies in the field of smart energy will be formed. Basic solutions will be power electronics, as well as technologies in the field of energy storage, distributed energy, automatization of distributed networks and distributed intelligent control, generative design and modelling, etc. The transition to a new technological package will lead to significant changes in the electric power market of cities: in

the new configuration, the end user of the power system is a prosumer - an active consumer who not only uses, but also generates energy himself. Energy exchange is monetized through a digital platform that allows you to design services and make micro investments without intermediaries. As a result, the Internet of energy is formed around the prosumer - an ecosystem of its producers and consumers, which seamlessly integrate into the common infrastructure and exchange energy. Smart cities and sustainable communities are already careening toward a low carbon future. A core part of that drive is locally derived power. Transition to the use of smart energy (smart distributed grids, smart control systems, etc.) and energy efficient technologies (smart lamps, smart lighting) will lead to savings in electricity consumption, a decrease in losses from interruptions in its supply, a decrease in accidents and capital costs for equipment, as well as to an increase in quality and reliability power grids. The drive toward low-carbon energy inadvertently boots circular economy approaches, putting more control in the hands of consumers. There is opportunity for utilities to take advantage of this trend by providing local power solutions, such as renewable power or resilient power backup. In San Francisco, as part of the Office Building Energy Efficiency Initiative, the Municipal Department of the Environment launched a project to conduct an annual benchmarking of energy consumption in non-residential buildings in the city and an energy audit every five years. As a result, the use of electricity was reduced by 7.9% in 176 office buildings.

Smart environmental solutions. Reducing the negative impact on the environment is due to several factors: a more conscious attitude towards it and towards the measures to reduce negative impacts (for example, the Paris Agreement under the UN Framework Convention on Climate Change), a gradual increase in the share of renewable energy sources in the energy balance of cities, the introduction of energy efficient technologies, the introduction of smart waste sorting and recycling, traffic control systems and smart transport technologies. Smart city technologies are frequently cited as enabling buildings to develop fully closed water, nutrition, material, and energy loops. The package of technological solutions designed to provide better environmental protection for smart cities includes a whole set of components - these are systems for monitoring environmental parameters; and systems of control and monitoring of transport load, allowing to reduce the level of hydrocarbons; and solutions in the field of smart waste management (sensors for monitoring the level of garbage, solutions in the field of smart sorting and recycling of waste, smart connected garbage trucks); and

smart wastewater treatment systems; and solutions in the field of renewable energy. For example, the launch of the SFpark Pilot Program in San Francisco, which forms prices for city parking depending on the level of demand at a particular time, led not only to a drop in the average cost of a parking space and to greater accessibility of parking spaces, but also a 30% reduction in greenhouse gas emissions. As part of the implementation of the smart city strategy in Vienna (Smart Wien Strategy), it is planned that by 2020 due to more efficient Waste management systems will be able to reduce harmful emissions into the atmosphere by 270,000 tonnes of CO_2 equivalent. From the point of view of efficiency, such solutions contribute to improving the quality of the environment (air, soil, water), the transition to a more rational model of waste management and, as a consequence, improving the health of citizens and the sanitary situation in the city as a whole. A circular city would enable space to be highly utilized, thanks to shared and flexible office spaces and flexible, smart, and modular homes. There are also waste management applications. They work with a wireless ultrasonic sensor that measures the fullness of the bin, sends the data to a platform that analyses it, and then sends the information via a mobile phone application to the garbage truck driver. Thus, the garbage truck only collects the full bins, avoiding unnecessary itineraries on roads where the bins are not full. Therefore, this leads to immediate cost savings of up to 50% on fuel costs, while reducing carbon dioxide (CO_2) emissions accordingly. Furthermore, cost saving is possible in buildings with the installation and operation of a system for monitoring of their energy consumption. In this way, a reduction of electricity consumption is achieved in real-time, but also of the energy footprint of carbon dioxide, something extremely important for the protection of the environment. Another very good example of circular cities / circular economy combination is the bike sharing philosophy. Citizens with the use of a dedicated application can find where co-sharing bikes are and use them in order to move around the city. Cycling promotes a healthy and sustainable lifestyle, and a bike share system encourages cycling by providing convenient access to everyone. To add on that, bike-sharing is one of the best examples of Circular Economy which also helps make cities become greener and transform cities market.

Conclusion

The concept of smart cities has a great potential to address sustainability criteria by promoting citizen participation, developing innovative and smart solutions for

environment challenges, better life condition, increasing efficiency in city systems, and adopting a transparent and inclusive governance system.

A Smart City must be developed on the basis of a multistakeholder, municipally based partnership. These players can be businesses, local authorities' management, associations of various stakeholders. Depending on the main subject, the basic motive for the implementation of the concept of a smart city and the introduction of technology. This can be a target setting either to reduce costs and save, or to make a profit and expand sales markets.

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USING SMART DIGITIZATION IN HAZARDOUS WASTE MANAGEMENT[1]

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Abstract
*The global information society is growing at a fast pace. At the same time,
the increase in purchasing power, urbanization and industrialization in many
developing countries have led to an increase in the quantities of products
placed on the market and respectively purchased, thus generating large
volumes of toxic waste. Thus, digitization and connectivity are critical to help
achieve the Sustainable Development Goals, the transition to an increasingly
digitalized world also involves multiple risks due to irrational consumption of
resources and mismanagement of waste. In our view, the problem of hazardous
waste management is possible by implementing modern and smart digital
technologies in waste management, and by implementing waste digitization
will improve the health of planet Earth, will reduce the negative impact of
pollutant emissions on the environment, will restore essential ecosystems to
ensure our long-term sustainability. Thus, the use of waste as a resource is
necessary to reduce the need to extract new resources. This study was
developed within the State Program 20.80009.0807.22 Development of the
mechanism for the formation of the circular economy in the Republic of
Moldova.*

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of the mechanism for the formation of the circular economy in the Republic of Moldova.

Introduction

In recent years, toxic waste is that waste which is harmful to human health, to nature, that contains particularly dangerous substances. Thus, toxic materials can be produced by humans or can occur naturally in the environment. Toxic waste can cause damage to living things if these toxins are buried in the soil, in the water they drink or even if they interact with flood waters. Mercury, for example, remains in the environment and accumulates. Humans and animals can absorb this substance when they eat fish. Toxic waste must be handled with care. That's why many cities around the world have regulations when interacting with them. Toxic waste must be disposed of in facilities intended for this purpose. Toxic waste has become more abundant since the Industrial Revolution. In addition, most technological advances contain toxic chemicals. For example: products such as mobile phones, computers, televisions, batteries, pesticides and solar panels contain harmful chemicals. Disposal of these materials has become problematic because they cause serious health problems in the world.

In our view, the problem of hazardous waste management is possible by implementing modern and smart digital technologies in waste management, and by implementing waste digitization will improve the health of planet Earth, will reduce the negative impact of pollutant emissions on the environment, will restore essential ecosystems to ensure our long-term sustainability. In a short time, extreme events, such as storms, heat waves, floods and droughts with intensities that once occurred every 100 years, became the new reality of the planet. Thus, it is necessary, before it is too late, to take firm measures to implement smart technologies.

The degree of approach to the topic in the scientific literature. Currently, contemporary researchers are conceptually addressing the risk of waste that can be characterized and assessed through the following three components:

1. Degree of hazardousness of the waste (including: volume, concentration, extent, etc.);
2. The route of exposure by which the dangerous substance passes from the source to the receptor (comprising the geographical and hydrogeological location, etc.);

3. Receptor status. Thus, it is important to know this data and information to assess the risk posed by the production, storage and warehousing of hazardous waste [10].

All these characteristics indicate that structurally the waste itself is very harmful and the amount of waste generated by the population is closely linked to consumption and production patterns. Thus, demographic changes, such as the increase in the number of single-person households, also affect the amount of waste they generate. In this study, the authors aim to reflect on the issue of toxic waste in the Republic of Moldova, which has a harmful impact on the environment and public health. Therefore, studying the literature, toxic waste, according to businessdictionary.com (2017), are all materials, liquid, solid or gaseous, that can cause damage by swallowing, inhalation or absorption through the skin.

In the Republic of Moldova, According to Law no. 209 of 29.07.2016 on waste, hazardous waste is any waste that has one or more of the hazardous properties specified in Annex no. 3 of the law. Therefore, according to art. 7 of Law no. 209 of 29.07.2016 on waste, the list of wastes, including hazardous waste, is prepared and updated periodically by the Ministry of Agriculture, Regional Development and Environment and is approved by the Government. Thus, in the case of a type of waste which falls, according to the List of wastes, under two different codes, depending on the possible presence of hazardous characteristics (codes marked with an asterisk), the classification as non-hazardous waste is done by producers and owners of such waste only on the basis of an analysis of origin, tests, analysis reports and other relevant documents [11].

According to the statistical reports from the Republic of Moldova submitted to the National Bureau of Statistics, all toxic waste are containing harmful substances, including toxic products that have become unusable in the process of treatment or transportation and cannot be used according to their destination (for example: pesticides unusable and prohibited). Therefore, harmful substances (products, compounds) that are in the form of products or semi-finished products are not subject to evidence. Also, aren't subject to evidence the toxic industrial wastes that hit the natural sources of surface water together with the wastewater and the gases released into the atmosphere, which are reflected in the statistical reporting forms no. 1 - water management "Water use" and no. 1-air "Protection of the atmospheric air". Thus, according to the degree of action on the human body, harmful substances are divided into four categories: category I - extremely harmful substances; category II - very harmful substances: category III - moderately

harmful substances; category IV – slightly harmful substances. The harmful categories of toxic waste, chemical content and physical characterization of industrial toxic waste are determined by laboratory analyzes in enterprises, scientific research institutions with the inclusion of specialists from institutions and subdivisions for environmental protection or specialists of territorial sanitary-epidemiological stations. When determining the chemical content of the waste, the percentage content of toxic substances in the dry mass shall be calculated.

Hazardous waste properties: HP1 "Explosive", HP2 "Oxidizing", HP3 "Flammable", HP4 "Irritant - skin irritation and eye damage", HP5 "Specific target organ toxicity (STOT) / aspiration toxicity", HP6 "Acute toxicity", HP7 "Carcinogenic", HP8 "Corrosive", HP9 "Infectious", HP10 "Reproductive toxicity", HP11 "Mutagenic", HP12 "Release of a gas with acute toxicity", HP13 "Sensitizers", HP14 "Ecotoxic", HP15 "Wastes capable of developing one of the hazardous properties mentioned above, which the initial waste does not directly present".

According to the National Bureau of Statistics (NBS), indicators of the methodology for completing the statistical report form no. 1-toxic waste are completed annually by the production units, factories, enterprises, industrial and agricultural units where toxic waste is accumulated, stored, used or neutralized (liquidated). In this report, toxic wastes of the companies are those wastes that contain substances that are particularly harmful to the health of citizens and to nature. All toxic wastes containing harmful substances, including toxic products that have become unusable in the storage or transportation process and that cannot be used according to their destination (for example, pesticides that have become unusable and prohibited) are subject to evidence [6].

The purpose of the research is to identify digital tools that would contribute to the reduction of waste, especially toxic waste, and would contribute to increasing the productivity of some companies through the process of reuse or recycling and would have an impact on the circular economy. Thus, the use of waste as a resource is necessary to reduce the need to extract new resources. In this context, the European Union has set out several main objectives for transforming waste into a resource. An important goal is set out in the EU Roadmap to an *Energy Efficient Europe.*

Hazardous waste management in EU law. Therefore, the main legislative instrument in the field of toxic waste is the Waste Framework Directive. It presents a hierarchy of waste management: it starts with prevention, followed by preparation for reuse, recycling and recovery and ends with disposal. The directive

aims to prevent the generation of waste as much as possible, to use the waste generated as a resource and to reduce to a minimum the amount of waste that reaches landfills. Therefore, EU countries can take different approaches to achieve their waste targets. Some approaches seem to work better than others. For example, if well designed, landfill fees appear to be an effective way to reduce landfill waste. Increasing producer responsibility, which means that the manufacturer must receive the product back at the end of its life cycle, also seems to be an effective method.

Thus, through communication: "*Investing in a smart, innovative and sustainable industry. A renewed EU industrial policy strategy" - Brussels, 6.11.2017, COM (2017) 479 final/2*, it is aimed to strengthen the capacity of industry to adapt and innovate to the requirements, to facilitate investment in new digital technologies for a transition towards a more circular low-carbon economy. Stimulating the use of the technological base and adapting new business models will favor future viability and a better functioning of the single market [12].

With regard to the regulation of waste management at EU level, a set of legislative acts have been adopted. Therefore, the main waste directives are:

➢ Directive (EU) 2018/849 of 30 May 2018 amending Directive 2000/53/EC *on end-of-life vehicles;*

➢ Directive 2006/66/EC *on batteries and accumulators and waste batteries and accumulators;*

➢ Directive 2012/19/EU *on waste electrical and electronic equipment;*

➢ Directive (EU) 2018/850 of 30 May 2018 amending Directive 1999/31/EC *on landfill of waste;*

➢ Directive (EU) 2018/851 of 30 May 2018 amending Directive 2008/98/EC *on waste;*

➢ Directive (EU) 2018/852 of 30 May 2018 amending Directive 94/62/EC *on packaging and packaging waste.*

The revised legislative framework on waste entered into force in July 2018. Thus, after amending Directive 2008/98/EC, the main objective of the new Directive 2018/851, according to Article 1, is to establish "*measures to protect the environment and public health through preventing or reducing the generation of waste, the adverse effects of waste generation and management and reducing the overall effects of resource use and increasing the efficiency of their use, which are essential for the transition to a circular economy and to ensure the long-term competitiveness of the Union.*" [1].

Following the above, the revised legislative framework on waste under Directive 2018/851, in order to move to an European circular economy with a high

degree of resource efficiency, Member States shall take the necessary measures **to achieve the following objectives:**

Directive 2018/851, according to art.11 par. 2

➢ separate collection of hazardous household waste (until the end of 2022), biological waste (until the end of 2023), textiles (until the end of 2025).

➢ By 1 January 2025, Member States shall organize the separate collection of *hazardous waste* fractions from households, in order to ensure treatment and to ensure that they do not contaminate other municipal waste streams.

Directive 2018/852, according to art.6 par. 5.

➢ *recycling of packaging waste by 31 December 2025 at the latest,* at least 65% of the weight of all and at least 70% of the weight of packaging waste will be recycled by 31 December 2030;

➢ *recycling targets for certain packaging materials, by 31 December 2025 at the latest*, for the recycling of the following specific materials contained in packaging waste: Paper and cardboard: 75%, Ferrous metals: 70%, Glass: 70%, Aluminum: 50%, Plastic: 50%, Wood: 25%.

➢ *recycling targets for certain packaging materials, no later than December 31, 2030*: Paper and cardboard: 85%, Ferrous metals: 80%, Aluminum: 60%, Glass: 75%, Plastic: 55%, Wood: 30%.

During 2018, several actions related to the circular economy were carried out. Thus, the European Commission has published the so-called *circular economy package*. The first important action is to adopt a European strategy on plastics:

Communication: A European Strategy for Plastics in a Circular Economy Brussels, 16.1.2018, COM (2018) 28 final - this strategy lays the foundations for a new plastics economy, in which *the design and production of plastic materials and plastic products fully meet the needs of reuse, repair and recycling and where more sustainable materials are developed and promoted.*

This Strategy proposes concrete actions to turn the vision for a more circular economy of plastics into reality. In this context, the strategy proposes a set of measures at EU level, as by 2030 all plastic packaging should be recyclable, thus contributing to the transition to a more circular economy. The strategy provides for actions to:

1. Improving the economic aspects and the quality of plastics recycling;
2. Reduction of plastic waste and waste disposal in the public domain;
3. Orientation of investments and innovation towards circular solutions;
4. Capitalizing on global action.

According to this objective, the strategy contributes "*to achieving the priority set by the Commission on an energy union with a modern, low-carbon and energy-*

efficient and resource-efficient economy, and will make a tangible contribution to achieving the objectives of sustainable development for 2030 and compliance with the Paris Agreement". This approach covers the entire value chain, which will encourage growth, job creation and innovation. Also, such an approach can reaffirm European leadership in global solutions and help us make the transition to a circular, low-carbon economy, while providing citizens with a cleaner and safer environment.

Another COMMUNICATION on the implementation of the circular economy package: options for addressing the interface between chemicals, products and waste laws. Strasbourg, 16.1.2018 COM (2018) 32 final. The proposed framework aims to facilitate recycling and increase the use of secondary raw materials by limiting unnecessary constraints and facilitating the cross-border movement of secondary raw materials, so as to ensure that they can be easily traded across the EU. Another objective of the Communication is to replace chemicals of concern and, where this is not possible, to reduce their presence and improve their traceability [2].

In 2018, the European Commission adopted other ambitious initiatives in the context of the Circular Economy Action Plan: *the EU Directive on reducing the environmental impact of certain plastics. Brussels, 28.5.2018 COM (2018) 340 final.* The European Commission proposes on 28 May 2018 for adoption a new directive that aims to reduce the impact of certain plastics on the environment by implementing the EU Strategy for Plastics, addressing the gaps identified in existing legislation. The Directive proposes main actions for specific disposable plastic articles, taking into account consumer behavior as well as consumer needs and opportunities for businesses. When alternatives are clearly available - both single-use and multi-use - restrictions are proposed. Other measures include appropriate labeling, raising awareness, voluntary action and establishing extended producer responsibility schemes that would cover the costs of waste cleaning [1].

Thus, on 4 March 2019, the European Commission presented a *comprehensive report on the implementation of the Circular Economy Action Plan* to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

The report also highlights the importance of adopting the first EU policy framework - *the Strategy for Plastics in a Circular Economy*, which states that by 2030, all plastic packaging placed on the EU market must be reusable or recyclable, and by 2025, 10 million tons of recycled plastics will be included in new products.

The Report sets out adapted sets of measures, which are in the final stages of the legislative process on single-use plastic articles and fishing gear, such as:

➢ measures to reduce the consumption of food containers and beverage cups, plastic, as well as the specific marking and labeling of certain products;

➢ the target of including 30% of recycled plastics in beverage bottles from 2030 and 25% for PET bottles from 2025, as well as the target of separate collection of 90% of plastic bottles by 2029, as well as the introduction of design requirements for connecting caps to bottles;

➢ measures aimed at reducing plastic waste from ships, such as the establishment of a flat fee for waste from ships, etc.

The Commission proposes that EU countries, in order to accelerate the transition to a circular economy, need to invest in innovation and provide support for adapting the industrial base. Over the period 2016-2020, the Commission has stepped up efforts in both directions, providing public funding for the transition totaling more than € 10 billion.

The new action plan for the circular economy, adopted on 11 March 2020 by the European Commission, is part of the main blocs of the European Green Pact, a new European agenda for sustainable growth and an EU growth strategy to achieve climate neutrality by 2050.

Communication An action plan on the circular economy for a cleaner and more competitive economy. Strasbourg, 11.3.2020 COM (2020) 98 final. The document proposes initiatives throughout the life cycle of products, aiming at their design, promoting the processes of the circular economy, encouraging sustainable consumption and aiming at ensuring that the resources used in the EU economy are preserved for as long as possible. At the same time, in order to promote a longer duration of products, the Commission proposes a series of actions focused on the sectors that use the most resources and where the potential for circularity is high. Thus, the Commission introduces concrete measures on:

➢ electronic products and ICT - "Initiative for circularity in the field of electronics" to have products with a longer life and to improve waste collection and treatment;

➢ batteries and vehicles - a new regulatory framework for batteries in order to improve the durability and boost the potential for battery circularity (this legislative proposal will be based on the evaluation of the Batteries Directive and the work of the Battery Alliance);

➢ packaging - new mandatory requirements on what is allowed on the EU market, including the reduction of (excessive) packaging;

➢ plastics - new mandatory requirements for the content of recycled materials, special attention being paid to both micro-plastics and plastics of biological and biodegradable origin;

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➢ textiles - a new EU Strategy for textiles in order to strengthen competitiveness and innovation in this sector and stimulate the EU market for the reuse of textiles;

➢ constructions and buildings - a comprehensive Strategy for a sustainably built environment that promotes the principles of circularity in the case of buildings;

➢ food - a new legislative initiative on reuse, in order to replace disposable packaging, single-use crockery and cutlery with reusable products in food services.

At both European and national level, this provision pays attention to the avoidance of waste production as a whole and its transformation into high-quality secondary resources that benefit from a functioning secondary raw materials market. Thus, the Commission will examine the possibility of establishing a harmonized model at EU level for the separate collection and labeling of waste. According to Eurostat, the amount of waste generated annually by EU economic activities amounts to 2.5 billion tonnes, which means 5 tonnes per capita. There is currently no comprehensive set of legal and policy requirements to ensure that all products placed on the EU market are increasingly sustainable and meet the circularity criteria, and the Commission's New Circular Economy Action Plan (CEAP) European Parliament, presented on 11 March 2020, aims to do just that [14].

The process of toxic waste management in the Republic of Moldova. The toxic waste management process takes place through the collection, transport, recovery and disposal of waste, including the supervision of these operations and the subsequent maintenance of disposal sites, including the actions taken by a trader or broker. Some of this waste can be recycled (solvents, oil). Others must be stored in places specially designed for hazardous waste. Therefore, the extraction of less material and the use of existing resources could help to avoid some of the impact created along the chain. In this context, unused waste is also a potential loss.

Waste is traditionally seen as a source of pollution. But well-managed waste can be a valuable source of materials, especially when raw materials start to run out. The best option is to stop the production of waste. And when that's not possible, other good options are reuse and recycling.

Recycling of waste is not possible without selective collection at source, this being an essential condition for maximizing the recovery of waste. Waste recycling generates additional revenue for companies, especially when it comes to waste paper, cardboard, plastic, metal, wood, rare metals, glass, etc. Essential aspects in generating benefits and opportunities:

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Figure. 1. Toxic/harmful waste management process
Source: elaborated by the authors.

➢ Appropriate selection at source.

➢ Efficient collection and storage system (compactors reduce the volume of waste collected and allow to reduce transport costs).

➢ Collaboration with authorized organizations for waste transport and recycling.

➢ The use of high-performance recycling technologies.

➢ Knowledge of waste properties and values [9].

From toxic products can be recycled mostly from the products of various industries: ***packaging, glass, metal, batteries, tires and plastics, used oil, paper and cardboard; electrical and electronic equipment, wood; construction and demolition waste.***

- *Metals* are materials that can be recycled in a proportion of 90-95% if they are collected selectively. Certain metals, such as aluminum, can be recycled

indefinitely. By recycling metals, energy consumption is reduced by 70% compared to the production of a completely new element.

- *Recycling paper and cardboard*. Almost any kind of paper and cardboard can be recycled. Recycling technology can remove inks, clips, staples, glue to which books are attached, but not oil. Therefore, oil and food-stained papers and cardboard cannot be recycled. In addition, waxed, plasticized or plastic-coated paper (glossy magazine covers), napkins or other used sanitary paper products cannot be recycled. Milk and juice boxes are recycled separately. Cardboard can be recycled several times, but not indefinitely. That is why it is good to avoid the packaging as much as possible, even if they are made of paper.

- *Glass recycling*. Glass can be recycled by melting indefinitely, without losing its properties. Also, the costs of recycling are lower than those of producing glass from raw materials, thus saving energy. Only glass of the same color can be produced from colored glass. Therefore, colorless glass is more valuable, as it can be reused for many purposes. Heat-resistant glass, such as Jena vessels, is not recycled with ordinary glass because it affects the melting process [16].

Thus, it is important that the waste is recycled, it is necessary that it is correctly identified and then sorted and put by the consumer in a separate container with the concrete specification of the waste.

Electrical and electronic equipment that constitutes toxic waste according to the provisions of art. 50 of Law no. 209/2016 on waste, including all components, subassemblies and consumables are an integral part of the equipment when it becomes harmful waste. Thus, waste electrical and electronic equipment contains various metals such as iron and aluminum, but also other metals such as copper and even precious metals such as silver and gold. Some of them also contain materials that are hazardous or harmful to the environment. Therefore, it is useful to collect the given waste separately, both in terms of recycling and environmental protection.

The categories of electrical and electronic equipment regulated by the *Regulation on WEEE approved by Government Decision no. 212 of 07.03.2018*, are:
1. Large household appliances
2. Small household appliances
3. Computer and electronic communications equipment
4. Consumer electrical appliances and photovoltaic panels
5. Lighting equipment
6. Electrical and electronic tools (excluding large industrial fixed tools)

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7. Toys, leisure equipment and sports equipment
8. Medical devices (except for all implanted and infected products)
9. Supervisory and control tools
10. Vending machines.

Therefore, of the total flow of solid waste, e-Waste represents only 2%, instead it accounts for 70% of the volume of hazardous waste that reaches the landfill. Due to its properties, this waste is included in Annex VIII of the Basel Convention, under the heading for hazardous waste. For example, the cathode ray tube of a TV can pollute about 50 m2 for 30 years, consisting of materials such as aluminum, lead, zinc, nickel, manganese, barium or cobalt. Refrigerators contain chlorofluorocarbons (CFCs), which are responsible for damaging the ozone layer and reducing the Earth's ability to protect itself from the sun's harmful rays. The phones contain heavy metals and rare metals. If this equipment were incinerated, it could release 36 tonnes of mercury and 16 tonnes of cadmium annually. Being so dangerous, this waste should not end up in landfills, but should be collected separately and recycled accordingly [8].

Waste digitization - a cleaner future for the Republic of Moldova. Digitization is an useful and a current process in all EU countries. This smart system allows both the citizen and local public administrations to have concrete, measurable data on the volume of waste and the degree of selective collection, by placing containers with large volume, correctly dimensioned to the number of inhabitants, allowing access only to the tenants. Thanks to these platforms located in special areas, the blocks will be much tidier and cleaner. Through this solution, each town hall in the locality will be able to monitor the total volume of waste and the degree of selective collection for each family, thus being able to calculate the sanitation tax on the quantities actually stored.

For a more efficient waste management, in 2018 it was approved by the Government of the Republic of Moldova - The Concept of the Automated Information System "Waste Management". The document provides for the accumulation of information on waste in an electronic register, which ensures the record of the circuit of waste produced and collected, including data on export, import, reuse and disposal of waste. The information for completing the register shall be provided by the authorized economic operators in the field of waste management. The digitization of information aims to improve the activity of operators in the sector. The waste management database can be accessed by public authorities, entrepreneurs and individuals. This system facilitates the exchange of

information between profile public authorities, but also with the European Environment Agency. The creation of the information resource facilitates the implementation of the European Classifier on the List of Waste, including Hazardous Waste, which allows the collection and processing of waste record data according to codes established in the EU [4].

Figure 2. Digitization of waste through smart sensors IoT (Internet of Things)
Source: [18]

For any locality, waste management is an important part of the construction of the city of the future, but very often it is neglected in digitization projects. Existing "simple" solutions are already obsolete - cities are growing rapidly and generating more and more waste, and the built infrastructure does not allow the integration of smart solutions in processes. Many localities have difficulty disposing of garbage on time, while others need solutions to improve service productivity. Some waste containers fill up faster than others, some areas are harder to reach for garbage trucks, and some companies need specific collection and transportation services. There are good examples for solving these problems and for implementing them in various localities.

An example is the smart IoT (Internet of Things) sensors, which allow the city administration to optimize the distribution of containers. Monitoring the level of filling and the type of waste is an easy task with the help of smart sensors. They can be installed in any type of garbage containers and are resistant to daily use.

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Smart sensors provide real-time monitoring of containers and are an important step in eliminating problems with spilled containers.
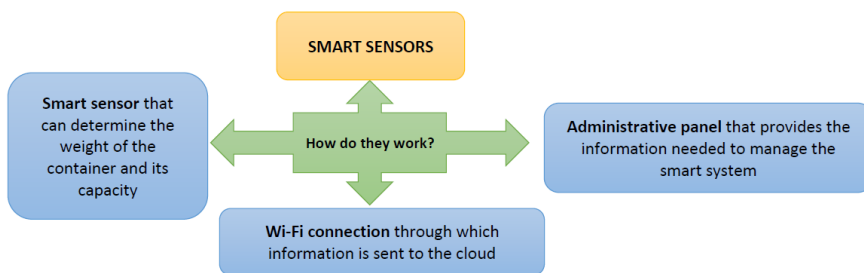
Figure 3. Functionality of smart waste sensors
Source: elaborated by the authors.

Real-time information collection allows the creation of detailed reports. Reliable and current statistics are available at any time and the city administration can use them to make informed decisions about how to optimize the system: areas that need more containers or more frequent collection, optimization of the collection schedule, redistribution of available resources and others. Each garbage truck, container and landfill is an important part of the waste management ecosystem. That is why their optimal use is very essential for the productivity of the whole process. Cloud technologies, IoT sensors and an intuitive management platform help create the optimal route daily for each truck that directs it exactly to where and when it is needed, depending on the optimal route between containers and landfill. This creates premises for reducing the price and improving the efficiency of the system. Modern cloud technologies and real-time data work together, enabling remote waste management [18]. This would be a good example to implement for localities in the Republic of Moldova.

Conclusions and recommendations.
The research results present a number of important and general aspects regarding the mechanism of toxic waste management through digitization.

Therefore, it is important to note that despite a large share of the number of toxic wastes recorded annually globally and nationally, the impact of this waste is high on the environment and health, and for non-essential reasons it is not practiced selective collection and delivery of this waste to authorized recyclers. Which is why every citizen continues to keep toxic waste in the home, office, specially designed spaces for an indefinite period, including the disposal with other waste.

Therefore, in the study, the concept of toxic waste at national level reflected in normative and legislative acts, the process of hazardous waste management at EU and Moldovan level were identified, in order to identify the most efficient mechanisms that would boost the toxic waste market in the Republic of Moldova by increasing the rates of selective collection and reducing the quantities arriving at landfills. Analyzing the statistical data provided by the NBS and the Environment Agency, we elucidated the main causes underlying the decision-making behavior of waste owners and generators at the national level. For consumers:

✓ To limit the use of dangerous products through rational and responsible consumption;

✓ To try ecological alternatives to ordinary detergents;

✓ Products in good condition, but which they no longer use, must be reused (sale, donation);

✓ Defective products can be repaired and then reused;

✓ Waste is thrown in specially arranged places;

✓ Sort the waste and send it for recycling;

✓ Replace regular batteries with accumulators/rechargeable batteries;

✓ To return to the pharmacy the expired or no longer necessary medicines;

✓ Use water-based paint, not solvent-based;

✓ Waste management services are paid in the same way as any service or goods, etc.

All these activities lead to changing consumer behavior and more efficient management of hazardous waste. Therefore, local public authorities must also participate in the decision-making process by:

- Working groups;
- Public consultation meetings;
- Endorsement of draft decisions;
➢ To provide expertise and consultancy, through:
- Elaboration of project proposals;

- Participating in the process of conceptualizing the model of hazardous waste management as well as municipal waste;
- Organizing study visits and exchange of experiences.
➢ And to provide communication and information services with citizens.

Thus, for the efficient management of toxic/hazardous waste, we come up with the following recommendations:
- Harmonization of the normative and legislative framework related to the Waste Law according to the European legislation;
- Population: rational consumption, collected and separated waste, paid services;
- LPA: integration in the regional waste management system, sorting / incineration stations, regional landfills;
- CSOs: pro-activism in decision-making and policy monitoring [7].

The study highlights the lack of facilities, and in these conditions, the awareness of the proper management of hazardous waste is not well perceived by the plants / factories generating hazardous waste. Thus, hazardous waste management is a complex subject consisting of several components. There is no perfect model that can be applied in any situation, but the EU has firm principles on which to base its approach to waste management that also can be applied in the Republic of Moldova, and a key tool would be digitization.

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THE AWARENESS OF THE CIRCULAR ECONOMY PRINCIPLES IN MOLDOVA'S COMPANIES[1]

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Abstract

The circular economy is a new approach to the responsible and cyclical use of natural resources, where the economy should aim at minimizing the impact on the environment and stimulating the economy. Solving environmental issues in tandem with promoting sustainable growth has never been more current than it is today. One of the essential stages of the transition to a circular economy is the improvement of waste management, which is primarily due to limited global natural resources and the need to reduce their consumption. The Republic of Moldova, similar to other countries in the world, annually it produces huge amounts of waste, a significant share of which goes to companies and enterprises. In order to hold economic agents accountable in recent years, certain steps have been taken by public authorities, but they have remained without visible impact on the situation in the field. Because the adaptation of such a circular economy model is done at different levels, including at the level of individual, whether owner or employee of a company, we decided to conduct their survey in order to determine awareness of the principles of the circular economy of those who are involved in the real sector of the country`s economy. The results of the interview clearly showed that the greatest efforts in the field of raising awareness, empowering companies are yet to be undertaken, and the transition to a circular economy in the Republic of Moldova will take some time.

Introduction

The awareness of the need to build and promote an economic system without harmful emissions and waste of materials has practically come with the already widespread emergence of those devastating effects that the linear model of the economy has on the environmental and the quality of human life. Although, in the last two decades, many countries can boast of some progress in the field of environmental protection consumption and trade patterns still remain in contradiction with sustainable guidelines [Bendixen et al., 2021]. In order to actively participate in the protection, the conservation of the environment and at the same time increase the competitive advantage, companies have a number of different approaches in the field of environmental management and sustainable development [Suciu, 2015] but the most commonly used business model currently used by the real sector remains the characteristic of a linear economy, which operates on the principle of production, use, disposal [Ellen Macarthur Foundation, 2013]. A linear economy is characterized by mass depletion of resources, their use for the production of goods that at the end of their life cycle become waste.

Although much progress have been made in the area of resource efficiency, the overall advantage of this approach is lost due to a system that is based exclusively on consumption and not on reuse [Ellen MacArthur Foundation, 2013]. And this in the conditions in which there are already researches that demonstrate that the circular economy can contribute to a better productivity, ecological efficiency, and the renewal of the environmental management system and to the sustainable development objectives [Rodriguez-Anton, 2019]. The implementation of the principles of the circular economy has a positive impact on inclusive and sustainable economic growth, employment, industrialization and promotion of innovations, increasing the quality and safety of life in urban areas, conservation of natural resources through their sustainable use [Rodriguez-Anton, 2019]

We can overlook here the fact that the transition of companies to a circular economy model is driven not only by its known and demonstrated benefits and advantages but also by certain short-term constraints, references to which we find in well-established studies [Planing, 2014], such as the continuous rise in commodity

prices, technological development and the emergency of new business models, changing attitudes and behaviour of final consumers.

The problems and possibilities of transitioning to a circular economy model are currently being discussed very actively and if a few years ago most of the written work in the field came from Asia, now European researches are becoming more active, looking for and providing solutions for both companies. [Kerdlap et al., 2019; Benachio et al;., 2020; Blomsma and Brennan, 2017; Suciu, 2015] as well as for the authorities in the field [Fassio and Minotti, 2019; Geng & Doberstein, 2008; Avdiushchenko and Zajac, 2019]. However, in the context of this study we have increased interest in the economy of the Republic of Moldova, the purpose of the research being to analyse the current situation and determine the extent to which companies in the country and their employees are familiar with the concept of circular economy or circular economy model, if they know the main reasons for the need to make a transition and what would be the factors hindering this process.

1. The principles of the circular economy and their implementation

The mechanism for implementing the principles of the circular economy is based on the 3Rs related to reduction, reuse and recycling. These are the basic actions without which one cannot imagine the implementation and achievement of the fundamental goals of the circular economy.

In turn, the implementation of the principles of the circular economy, as shown by the experience of one of the most advanced countries in this regard (China), must take place simultaneously at all three levels: micro, meso and macro. This conclusion is supported in the works and studies of several economists, who also classify the practices of the continuous circular economy in four areas: production, consumption, waste management and other support. Respectively, the complexity of the practices increases with the level of action, suggesting that the micro and meso levels are more vibrant compared to the macro level.

At the micro level, namely at the level of production companies and enterprises, the adaptation of the production, packaging and packaging process is encouraged taking into account a number of new requirements by using cleaner production methods in order to reduce emissions and increase efficiency and durability of products over time.

For example, a law to promote cleaner production was adopted in China in 2003, which addresses key issues related to pollution generation and resource efficiency at all stages of the production process. The implementation for enterprises with a high

level of pollution, energy use and other negative outsourcing is compulsory. Such a law is indispensable to minimize consumption and waste, move to greener production by promoting durable products, the need to recycle waste and use them in other stages of the production cycle, as part of an integrated industrial ecosystem.

At the intermediate medium level, the circular economy practices include the development of eco-industrial parks and eco-agricultural systems. These need to be complemented by other measures, such as green design of industrial parks and proper waste management.

By applying the concept of industrial symbiosis, eco-industrial parks use common infrastructure and services. They allow groups of companies to cooperatively manage resource flows and by-products that reduce environmental outsourcing and reduce dependence on both companies and the nation`s resources. In parallel with eco-industrial parks, this includes the ecological design of residential communities to create an ecological living environment. At this level, the same emphasis is placed on regulating and managing the urban consumption of energy, water and other natural resources to reduce their use, as well as the management and recycling of wastewater and solid waste in order to improve the quality of life and well-being of the population.

Finally, the practice of the global macro-circular economy requires the complex and extensive formation of a network of active cooperation and collaboration between industries and industrial parks including primary, secondary and tertiary sectors in production areas and in the residential sector. In the context of China, the macro level is addressed to large cities or regions/provinces.

The aims of the 3R principles can be achieved through the appropriate design and management of urban infrastructure and suburban and agricultural industrial production, as well as inventive public programs to phase out energy consumption and polluting technologies, replacing them with environmental friendly technologies and activities.

Regarding the area of consumption, the economists suggest the implementation of system based on renting and ``collaborative consumption``. This practice allows consumers to meet their needs rather through rental, systems based on the services offered by products and agreements. This system will reduce over-demand for resources and waste, and lower production capacity will be offset by the creation of a new range of services. An urban symbiosis as an extension of an industrial symbiosis that needs to be developed to take care of waste management by transferring waste materials for environmental and economic benefits from recycling and reuse.

The last area that includes administrative support includes the initiatives of governmental and non-governmental organizations covering all areas odd production, consumption and waste management at all levels of aggregation. The regulations and initiatives of ministries or other administrative structures empowered to implement the principles of the circular economy at various levels must also be strengthened through the development of non-governmental and environmental organizations to change attitudes towards the environment in society. This is facilitated and supported by investments in education, providing information and active involvement of the public in raising awareness of the need to improve the quality of the environment. The healthier the environment, the better our well-being and health will be.

Summarizing the description of the circular economy model, we can conclude with the idea that the circular economy actually offers newly designed products, which are friendlier to changing production market.
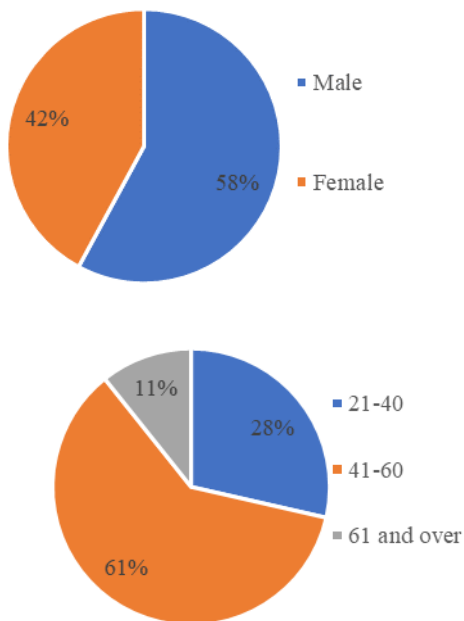
Fig. 1. Gender and age composition of respondents

2. Methodology

The main objective of the study is to determine the awareness of Moldovan enterprises on the need to implement circular economy practices in its activity by determining the knowledge and skills of company employees about the circular economy and identifying circular economy practices that may already be implemented in companies. For this purpose, it was developed with a questionnaire that was random distributed online through various social networks and e-mail addresses of companies. The responses were received from 28 employees in various companies. Thus, 42% of women and 58% of men participated in the survey. Most, 61% of respondents belong to the 41-60 age group. 28% of respondents belong to the 21-40 age group. At least 11% in the age group of 61 years or more.
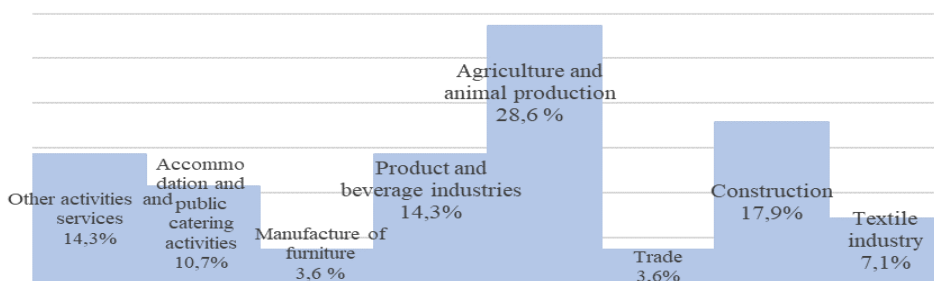
Fig. 2. The type of activity of the companies in which the interviewees work

The majority, up to 43% of respondents work in food production companies, 29% in companies whose activity is related to trade or services and 28% in various branches of industry. The structure of companies according to activity is presented in Figure 2.

About 42.9% of the respondents work in small enterprises with up to 10 employees, 32.1% of respondents came from small companies (with about 11-100 employees), 7,1% of medium-sized companies (with 101-205 employees). And 17.9% of respondents characterized the situation in large companies (they have 251 or more employees).

In addition to the basic demographic questions, the research also included questions related to the knowledge of the concept of circular economy. The questions were optional, some with multiple choice answers.

3. Research results

The main purpose of the research was to obtain a perspective image on the situation in the field of circular economy in the Republic of Moldova, by determining the degree of awareness of the principles of the circular economy. The questions to be answered in the survey were:

Q1: To what extent is the concept of circular economy known and if it is considered a topical issue, what requires urgent attention and involvement?

Q2: To what extent are the principles of the circular economy implemented in the companies in the country?

Q3: What barriers prevent companies from engaging in circular economy projects are important to more than half of respondents?

When they asked if they had heard about the term circular economy, the majority, 78.6% of respondents answered in the affirmative. When asked if there is a link between the current linear business model (which does not take into account the issue of waste and the recovery of the resulting by-products) and climate change, 39.3% answered that it exists to a large extent, 25% - to a moderate extent, 14.3% of respondents answered that to a small extent and to a very large extent. At the same time, when asked if an urgent involvement in the implementation of the circular economy is necessary, 60.7% of the respondents considered this issue very important and necessary. The distribution of the answers regarding the knowledge of the concept of circular economy is presented in Figure 3.

Do you think there is a link between the current linear business model and climate change?

Do you consider the circular economy to be a topical issue, which requires urgent attention and invo[...]
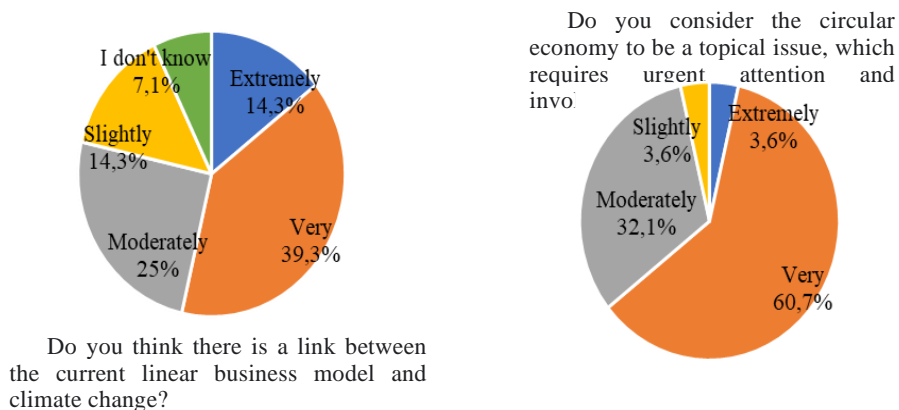
Fig. 3. Answers to the questions related to the knowledge of the concept of circular economy

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From the answers of the respondents we can deduce that not everyone who has heard about the concept of circular economy is well acquainted with its essence. At the same time, those who consider that there is a direct link between the current business model and climate issues are convinced of the need to speed up the implementation in practice of the principles of the circular economy. The results obtained are encouraging, as they show that more than half of the respondents are familiar with the concept of circular economy that requires attention and involvement.
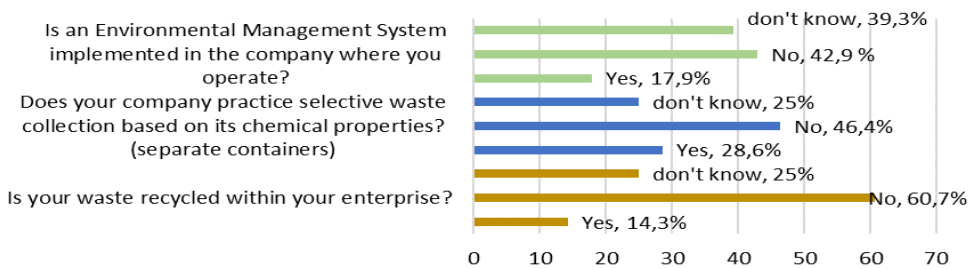
Fig. 4. Implementation of actions needed for the transition to a circular economy in enterprises

Whereas that knowledge is not equal to implementation, we set out to see the degree of implementation of the principles of the circular economy in practice. To this end, we aimed to see if the companies in which the respondents operate implement an environmental management system and whether selective waste collection and recycling are practiced – activities that are practically the basis for implementing the principles of the circular economy.

The answers to these questions give us the opportunity to conclude that measures on the implementation of the principles of the circular economy are practically not undertaken in the companies in the country. More than half of the employees are also unfamiliar with whether or not they are employed by the company in which they operate in this direction.

We also asked employees about the barriers that prevent companies from getting involved and reaping the benefits of the circular economy. The figure 5 shows the frequency of occurrence of each barrier.
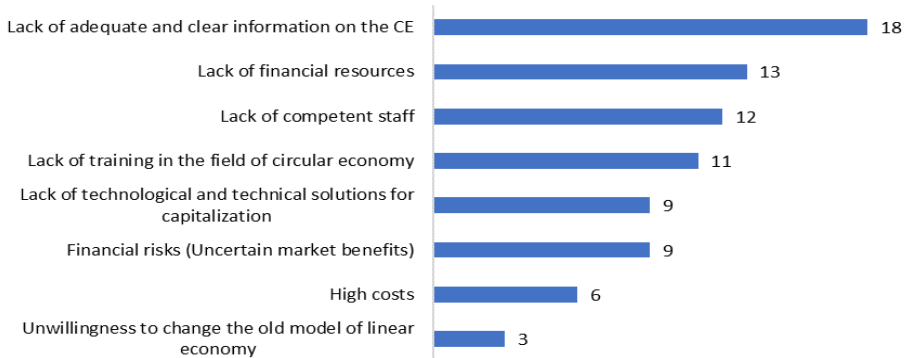
Fig. 5. Barriers that prevent companies from reaping the benefits of the circular economy

Among the barriers that prevent companies from reaping the benefits of the circular economy, more than half of respondents chose the lack of adequate and clear information on the circular economy, the lack of financial resources and competent staff. We note, therefore, that knowledge of the principles of the circular economy is practically one of the essential barriers in the transition to a circular economy model, which is an effect of the lack of information and the lack of trained staff in the field.

92.9% of respondents to the question to what extent the state takes enough action on the transition to a circular economy answered that no action is taken at all (28.6%) and not enough action is taken (64.3%) and please identify the most important tool that could facilitate the transition to a circular economy regulations in the field of circular economy, the active intervention of the state has been selected as one of the main driving forces. After that, a practically identical major importance has the programs of education and awareness of the population and the tools of counselling and financing.

Conclusion

The implementing sustainable practices is the only visible solution that would protect nature and the environment for future generations. The circular economy model can significantly contribute to the conservation of nature, natural resources and can offer certain economic benefits. The countries around the world are already actively implementing transition practices to the circular model, including

in business, with increasing success and positive results. Respectively, Moldova should not lag behind in the process of transition to a circular economy either. We conducted this research to determine the current situation and established the starting points for promoting the circular economy model in Moldova.

The results showed that Moldovan companies are insufficiently aware of the importance of the circular economy model and, in general, do not know the model well. The companies attach considerable importance to state legislation and initiatives, which indicates that it would make sense to take certain measures at the state level. For the successful introduction of the circular economy model, it is not only necessary to prepare an individual company, but also the support of all stakeholders, including the state. After all, the state could lso ensure that companies are better informed about the circular economy model, which has proven to be the most common obstacle to implementing the model.

The biggest limitation of the research presented is certainly the sample size. Due to the weak response of companies, and especially the high share of companies engaged in agriculture in their core business, we could assume that the survey results are biased and a larger sample would show even less awareness of companies and employees about awareness of the circular economy model. In the future, it would make sense to repeat the research and try to compare the results of the research with any of the other European countries.

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THE PRODUCTION OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES IN THE REPUBLIC OF SRPSKA

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Abstract

Reducing greenhouse gas emissions by at least 55% by 2030 requires higher shares of renewable energy and greater energy efficiency in an integrated energy system. The RS produces electricity from different sources. The Thermal power plant "Ugljevik", a relatively small plant, emits unimaginable amounts of dangerous sulphur dioxide. Bearing in mind the share of energy from fossil fuels, the question for the RS is how to provide enough energy to future generations? The development of the RES production in the RS is a crucial challenge for policymakers nowadays. This transformation will improve our health and well-being, create jobs, generate investment and innovation, reduce energy poverty and dependency on energy imports and strengthen the security of supply.

Keywords: *The Republic of Srpska; renewable energy sources; greenhouse gases; power plants; feed-in tariffs; premium.*

JEL Classification: Q4, Q42, Q48

Introduction

Climate change and environmental degradation are existential threats to the world. Through numerous agreements and adopted documents, both the world and the European Union (EU) committed themselves to reduce pollution on the entire planet. EU member states have committed to make Europe the first "green continent" with 0% pollution by 2050. This means abandoning energy production from fossil fuels and completely switching to electricity from renewable sources because 75% of total greenhouse gas (GHG) emissions in the EU come from the energy sector. [European Commission, 2021]

Bosnia and Herzegovina (B&H) and The Republic of Srpska (the RS), as one of two B&H entities, is signatory to the numerous agreements on climate changes, reduction of GHG emissions, as well as the Treaty establishing the Energy Community (EC). By transposing EC directives into national legislation, under the Treaty, BiH is taking steps to achieve its goals. [European Commission, 2009]

Table 1. Production of electricity in the RS

Power plants by technologies		Number of plants	Installed power	Realized production
			(MW)	(GWh)
1.	Thermal power plants	3	900	5.287,22
2.1.	Hydropower plants (>10 MW)	3	730	1.776,43
2.2.	Small Hydropower plants (≤10 MW)	44	99,77	220,37
2.	Hydropower plants (TOTAL)	47	829,77	1.996,80
3.	Small SP	97	11,41	11,66
4.	Biomass/biogas power plant	3	2,12	12,37
5.	Total	150	1.743,29	7.308,05

Source: Author's calculation based on data from *Regulatory Commission for Energy of the RS (2020)*

The production of electricity from renewable energy sources (RES) in the RS is regulated by numerous laws and bylaws. The government of the RS adopts the Action Plan of the RS for the use of renewable energy sources, the share of energy from renewable sources in gross final consumption of electricity, heating and

cooling energy and energy in transport. In addition, the law on RES and efficient cogeneration regulates planning and encouragement of production and consumption of energy from renewable sources and in efficient cogeneration, technologies for the use of RES, incentive measures for production of electric energy using RES and efficient cogeneration, implementation of a system to encourage production of energy from RES and construction of a plant for production of electricity from RES and other issues relevant to this area.

What is the share of RES production in total production in the RS? What is the share of production from solar power plants in RES, and what is the perspective of production from this energy source in the RS are answered in this paper.

1. Production of electricity in the RS

The RS produces electricity from different sources. Data about electricity production in the RS in 2020 are presented in the table above.

The RS in 2020 produced 7.308,05 GWh of electricity, which means the RS produces enough electricity for its own needs and the international market. These data do not include low-power plants for electricity production for their own needs because such power plants do not need to obtain a license to operate. The most important natural resources nowadays in use for energy production and supply are coal and water streams. In addition to these resources, the RS also has electricity production from biomass and solar energy.
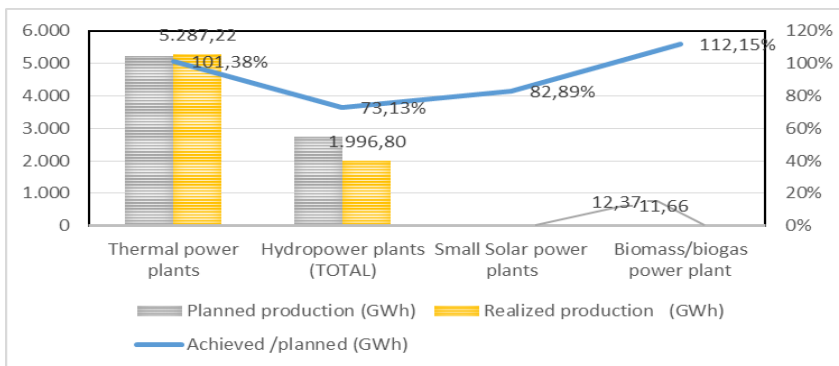
Fig. 1. Planned and realized production of electricity in 2020

Source: Author's calculation based on data from *Regulatory Commission for Energy of the RS, 2020.*

Graph 1. provides an overview of the total realized electricity production during 2020 in power plants that supplied electricity to the grid for the needs of customers in the public service system or the market and a comparison with the planned values.

As we can see from the previous figure, the most significant share of electricity production is from thermal power plants. The most critical impacts of the energy sector on the environment in the RS are emissions of pollutant materials in the air generated during the combustion of fossil fuels. Other significant impacts of the energy sector on the environment are the discharge of pollutants into the water and land, waste production and noise.
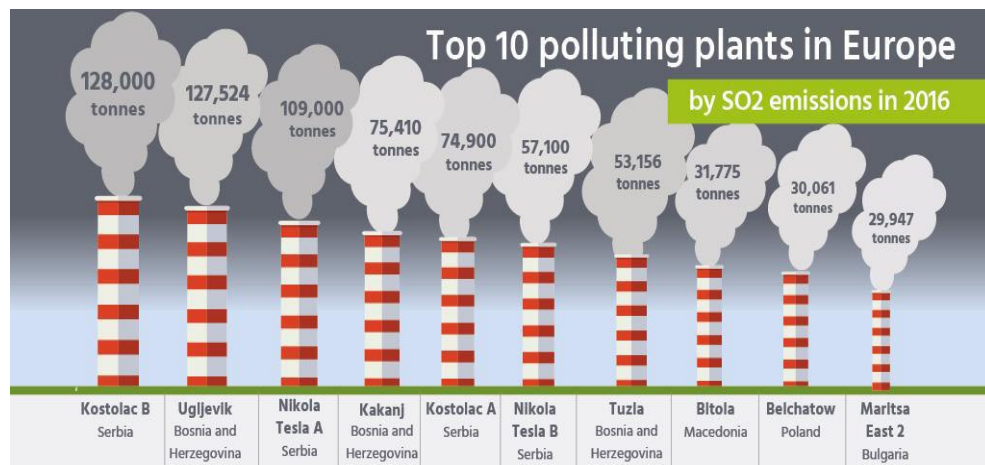
Fig. 2. Top ten polluting plants in Europe

Source: Health and Environment Alliance, 2019.

Figure 2. presents the top ten polluting plants in Europe. According to SO2 emissions in 2016, the second place is taken by the thermal power plant "Ugljevik" (the RS). "Ugljevik" power plant is a one-of-a-kind polluter. A relatively small plant (300 MW) emits unimaginable amounts of dangerous sulphur dioxide: 83.265,84 tonnes. [CEE Bankwatch network, 2019. p. 18]. This power plant has a problem with the installation of flue-gas desulphurization equipment, as well as the application of measures to reduce emissions of nitrogen oxides. Ugljevik's toxic

emissions caused 635 deaths, 1.689 cases of bronchitis in children and adults, 494 hospital admissions and 192.236 lost working days in 2016 only. [Health and Environment Alliance, 2019, p. 17]

On the other hand, from the ten largest thermal power plants in Europe (with an installed capacity of 2.250 – 4.928 MW), Polish Belchatów is the only power plant among the ten largest polluters in Europe. Nevertheless, by adopting the Green Deal, the EU has committed itself to shutting down thermal power plants and switching to renewable energy sources in total. The European Green Deal involves several different activities: transforming the transport industry, investing in renewable energy technologies, creating markets for clean technologies and products, reducing GHG gas emissions, renovating homes and buildings, restoring nature and enabling biodiversity etc. [European Commission, 2021]

Bearing in mind the share of energy from fossil fuels, the question for the RS is how to provide enough energy to future generations? Therefore, the development of the RES production in the RS is a critical challenge for policymakers nowadays.

1.1 Production of electricity from the RES in the RS in 2020

Directive 2009/28/EC on promoting the use of energy from renewable energy sources establishes a common legal framework and uniquely regulates the promotion of electricity from renewable energy sources and the promotion of biofuels or other renewable transport fuels. This Directive is also binding for the RS, i.e. B&H, since the Ministerial Council of the Energy Community in October 2012 decided to extend the mandatory legislation to this Directive. An integral part of the decision is the targets for the share of renewable energy sources in 2020 for all countries signatories to the Treaty establishing the Energy Community. That target is 48% for RS and 40% for B&H. [European Commission, 2009]

Adopting the Law on Renewable Energy Sources and efficient cogeneration created a legal framework for the final definition of the system of incentives for electricity production from renewable sources and in efficient cogeneration. The incentive system is based on the most important and most recognizable types of incentives:

- the right to mandatory purchase of produced electricity according to guaranteed purchase prices (feed-in tariffs - FIT) and

- the right to a premium for consumption for own needs or sale on the market of the RS (feed-in premiums). [Official Gazette of The RS, 2013]

In addition to these types of incentives, the following are also prescribed: benefits when connecting to the network, advantage in network access, the right to

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mandatory purchase in trial operation, handover of electricity according to the principle of net measurement. For a maximum duration of 15 years, the incentive can only be realized for plants with new equipment. The amount of encouraging electricity has been regulated, and the RS Action Plan set the quantity limits. Quantitative restrictions do not apply to incentives insight transmits on the principle of "net measurement".

The right to support electricity production from RES and efficient cogeneration in 2020, was granted to 142 production plants. Table 2 gives the fundamental production indicators of plants in the incentive system:

Table 2. Production of electricity from RES

Power plants by technologies	Realized production	Calculated at the reference price	Calculated premium	TOTAL
2020	**(kWh)**	**(0.0029€/kWh)**	**€**	**€**
Solar power plants	9.913.986	291.834	1.003.073	1.294.908
Hydropower plants	214.509.087	6.241.945	7.654.971	13.896.916
Biomass power plants	1.292.533	151.744	490.639	642.384
Biogas power plants	10.751.183	199.254	640.408	839.661
FEED-IN price (FIT)	**236.466.789**	**6.884.777**	**9.789.092**	**16.673.869**
Solar power plants	1.717.150	0	103.904	103.904
Biogas power plants	330.768	0	24.152	24.152
Premium	**2.047.918**	**0**	**128.056**	**128.056**
TOTAL	**238.514.707**	**6.884.777**	**9.917.148**	**16.801.925**

Source: Regulatory Commission for Energy of the RS (2021)

The following graph showed the structure of energy production from RES in the RS in 2020. As we can see, the most significant share in production from RES is from hydro plants, even 91%.

The RS produced 7.308,05 GWh of electricity in 2020, but only 2.020,83 GWh come from the RES or just 27,65%. Production of electricity from RES in the RS depends on the hydrology and the operational readiness of all capacities. However, in the total gross consumption in 2020, electricity produced from RES amounted to
314

49,4%! Total electricity production realized in small hydropower plants in the incentive system amounts to 214.509 GWh, which is 58,1% of the planned annual production of these power plants in 2020.
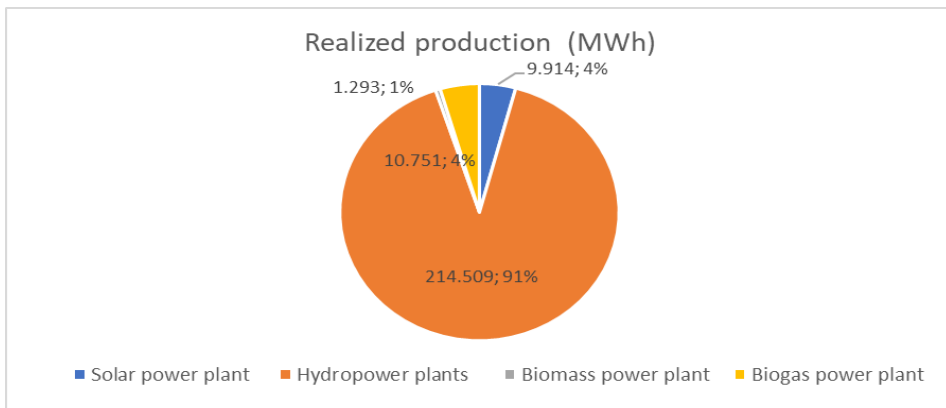
Fig. 3. Production of electricity from RES

Source: Author's calculation based on data from *Regulatory Commission for Energy of The RS (2020)*

The right to support the electricity production from RES and in efficient cogeneration (based on the contract on mandatory purchase of electricity) at the end of 2020 was granted to 97 solar plants, with a total installed capacity of 11,41 MW and planned 14,06 GWh annual production. In 2020, solar plants produced 11,67 GWh, which represents 83% of the planned annual production. Only three biomass/biogas plants, 2,12 MW of the instaled power, produce 12,37 MWh or 12,15% more than planned annual production in 2020. [Regulatory Commission for Energy of the RS, 2021]

2.   Production of electricity from the RES in the future

B&H has developed many documents dedicated to reducing GHG, among them, *National Emissions Reduction Planned in 2018* and, following the Paris agreement, *Nationally determined contribution of Bosnia and Herzegovina* (NDC) for the period 2020-2030. District heating, building, transport, industry, agriculture, forestry and waste are critical sectors for reducing GHG emission. [United Nations, 2015]

The thermal power plant in B&H cannot meet EU standards. B&H plans to cut GHG emissions by 33,2% by 2030 and almost 66% by 2050, compared to 1990 levels. With the increase of GHG sinks in the forestry sector, the projected emissions by 2050 will be about 80% less than the net emissions in 1990. [United Nations Climate Change, 2021]

With this declaration, the country has also committed itself to introduce a model for the taxation of GHG gas emissions, an increase in the share of renewable energy sources, and the phasing out of coal subsidies. However, all the above-stated data and facts indicate that the RS will have a severe problem when facing taxes on energy produced from fossil fuels.

No doubt, the RS must increase the share of RES in total electricity production in the next decade. However, what is the potential of RS in the field of RES?

The RS is an area rich in hydro potential, with 3.200 MW technically exploitable hydro energy potential. According to the data stated in *the Energy Strategy of the Republic of Srpska, up to 2030*, RS could produce up to 9.500 GWh of electricity per year on average. However, only 2.420 GWh of this potential is used.

In the coming period, Power utility Elektroprivreda RS Trebinje plans to build four significant hydropower facilities with 340,03 MW installed capacity:

• HPP Dabar (installed capacity 159,15 MW, production 251,80 GWh/year),

• HPP Buk Bijela (installed capacity 93,52 MW, production 332,34 GWh/year),

• HPP Foča (installed capacity 44,15 MW, production 175,87 GWh/year) and

• HPP Paunci (installed capacity 43,21 MW, production 166,9 GWh/year). [10]

HPP Dabar is under construction, and other projects are in the phase of providing funds for investments and resolving property issues.

The south of the RS has 1,50 to 1,55 MWh/m2 of total solar irradiation. On the other hand, solar radiation is not too low in the northern regions: 1,25 to 1,30 MWh/m2. A study of the construction of the first large solar power plant near Trebinje, with an installed capacity of 100 MW and an average annual production of 147,7 GWh, is currently underway.

Wind energy has not been used for production of energy in the RS until now. It can be said, the south of the RS has significant potential for the production of energy. According to one-year wind measurements, the average annual wind speed is determined between 6,1–8,1 m/s. The theoretically exploitable potential for the use of wind energy is estimated at 640 MW and 1.200 GWh/year. A feasibility

study was prepared for the construction of WPP "Hrgud" with an installed capacity of 48 MW and an average annual production of about 126 GWh.

Some geothermal potentials have the northern part of the RS with the average temperature of geothermal waters in reservoirs around 100ºC (80-150ºC). Nowadays, these sources of hot weather are used primarily for balneological purposes.

Waste from the timber industry, firewood, municipal waste, cattle breeding and energy crops, pruning residues of perennial crops etc., could be a great source of energy in the RS. The theoretical potential of biomass in the RS is estimated at 31,08-46,24 PJ. 59% is biomass suitable for combustion, and 39% biomass is suitable for biogas production. No biomass/biogas power plant has been planned to be built nowadays by the government of the RS. There are only three small capacity biomass/biogas power plants in the private sector in the RS. [The Republic of Srpska Government, 2012]

Conclusion

Reducing greenhouse gas emissions by at least 55% by 2030 requires higher shares of renewable energy and greater energy efficiency in an integrated energy system. This transformation will improve our health and wel-lbeing, create jobs, generate investment and innovation, reduce energy poverty and dependency on energy imports and strengthen the security of supply.

Somebody said the amount of sunlight that strikes the earth's surface in an hour and a half is enough to handle the entire world's energy consumption for a full year. Solar energy is accessible everywhere. Wind and solar investment should be explicitly linked to closing coal plants. Only wind and solar give the full benefits of a coal phase-out in terms of jobs, investment, energy self-sufficiency, cheap energy, clean air, and reduced CO2 emissions.

Although there is significant energy potential in RS, utilization depends on investment opportunities. Although sun and wind are recognized as the best energy source in the future, the technology of producing energy from the sun and wind is still expensive for the RS.

Whether RS will change from an electricity exporter to an importer depends on the policies and decisions made in the coming period. Installing the necessary equipment for desulphurization in thermal power plants will somewhat delay the inevitability of extinguishing pollutants. However, if we want to follow the EU directives and other documents that we are obliged to incorporate into domestic

legislation, B&H (and the RS) will face coal out. In the future, sufficient amounts of solar and wind energy must be provided to replace energy from fossil fuels.

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COMPETITIVENESS AND INNOVATION: THE CASE STUDIES OF SERBIA AND ROMANIA

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Abstract

Non-technological innovation comes from sectors with the capacity of applying knowledge provided by foreign companies and trade partners. Green procurement proved to be an essential factor that stimulates innovation and economic resilience. It is often found in companies in South-Eastern Europe, social responsibility, a high level of competencies, and agile operational management. Romania made critical green procurement and agile management steps to impact productivity with a low footprint on the environment positively. On the other hand, Serbia could not access FP7funds to invest in R&D and eco-innovation, reflected in a low Global Innovation Index Ranking. The paper addresses competitiveness and innovation within the

case study model of Serbia and Romania, explores similarities and differences, and makes recommendations. Competitiveness and innovation are observed within the context o circular economy.

Keywords: *competitiveness; innovation; South-Eastern Europe; circular economy.*

JEL Classification: O10, M21, Q10

Introduction

The analysis of available official sources and reports were performed based on collected data on innovation and competitiveness of the Republic of Serbia and Romania (Content analysis is a research technique). These data are further compared (comparison method).

The Global Competitiveness Report of the World Economic Forum for 2019 ranked Romania in the 51st place out of 141 countries with an I.G.C. score value of 64.4, moving one place up since the 2018 report when it ranked 52nd with an I.G.C. score of 63.2 [WEF, 2018]. Data used to present ranking and innovation elements are based on 2018 and 2019 WEF GCR because the 2020 WEF Special Edition contained no rankings on the Global Competitiveness Index [Schwab & Zahidi, 2020].

When it comes to the ability to innovate business activities [12th pillar: Innovation capability], Romania ranked 55th of the 141 countries with a 42.3 point score that was subjected to the analysis, according to the source [WEF, 2019] versus the previous year report [WEF, 2018]., when Romania ranked two positions lower [57th] on the same ranking list, maintaining a 39.6point score for innovation. Furthermore, Romania was placed 72nd in business activity dynamism [11th pillar: Business dynamism] in 2019 with 59.7 points [out of 100], which compared to 2018, shows that Romania ranking has improved by eight places having in mind that Romania regarding this pillar was ranked at 64th place with 60.1point scale in 2018, due to the insufficient business dynamism in general. In Romania, most innovation comes from the IT&C sector, which is organised in business clusters that offer informational and consultancy support, especially for SMEs. The young working force has good results in the IT&C sector, sustaining most multinational I.T. companies that set up subsidiaries in Romania [Pantea, 2021]. A sustainable creative economy is based on the competitiveness of companies and human development [Suciu et al., 2018].

According to the World Economic Forum's GCR for 2019, Serbia ranked 72nd out of 141 countries with the recorded value of the I.G.C. of 60.9 [Schwab, 2019]. Serbia has fallen seven places compared to the results obtained in 2018 [65th rank with 60.9 scores]. According to the FREN analysis, Serbia improved the following indicators compared to 2018: institutions, infrastructure, skills, labour market, financial system, market size, business dynamism, and the ability to innovate. Data used to present ranking and innovation elements are based on WEF GCR for 2018 and 2019, considering that 2020 WEF created Special Edition without rankings on the Global Competitiveness Index [Schwab & Zahidi, 2020].

Speaking of the contributions, the Business Dynamism competitiveness pillar made the most significant positive contribution, increasing 2.2 points in 2019 compared to 2018. The I.G.C. value increase in the level of said pillar resulted from the better assessment made by the entrepreneurs and obtained after a survey had been conducted by the S.E.F. every year to measure the dimensions impossible to include otherwise, says the FREN study. When the Ability to Innovate pillar is concerned, Serbia moved from 39.7 to 40.2 in 2018 and 2019, respectively [Tanasković & Ristić, 2019].

When the ability to innovate business activities is in question that was subjected to the analysis [12th pillar: Innovation capability], the Republic of Serbia ranked 59th of the 141 countries with 40.2 points, according to the source [WEF, 2019]. The same source [WEF, 2019], a report for the previous year, records that, in comparison with the year 2018, Serbia ranked three positions lower [56th] on the same ranking list, with a 39.7 point score for innovation capability. On the other hand, however, Serbia moved up from 59th place in 2018 to 54th place in 2019 with a 63.1point score [out of 100], a rise of five positions because Serbia's 2018 rank was lower due to insufficient business dynamism in general.

1. Literature review

In Romania, territorial clusters can be found: "knowledge-intensive hubs, technology-intensive platforms, diversified agglomerations, industrial production zones, and structurally challenged regions" – each of them in need of differentiated policy interventions. The knowledge-intensive hubs of Bucharest, Cluj-Napoca, Timisoara, Iasi and Ilfov are the most innovative, determining regional growth, and directly contacting top-European research networks. FP7 funds were accessed primarily by private enterprises showing that innovation in Romanian enterprises directly correlates with the R&D system [Jana, 2021].

In Romania, another positive influence on innovation and working force creativity is tight cooperation between universities – private sector and public sector, facilitating "communication, research, innovation, and technology". Consequently, in Romania, a legal framework that facilitates standardisation and regulation of this cooperation was set up.

Regulation is one important criterion that sustains competition in the Romanian market, which can be observed in different innovations integrated into enterprises' products, processes, and technology. Furthermore, green procurement sustained in Romania depends on the market participants' level of knowledge and skills [Busu & Busu, 2021].

Romania made essential steps in the innovation field. Some urban agglomeration centres demonstrate a high level of creativity due to knowledge-intensive hubs [Bucharest, Cluj, Timisoara, Iasi and Ilfov] and the tight relationship between business and universities. The young generation performs highly when creating knowledge with outstanding productivity refers to exports of medium and high-tech [Pantea, 2021]. They finance their innovation with R&D funding, FDI, ESIF funds, etc.

From the beginning of the introduction of CE within the European Union, the Republic of Serbia has been closely following and accepting the recommendations regarding adopting the circular economy. In February 2016, changes and additions to the law in environmental protection had made space for introducing the circular economy. In this way, environmental infrastructure becomes a generator of waste management efficiency and energy recovery. When it comes to the Republic of Serbia, on the way to the full implementation of CE, the necessity of changing the business model of domestic industries in terms of promoting an environmentally sustainable way of doing business has been emphasised for some time. At the same time, the CE implementation strategy must be adopted as a priority goal for the development of the economy of the Republic of Serbia.

In 2018, the G.D.P. of the Republic of Serbia increased by 4.4%, and in 2019 by 4.2% due to foreign direct investment and domestic consumption. However, due to the outbreak of the COVID-19 pandemic, those projections in 2020 have been significantly reduced. Due to all the above, Serbia has entered an economic recession that caused a 4% drop in G.D.P. in 2020 [Statistical Office of the Republic of Serbia, 2018].

The latest report on Serbia's competitiveness for 2020 [SME Competitiveness Outlook 2020] provides forecasts of the impact of the SARS-CoV-2 virus

pandemic on small businesses [SME Competitiveness Outlook 2020]. The report for Serbia indicates that the most significant disturbances are in the production of machines, plastics, and rubber, in which the so-called linear business models have been applied. Therefore, Serbia decreased exports of industrial raw materials by 3% [Official Gazette of R. Serbia, 2020].

2. Innovation and Competitiveness of the observed countries

The dynamism of innovation acceptance based on two components [Innovation Capability and Business Dynamism] in Romania is shown in Figure 1.
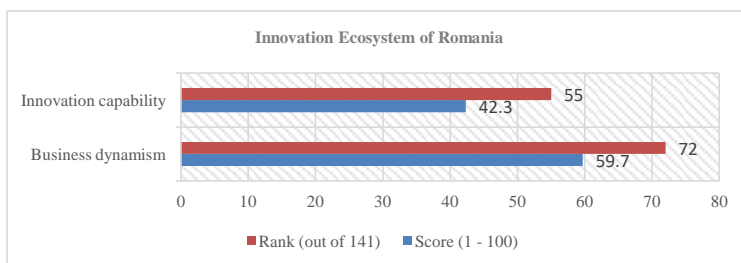
Fig. 1. The dynamism of innovation acceptance in Romania, 2019 [Calculation based on WEF, 2019]

The business dynamism element's administrative requirements are measured based on four components: Cost of Starting a Business, Time to Start a Business, Insolvency Recovery Rate, and Insolvency Regulatory Framework for Romania, as shown below in [Table 1] and [Figure 2].

The positive components contained in the administrative requirements for business dynamism in Romania in 2019 are as follows: the "Insolvency regulatory framework" – Romania ranking at the excellent 17th place, also for "Cost of Starting a Business" Romania is at 9th place, but regarding the "Insolvency Recovery Rate," Romania is at 75th place [WEF, 2019], meaning that most of the companies when ending in insolvency cannot recover anymore, because they have neither governmental support nor financial and business consultancy.

Table 1. Business Dynamism element's administrative requirements for Romania

Components of Administrative requirements	Score [1 - 100]	Rank [out of 141]
Cost of starting a business	99,8	9
Time to start a business	65,3	123
Insolvency recovery rate	38,5	75
Insolvency regulatory framework	81,3	17

Source: Calculation based on [WEF, 2019]
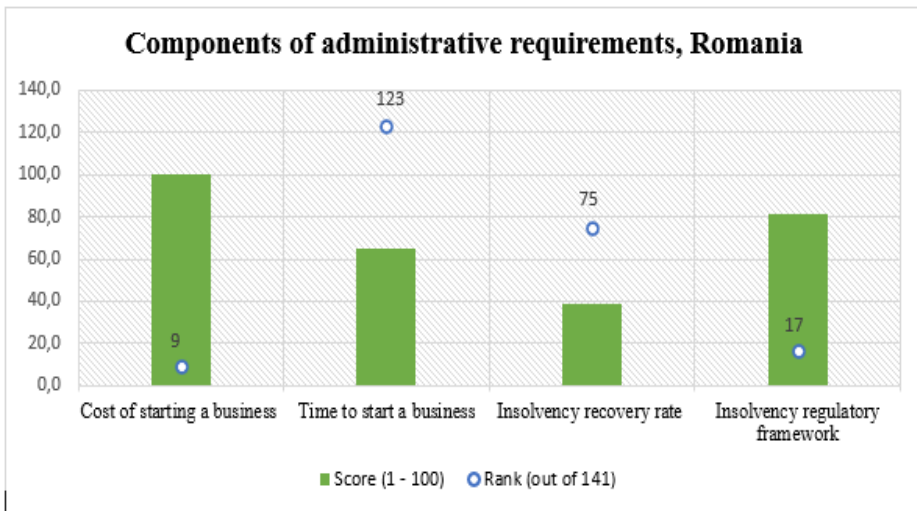
Fig. 2. The components of the administrative requirements in the framework of business dynamism for Romania [Calculations based on WEF, 2019]

The harmful component contained in the administrative requirements for business dynamism in Romania is the "Time to Start a Business" component. As a result, Romania is ranked 123rd among the 141 countries included in the survey. Regarding the years of education, Romania's available workforce spent on average 11.0 years on education, this fact leading Romania to the relatively good 46th place of the 141 countries included in the survey and subjected to observation. When the

school life expectancy terms are concerned, Romania is 69th with 14.3 years of school life expectancy. [Table 2]. Romania ranks 133rd regarding the ease of finding the skilled workforce; it ranks at 89th place of future workforce skills; ultimately, it is the 53rd in the category of the digital skills at disposal to that very same workforce [WEF, 2019].

Table 2. The business capacity of the workforce in Romania

The selected components of skills in Romania	Value	Score [1–100]	Rank among the countries [1 to 141]
Current workforce [0 -100]	-	59.1	63
* Mean years of schooling [years]	11.0	73.2	46
Future workforce [0 - 100]	-	65.9	82
* School life expectancy [years]	14.3	79.2	69
Skills for the future workforce [0 - 100]	-	52.6	89

Source: [WEF, 2019]

The dynamism of innovation acceptance based on two components [Innovation Capability and Business Dynamism] in Serbia is shown in Figure 5. When the Global Innovation Index Ranking [Sopjani et al., 2020], [INSEAD & WIPO, 2014] is considered, Serbia ranked 101st, whereas it was 67th in 2013. However, according to the said statistics, Serbia's innovation acceptance dynamism became notably better meanwhile.

The latest research results obtained in a study dealing with the subject matters of innovation, the activity, and the size of the Serbian enterprises from 2016 to 2018, are presented in Table 3. Research study refers to innovative business entities as all those business entities which introduced innovation in a product or a process in the period of observation or those which had either already renounced or had not yet completed their innovations.

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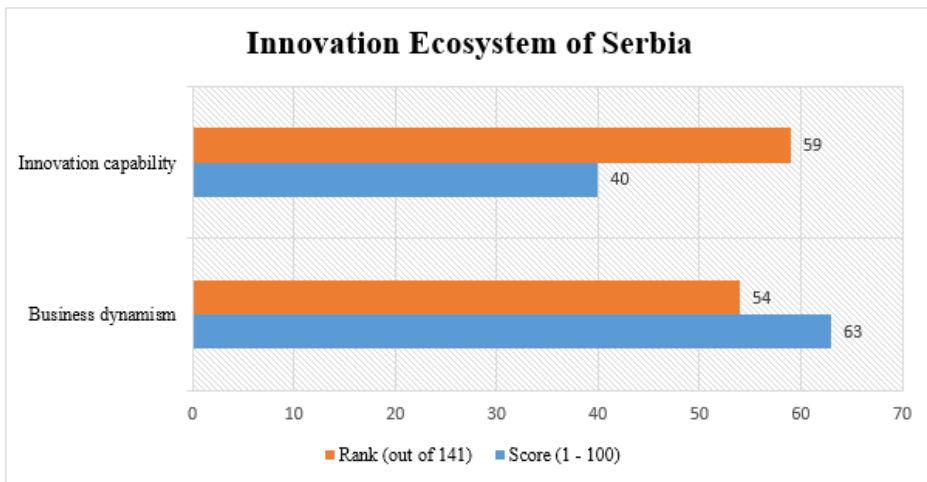
Fig. 3. The dynamism of innovation acceptance in the Republic of Serbia, 2019 [Calculation based on WEF, 2019]

Table 3. Business entities by innovation, activity, and size [Statistical Office of the Republic of Serbia, 2018]

	Total	Enterprises - innovators	The enterprises that did not introduce innovations	The share of innovators in %
Total	19011	9546	9466	50.21
Small enterprises	15878	7566	8312	47.65
Medium-sized enterprises	2544	1573	971	61.83
Large enterprises	589	407	182	69.10
Manufacturing enterprises	5039	2854	2185	56.64
Service enterprises	13972	6692	7281	47.90

Due to its significance and vivid impact on sustainability, CE is constantly receiving enormous attention from researchers, policymakers, and entrepreneurs [Sopjani et al., 2020]. The focal point of the initial research study is the enterprises having applied but a few of said innovations at least once [they account for 50.2%]. Interestingly, the size of an enterprise is a significant variable necessary to define

an innovative activity. Over 69% of the significant business entities, around 62% of those medium-sized, and 47% of the small ones can be considered innovative enterprises. Ultimately, the enterprises dealing with manufacturing are innovative to a greater extent in comparison with the others [almost 57% of them implemented innovation in comparison with the enterprises rendering services [almost 48% innovative]] according to the Statistical Office of the Republic of Serbia [Statistical Office of the Republic of Serbia, 2018].

The healthy competitiveness evident in developed economies is generated by the concentration of Serbia's different industrial business entities in the market. Conversely, reduced business dynamism results from lower competitiveness, which is confirmed in Figure 6. The business dynamism element's administrative requirements are measured based on four components: Cost of starting a business, time to start a business, Insolvency recovery rate, and Insolvency regulatory framework for Serbia, shown in the following Table 4 and Figure 4.

Table 4. Business Dynamism Element Administrative requirements for Serbia

Components of Administrative requirements	Score [1 - 100]	Rank [out of 141]
Cost of starting a business	98,9	45
Time to start a business	95,0	27
Insolvency recovery rate	37,1	78
Insolvency regulatory framework	84,4	14

Source: Calculation based on [Schwab, 2019]

The positive components contained in the administrative requirements for business dynamism in the Republic of Serbia in 2019 are as follows: the "Time to Start a Business" component – Serbia ranking 27th of the 141 countries included in the survey, and the "Insolvency Regulatory Framework" – Serbia ranking in the excellent 14th place. There are incredibly high "Costs of Starting New Business Activities", especially those in the industrial sector, irrespective of Serbia ranking one place higher than in the year 2018. No change in the position was recorded with the "Insolvency Recovery Rate" [WEF, 2019], [WEF, 2018].
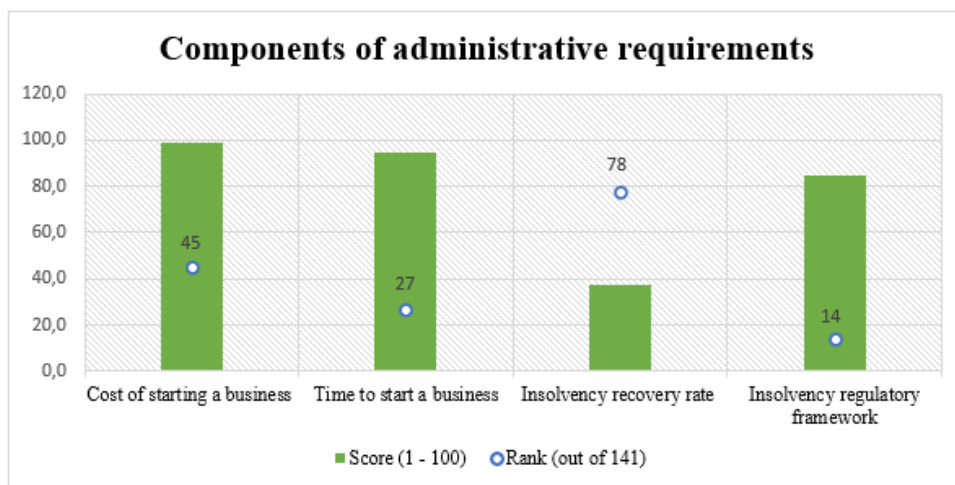
**Fig. 4. The components of the administrative requirements in the framework
of business dynamism for Serbia [Calculation based on [WEF, 2019]]**

Table 5. The business capacity of the workforce in the Republic of Serbia

The selected components of skills in Serbia	Value	Score [1–100]	Rank among the countries [1 to 141]
Current workforce [0 -100]	-	62.4	50
* Mean years of schooling [years]	11.1	74.2	43
Future workforce [0 - 100]	-	74	53
* School life expectancy [years]	14.8	82	59
Skills for the future workforce [0 - 100]	-	65.9	49

Source: [WEF, 2019]

Regarding the years of education, the available workforce of the Republic of Serbia spent on average 11.1 years on education, this fact leading Serbia to the relatively good 43rd place of the 141 countries included in the survey and subjected to observation. When the school life expectancy terms are concerned, Serbia ranked in the first half of the countries included in the survey, which tells us that

Serbia has a good source of the workforce [Table 8]. Additionally, the following further conclusions about the exact analysis of the 141 countries included in the survey are worth mentioning: the Republic of Serbia ranks 51st in finding the skilled workforce; it ranks 65th in the set of knowledge and skills the workforce has; ultimately, it is 77th when speaking about the digital skills at disposal to that very same workforce [WEF, 2019].
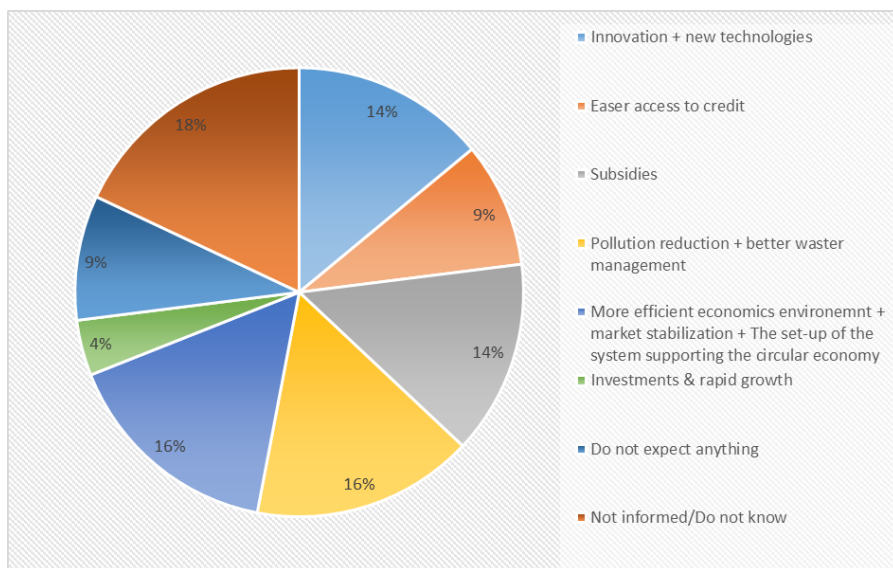
Fig. 6. A statistical overview of the expectations of the strategy of industrial development in the Republic of Serbia for the period from 2021 until 2030 [Official Gazette of R. Serbia, 2020].

Due to the current pandemic, the E.U. provides direct support to the Western Balkans region. In synergy with the European Investment Bank, it has allocated more than 3.3 billion Euros to support this part of Europe. This assistance will mainly target small and medium-sized enterprises, innovative projects, agriculture, rural and tourism enterprises, and those firms run by young people and women [Ec.europa.eu, 2021]. This financial assistance for the Western Balkans countries should be paid successively in the period from 2021-2027, and a significant increase in grants and financial guarantees for the countries of this region is

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envisaged [Ec.europa.eu [2021]. E.U. assistance mainly refers to the circular economy, clean and digital economies, so understandably, the Republic of Serbia's government will prioritise the same areas in the coming period. This assumes that the circular economy and the environment laws would be among the main pillars in implementing the new measures.

Having drawn up a *Roadmap to a circular economy*, Serbia has become the first of the Western Balkans countries to be recognised for drafting a strategic document containing clear plans and goals for sustainable CE-based production. In addition to this document, the report of ex-ante analysis of effects for the CE sphere was made. According to the guidelines, it is conducted as a mandatory initial part before developing the Program for Circular Economy [Ekologija, 2021].

Serbia has announced an improvement of the present packaging waste management system. It plans to make investments in the manufacturer's comprehensive responsibility system and introduce the deposit system. The shifting from the production and consumption linear model to the circular model has institutionally been recognised. In connection with that, a few quality projects have been launched, intended for solving partial problems society has been faced with. A broad platform and synchronous activities, however, are missing in all disciplines of interest. The situation is no better when promoting the circular economy concept in the civil sector; closer cooperation with business entities and academic institutions are concerned. There is a need to promote circular culture and remove the regulatory barriers preventing the economy from developing. . It is critical to emphasise that Serbia will not be admitted to the European Union unless and until it changes its approach to resource management; CE implementation represents a unique opportunity for accelerated accession to this community [Bucea-Manea Tonis et al., 2021].

Conclusion

A comparison between the two countries: one supported the EU [Romania] and the other without assistance [Serbia] evolved differently. In Romania, although business dynamism is deficient [rank: 72 from 141], the innovation capability is rather good [rank: 55 of 141], The innovation capability is due to young upper skilled generation and EU support in developing knowledge and technology-intensive hubs, clusters, based on FP7funds. Due to these funds, Romania made critical green procurement and agile management steps to positively impact productivity with a low environmental footprint [Schwab, 2019], [Song et al.,

2020]. Furthermore, the innovation is grounded by solid cooperation between universities – private sector – public sector. These facts are reflected in I.G.C. rank, too [51 of 141].

In Serbia, the situation is inversed: although the business dynamism is higher [rank: 54 from 141], the innovation capability is slightly lower [rank: 59 from 141]. Serbia could not access FP7 funds to invest in R&D and eco-innovation, reflected in a low Global Innovation Index Ranking. The analysis of competitiveness and innovation in the CE field in Serbia shows that the circular economy would automatically move the country from manufacturing to an innovative industry with a higher value of finished products—implying a much faster transition from manufacturing to services. Numerous connections would be made with foreign companies and potential investors, making Serbia more competitive in offering circular economy products and services. The latter would imply automatic access to various financial sources, significantly assisting innovation processes and enhancing relations with countries that promote CE through cooperation programs. All of the previous would inevitably result in technological and educational independence and a narrowing of the economic divide between Serbia and other advanced economies in the region and beyond.

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DIGITAL ELECTRONIC PAYMENT AND BANK PERFORMANCE IN NIGERIA

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Abstract

This study investigated digital electronic payment techniques being a financial technological innovation, and its impact on banks performance in Nigeria. The study adopted an expost-facto research type with a time series collected on a quarterly basis covering a period of 2009 to 2020. Entirety of study was 21 deposit money banks quoted on the Nigerian Stock Exchange. Data collected were obtained from Central Bank of Nigeria (CBN) Statistical bulletin and analyzed with Error Correction Model (ECM). The study revealed that digital payment by way of mobile banking; automated teller machine and internet banking have significant influence and positively related to bank financial performance, suggesting that they were cogent technological changes factors enhancing bank performance. Meanwhile, Point of Sale (POS) or debit cards had a negative significant influence on bank performance. The study has provided some useful insight into factors that can continue to enhance the influence of the nexus between digital electronic payment means and banks' performances.

Keywords: *mobile banking; automated teller machine; internet banking; point of sales and financial performance.*

JEL Classification: G24

Introduction

The paradigm shift from traditional payment to digital age trend in the banking industry turn out to be source of profit for banks, whereby reducing bank's operating expenses and invariably boost their financial performance (Van, Uyen, & Phuong, 2015). Modern financial technology has become a very critical aspect of recent banking services delivery in the world at large and African countries in particular. ATM is one of the foremost indicators for this technical know-how and is adopting by commercial and non-commercial banks with in the globe (Otukoya, 2014). Digital electronic payment like automated teller machines, internet banking and mobile banking were introduced in the banks to enable customers make quick transactions with minimum delay and reduce queues in the banks (Sanjeev, 2014). With the introduction of digital electronic payment, customers of banks have efficient, fast and convenient banking services delivered through such as ATMS, Online Banking, and Mobile banking (Monyoncho, 2015). Regardless of numerous benefits uncovered by Digital electronic payments diverse risks of increased fraud and exposure to litigations emerges, while human complaints ranging from poor service network, difficulties in understanding technological innovation in bank operation and ease of use, poor service delivery, existence of long queues, expensive charges and the insecurity in the use of e-banking products leads to customer dissatisfaction and resulting to low financial performance (Olumide, 2014; Dangolani, 2011, Ahaiwe, 2011).

Despite the irrefutable importance of technological changes in e-banking products, two misconception are identified; derisory discovering on drivers of technology and empricla findigs on technology's impact on banks' performance remains modestly tested using data from banks (Mabrouk & Mamoghli, 2010: Ngumi, 2013). Muhammad and Smith (2000), postulates that the level of ATM fraud tends to have overshadowed the improvements conveyed into the Nigerian service delivery systems. Similarly, Ihejiahi (2009), posit that despite the realization of ATM terminals as a banking instrument, several customers sees ATM as an alternatives to frustrating queues in banking hall, and as a result, bank officials are being worried seeing function of ATM being erroneously misused. However, most extant studies from developed and developing countries produced mixed results apropos impact of technological changes on bank performance

(Mwania and Muganda, 2011; Franscesa and Claeys, 2010; Pooja and Singh, 2009). In the study conducted by Franscesa and Claeys (2010) and Pooja and Singh (2009), technology was concluded on having least impact on bank performance, while Mwania and Muganda (2011) and Batiz-Lazo and Woldesenbet (2006), reported on technology contributing significantly. Within Nigeria context, several studies focused on information technology in terms of either ATM, internet banking, mobile banking and, or e-banking (Jegede; 2014; Olumide, 2014; Ahawe, 2011). The expectations from this study was to provide a clear way to the banks of what they ought to do to ensure that their operation is effective despite having digital payments means and that customers are satisfied and their financial performance is kept at bay. On this note, this study aims at investigating prospects of digital electronic payment techniques and its impact on banks performance in Nigeria.

2. Literature Review
2.1 Bank Performance

Bank Performance has been defined in various ways and all definitions given, are channeled towards the same direction by extant studies (Harash, Al-Tamimi, & Al-Timimi, 2014a). Bank performance is seen as the achievement of bank objectives measured against known standards, totality and cost (Sacristan-Navarro, Gomez-Ansón & Cabeza-García, 2011). Fauzi, Svensson and Rahman (2010) define bank performance as the bank's capability to achieve its goals by utilizing resources in an effective and efficient way. The performance of bank arises because of the tactics the bank employs to attain goals and objectives (Harash, et al., 2014a).

Performance deals with determining organization's policies and outcomes in monetary terms, and is being measured using objective, subjective or operational measures (Petersen and Schoeman, 2008). The goal approach measures performance using quantitative (objective) and qualitative (subjective) measures (Olaleye et al., 2020; 2019; Thrikawala, 2011). Among various measures of performance includes; business performance, operational performance, financial and non-financial performance, innovation performance, and quality performance (Olaleye et al., 2021; 2020; Aribaba, Oladimeji, Ahmodu, Yusuff and Olaleye, 2019; Mwai, Memba and Njeru, 2018; Ahmed, Francis and Zairi, 2007). Al-Hussein and Johnson (2009) explain financial performance as the degree to which financial objectives are being or have been accomplished.

Firm financial performance denotes firms' usage of assets, which serve as prime business means to generate revenues and profits (Oladele et al., 2021; Aribaba et al,

2019). Scholars posit on accounting ratios as a measure of financial performance, among which are Return on Asset (ROA) and Return on equity (ROE), being mostly used in financial performance studies as a reflection of company's facility to generate income from non- traditional services. ROA revealed profit earned per naira of assets of the organizations, reflecting the management's ability to utilize the company's or firm's financial and real investment resources to generate profits. For any corporate organization irrespective of the line of business, Return on Asset (ROA) depends on the firm's policy decisions as well as uncontrollable factors relating to the economy and government regulations.

2.2 Electronic payment in Banks

Globally, the success of electronic payment is linked to an effective global banking management system with personnel capable of designing and implementing transnational business strategies through the use of modern technology such as point of sales, automated teller machines, mobile and internet banking (Adeyeye, Fapetu & Adefolu, 2018, Otukoya, 2014).

2.2.1 Mobile Banking

Mobile banking is seen as one of technological changes in banking industry. is a term used for performing balance checks, account transactions, payments, credit applications and other banking transactions through a mobile device such as a mobile phone or Personal Digital Assistant (PDA) (Ndunga,Njati & Rukangu (2016). According to Rose (1999) mobile banking is a service provided by financial institutions in cooperation with mobile phone operators. Monyoncho (2015) noted that mobile banking allows customers with busy lifes to conveniently do their transactions via their phones at ease and anytime they choose.

2.2.2 Automated Teller Machine (ATM)

Automated Teller Machine (ATM), also known as automated banking machine (ABM) or Cash Machine. Technology like automated teller machines (ATMs) is a computerized telecommunication devices that offers clients of financial institutions access to financial transactions in a public space without the need for a cashier, human clerk or bank teller (Bochaberi & Ong'era, 2020; Abdullai & Nyaoga, 2017). Hence, ATM as a banking mechanism is widely acceptable and used. Low-income people no longer need to use scarce time and financial resources to travel to distant bank branches. Since Automated teller machines transactions cost far less

than transactions at the branch teller, banks can make a profit handling even small money transfers and payments. However, despite the adoption of automated teller machines in commercial banks, the performance of banks has been declining.

Ogbuji. (2012) revealed that the ATM is one of the prevailing surrogates of the tumbling labor-intensive transaction system realized through "paper-based payment instruments".Olumide (2014),reported that ATM Usage has enhanced customers' satisfaction and bank performance in Nigeria. Mwai, et al. (2018), revealed that ATM is statistically significant with the financial innovations adoption and financial deepening among commercial banks in Kenya. Jegede (2014), posited on positive significance in the relationship between ATM Usage and Customers' satisfaction, thereby improving financial performance of banks in Nigeria.

2.2.3 Internet Banking

Internet banking is also referred to as online banking, e-banking, or virtual banking. It is e-payment system that permits bank customers to undertake diverse financial transactions through the financial institution's website which is interactive and communication channels. That is, client executes banking transaction via electronic means. Internet banking conceptualization varies among researches moderately, because it entails electronic banking through which bank customers can request information and carry out most retail banking services via computer (Daniel, 2000). Routine transactions performed by traditional banks vua the internet includes; account transfers, balance inquiries, bill payments, and stop-payment requests, and some even offer online loan applications (Nickel, 2018; Kannabira & Narayan, 2005). Mixed reactions were made on the effects of internet banking on bank performance; Mateka, et al.(2016), revealed that internet banking has positive influence on bank financial performance, while Van, et.al., (2015) concluded on internet banking significance on bank profitability through increased service income activities.

2.2.4 Point of sales (POS)

Point of sales is one of technological changes massively used in the banking industry. POS is a retail payment device which absorbs customer's bank details whenever a bank or credit card is swiped (passed through a magnetic stripe reader). Banks refers to POS as being cost effective and more feasible when compared to retail payment offices. Revolutions on retail payment facilities greatly impacted bank performance in nations with a quite great acceptance rate of retail payment

transaction technologies (Iftekhar, Schmiedel and Song, 2009). Nguma (2013), in his study noted that connection is stronger in countries with more retailed payment transaction equipment, like POS terminals. Likewise, a higher usage of electronic retail payment instruments seems to stimulate banking business. Nofie (2011) revealed that impact of retail services on bank performance is dominated by free income. Nader (2011) analyzed the profit efficiency of the Saudi Arabia Commercial banks during the period 1998- 2007 and found that the number of point of sale terminals (POSs) did not improve profit efficiency.

Sequel to mixed reactions from previous studies on significance of digital electronic payment with means being construct like mobile banking, automated teller machine, internet banking and point of sales on financial performances of banks, the following hypotheses were posited to test and stated below;

HO_1: *Mobile banking has no significant influence on bank financial performance among quoted banks in Nigeria*

HO_2: Automated teller machine *has no significant influence on bank financial performance in Nigeria*

HO_3: *Internet banking has no significant effect on bank financial performance among quoted banks in Nigeria.*

HO_4: *Point of sales has no significant impact on bank financial performance among quoted banks in Nigeria.*

3. Methodology

This study employed ex-post facto type of research. It is a time series study covering a period of twelve years (2009-2020) on a-quarterly basis. The choice of the periods was necessitated following Central Bank of Nigeria disclosure of electronic banking data in the statistical bulletin. A total of twenty-one (21) banks in Nigeria constituted the population of the study. The population cuts across deposits money banks (DMBs) with international, national and regional authorisations in Nigeria. This study collected data through second source with historical data obtained from the financial statements and accounts of banks, as well as Central Bank of Nigeria (CBN) statistical bulletin.

For the purpose of this study, our model is specified as:

$$ROA = f\ (MB, ATM, INET, POS, BSIZE.)\ ....Equ\ 1$$

While the explicit model is given as

$ROA_{it} = \beta_0 + \beta_1 MB_t + \beta_2 ATM_t + \beta_3 INET_t + \beta_4 POS_t + + \mu ...\ldots\ldots\ldots$ Equ 2

ROA=Return on asset proxy for bank financial performance (Dependent Variable)

K_0 =Constant or intercept

β_1, to β_4 = Coefficients or parameters of the proposed estimates

t = Where "t" for time.

MB= Mobile Banking (explanatory variable)

ATM= Automated Teller Machine (explanatory variable)

INET= Internet Banking (explanatory variable)

POS= Point of sales (explanatory variable)

Apriori Expectations

The apriori expectations are as follow: $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$ and $\beta_4 > 0$.

Table 1: Operationalisation of Variables

SN	Variables	Notation and Measurement	Apriori Sign
		Dependent Variable	
1	ROA	Bank financial performance will be proxied with: ROA which is return on asset will be measured as profit before tax divided by total asset (Wachira, 2013: Matevu & Kerongo, 2015).	
		Independent Variables	
2	MB	Mobile banking is measured in this study as the total value of mobile banking transactions in a particular year respectively (CBN Statistical Bulletin, 2020).	+
3	ATM	Automated teller Machine is measured as the total value of ATM transactions in a particular year respectively (CBN Statistical Bulletin, 2020).	+
4	INET	Internet banking is measured as the total value of mobile banking transactions in a particular year respectively (CBN Statistical Bulletin, 2020).	+
5	POS	Point of sale is measured as the total value of POS transactions in a particular year respectively (CBN Statistical Bulletin, 2020).	+

Source: Researcher's Compilation (2021)

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4. Results

Table 2: The Parsimonious Result of the Error Correction Model or Short Run OLS

Variable	Coefficient	Std. Error	t- Statistics	Prob.
Constant	-0.004810	0.078815	-0.061030	0.9519
D(MB)	2.760259	0.859093	3.212994	0.0039
D(ATM)	3.006796	0.702804	4.278285	0.0002
D(INET)	0.003910	0.015239	0.256569	0.7998
D(POS)	-0.196327	0.091307	-2.150193	0.0423
ECM(-1)	-0.836597	0.168876	-4.953924	0.0001
R^2 = 0.6386 **Adjusted R^2 = 0.5286 F- Stat (Prob.) =5.8056** (0.00058) **DW** = 1.6681				

Source: Author's Computation (2021)

The error correction model (ECM) least square result reported a coefficient of determination R-squared (R^2) value of 0.6386 with return on asset (ROA) being the proxy for bank financial performance. Hence, this implies that approximately 64% of the systematic variations in the dependent variable, being bank financial performance (return on asset, ROA) was accounted for by the explanatory variables of mobile banking (MB), automated teller machine (ATM), internet banking (INET) and point of sale (POS) While about 36% were unaccounted for, hence captured by the error terms. After adjusting the degree of freedom, adjusted coefficient of determination (adjusted R-square bar (R^2) which indicates 0.5286 with ROA, showed that approximately 53% of the changes in the bank financial performance which was proxied by return on asset (ROA) were explained by the independent variables of bank technological changes (mobile banking (MB), automated teller machine (ATM), internet banking (INET) and point of sale (POS), while, 47% of the variations were unexplained, hence captured by stochastic disturbance. The F- Stat (Prob.) of 0.00058 indicates that there is a simultaneous linear relationship between the dependent variable and all the explanatory variables combined. This suggests that the joint effects of all the included variables in the model are significant in explaining bank financial performance in Nigeria. The Durbin Watson (D-W) statistic values for the equation of 1.6682 is sufficiently and approximately to be 2. Thus, there is the absence of a first order position autocorrelation in the model. The coefficient of ECM is statistically significant at 1 percent level and correctly signed. From the result, ECM coefficient indicated

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negative value of 0.8366. This suggested that about 84 percent of the disequilibrium in the model will be corrected every year. Interestingly, the overall model is highly significant and shows a high goodness of fit even at the 1 percent level.

5 Discussion and Findings

Mobile banking coefficient (β_1) is 2.7603. The coefficient of mobile banking is significantly different from zero, implying that a unit change in mobile banking would definitely increase bank performance by 2.7603 units. The t-statistic value is 3.2130 and the probability value is less than critical value of 5% significant level. The outcome of the test indicates that mobile banking is statistically significant. The inference of this test is that mobile banking is a critical factor influencing bank financial performance in Nigeria. This implied that mobile banking is a strong influencing factor of bank financial performance. The finding is consistent with extant studies. For instant, Hernando and Nieto (2007) found that mobile banking was able to invite additional customers, leading to increased financial performance via customer deposits. Lee, et al., (2007) showed that mobile banking offers prospect for banks to outspread their facilities to new customers, thereby increasing their market performance. Similarly, Harelimana (2017) revealed that mobile banking transactions volume had a positive influence on the bank financial performance.

In establishing the influence of automated teller machine (ATM) on bank financial performance in Nigeria, linear regression model analysis in Table 2 is used. The positive coefficient (β_2) value of automated teller machine of 3.0068 units, was significantly different from zero and this implied that a unit change in ATM will definitely increase bank financial performance by 3.0068 units. The t-statistic value is 4.2783 and the probability value is less than critical value of 5% significant level. The outcome of the test indicates that automated teller machine (ATM) is statistically significant. The finding conforms to apriori expectation that as more ATM are installed, the more likelihood to influence bank performance. The inference of this test is that ATM has a significant influence on financial performance of banks in Nigeria. This also indicated that ATM has positive relationship with bank financial performance in Nigeria. The result is in line with the apriori expectation. The finding is consistent with plethoras of studies such as Kabiru and Farouk (2012) who found that number of ATMs had a significant impact on financial performance of Nigerian banks as measured by return on assets (ROA). Olumide (2014) showed that ATM Usage has enhanced customers'

satisfaction and bank performance in Nigeria. Mwai, et al., (2018) revealed that ATM is statistically significant with the financial innovations adoption and financial deepening of commercial banks in Kenya, as well as the study conducted by Jegede (2014) showed significant positive relationship between ATM Usage and Customers' satisfaction and this resulted to improving financial performance of banks in Nigeria.

Table 2 depicts the result of the effect of internet banking (INET) on bank financial performance. Internet banking (INET) indicated positive coefficient (Υ_3) value of 0.00491 and this showed that internet banking in relation to bank financial performance (return on asset) equation is slightly different from zero, indicating that a unit increase in internet banking could affect bank financial performance by 0.00491. The value of internet banking (INET) of t-statistic was 0.2566 and associated probability value of 0.7998. The t-statistics probability value in the estimates is higher than the critical value at the 5 percent(5%) significant level. Thus, the results of the linear regression model analysis showed that internet banking (INET) is not statistically significant. This shows that internet banking is significantly low and that usage of internet banking is a weak factor having effect on bank financial performance. The inference therefore is that internet banking) does not significantly has effect on bank financial performance in Nigeria. The finding conforms to the study of Mateka, et.al. (2016), who revealed that internet banking has positive influence on bank financial performance.

Nexus between POS and bank financial performance depicts that, point of sale (POS) indicated negative coefficient value with bank financial performance substituted with return on asset (ROA), which implied that a unit increase in point of sale (POS) could affect bank financial performance negatively by -0.1963 units. The t-statistic was 2.1502 with probability value less than critical probability value of 5%. The result showed that point of sale is statistically significant. Following the decision rule, we therefore reject the null hypothesis which implied that point of sale (POS) has significant influence bank financial performance in Nigeria. The findings conform to a priori expectation. The inference of this test is that point of sale (POS) has significant influence on bank financial performance in Nigeria. The finding argued against Fu-Qiang and Sajid (2014) who investigated effect of POS usage on profitability of banking industry in form of ROA over the period of 2004 to 2013 quarterly in the banking sector in Pakistan and showed that increased in POS usage enhance the profitability of banking industry in form of ROA. Polatoglu and Ekin (2001) identified that users of POS users were more satisfied

with the cost saving factor of electronic banking including train reservations, energy bills, taxes and investment in stocks. However, this result conforms with Nader (2011), who argued that the number of point of sale (POSs) do not improve profit efficiency, hence it implies that more cost were associated in making or maintaining the POS and its porosity might have negate the purpose and of course having adverse effect on performance.

6. Conclusion

The thrust of this paper is on digital electronic payment and financial performance of deposit money bank in Nigeria. The role of digital payment on efficiency and cost reductions in the banking sector is paramount to a successful and profitable service delivery to customers in Nigerian banks. Digital payment like mobile banking, automated teller machine, internet banking and debit cards have influence on transfers, payments, deposits and withdrawals in financial transactions, thereby reducing instances of human error, which affect financial performance. Grounded on the findings, it was concluded that technological changes by bank affect its financial performance. However, sequel to the situation of Automated teller machines in major boulevards in towns and cities, there is need to always fund the machines to ease transactions and prevent risk of carrying cash at long distance by customers of banks. Despite prolific efforts by banks on the issuance of point of sale (POS) to registered customers to achieve cashless policy by CBN, high-security level should be activated in safeguarding customers' data. In addition, financial institutions ought to intensify on the internet banking and ensure ample internet securities are acquired to protect customers' accounts against threat of system intrusion by hackers.

7. Limitation and Future Studies

Despite myriad recommendations in this study, certain precincts exist, demanding attention towards future research. Firstly, considering limited number of banks within the nation makes this research lack representation and as a result generalization proves jeopardize. Secondly, moderating or mediating role of individual and organizational factors can be explored in future research, considering the nexus between banks' financial performances. Finally, proxy for financial performance can be delve into considering indicators such as working capital, leverage, market share, debt to-equity and market share, profitability index.

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ORGANIZATIONAL FACTORS ON ENTREPRENEURIAL DEVELOPMENT IN SELECTED MICRO-FINANCE BANKS IN OYO STATE, NIGERIA

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Abstract
The study investigates the influence of organizational factors on entrepreneurial development in selected micro-finance banks in Oyo State, Nigeria. Leadership style, job security, communication/information, and staff training were used as a dimension of organizational factors, which was used to determine the entrepreneurial development among the micro-finance bank in Oyo State. The study employed a descriptive survey research design. The target population of this study comprises all employees in the microfinance banks in Oyo State. A random sampling technique was used to select 925 for the study. The questionnaire was used as an instrument for data collection. Statistical Package for Social Sciences (SPSS) version 21 was used to analyze the data collected. Regression analyses at a 5% level of significance were used in the analyses. The study's findings show that organizational factors reveal a significant joint contribution of the independent variables (information/ communication system, leadership style, job security and staff training) to predicting entrepreneurial development.

Also, information/communication system, leadership style, job security and staff training are significant predictors of Entrepreneurial development. The findings show that information and communication system ($\beta = .626$, $t = 6.444$, $P<0.001$). Followed leadership style ($\beta = .288$, $t = 2.11$, $P<0.001$), Job security

(β = .144, t = 0.621, P<0.001). Lastly, staff training is had a significant predictor of entrepreneurial development in selected Micro-finance banks in Oyo state, Nigeria. The study concluded that organizational factors enhance the entrepreneurial development in selected Micro-finance banks in Oyo state, Nigeria. Micro-finance management should use continuous transformational leadership style practices to sustain high employee commitment and organizational effectiveness. Also, micro-finance should apply both transactional and laissez-faire leadership styles from time to time depending on the situation of things at the workplace as there is no particular leadership style that is one-size-fits-all but depends on the situation at hand.

Introduction

Entrepreneurship development involves developing context-specific entrepreneurship policy, creating the business environment comprised of institutions to support entrepreneurship in line with policy, and fostering entrepreneurship knowledge, skills, and abilities within the population. When used narrowly, entrepreneurship development refers to offering entrepreneurs the human capital through training and education needed to succeed in the business environment. Thus, in the broad sense, entrepreneurship development refers to a range of activities, including creating macro-economic policies to incentivize entrepreneurship, creating an enabling business environment by investing in institutions, and training and educating entrepreneurs (Asamani & Mensah, 2013). In the narrow sense, entrepreneurship development means deploying specific training and education to improve entrepreneurial performance. Despite this distinction, any effort to invest in entrepreneurial human capital using training and education is part of a more comprehensive NHRD policy approach to enhance the performance of entrepreneurs. As such, these interpretations of entrepreneurial development are connected (Boateng 2019).

According to Afolabi, Kareem, Okubanjo, Ogunbanjo, & Aninkan (2017). Entrepreneurial development thus involves the promulgation of entrepreneurship policy to ensure the business environment is favourable to entrepreneurs to

introduce a policy to furnish the population with entrepreneurship knowledge, skills, and abilities and to foster a positive cultural attitude towards entrepreneurship. Each component of entrepreneurship development is complex, and coordinating these components can seem daunting, influencing entrepreneurial outcomes such as entrepreneurship participation and business growth (Afolabi et al., 2017). Thus, it is essential to consider the literature exploring the different components of entrepreneurship development in Nigeria to understand better the role entrepreneurship policy, the business environment, entrepreneurship knowledge, skill and ability acquisition, and societal attitudes play in the growth of entrepreneurial businesses in Nigeria Uygur, (2009). Entrepreneurial developments are a pre-planned advancement, increase or growth in skills, and capacity which entrepreneurial ability in each set of people especially when conscious efforts are made to purposefully re-orientate the people by inculcating positive entrepreneurial attitude/spirit in the people by redirecting or changing the taught pattern of the citizens. In this study, entrepreneurial development is seen as the acquisition of skills by individuals for business formations.

Organizational factors like training opportunities, leadership style, communication system, and job security considerable interest as attempts to ensure the intensity and stability of a worker "s dedication to such an organization. Organizations state that workers are their most important asset. As a result, they constantly endeavour to create an employment brand attractive to existing workers and potential talents while competing in a war for talents (Glen, 2006). Training opportunities available in organizations are strategies usually applied by the management in the organizations to boost workers performance and lead to entrepreneurial development. When workers receive adequate training on the job, trainees are motivated to perform to a better degree. However, the training should emphasize the relevance and utility of training programmes to encourage more excellent entrepreneurial development and maximize return on investments incurred by workers in the micro-finance bank organizations. It is a way by which workers could be adequately prepared to carry out their responsibilities with expected effectiveness and efficiency, which will subsequently lead to entrepreneurial development

The leadership style adopted effect also affects the development of entrepreneurship either positively or negatively because it has been observed that one major problem plaguing the micro-finance bank in Oyo state and Nigeria at large has to do with the leadership style. The issue of leadership deficit is an essential factor in understanding Nigeria's predicament, which adversely affects

workers and the organization itself. The leader can lead well, carry along with his workers especially making workers run a teamwork style, approachable, ready to listen and learn from others (Sanya 2016). All these will make the organization efficient and effective to be high among the employees. These will also help the employees to accomplish their goals and enhance the career path of employee (Salami, 2014; Uzondu, 2012)

The communication system in the microfinance bank function through the collective action of people and workers who can take an independent action that may not be in line with laid-down policy and instructions. This, sometimes, may not be adequately reported to others who are supposed to know about such information within the system. To this end, Sanya (2016) argued that effective communications are required to achieve coordinated results in the workplace. Organizations are subject to the influence of continuous change, which affects the work being done by workers' collectivity (Azinge, 2011; Okunade, 2008). Also, the communicated information from the sender must be accepted, well understood, and free will of the receiver. The interest, awareness, and absolute recognition of benefits and responsibilities should be ensured in disseminating and utilizing the communicated information.

Job security is one's expectation about continuity in a job situation. Iakapan (2013) argued that job security refers to the employee feelings over a job loss or loss of desirable job features such as lack of promotion opportunities, current working conditions, etc. well as long-term career opportunities. Therefore, job security is an essential factor in entrepreneurial development. Philip (2015) considers the concept of job security as analogous to the terms security of tenure and employment protection. Udeobasi (2018) posits that job security is one of the creators of job satisfaction and commitment to the company, resulting in the worker investing more time and effort into their companies. Therefore, job security is one of the most significant organizational factors that express the employee's general attitude to his or her job (Bakan & buyukbese 2004). On the other hand, when job security is perceived negatively, employees cannot be expected to transfer their knowledge and experience into their work. For this reason, organizations should provide lifelong job security to their employees and adopt management policies that offer assurance to motivate them (Brisling, Kabigting, Macnab, Zukis & Worthley 2005).

A literature review discovered that employees of a micro-finance bank in Oyo State are primarily affected by the responsibilities and the organization's culture.

This study revealed that employees who do not make their job a central part of their character tend to be less focused and less productive. According to Sanya (2016), low employee morale and a lack of regular office attendance are the factors that can affect the growth of a micro-finance bank. The various trends in the micro-finance industry have a negative effect on the progress of the organization and its goals. Therefore, understanding the various organizational factors that affect the success of a micro-finance bank can help improve its operations. Previous studies have focused on only a few factors: organizational culture, organization commitment, and performance. The study views organizational factors in another dimension, such as training opportunity, leadership style, communication system, and job security. The factors that affect the establishment and operation of micro-finance banks in the Oyo state will also be studied to determine why they have failed to create jobs and boost entrepreneurship in the area. This study investigates the extent to which organizational factors influence the development of micro-finance businesses in Oyo State.

Purpose of the Study

The primary purpose of this research is to investigate the influence of organizational factors on entrepreneurial development in selected micro-finance banks in Oyo State, Nigeria. The specific objectives are to;

i. Ascertain the impact of leadership style on entrepreneurial development in selected Microfinance banks in Oyo State, Nigeria.

ii. Determine the effect of job security on entrepreneurial development in selected microfinance banks in Oyo State, Nigeria.

iii. Examine the effects of communication/information on entrepreneurial development in selected Microfinance banks in Oyo State, Nigeria.

iv. Examine the effects of staff training on entrepreneurial development in selected Microfinance banks in Oyo State, Nigeria.

Statement of Hypotheses

The study sought to test the following hypotheses

H_{01}: There is no significant relationship between leadership style and entrepreneurial development in Micro Finance Banks in Oyo State, Nigeria.

H_{02}: There is no significant relationship between job security and Entrepreneurship Development in Oyo State, Nigeria.

H_{03}: There is no significant relationship between information/communication systems and entrepreneurial development in Micro Finance Banks in Oyo State, Nigeria.

H₀₄: There is no significant relationship between staff training and entrepreneurial development in Micro Finance Banks in Oyo State, Nigeria.

Literature Review
Concept of Entrepreneurial Development

Various dimensions of entrepreneurial development have been identified (Ndechukwu, 2001; Oliver, 1998). Regarding business transformation as an entrepreneurial process, one thread relates to all of them: the ability and willingness to identify business opportunities, harness the necessary resources, and take appropriate actions. Entrepreneurship development refers to the process of enhancing entrepreneurial skills and knowledge through structured training and institution-building. To hasten the creation of new ventures, ED wants to increase the number of entrepreneurs. As a result, it accelerates the creation of jobs and economic growth. Entrepreneurship development is the process of starting or expanding a business. In addition, entrepreneurship development focuses more on growth potential and innovation.

Essentially this means the acquisition of skills that will enable an entrepreneur to function appropriately and adequately in terms of:

1. Attaining present results based on previous decisions and planning for the future based on present circumstances.

2. Maintaining and developing the organized capability which makes achievement possible, and

3. It coordinated the specialist functions that should enable a firm to perform the technical task in marketing, personnel, research and development, manufacturing, finance, and control, especially in the face of changing technology and dynamic industry trends.

Entrepreneurial development processes, procedures, and skill acquisition must be anchored in specific skills to accomplish these functions. As a result, entrepreneurs will be transformed into taskmasters, mediators, and motivators as they gain conceptual and human skills. This study examines how the organizational factors have enhanced entrepreneurial development in micro-finance banks in Nigeria. However, entrepreneurial development depends on three entrepreneurial skills, which positively affect the strategic management and development of entrepreneurial organizations in Nigeria.

Concept of Organizational Factor

Organizational factors are elements and descriptions of predictors that define an organization's character, property, function, influence and impacts on other variables about the workers, management and the entity. Examples of organizational factors include the leadership style, the structure on the ground, climatic situation, political scenario, the process and procedure and so on. (AmyTsang, 2007). Willsaggers (2009), in his submission, postulated organizational factors as strong leadership provision of adequate funding by management, assurance and availability of needed technology/personnel that allow the champion to function throughout the development processes. Sanya (2016) refers to organizational factors as workplace attributes that influenced and enhanced employee involvement at work. These factors are training opportunities, leadership style, communication system, environmental variability and gender policy. However, Olalemi (2021) supported the section of Sanya (2016); he revealed that organizational factors encompass all those elements that influenced how the organization and the employee reacted towards the actualization of the organizational goals. For this study, organizational factors considered are training opportunities, leadership style, communication system, and job security.

Dimensions of Organizational Factors
Training Opportunities

Training opportunities can be offered to employees at the same time with the overall goal of increasing products (Adeyoriju & Fajebe, 2019), and this is accomplished by improving and supporting current employee skills (training) and planning for future employee needs (development). Training and development can be provided concurrently or separately; both do not need to coincide. Both of these fundamentally ignore recognized human resource management. According to Jeni, Momotaj, and Al-amin (2021), a company strives to assist their employees' skills to hit the target, while developing the staff is intended to gain additional responsibilities and plans that they were hired to take part in the organization based on their efficiency.

According to Rukumba, Iravo, & Kagiri (2019), trained employees are best prepared for the coming years to construct a bright future while working hard for it now. They will be the primary energy source for their organization, and nothing can stop what they have planned (Abdulla et al., 2017). Both are parts of human resource management that strive to improve an organization's ability to achieve a

positive outcome. Employee development, human resource development, and learning are numerous names (Anwar & Balcioglu, 2016). Training is stated to provide ongoing improvement in human abilities and skills, improving their way of thinking and interacting with consumers Anwar and Climis, (2017). Thus, training entails planning to prepare various learning strategies for employees to boost their ability to achieve the desired goal. While development is concerned with knowing the workings of things and future challenges, it considers not only existing processes in general but also future expectations, and it takes place over a longer length of time than current training and deals with every single staff responsibility (Nechirwan, Bayad, Anwar, and Pshdar, 2021).

Leadership style

Leaders and leadership practice have been in existence since the onset of humanity. Man is a complex social being that can be simplistically categorized into two groups, namely leaders and followers. The successes recorded by most human endeavours can be attributed to leadership quality (Matira & Awolusi, 2020). Over the years, various scholars have studied the concept of leadership with the aim of understanding and improving the inherent benefits of effective leadership; these studies have given rise to several definitions of leadership (Blazi & Awolusi, 2020; Matira & Awolusi, 2020; Mukonga & Awolusi, 2019; Olatunji & Awolusi, 2019). One of the most popular definitions of leadership states that "leadership is the art of getting things done through people". While there are several and sometimes conflicting theories on leadership, what is immutable is that leaders inspire their followers and direct their actions towards the attainment of a set goal (Olonade, Omotoye & Ouwoye, 2021). The practise of leadership has evolved considerably over time, and the need for leaders and leadership has witnessed a significant upswing over the years. Historically, leaders were simplistically selected based on lineage, wealth or by exhibiting distinguishing acts of velour. It was believed that such individuals possessed innate talents and attributes that set them apart and conferred upon them the right to be leaders. This natural leadership selection process was the premise of the Great man theory (Matira & Awolusi, 2020).

Possible leadership styles and leadership outcomes have been an area of great interest in leadership literature, particularly since the advent of the Multifactor Leadership Questionnaire (MLQ-5X) over 25 years ago. During this period, response to the interest has seen research outputs on the effects of leadership styles on leadership outcomes that include leadership effectiveness and organizational

performance. Amirul and Daud (2012), for example, examined the relationship between leadership styles and leadership effectiveness among Malaysian government-linked companies and found that leaders at all organizational levels demonstrate the full range of leadership styles, with transactional leadership being demonstrated the most in Malaysian government-linked companies, followed by transformational leadership, and finally the passive or avoidant leadership. The laissez-faire leadership style, however, negatively correlated with leadership effectiveness

Job security

Job security is personnel's belief about permanence in their employment. It has to do with employee belief over a job loss or loss of attractive job benefits such as job advancement and promotion opportunities, good work circumstances, career training and development opportunities, and attractive remuneration. Job security is crucial to the commitment of personnel to an organization and otherwise, and it has a consequence on personnel's commitment to the organization. Personnel will be more steadfast to their job and the organization if they feel secure. Job security can be referred to as attachments to the jobs by employees. It makes employees loyal and committed to their organizations because employees with a high sense of security in organizations have a high sense of regard for the organizations, consider them as theirs, and have a passionate feeling for them. In addition security of jobs creates a pleasant rapport between the workforce and organizations. Organizations, where the personnel enjoy job security may enjoy stability, progress, and longevity (Robins and Timoty, 2010). Artz and Kaya (2014) posited that job security, habitually calculated using the supposed possibility of future loss of jobs, is a factor that can influence job satisfaction among personnel in an organization. They posited that job security's sway on job satisfaction is not only a function of losing a job and securing another by personnel. The consequence of this on personnel job satisfaction differs based on the apparent job loss and availability of vacancies in other organizations. Greenhalgh & Rosenblatt (1984) identified threat to total job and threat to job features as significant job manifestations of insecurity.

Threats to a complete loss of jobs manifest in one or all the following demotion within the organization, redeployment at the same or lower level, redundancy and momentary lay off. In addition, there may be downsizing or rightsizing of personnel in severe cases, outright dismissal, and compulsory retirement. The changes within the organization occasioned by downsizing or rightsizing of

personnel can negatively affect functional areas within an organization and may result in job loss. Job insecurity also manifests when some job features are encroached or endangered. This manifests when organizational structural changes affect remuneration, career advancement, pay stagnation, position in the organization, professional competencies, and other encumbrances. Kwabiah, Hodibert, & Amankwa (2016) identified another manifestation of job insecurity as a feeling of lousy deletion of power or lack of power and exclusion from the management of organizations. When personnel experience any of the above, job insecurity sets in and productivity and commitment are affected.

Communication systems

Communication is a coordinated activity aimed at constituting a framework to convey salient information as one of the fundamental pillars of social life and organizational structure and building lasting relationships between organizations and customers. In this case, effective communication enhances customer retention in the tourism sector vis-à-vis the hotel industry. Healthy communication is needed to know and understand each other better, create an enabling environment for proper functioning in hotel hubs, and market their products and services to existing and potential customers more accessible (Ruck & Welch, 2012). Effective communication is indeed good communication is the general term that sums up the sending and receiving of messages. Communication efficiency is very widespread, as most organizations develop human resources to facilitate effective customer communication. Without having a strategy that effectively reaches the predetermined target audiences, there is absolutely no way that the hotel industry can attract patronage, which would lead to an increase in turnover. If an organization is going to spend time to figure out its key messages, it will be best to develop a strong communication strategy to market its products and services using modern communication models.

Conceptual Framework

The conceptual framework was developed to provide clear links between the independent and dependent variables as they relate to each other in this research. It explains why research is conducted in a certain way, pictorially. The conceptual framework indicates how long it will take to get to point B from point A (Mugenda & Mugenda, 2012). As earlier said, this research aims to ascertain the influence of industrial health and safety on employees' attitudes. Organizational factors were the

independent variables. The independent variable was organizational factors which as staff training, effective communication, job security and leadership styles and indicators.
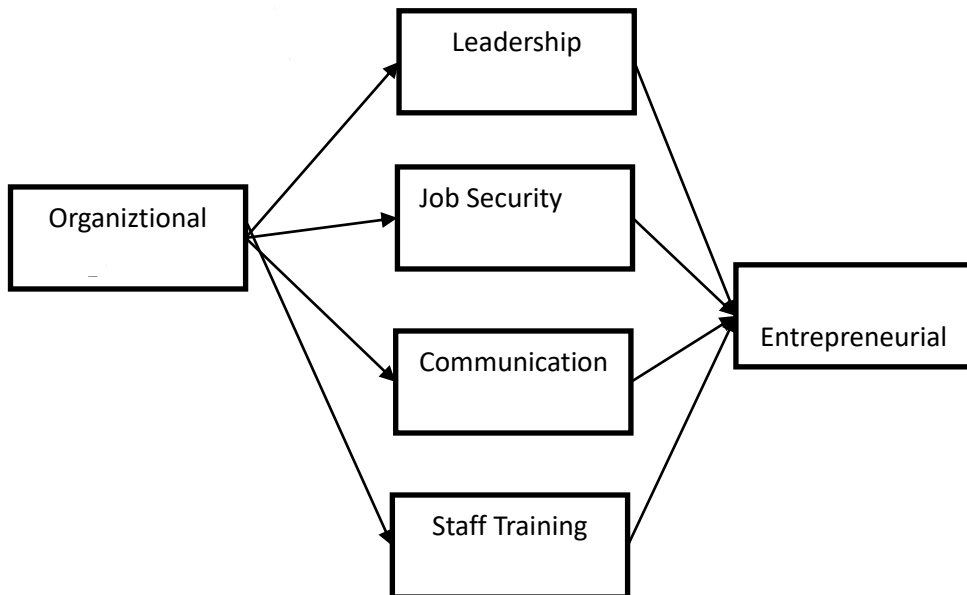
Fig. 1. Model showing the relationship between organizational factors and entrepreneurial development.
Source: Sanya and Olalami (2021).

Methodology

The study employed a descriptive survey research design. The target population of this study comprises all employees in the microfinance banks in Oyo State. The total population of this study is estimated to be around 2500 microfinance bank employees in Oyo state; a simple random sampling technique was used to select 925 for the study. In addition, a simple random method was used to ensure randomness among the selected samples. The instrument used to obtain data is an

adapted and structured questionnaire. Out of 925 questionnaires that were distributed, 615 was returned entirely and used for the study. The Cronbach's alpha coefficient in parentheses indicates the scale's internal consistency reliability to be α= 0.996. Statistical Package for Social Sciences (SPSS) version 21 was used to analyze the data collected. Regression analyses at a 5% level of significance were used in the analyses.

Results and Discussions
Regression Analysis

Table 1. Summary regression showing the joint contributions of independent variables to the prediction of entrepreneurial development.

R= .625					
R square = .412					
Adjusted R square = .307					
Model	Sum of square	Df	Mean square	F	Sig
Regression	19484.77	3	6223.705	49.482	.000
Residual	40127.288	912	152.332		
Total	59612.05	915			

Source: Researcher, 2021.

Table 1: Above reveals a significant joint contribution of the independent variables (information/communication system, leadership style, job security and staff training) to the prediction of Entrepreneurial development. The result yielded a coefficient of multiple regression R= 0.625, multiple R^2 = 0.412 and Adjusted R^2 = 0.307. This suggests that the five independent variables combined accounted for 30.7% (Adjusted R^2 = .307) variation in the prediction of entrepreneurial development in selected Micro-finance banks in Oyo State, Nigeria. The other variables accounting for the remaining 69.3% are beyond the scope of this study. The regression analysis's ANOVA result shows a significant joint effect of the independent variables on entrepreneurial development, F (49.482) = P <0.001.

Table 2: Summary of Regression for the relative contribution of the independent variables to the prediction of Entrepreneurial Development in selected Micro-finance banks in Oyo state, Nigeria.

	β	Std. Error	Beta	t	Sig
(Constant)	19.248	5.222		7.549	.000
Information/Comm.	721	0.99	.626	6.444	.000
Leadership style	.114	.054	.288	2.111	.000
Job security	.029	0.21	.144	0.621	.000
Staff training	0.111	0.20	.121	0.411	.000

Source: Researcher, 2021.

The table above shows that all four predictor variables, information/communication system, leadership style, Job security and staff training, are significant predictors of Entrepreneurial development. The most potent factor was information and communication system (β = .626, t = 6.444, P<0.001). Followed leadership style (β = .288, t = 2.11, P<0.001), Job security (β = .144, t = 0.621, P<0.001). Lastly, staff training is had a significant predictor of entrepreneurial development in selected Micro finance banks in Oyo state, Nigeria.

Discussion of Findings

This study depicts a significant joint effect of information/communication systems, job security, staff training, and leadership style on entrepreneurial development in micro finance banks in Oyo State. Also, the study revealed that out of the four predictor variables such as information and communication system, leadership style, job security and staff training, that communication/ information system was the most potent factor which curbs fraudulent practices among employees of micro finance banks in Oyo State, that the said communication/information system remains the best solution to entrepreneurial development. In addition to the above findings, this study also deduced a strong link between fraudulent employee practices and the internal control system put in place by the management of each micro-finance bank in its operations.

Conclusions and Recommendations

Based on the study's findings, it was concluded that leadership type in an organization (micro finance banks) would determine to a greater extent the position of entrepreneurial development and checkmate fraudulent practices among the employees of micro-finance banks in Oyo State. Furthermore, it was revealed from this study that job security of employees in micro-finance banks would determine the performances of employees positively, thus reflect on both the rate of fraudulent practices in an organization (micro finance banks) and entrepreneurial development in micro finance banks in Oyo state. Also, information/ communication which links employees together for several purposes in an organization would also go a long way to fish out all forms of fraudulent practices through making use of devices needed to do so; effective communication would also promote organizational productivity, which leads to good customers' satisfaction and development of such organization and entrepreneur.

The following recommendations were formulated;

• It was recommended that the impact of training should be reviewed on a basis, i.e. periodically at every quarter. Furthermore, several training programmes should be evaluated, and selection for training should be based on all criteria for selection, most especially on the qualification and challenges faced on the job.

• Motivation is crucial to ensuring personnel commitment. Highly motivated personnel exude happiness and passion for their organizations. As such, motivational incentives available in the university libraries should be sustained and improved upon. Specifically, the condition of work of the personnel should be reviewed and improved upon, provision of pleasant internal and external environments, prompt payment of remuneration acknowledgement of worthwhile contributions and, promotions.

• Micro-finance management should use continuous transformational leadership style practices to sustain high employee commitment and organizational effectiveness. Also, micro-finance should apply both transactional and laissez-faire leadership styles from time to time depending on the situation of things at the workplace as there is no particular leadership style that is one-size-fits-all but depends on the situation at hand.

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CORPORATE IDENTITY AND CORPORATE WEBSITE: QUANTITATIVE EVIDENCE FROM SELECTED BANKS IN NIGERIA

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Abstract

Research establishing the mediation of corporate identity and corporate website is still at its infancy. Researchers have established the necessity to have stakeholders' confidence through the creation and maintenance of functional website, while others concluded that it is an organisational strategy for success in the market place. The failure of Nigerian banks to have a univocal corporate identity definition and understanding of how to construct a corporate website that can communicate desired corporate identity for stakeholders confidence hold sway. This study examined how banks in Nigeria developed their corporate identity through their corporate website. The theory of social construction was used to discuss the relationship among corporate identity and corporate website. A quantitative approach was adopted using questionnaires to customers of three selected banks based on their international status. 520 copies of the questionnaire were distributed to selected customers of the three banks who use electronic banking applications via the corporate website. 473 copies of the questionnaire were returned and found useful for the study giving a 79% response rate. Data were analysed using correlation analysis. Findings revealed that the banks use their website to disseminate generic, distinctive, transformative and innovative corporate personalities. Also, there is a significant relationship between corporate identity and corporate website (r=0.616; P=0.000). Based on these findings, Management of firms should strive for higher commitment and guarantee from

the stakeholders through a continuous communication and feedback using the websites that offer quality and timely information that maximize their welfare and wealth. There is a need for firms' management to pay adequate attention to the nature of corporate identity that will be reflected by their websites in terms of culture, ethos and philosophy guiding their operations and expectations. Further studies can consider other aspects of corporate websites that can influence corporate identity and image in Nigeria while the use of websites in promoting corporate identity and image should be encouraged as a means of creating deeper deliberations on how several measures of corporate websites can influence the development of corporate identity and image.

1.0 Introduction

Over the past decades, the decision to use Information and Communication Technology (ICT) by organisations has long been of interest due to its increasingly important roles in the existence of individuals and firms (AbuGhazaleh, Qasim & Hadad, 2012). The World Wide Web (WWW) evolved from the internet to become a useful tool of wireless technology for multiple exchanges, customization and adaptation within a secure and interactive environment (*Chu, Leung, Hui & Cheung, 2007*). Also, patterns and expectations of web users, businesses and the role they play in attracting and retaining customers has changed due to the adoption of corporate websites such that good service offerings is inadequate to differentiate competitors (Ageeva, Melewar, Foroudi, Dennis & Jin, 2018).

Whilst offerings by Gordon Lippincott led him to develop the corporate identity concept so as to differentiate his corporate products (Meech, 2006; Otubanjo & Melewar, 2007); till date, constructing corporate identity's meaning has been problematic for both academics and practitioners despite increased development in corporate identity literature (Otubanjo & Melewar, 2007; Mohammed, Guilet, Schuckert, & Law, 2016). After the initial definition of corporate identity as visual design elements by Selame and Selame (1975), a series of corporate identity models have evolved to express the conceptual thinking of academics and practitioners illustrating the significance of corporate identity (Stuart, 1999).

Nevertheless, the rising importance of corporate identity communication among businesses, continued to develop reliance on corporate websites for information searches and communication to sprout research interest in corporate identity communication on corporate websites (Mohammed, et al., 2016).

Bartholmé and Melewar (2011) distinguished between organisation's identity and CI as he explained that the focus of organisational theorists is on the relationship between organisational member (employees) and their feelings and beliefs about the organisation; while marketing theorists see corporate identity as a management driven perspective of conveying key idea of organisation to external audiences. But reaching a consensus of opinion with regards to what corporate identity is has proved challenging due to the multidisciplinary nature of the literature (Balmer, 2018; Coleman, 2011) since the construct has different meanings to different stakeholders (Melewar, Karaosmanoglu, & Patterson, 2005; Coleman, 2011). For instance, earlier scholars defined CI based on the visual aspects observed such as logo or other visual manifestations that can be used to identify an organisation (Carter, 1982) but Dowling (1994), argued from the position that CI is a representation of symbols which organisations use to identify self to stakeholders.

Inference from Otubanjo (2008), suggests that the Nigerian banking industry was not initially concerned about creating an identity or image that can compete with other financial institutions outside the boundary of Nigeria because the usage of traditional marketing techniques were conscious of the natural national boundaries. Hence, competition was within while their level of development and adoption of technology was still very low. Nigerian banks had been slower than some other international banks in joining the use of the internet in e-commerce activities until the early 1990s when organisations began to adopt the use of the new internet technology for real time online banking communication and conscious corporate image management (Fashola, 2014).

1.2 Statement of the Problem

Literatures (such as AbuGhazaleh, et al., 2012; Lien, Wen, Huang and Wu, 2015; Hetze and Winistorfer, 2016; Maahlo, Ratsoana and Mearns, 2014; Cyr, 2013; Cyr and Head, 2013; Diaz and Koutra, 2013; Wagner, Hassanein and Head, 2014) have examined how corporate websites enhances purchase intentions, usability, investor relations, persuasiveness, role of gender, trust and culture, strategic alignment and Corporate Social Responsibility (CSR) amongst others.

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But, not many empirical researches have been conducted to capture how corporate websites mediate the relationship between corporate identity and corporate image. More importantly, there is a gap in literature regarding how meaning of corporate identity and corporate image cues are communicated effectively and efficiently via a mediating corporate website.

Unfortunately, organisations have many design concerns (Lee, & Kozar, 2012) that do not effectively project and manage intended meanings of corporate identity as perceived by organisations. The lack of effectiveness and quality of the corporate website to interface between organisations and stakeholder so as to gain competitive advantage, improve customer relationships and enable innovation will not project corporate identity and manage corporate image (Bravo, Matute & Pina, 2012; Casalo, Flavian & Guinaliu, 2008; Foroudi, Dinnie, Kitchen, Melewar & Foroudi, 2017). However, in-spite the inadequate utilisation of corporate websites for effective communication of desired messages, interest in its use has increased considerably (Cyr & Head, 2013; Ageeva, Melewar, Foroudi, Dennis, & Jin, 2018). This therefore necessitates the requirement to examine the relationship that exists between corporate identity and corporate websites in Nigeria.

1.3 Objective of the Study

The main objective of this study is to investigate how banks in Nigeria develop their corporate identity through their corporate websites so as to influence a corporate image. The specific objective of the study is to examine the relationship between corporate identity and corporate website of selected banks in Nigeria.

1.4 Research Question

In carrying out this research, the major research question on how does corporate identity relate with the use of corporate website of selected banks in Nigeria?

1.5 Research Hypothesis

H_{o1}: There is no significant relationship between corporate identity and the use of corporate website of selected banks in Nigeria

2.0 Literature Review
2.1 Conceptual review

Holland (2012) observed that several scholars have, over the years, given different definitions to the corporate identity (CI) as a concept in order to show its

importance to organisations. Although Gordon Lippincott developed the corporate identity concept so as to differentiate his corporate products (Craciun, 2019; Otubanjo & Melewar, 2007). It is believed to encompass the way organisations communicate and its behaviour (Almeida & Coelho, 2019). Corporate Identity was first considered to consist of logos, house styles, visual symbols and visual expressions of the entire organisation (Holland, 2012).

This justifies why Abratt (1989) personified CI in his seminal study by arguing that brand personality is an antecedent of CI, and that CI is an assemblage of physical and behavioural cues by which an audience could recognise the organisation and distinguish it from others. This definition conceivably boosts the recognition of corporate identity beyond visual clues to include behavioural representations. Therefore, the definition of van Rekom (1997) is centred on the ability of an organisation to continuously, distinctively and centrally express sameness over time. These expressions can also be constant behavioural expression of employees. This position of van Rekom (1997), about CI further extends a similar work by Dowling (1986), and Abratt (1989), as it considers visual and behavioural elements respectively (Coleman, 2011).

While the scholars perceived CI from visual behavioural and perspectives, Olins (1991) focused on how organisations communicate, by defining CI as everything that the organisation does, in every way it communicates. This definition led to the emergence of the corporate identity mix (van Riel & Balmer, 1997). These complexities surrounding the definition of CI, perhaps, made scholars to come up with simple expressive statements like - what the organisation really is (Thomas & Kleyn, 1989), what an organisation is (Baker & Balmer, 1997); or the use of baseline questions (Coleman 2011), which tends to ask what the organisation is?, what it stands for?, what it does? How it does it, where it is going, how the firm is different, or how the firm carries out its business (Bernstein, 1984; Coleman, 2011; Melewar & Jenkins, 2002; *Melewar, et al. 2005*; Otubanjo & Melewar, 2007). But do all these questions appear to answer what corporate identity really is?

Gray and Balmer (1998), expressed that CI is reality and uniqueness of the organisation, while Hatch and Schultz (2000) posit that the concept should be viewed as the central or distinctive ideas of the organisation and how this idea is represented and communicated to a variety of audiences. This definition, according to Coleman (2011), is similar to Marwick and Fill (1997), that it is organisation's presentation of itself to its various stakeholders and the means by which it distinguishes itself from all other organisations. Hence, the understanding of the

central or distinctive attributes of the organisation which are to be communicated to a broad range of stakeholders (Coleman, 2011). Melewar and Karaosmanoglu (2006) offered their definition based on result gathered from in-depth interviews which gave the benefit of being empirically informed to operationalise the constructs used in defining CI as the presentation of organisation's unique features to every stakeholder through behaviour, design, structure, culture, industry identity and strategy via organisation's communication.

For example, Marsden (2019) expressed understanding of corporate identity via the framework of brand expression by positing that there exist very little conceptual apparatus for understanding the type of expressions that feature in a corporate logo. Based on the position of Olins (2008) that corporate identity expresses who we are, what we do, how we do it and where we are heading; Marsden (2019) explained that researches within visual identity majorly offers incomplete understanding of brand mark expression. This result suggests therefore, that management is expected to play a key role in the development and maintenance of corporate identity (Simoes, Dibb & Fisk, 2005). This is because corporate identity deals with the impressions, personality and image that an organisation presents to stakeholders. Conversely, corporate image is a concept set in the subjectivity of the public, based on the public's accumulated experiences (Nguyen & Le Blanc, 1998). It is a multidimensional construct that can be seen as either organization brands promise or associations that the audience has towards the organizations (Tran, Nguyen, Melewar, & Bodoh, 2015). Unfortunately cooperate image and be portrayed differently from what an organization is trying to portray due to its Nature as a subjective evaluative construct held in the minds of individuals but not part of an organizations possessions (Tran, et al 2015).

2.1 Indicators of Corporate Identity

Corporate identity comprises the following perspectives: behavioural and visual perspectives, corporate symbolism, corporate culture and structure, and communication.

2.1.1 Behavioural and visual perspectives: Bartholme and Melewar (2011), and Jabbar (2014) recognised corporate visual identity to be an integral to corporate identity mix which serves a crucial aspect when conveying the identity of an organisation. It is important because characteristics that are enduring, distinctive and central to the organisation such as corporate logos, corporate slogans, corporate

names and colours typography (Simoes & Sebastiani, 2017) and very often additional graphical elements (Jabbar, 2014) are transmitted to external and internal stakeholders.   For example, corporate symbol or corporate logo expresses organisational characteristics (Jabbar, 2014) with other corporate visual elements on a variety of platforms / applications such as buildings, vehicles and corporate clothing. Balmer and Gray (2000), sees corporate visual identity as providing recognisability as an important component in the structure of corporate identity because it communicates and develops symbolic associations with stakeholders which are important components in the building of branding strategy (Jabbar, 2014). Furthermore, Machado, Torres, Vacas-de-Carvalho and Costa (2018) expressed that visual expression forms an integral component in the branding strategy because of its ability to communicate and develop symbolic association with stakeholder. This interaction of the brand influences many stakeholders because it is the most frequently discussed aspect of the corporate identity. This posits why Melewar and Karaosmanoglu, (2006) suggests that when alterations in corporate image is in line with corporate identity projections, there is transition in identity as desired by the organisation.

2.1.2 Corporate symbolism: Anisimova (2016), observed that symbolic meanings are associated to brands which can help consumers to achieve their fundamental identity goals and projects. This is so because consumers often choose their brands as symbol of their social interactions with others. Possibly, Cornelissen and Harris (2001), posit corporate identity to be a tangible symbol of corporate personality which is manifest in the behaviour and communication of organisations. The symbols are considered as interface (*Melewar, et al, 2017)* between corporate identity and corporate image. For example, Faroudi and Montes (2017) stated that a logo is a sign of symbolic nature, with its own autonomy to develop recognition and empathy from stakeholders towards an organisation. Therefore, symbols are seen to be more harmonious with our goals, feelings and self-definitions; because it eases the making of choice (Anisimova, 2016).

2.1.3 Corporate culture and structure: Over the years, corporate communication has very often been seen as an expression of corporate personality that forms the corporate philosophy embodying the core value of a company (Abratt, 1989). These core values according to Abdullahi, Nordin, and AbdulAziz (2013*)*, are the philosophies and organisational values that are the cultural

influencers embedded in the vision and mission statements of organisations. These two statements are strategic focus of corporate information as they articulate culture, communication, fashionability of visual elements and the control of information communicated with internal and external stakeholders (Balmer, 1995), in order to have a unique and coherent meaning.

2.1.4 Communication: Communication can therefore be seen as a medium of relating persuasive information to enhance participatory decision making. It can also be seen as a strategy used by organisations to coordinate its activities so as to gain loyalty and commitment of stakeholders (Faroudi & Montes, 2017). Melewar, et al (2017) further posit that corporate identity and corporate image are connected via communicating corporate strategy. It also provides a corporate communication system to stakeholders. Therefore, central form of communication between corporate identity and corporate image is hinged on organisational and marketing communications are because it affords organisation the capacity to integrate information between external and internal stakeholders (Simon, & Peppas, 2005).

Therefore, firms must deliberately choose how to shape the perceptions of the public by having defined standard of consistency to position itself through its corporate communication and create desired impressions with stakeholders over time (Faroudi & Montes, 2017). This will enhance a viable reputation and high degree of credibility and trust of stakeholders (Belasen & Belasen, 2018).

2.2. Corporate Identity Models and Corporate Website Theories: a Critique

A critical look at the corporate identity models and corporate website theories above suggests that they belong to Compte's metaphysical realm of positivism due to the assertive and non critical nature of the authors. Their discussion assumes that physical and social world exist independently of humans based on hypothetic – deductive logic and analysis (Dube & Pare, 2003). They posit that a priori fixed relationship can be tested within given phenomena (corporate identity or corporate websites). Furthermore, these developed models and theories define the nature of corporate identity and corporate websites over the years. But unfortunately, their trials to advance existing knowledge and give further information about the development of a corporate website are limited to positivistic thinking. This implies that the nature of these studies did not put into consideration issues that are of critical concern or central to the social constructionist or interpretive orientation

(Gioia, 1998). Likewise, they fail to recognise the notion of continuous change which is responsible for making a never-ending set of interaction between firms and their corporate websites. The notion of continuous change is a basic requirement for the development and maintenance of corporate communication tools that led to the development of the corporate website to communicate desired corporate information effectively.

It is also observed that the reviewed Literature on corporate websites and corporate identity disregard the importance of social order, direction and stability that form the basis of social construction which provides a platform of social interaction between the firm and stakeholders with the aid of the corporate websites. While these positivist positions about the two concepts under studied arrogate the conceptualisations of meanings and roles to stakeholders' realm of interpretations alone, they also lack the understanding of Habitualisation which is the notion that the frequency or continuous use of corporate websites will lead to the development of better features. Furthermore, the above view-points remotely promote the development of a desired corporate image by the nurturing of relationships between firms and their various stakeholders. Unfortunately, there is not notice to show from these view-points about firms that use these corporate websites share a habitual and continuous or ongoing interaction (institutionalisation). This is fundamental to the development of strong knowledge about how to use the corporate websites to communicate effective corporate identity.

2.3 Theoretical review
2.3.1 Theory of Social Construction

Berger and Luckmann (1966) observed that epistemological position of social construction is to investigate how reality is observed. Hackley (2001) buttresses the argument of Berger and Luckmann 1966) that social construction is beliefs that are deeply-rooted in the hearts of people within societies. This suggests that perception of reality by individuals, groups or organisations is based on their mindset. Therefore, the changing or continuous creation of social phenomena that are made into custom by groups of people is based on their understanding, knowledge and interpretations of such changing processes (Berger & Luckmann, 1966; Otubanjo, 2008). Thus, social construction is the belief that is maintained by individuals or organisations about how they see reality within their environment. The reality is constantly reinforced (Searle, 1995) by social interactions (Gergen, 1994). In the

following section, we look at social construction from two epistemological assumptions which are that people try to understand their environment or society which they exist as an external, objective reality or approaching and experiencing their environment as an internal, subjective reality.

Society as an external and objective reality

Societies have strict rules of governance which have been preserved and passed through generations. As these rules, norms, practices, values and customs are practiced as way of life, alteration or non compliance are grievously frowned at through invocation of sanctions for strict compliance. Consequently, these norms become customary and institutionalised as objective reality by individuals, groups or firms within such environment that conform to the dictated norm over time.

Society as an internal and subjective reality

This situation occurs when there is conflict with the line of thinking of the community by the individual, group or organisation. This is because every individual, group or organisation has the right to make sense of their own world. In this situation, they are not influenced by the external objective reality they exist, but coexist with selected people, groups or organisations within their environment that identify with their own line of thought. By the nature of the individual, group or firms ability to constantly pan the objective reality to make other importance in which they can act upon; it makes the individual, group or organisation to create a subjective consistent identity that will eventually sway the society on the long run. This becomes an objective reality when the society accepts, engages and enforces a continuous practice. The assumptions indicate that there will be a continuous interaction between external, objective reality and internal subjective reality due to continuous generation of new idea or practice. This never ending cycle of change (Berger & Luckmann, 1966) is based on the growth of a personal version of reality that is offered, established, habitualised and institutionalised as objective reality by the society. However, a later critic may challenge or query the existing external objective reality which may inform the creation of a new internal subjective reality. This continuous change is shaped by the following ontological assumptions.

3.0 Research Methods

This study adopted a descriptive design with a quantitative research method (Creswell & Creswell, 2018). The population of this study is grouped into two. The

first set are the customers of the banks that interact with the corporate websites and other corporate communication channels available for e-banking and other banking transactions. This group's population is infinite in nature (Gray, 2017). The sampling technique employed was multiphase in nature. This sampling method comprises convenience sampling for selection of banks and snowball sampling for selection of banks customers via their customer service. For data collection purpose, the questionnaire was employed. Therefore, 400 questionnaires plus 120 questionnaires (30% of 400) equals 520 questionnaires. However, since the number of banks used as sample for this study is 3 commercial banks, 520 units of questionnaires is not totally divisible by three. The researcher deconstructs the home pages of the three commercial bank's corporate website namely UBA Plc, First Bank, Plc and Union Bank Plc with the aid of critical hermeneutics analytical process. The critical hermeneutic phase consists of three major phases namely social historical moment, formal moment and moment if interpretation and re-interpretation. The statistical technique for data analysis was Pearson correlation technique.

4.0 Results, Analysis, and Discussion of Findings

Hypothesis One: There is no significant relationship between Corporate Identity and Corporate Website.

In order to test the hypothesis, Pearson product moment correlation coefficient technique was used to establish the relationships between the study variables. The correlation results are summarized on Table 4.12

Table 4.12: Bi-variate Correlations of Corporate Identity and Corporate Website

		CORPORATE IDENTITY	CORPORATE WEBSITE
CORPORATE IDENTITY	Pearson Correlation	1	0.616^{**}
	Sig. (2-tailed)		0.000
	N	473	473
CORPORATE WEBSITE	Pearson Correlation	0.616^{**}	1
	Sig. (2-tailed)	0.000	
	N	473	473

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

The Bi-variate correlation table above shows the relationship between corporate identity and corporate website. The results in Table 4.12 shows that the relationship

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between corporate identity and corporate website was positive and statistically significant (r=0.616, p-value=.000). This result is supported by Saunders, Lewis and Thornhill (2009), that any result above 0.60 on the scale of correlation is strong. This implies that corporate website and corporate identity move in the same direction towards enhancing the corporate image of Nigerian Banks. Therefore, the null hypothesis which states that there is no significant relationship between Corporate Identity and Corporate Website was rejected.

The relationship between corporate identity and corporate website is observed to be symbiotic in nature. This suggests why the result of this study rejects the hypothesis which states that there is no significant relationship between corporate identity and corporate website. The significant relationship identified to exist between corporate identity and corporate website further supports the work Hetze and Winistorfer (2016) who affirmed the synergy between organisation and its use of corporate website. Likewise, this result of this hypothesis further confirms the position of Simoes and Sebastini (2017), that both strategic and instrumental relationship exist between the two variables because the corporate website enhances coherent expression of organisation's messages in the form of visual identity systems, behaviour and other forms of communication. Furthermore, corporate websites is believed to be the most important vehicle for the expression of Corporate Social Responsibility (CSR) (Hetze and Winistorfer, 2016). The characteristic features expected of a corporate website (Siano, et al, 2016; Ageeva et al, 2017; Simoes et al, 2015) also satisfies the need for an ongoing management of corporate identity traits. Therefore, he argued that in the need to continuously meet stakeholders' identifications and resultant behaviours, organisations adopt the use of corporate website due to its characteristic features that allow continuous re-modifications for corporate identity sustainability and management.

5.0 Conclusion and Recommendations

Arising from the major findings emphasized above, the study concludes that there is a functional relationship between corporate identity and corporate website. This is because corporate websites are maintained by organisations in order to present the firm to various external stakeholders such as customers, investors etc. The information circulated on these platforms by the organisations provides the best means of communicating vital information to their stakeholders. Because organisations have direct control over the corporate websites, the information transmitted through this channel cannot be filtered by business angels.

On recommendations, the followings were suggested

1. There is a need for firm managers to realise and appreciate the relevance of corporate website and its influence on corporate identity and image. It is imperative for managers to design plan of actions that will present the firm in the right logic to all stakeholders that elicit appropriate responses using that most ideal website designs.

2. Management of firms should strive for higher commitment and guarantee from the stakeholders through a continuous communication and feedback using the websites that offer quality and timely information that maximize their welfare and wealth. This is essential in order to have an up-to-date response from their interactions and expectations from the firm.

3. There is a need for firms' management to pay adequate attention to the nature of corporate identity that will be reflected by their websites in terms of culture, ethos and philosophy guiding their operations and expectations. This is important to preserve the personal preference and belief of stakeholders from different background and settings.

Contribution to knowledge

1. The development of a conceptual framework that shows the linkages and relationship between corporate identity, corporate website and corporate image.

2. The review of extant literature was able to establish that most definitions of corporate website were positivist in nature and that the lack of a social constructionist based definition cannot explicitly describe what a corporate website is. Hence, this study came up with a social constructionist based definition.

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A SYSTEMATIC VIEW REGARDING BUSINESS RETHINKING IN THE CONTEXT OF SUPPLY CHAINS SUSTAINABILITY

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Abstract

The crisis generated by the pandemic has challenged the hospitality industry on multiple layers. We are not talking only about the reduced number of customers and instability of the tourists flows, apart of the total lockdown from the beginning of the pandemic, but, we are referring to the managerial and marketing capabilities of hospitality companies to deal with profound changes along their supply chains. The present paper proposes a systematic review aimed to highlight the main directions in which the scientific literature from the field is analyzing the complex issue of hospitality supply chain sustainability implementation. Authors have been selected only articles from journals, conferences or books indexed in the last five years within Web of Science databases. The results of the analysis are showing that implementation

of sustainability related principles along the supply chains, combined with a proper sustainable human resources management and a special view upon the customer relationship management offers to the hospitality field companies a certain sum of strategic instruments in order to cope with the huge challenge imposed by the pandemic. The future business models adapted entirely to a post-pandemic economy should emphasize a sustainable type of consumer behavior and a supply-delivery chain based on intelligent" out of the box" collaboration between organizations along the chain.

Introduction

The aim of this systematic review is to examine the recent literature on sustainable supply chain management and synthesize it by analyzing the most recent (2017–2021) and important (Web of Science) sources. We have attempted to prove that sustainability standards and metrics are valuable analytical tools. The actuality and novelty of our systematic review are configured by focusing on a hot emerging topic - the sustainable supply chain management within hospitality industry. The research problem presented within the article is the degree in which different organizations acting as active players in the hospitality field succeed to implement sustainable supply chains and strategies into their activity. In this article, we cumulate previous research findings indicating that, despite the fact that sustainability and the green approach of business models in the field of hospitality has been a hot topic for many specialists over the last years, actually, organizations in the field do not succeed every time to implement an operational sustainable oriented strategy. Our main objective is to analyze the mechanism of adoption of sustainable practices within hospitality field and to reveal the importance of a proper sustainable supply chain management. Within hospitality field, the concept of supply chain has a special importance due to the nature of relationship between main hospitality service providers and the other members of the chain – the capacity of the supply chain to manage properly the customers' dynamic needs and to help the implementation of sustainable business models.

We contribute to the literature on sustainable supply chain management related to the field of hospitality with a comprehensive view of the complex endeavor that

should be made by a hospitality organization in the present time. We try to clarify the importance of such a demarche in close relation to the COVID-19 pandemic that is a unique and huge challenge for all the players in the field.

Within the specialized literature that has approached in a general way the issue of sustainability and the sustainable supply chain in the field of hospitality, there is a certain "staging" of the content of the papers dedicated to these topics. Thus, between 2000 and 2004, the barriers and the motivational factors that were associated with the sustainable practices in the field of hospitality were mainly investigated. The period 2005-2009 was followed by a phase characterized by studies that addressed the technical applications of sustainable practices such as waste reduction and energy saving programs, with an emphasis on financial or marketing benefits [Kim, et al., 2017].

After 2012, articles that studied topics related to supply chain sustainability and sustainable hospitality practices focused on identifying the effects that these practices have on customer and employee relationships [Kim, et al., 2017]. In its evolution, the empirical and theoretical dimension of studies in the field has managed to individualize the required conditions as well as the benefits resulting from the implementation of sustainable practices [Abdel-Baset, et al., 2019].

A required distinction is that in the implementation of a sustainable approach at the level of economical agents in the field of hospitality according to the opinions of hotel managers interviewed, aims to create competitive advantages, net benefits in business strategies and less environmental protection [Sharma, et al., 2020]. From the perspective of drivers who can be identified for the development and initiation of sustainable practices, the size of the company, the commitment of the company's management and the legal regulations in the field were highlighted [Sharma, et al., 2020]. However, studies indicate that of the three categories of factors, commitment from managers is a prevalent factor because of the positive orientation of managers that can increase the potential applicability of sustainable practices, as they are more willing to overcome various types of barriers and obstacles that may arise [Wut, et al., 2021]. The effective implementation of ecological practices is determined in the field of hospitality by identifying clear benefits by the economic agents involved - in the case of smaller accommodation units for example the application of materials recycling and food waste reduction programs instead of investments of greater magnitude [Arici, & Uysal, 2021].

The literature in the field is focused on the successful proactive implementation of ecological practices, which involves, among other things, the management of an

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optimal number of ecological certificates, a large number of them being able to cause confusion among stakeholders [Khan, et al., 2021].

Methodology

We performed a systematic review of recent relevant literature on sustainable supply chain and sustainable practices in the field of hospitality using as a reference Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines. Papers and sources have been included within our analysis using the following criteria: a) publications indexed in Web of Science databases, b) only original research papers or reviews has been considered, c) the publication date range is between 2017-2021, d) the specific scientific topics taken into consideration. In order to employ our quantitative literature review we have used search terms referring to: green tourism, sustainable hospitality industry, hospitability green supply chain management, hospitality sustainable strategy, hospitability green human resource management.

Green Tourism

The field of hospitality is close related to development and implementation of green tourism specific activities. Implementing sustainable principles and practices takes account of the development of "greener" and more sustainable strategies by tourism-based companies and destinations and helps to reflect the growing environmental concerns that influence the behavior and consumption patterns of tourists [Satta, et al., 2019].

There is growing pressure on organizations operating in the events and tourism services market to apply sustainable techniques to their operations, with a notable focus on adopting principles of loss reduction, reuse and recycling. Consideration is largely given to minimize losses and especially the accent put on the use of recyclable products, as well as the use of electronic promotion of tourism and events [Séraphin, & Nolan (Eds.), 2018]. Therefore, the way in which tourism will develop in the context of the low-carbon green economy has become the main problem of tourism development [Han, & Li, 2021]. At the same time, the issue regarding the consumers' education into the field has the same amount of importance in order to promote an optimal development of the concept of green tourism and the possibility to apply it into practice. For example, into the field of ecological marine tourism, implementing and promoting specific activities has a tremendous impact over the awareness degree of citizens regarding the protection

of marine habitat, the rights and interests of this habitat and the promotion of a full scale strategy for developing marine areas [Shen, 2020]. Also, from the point of view of the impact of the ecological tourism practices over local communities, the development of ecological tourism can solve a series of complex problems that manifest themselves in rural areas where the phenomenon of depression of the local economy has been registered [Kravchuk, et al., 2019].

Identifying solutions to enable the development of rural tourism in a friendly natural environment and promoting intensive development instead of extensive expansion are top priorities for the development of eco-tourism [Qin, & Yinhua, 2019].

As a form of sustainable tourism development, green tourism is a mean of environmental protection and one of the evolutionary forms of contemporary tourism. Research on managers of tourism enterprises indicates that, in the formation of an ecological tourism supply chain, most of these enterprises are stimulated to have an ecological behavior [Huang, et al., 2019].

The green touristic services consumer behavior can have different ways to manifest according to the interests and consumption experience of tourists, being possible the development of different scenarios, taking account also of other elements from within the supply chain [Ma, et al., 2021].

Climate change and other factors specific to globalization have driven changes in consumer behavior in tourism services, from mass consumption to consumption specific to eco-tourism. The development of eco-tourism has boosted the manifestation of ecological entrepreneurship. The limited knowledge regarding ecological tourism, the lack of awareness of the need to conserve the environment, the lack of support measures from state institutions can be taken into account as inhibitory factors for the development of eco-tourism [Rahmawati, et al., 2021]. The results of various studies have shown that ecological motives and green business strategies enable the achievement of sustainable development goals in the hospitality industry [Yousaf, et al., 2021]. Despite the heterogeneity of sustainable entrepreneurs, companies in the field of tourism may develop sustainable networks that can support efforts to change rural areas and different forms of supply chains [Panzer-Krause, 2019].

Sustainable Hospitality Industry

In order to develop or implement the concept of sustainable supply chain within hospitality field a certain background has to be put in place referring to the sustainable dimensions of the entire industry itself. One of the main topics in this

respect deals with creation and development of sustainable competitive advantages within the hospitality industry.

A survey of 457 respondents among hotel managers in Malaysia found that [Hossain, et al., 2020]:

(1) absorption capacity, team culture, competitive intelligence awareness has a significant impact on learning capacity;

(2) the learning capacity has a significant mediating effect between the absorption capacity, the team culture, the awareness of competitive intelligence and the sustainability of the hotel organization's competitive advantage;

(3) entrepreneurial behavior has an insignificant impact on learning capacity and sustainable competitive advantage;

(4) learning capacity has a significant impact on sustainable competitive advantage;

(5) innovation actively moderates between learning capacity and sustainable competitive advantage.

Creating sustainable competitive advantages has a specific importance in order to promote the sustainable orientation within the hospitality industry. The results of a study conducted in Asian hotels highlight that the incorporation of local arts and culture in the sustainable design of services can generate unique value and experiences for customers. From a sustainable development perspective, these hotels seek to add value by using local creative and cultural resources to ensure that they have a solid commercial base from which to present their cultural characteristics. As such, the study recommends that the hotel industry turn its attention to a paradigm that provides a strategic and sustainable vision to create value for society, while protecting local natural and cultural resources. A model that integrate the points of contact with consumers, ecological practices and the competencies of the front line employees is proposed. The design of services in the spirit of sustainable orientation aims at an improved level of customer satisfaction [Chen, & Chen, 2021]. The sustainable dimension at hospitability cannot remain outside of the customer satisfaction paradigm. A survey of 288 tourists from Sardinia found that sustainable hospitality practices generate a direct and positive link with consumer satisfaction and an indirect one, also positive, with consumer loyalty, while satisfaction mediates the impact of sustainable and sustainable practices on loyalty [Modica, et al., 2020]. Different approaches regarding the implementation of sustainable principles within the hospitality field take into consideration the efficient use of spaces and infrastructure. A qualitative research in

the form of an in-depth interview revealed the opinions of managers involved in the specific activity of the hospitality industry regarding the benefits and advantages of adaptive reuse of hospitality-specific spaces and infrastructure seen as a specific technique for a sustainable approach. Adaptive reuse is considered a timely method to ensure the sustainable development of hospitality. The social, environmental and economic benefits of this method outweigh the challenges and extend to regional and even national levels. From a practical perspective, adaptive reuse projects have the capacity to stimulate a better use of space and transform entire communities - especially if there is extensive and improved support from local and relevant authorities. With sufficient incentives to make projects economically viable, the result would be a higher level of cultural and historical conservation, building materials, energy and other resources relevant to the demolition and construction process [Liang, & Wong, 2020].

Another approach that contributes to the implementation of sustainability in hospitality field lays on inclusion of durable efforts within the hotel brand personality. Research based on secondary sources has demonstrated the importance of integrating sustainable efforts into the brand's personality, with hospitality companies being able to design authentic goals that are organically embedded in the brand vision, strengthening brand equity and creating value while increasing customer loyalty. The importance of integrating these efforts in the activity specific to the social responsibility of companies in the hospitality industry is also highlighted [Matteucci, 2020]. In the same area, the results of a quantitative research, conducted on a sample of 360 customers, illustrate a link between brand capital, innovation in marketing, sustainable competitive advantage and market performance in the hospitality industry. Thus, sustainable marketing resources have a positive and strong effect on market performance. Also, the sustainable competitive advantage fully mediates the relationship between brand capital and market performance. The conclusions highlight the importance of elements related to sustainability in terms of formulating marketing strategies in order to attract customers [Hussain, et al., 2020].

The availability of managers and other decisional factors to implement and develop sustainable solutions within hotels activity is a positive factor that can contribute directly to the development of sustainable practices. A quantitative survey conducted on 102 respondents reveals favorable opinions towards the implementation of sustainable solutions in hotel activity in the case of more than 90% of respondents. This finding confirms the importance of resource management

in the hospitality industry related to food, water, energy and waste management. At the same time, there is an unfavorable attitude towards the willingness to pay higher prices in order to implement sustainable solutions in hotels [Floričić, 2020].

It has been underlined that the development of tourism brings many benefits to the areas where this activity takes place (jobs, income for the community and for individuals, etc.), but also has some shortcomings, such as environmental degradation and impact on local traditions. To stop these negative effects, the concept of sustainable development must be applied. A qualitative research revealed the perceptions of tourists regarding the application of the concept of sustainability in the tourism industry, being highlighted a low degree of penetration of these notions at the level of the general public. Efforts are needed to educate tourists and raise their awareness in the direction of accepting and promoting these concepts [Madar, & Neașu, 2020].

In the post-epidemic period, it is important to encourage the behavior of economic agents in the field of hospitality to implement innovation in green technology, thus reducing resource consumption and environmental pollution in order to promote development. Sustainable industrial diffusion of technology can take place in the network of partners of the economic agents within the industry, both with the help of informal communication channels and through social networks [Sun, et al., 2021].

Hospitability Green Supply Chain Management

The development of an analysis framework for the green supply chain management within the hospitality field needs a short introduction aimed to highlight some practical issues regarding green supply chain management content in general. Thus, green supply chain management can be defined as being an organization philosophy able to offer competitive advantages for the organization based on high product and high services quality features, minimum wastes policy, zero pollution approach, high return of investment and a better image on the market [Dubey, et al., 2017]. In the same time, a sustainable approach on supply chain management presupposes a set of managerial practices that takes into consideration the impact on environment as being an imperative, a special attention to all stages across the entire value chain and a multi-disciplinary perspective, encompassing the entire product life-cycle [Gupta, & Palsule-Desai, 2011]. Green supply chain management practices can be classified into four main categories, namely the activities related with (1) inbound operations, (2) production operations, (3) outbound operations, and (4) reverse logistics [Sari, 2017].

Making sustainable practices efficient within the supply chain requires a continuous effort aimed to manage the supply chain and fully implement a sustainable strategy. Sustainable management of the hospitality supply chain involves the management of materials, information and capital flows and the development of collaboration between companies along the supply chain in order to achieve objectives at each level of sustainability - economic, environmental and social [Dubey, et al., 2017].

The sustainable management of the supply chain has a strong relationship with internal management practices of the hospitality organizations. In a research conducted on 269 respondents that are hotel managers in the hospitality industry in Vietnam, the results have shown that the management of the internal environment has a significant impact on the external environment and on the image of the destination. The study has also revealed a direct and positive relationship between the practices regarding the sustainable management of the supply chain and the image of the destination [Do, et al., 2020]. At the same time, besides internal approach of managerial techniques, the attitude developed by owners-managers, consumers and the state policies have a strong effect over sustainable practices designated for the supply chain management [Kerdpitak, 2019]. The attitude of managers and the feedback provided by the consumers related with topics that concern sustainable practices create in time a background useful for the practical development of such actions. Studies based on classification robust technique and neutrosophic sets theory highlight as important factors that have a great impact over sustainable practices of supply chain management reversed logistics, suppliers' environment collaboration management and carbon emission management [Abdel-Baset, et al., 2019].

From the point of view of sustainability innovation criteria framework capable to foster sustainable supply chain management, a research made in the context of Indian manufacturing sector considers financial availability for innovation the most important criterion, followed by technical expertise availability and investment in R&D for green practices, green manufacturing and operational capabilities development, and cultural, social values and norms [Kusi-Sarpong, et al., 2019]. The relationship between sustainability and innovation goes also back.

As regarding the assessment of the supply chain performance in the field of hospitality we may encounter a framework based on green awareness, know-how, and implementation, framework that has to overcome the insufficient support of hotels management towards green practices [Al-Aomar, & Hussain, 2017]. Supply

chain performance given by a proper set of sustainable practices has a strong correlation with organizational performance and with financial performances in particular [Acquah, et al., 2021]. Focusing on the Vietnam's tourism enterprises, Nguyen et al. (2020) assessed the influence of green supply chain management practices on the financial and non-financial performance of this sector. According to their findings the implementation of green supply chain management practices in tourism has positive impact both on financial and non-financial performance [Nguyen, et al., 2020].

Supply chain performance is dependent also on the competitiveness of the company and on green customer awareness, along with owner managers' attitude and the government regulations [Jermsittiparsert, et al., 2019; Kerdpitak, 2019]. No less important is also the hotel innovation strategy in order to achieve a desirable level of economic sustainability, with indicators referring to technology usage, standardized services, service quality, and product introduction readiness [Njoroge, et al., 2020].

Tourism and the hospitality industry in general is a sensitive and vulnerable sector to any risk situation caused by external factors, whether we talk about a natural disaster, an economic crisis, an international conflict, terrorism or epidemics. The literature dealing with supply chain issues usually identifies two types of risks that supply chains may face - operational risks that may cause disruptions in the form of demand fluctuations and risks that cause the simultaneous spread of disruptions throughout the chain and demand - manifestation of a ripple effect [Kinra, et al., 2019].

In the context of the present pandemic situation, the possibility to manage a sustainable supply chain in the field of hospitality has become almost a dream, because of the strong negative effect that was accounted for almost every type of touristic services all around the world. A recent research shows that, in order to diminish the very negative effect of the pandemic, top managers from three different hotel chains highlight several managerial approaches regarding relationship with government (financial incentives coordination, labor field coordination, market demand coordination), relationship with tour operators (coordination within the supply field) and, of course, relationship with competitors (coordination from the point of view of demand and regulations) [González-Torres, et al., 2021].

Also, in the current situation, depicted by the negative effects of the pandemic, the business objectives of hotel chains should evolve from reducing costs and

targeting operational efficiency to limiting losses, maintaining employment, reactivating international arrivals, attracting customers, reducing dependence on tour operators and achieving fair relationships and greater control over the final customer and, ultimately, ensuring an industry-friendly regulatory framework. The most discussed relationships are those between tour operators and destinations, tour operators and travel agencies; hotels and airlines and competing hotels.

On the other hand, the results reveal that, in order to overcome the risks of disruptions caused by the pandemic, the hospitability industry needs financial support from governments. The recovery of hotel chains will depend on coordination agreements with the government to stimulate demand.

Using tour operators is the most cost-effective way for the hospitality industry to distribute accommodation services. Studies have shown that many hotel chains rely almost entirely on these agents to expand their sales and marketing efforts [González-Torres, et al., 2021]. An interesting idea for overcoming the situation caused by the pandemic is the collaboration between competitors in those areas where there is no rivalry – like in terms of promoting destinations, and influencing the direction of a regulatory framework favorable to industry at the sectorial level.

Consequently, in order to achieve sectoral differentiation to attract demand, cooperating firms should focus on creating health standards or certifications attesting the lack of contamination with COVID-19. These types of initiatives allow companies to create more value than they would achieve by acting individually. From a sectoral perspective, for highly fragmented sectors, such as hospitality, it is difficult to achieve favorable conditions, despite the industry's contribution to national income. Therefore, focusing on lobbying would be particularly useful to increase bargaining power in order to influence regulatory frameworks in the context of an economic turmoil [González-Torres, et al., 2021].

Hospitality Sustainable Strategy

The topic about sustainability and sustainable green practices within the supply chain management requires to take into consideration the meaning of the strategy concept. Obtaining a sustainable orientation in the field of hospitality involves investigating the relationship between intellectual capital, leadership in the organization, quality of services, supply chain, the impact of the hotel and its strategy. Such a relationship was tested on 84 high-end hotels in Greece and analyzed using the method of structural equations. The results of the study bring into the light the idea that a high level of leadership excellence has a positive

influence at the level of intellectual capital. In the same time, the proper implementation of leadership has a positive effect on quality of the service, hotel impact on the market and the specific decisions that are implementing the hotel strategy. The same positive influence has been highlighted in case of supply chain of the hotels, meaning that the superior leadership contribute to the efficiency of the hotel from the point of view of the integration within the supply chain [Metaxas, et al., 2019].

We can say that the hospitality industry is "dependent" on the specific approach to sustainability. There are many ways to achieve this goal, one of the most common being the one based on effective communication. However, the effects that this communication produces at the level of convincing customers in the direction of adopting a consumer behavior, that can be in turn, sustainable, are not entirely conclusive. The authors of a desktop type research identified in the literature a typology of communication approaches at the international level, which is summarized in the form of two strategies (a verbal and a nonverbal approach) and 7 tactics of communication with customers regarding the concept of sustainability (accuracy, being comparable, positivity, being certified, being visible, being authentic and being internalized) [Shen, et al., 2020].

A major problem in order to develop a real sustainable strategy within the hospitality field is related to the continuous effort to implement innovation. The business innovation model can be a potential mechanism for integrating business sustainability. Very few companies have a clear innovation strategy, and fewer have a green development strategy and even fewer have a green innovation strategy. The tourism and hospitality industry faces some environmental challenges in a more explicit way than other industries [Presenza, et al., 2019; Messeni Petruzzelli, & Ardito, 2019].

Although over time there has been a growing interest in innovative and sustainable proposals in the field of tourism, the hospitality industry has known a continuous controversy. A number of countries have not yet succeeded in implementing sustainable development goals in the field of hospitality, while others have made significant progress. In this direction, it is necessary to collaborate between stakeholders, at all levels, as well as to engage organizations that are able to operate on a large scale [Seraphin, & Gowreesunkar, 2021; Jones, & Comfort, 2020].

Strategic approach within the field of hospitality in term of sustainable practices has to be implemented starting from the clear green marketing orientations. In

order to implement optimally such an approach, managers of hospitality companies have to take into consideration market orientation, resource orientation, environmental orientation and brand orientation [Ho, et al., 2021, Ertac & Cankan, 2021, Andronie et al, 2019].

One of the main orientations that can bring further lines of development even in the case of a sustainable approach is the one that concerns the green brands image that can encompass the marketing communication for hospitality organizations. A research with a sample of 400 respondents has been conducted in order to emphasize the strategic decisions related with a sustainable strategy approach from the point of view of hospitality services consumers' perceptions on green hotel brands. The results of the study show that the green brand image, along with awareness of the green brand and perceived value of the brand as a green asset has a positive impact over the brand management [Shanti, & Joshi, 2021]. Regardless the type of strategy implied, sustainable dimension is assured through a continuous effort that can connect in an optimal way the past, the present and the future of the organization. From this point of view, even at the level of a touristic destination, we can manage a certain lifecycle, which imposes from the point of view of a sustainable approach the proper evaluation of past strategies. Numerous factors like technological progress, local features of the destination, specificity of tourists' needs and consumption motives, etc. can determine different results for the process of evaluation [Gore, et al., 2020].

The link between past and future strategies in the field of hospitality is assured in a proper manner by the creativity used to develop and implement different models of initiatives regarding touristic products. From this point of view, studies have individualized five main models that can assure a sustainable approach: repeated stand-alone offers; series of creative activities and other initiatives under a common theme; localized networks for creative tourism; small-scale festivals that include creative tourism activities; and creative accommodations [Duxbury, et al., 2021]. Such approach can be particularly useful in times such the present one, characterized by the COVID-19 pandemic, because it can give to a specific local community the tools and resources to revitalize the touristic offer putting the emphasis on cultural vitality, distinctive elements of local identity, connections and flows between different players in the spirit of collaboration, exchange and development.

One of the most important requirements from the perspective of a sustainable approach to hospitality activities, especially in the current context, is the one that
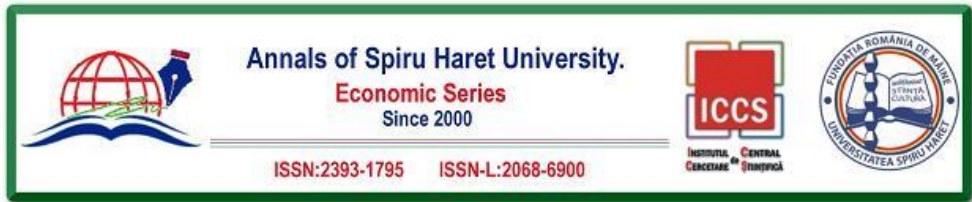
refers to the need to develop integrated, holistic, systemic and participative strategies. Sustainability, even in the context of hospitality field, has the role of balancing corporative interests and needs of the stakeholders. In order to facilitate this role, managers have to build a productive management relationship through which all the parties can understand the implications of their actions from the point of view of sustainability [dos Santos, et al., 2020].

More than that, acquiring a true sustainable orientation means that objectives related to environment and efficiency of the processes within hospitality services are harmonizing with the fulfillment of other categories of needs, like the ones expressed by other stakeholders – consumers and investors. Actually, we talk about a culture of sustainability that can be implemented in an equilibrated manner, integrating all categories of expectations and interests, as hospitality services are complex processes that need a synergy from all the implied parties [Bernal Escoto, et al., 2019]. In line with this idea we can cite also the research of ElShafei which highlight the importance of risk perception at the level of hospitality companies' managers in order to implement a sustainable consumption of resources, in harmony with stakeholders' perception [ElShafei, 2020].

Hospitability Green Human Resource Management

One of the most preeminent issues about sustainable supply chain management within the hospitality field deals with the need to implement green human resources practices. In order to promote a sustainable orientation of hospitality organizations it is necessary to define correctly and completely the practices of ecological management of human resources at all levels of the organization. In this way it becomes possible to encourage employees to promote environmentally responsible behavior. The environmental performance of the organization represents a complex objective that can be properly attained only through the implication of all employees from all organization's levels from the point of view of a positive response regarding green human resources management practices. Only in the moment that those practices are fully explained and defined for all the employees' levels, people have the capacity to really improve the environmental performance of their organization. Every single employee is capable to have a responsible behavior toward the environment preservation. Ecological human resources management can be defined as the totality of human resources practices that promote the sustainable use of the company's resources by increasing the awareness and commitment of staff in relation to solving environmental problems

[Tulsi, & Ji, 2020]. Ecological human resources management involves activities aligned with the three pillars of sustainability related to environment, society and economy, being in the same time closed connected with the need to insure financial stability [Abdeen, & Ahmed, 2019].

Studies in the field indicate that, in the context of the hospitality industry, employees are more willing to actively support environmental practices when managers in the next higher echelon are also engaged in such practices. Integration in daily work determines the emergence of an organizational culture oriented towards sustainability [Tulsi, & Ji, 2020]. Also, sustainable staff training is considered a crucial factor in the ecological management of human resources, stimulating performance in the internal environment of organizations. Given the proactive maturity of the management of the internal environment of hospitality companies, the development of staff skills from the perspective of managing work processes on sustainable principles determines a natural transition to sustainable hospitality management [Cabral, & Jabbour, 2020]. As a final conclusion the implementation of sustainable principles that are reflected in the employees' level starts from the promotion of an appreciative culture within the organization that targets both the employees and the consumers of hospitality services, as well as the promotion of a socially responsible image oriented towards the general public [Heimerl, et al., 2020]. The company's corporate environmental responsibility is integrated with green human resources management, green competitive advantages and green supply chain management in order to assess the full potential of a proper development strategy within the hospitality field [Tulsi, & Ji, 2020; Jabbour, & de Sousa Jabbour, 2016].

Conclusions

Many specialists argued that sustainable development should become central for the hospitality industry as a part of the general effort towards a „new normality", with measures that cover social distancing, transport systems, sport events and hotels check-in.

Countries that have a special situation, as the hospitality industry represents a major sector of the economy, could offer an increased role for the state, with a full cooperation between governments and hospitality industry. COVID-19 crisis was the biggest challenge ever for the hospitality industry because of its global scale. If certain natural disaster like a tsunami or a local epidemic have caused problems for the hotel industry in a certain region or country, major touristic players can have

always like a back-up plan. Here, companies could use their financial resources, both to reduce the overall impact of the event and to try to quickly bring back to business the facilities in the affected areas. In such circumstances, large companies may also seek to relocate customers to the company's hotels, cruises and vacation packages to other parts of the world and thus protect, at least in part, their revenue streams. But, in present conditions with a global full limitation of the touristic activities, such solutions don't work anymore. The situation in which local touristic businesses can evolve better because majority of tourists wants to stay home and go with friends or relatives in close locations, away from any human agglomeration can bring some advantages for the local economies but it will be way too little in order for the entire industry to revive itself. Some of the specialists actually consider the crisis as a huge test for the future coming challenges including climacteric changes and potential other pandemic situations. As a consequence, the integration of sustainable principles along supply chains in hospitality industry and the implementation on a large scale of other sustainable activities and managerial decisions are a prerequisite for the survival and future development plans. More than that, there are voices arguing that mankind will face the need to change structural elements regarding our very lifestyle and the relationship with the environment not only at governmental or business level but as individuals. The COVID-19 crisis was an objective proof about how a global negative event can effectively turn upside down individual lives and business models alike forcing everybody to find solutions for a real sustainable approach.

Our research points out some clear aspects regarding the way in which specialized literature in the field approach the issue at hand – sustainable supply chain management within hospitality field. We have discussed also how the present challenges have affected the capacity of companies from the field to cope with different pressure elements. As for future directions of research we may propose subsequent literature review efforts that can highlight the current changes that took place at the level of empiric practice and theoretical conceptualization in the field. In the same time, we think that a qualitative type research aimed to explore the perceptions of managers from the industry regarding sustainable practices and optimal ways to manage a green supply chain alongside with relationship with other organizations from the market can bring new insights that could picture an objective and clear perspective over the special situation that characterize hospitality companies nowadays.

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ASSESSMENTS OF SOCIO-ECONOMIC AND DEMOGRAPHIC FACTORS INFLUENCING INSURANCE BUYING BEHAVIOUR AMONG SMALL AND MEDIUM-SIZED ENTERPRISES IN LAGOS, NIGERIA

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Abstract
Socio-economic and demographic metrics are important yardsticks in the behaviour pattern of an individual. They influence the behavioural attitude of people to perceive the image of insurance as an intangible, inseparable, variable, and transferable product. Therefore, this study aimed at assessing the effects of socio-economic and demographic factors on insurance buying behaviour, with specific reference to the perceptions of selected SMEs in Lagos, Nigeria. The study adopted a cross- sectional survey research design. The study population consisted of the total number of registered SMEs recorded in Lagos State at 11,666. Thus, a single-stage cluster sampling technique was employed in the questionnaire distribution and data collection processes. A total of 386

copies of questionnaire were distributed, of which 243 were found usable which represented a 63% response rate. The major statistical technique employed was multivariate regression. This study confirms the importance of socio-economic and demographic factors in the behavioural evaluation of insurance purchases in Lagos, Nigeria. This study recommended that insurance providers in Nigeria should attempt to tailor insurance products in a lovable and affordable manner to SMEs' operators/owners in a bid to sharpen their socio-economic and demographic risk attitudes. More so, SMEs operators should try to shift their desire to manage the thrust of risk-off to the insurance providers for adequate business, economic and financial security. Given this implication, similar studies should be carried out in other industries in this country.

Keywords: *socio-economic factors; demographic factors; insurance buying behaviour; SMEs; Nigeria.*

JEL Classification: M04, M19

1.0. Introduction

Insurance, as a risk transfer technique, is an indispensable financial instrument required for all-round safety to lives, properties, businesses, to mention few. Insurance, being a risk management tool, is critical to the advancement of every facet of businesses in an economy of the globe, most especially small and medium-sized enterprises (Ajemunigbohun & Adeoye, 2018; Chatterjee & Wehrhahn, 2017). However, SMEs have been ascribed as a core developmental segment of every nation's progression and attainment of desired sustainable growth (Adeosun, & Shittu, 2019; Herr & Mettkoven, 2017; Morina & Gashi, 2016). SMEs, being a strong tool for economic growth, foster prosperity in the areas of job provided in any country of the world are created by SMEs, and their dominance are usually evident in the private sector space of every nation.

SMEs have been noted to facing a number of problems (Prinsloo, Walker, Botha, Bruwer, & Smit, 2015; Smit & Watkins, 2012). Duong (2009) as cited in Obalola and Ajemunigbohun (2017) opined that SMEs are troubled with a number of risks such as business entity risk, financial risks, human capital risks, and consumer risks. According to Suh (2010), economic risks had adversely affected most SMEs by reducing their sales volume and fast tracking their non-existence. Belas, Machacek, Bartos, Hlawiczka, and Hudakova (2014) pinpointed that SMEs are faced with some basic risks which include loan access restrictions, unhealthy

competitive environment, undue tax burden, inexperienced managerial skills, administrative complexity, and risks of failing. Accordingly, failure to businesses especially (SMEs) is often caused by paucity of risk management plan, and deficit managerial structure (Hartcher, Hodgson, & Holmes, 2014).

SMEs have been adjudged the bedrock of many nation's successes (Motilewa, Ogbari & Aka, 2015; Tsatsenko, 2020; Karadag, 2016). Nonetheless, the height of their successes have always been hampered by the vagaries of many risk exposures to which they have little or no control of. SMEs have been said to be encountered with economic, political, social and financial difficulties (Ajemunigbohun & Adeoye, 2018; Adeyele & Osemene, 2018). An earlier study of the Insurance Information Institute (2005) stipulated that SMEs are susceptible to disastrous situations and have no standardised disaster recovery scheme for restoration. In a bid to response to the many calamitous situations, SMEs are expected to demonstrate behavioural attitude that possibly motivate their patronage towards insurance policies. The desire to patronise insurance can be influenced by socio-demographics and socio-economic factors, yet great deal of apathy is continually being experienced among Nigerians especially SMEs owners and operators. This, therefore, necessitate the need to carry out the study on the analytical factors influencing insurance buying behaviour among SMEs in Nigeria.

1.2. Objectives of the Study

The aim of this study is to analyse the factors influencing insurance buying behaviour among SMEs. The specific objectives are to assess the effect of economic factors on insurance buying behaviour of SMEs in Lagos State, Nigeria; evaluate the influence of social factors on insurance buying behaviour of SMEs in Lagos State, Nigeria; and investigate the relationship between demographic factors and insurance buying behaviour of SMEs in Lagos State, Nigeria.

2.0. Literature review

Studies conducted empirically (such as Hagos, Kebede, & Shewakena, 2019; Ogundeji, Akomolafe, & Butana, 2018; Petrovic, & Stankovic, 2018; Shahriari & Shahriari, 2018) have exhibited that insurance buying behaviour can be influenced socially, economically, demographically, legally, culturally, and politically. Many other studies in relation to insurance purchase have been largely examined (Abdullah, Roslan, Yusuf, & Rasid, 2020; Bhatia, Bhat, & Tikoria, 2021; Ulbinaite, Kucinskiene, & Moullec, 2014). As cited in Adeleke, Olowokudejo, and

Ajemunigbohun (2016), Graven (2007) delineates insurance purchase as a collection of logarithmic utilities which comprises the effect of changes in loss degree; the effect of changes in income; the effect of changes in loss frequency; and the effect of changes in insurance pricing. Seog (2010) expresses that insurance purchased on a full scale under suitably actuarially fair pricing is more favourable than insurance purchased on a partial scale. According to Rossi and Black (2001), as cited in Kwofie, Yormekpe, Mensah and Botchway (2018), the patronage of insurance makes provisions for sufficient protection concerning loss that reduces the probability of fiduciary crises whenever they occur. In a similar remark, an earlier study by Cummins and Danzon (1997), as cited in Dionne and Harrington (2017), found that the decision concerning insurance buying behaviour is not only evident in the current condition of the product but showcases future benefits that are achievable.

The distinctive characteristic of insurance service is that it is procured at the immediate time just for the worth to be actualised subsequently. Ikupolati (2008) specified that insurance service is distinguished by intangibility, inseparability, transferability, and variability. According to Idris, Asokere, Ajemunigbohun, Oreshile, and Olutade (2012), the intangible nature of insurance plays a decisively challenging role in convincing customers as to the value of insurance products. The earlier study by Capgemini (2007) averred that insurers ought to express preparedness in appropriating values to segmented customers; predicting customers' behaviour and applying methods that fulfil satisfaction and retention of customers; and acknowledging and optimising opportunities to boost sales and drive the desired qualities. Toran (1993) as cited in Abass and Oyetayo (2016) ascribed quality as a focal point in measuring insurance service. Walker, Baker (2000) believed that customer's expectations formed the basis for insurance quality measurement. Nwankwo and Ajemunigbohun (2013) suggested that insurance companies should clarify their value and expectations in dealing with prospective and existing customers, as well as making efforts towards customers' attraction and retention.mpa, Pratama, Also, King (1992) as cited in Isimoya, Ajemunigbohun and Balogun (2018) stipulated that insurance quality evaluation is an embodiment of the insurer's credit, pecuniary stability, the rectitude of the agent (s), and soundness of information and direction from the agent.

Several studies have been conducted in Nigeria and other countries of the world in relation to identify factors influencing insurance buying behaviour (Adamu, 2018; Buzatu, 2013; Kempa, Pratama, & Sukatmadiredja, 2020; Malini, 2016;

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Nursianan, Budhijono, & Faud, 2021; Ulbinaite et al., 2014). Al-Rawashdeh (2016) investigated factors influencing purchase for the promotion of insurance in Jordan. With the questionnaire survey, 662 sample population were employed. The study used the descriptive statistics and stepwise logistics regression in its data analysis. The study suggested social security, competitive advantage, promotion and quality in the purchase of insurance products. Also, Tati and Baltazar (2018) research was based on factors influencing the choice of investment in life insurance policy; with particular reference to India. While questionnaire survey instrument was employed among 75 insurance investors, Chi-square technique was in analysing collected data. The study established that insurance is seen as risk protection in choices made with respect to investment in life insurance policy.

Nomi and Sabbir (2020) examined factors of consumers' purchase intention towards life insurance in Bangladesh with the application of the theory of reasoned behaviour. The cross-sectional research design adopted can a convenience sampling technique. While method of data collection was questionnaire from 315 respondents, structural equation model (SEM) was adopted for data analysis. The study established relationships statistically between factors of consumers' purchase intention and life insurance.

Planned behaviour, as a theory, was propounded to depict social values, attitude and controlled behaviour of mankind in business related activities (Zhang & Cain, 2017). This theory commenced as the theory of reason action in the 80's to predict individuals' intents to get involved in behavioural events at a specific place and time (Ajzen, 2011). It is a well-designed estimates of risk attitude regarding a behaviour of interest, perceived behavioural intention and control, and subjective values. The outcome of previous studies (such as Brahmana, Brahmana, & Memarista, 2018, Mai, Nguyen, Vu, Bui, Nguyen, & Do, 2020; Kautonen, Van Gelderen, & Tornikoski, 2013) have shown that the theory of planned behaviour (TPB) has contributed extensively to insurance behavioural studies. This theory is thus considered typical for business activities even if the new venture may develop abruptly due to a chance realised. With TPB, two major sources of intent, that is, motivation to act for an intended behaviour and possibility of a given behaviour (Sabah, 2016). It is necessary to note that TPB contends that intent is a direct antecedent of behavioural performance. TPB stipulates, in principle, that the more acceptable the attitude and subjective value, the higher the perceived behavioural control, the stronger an individual's intent concerning the performance of insurance behaviour (Harrison, 2019; Sung, Yam, Yung, & Zhou, 2011).

3.0. Research Methods

This study employed a survey research design anchored on a quantitative method to give an improved view of critical decisions integral to the behavioural factors affecting insurance purchase. This design thus assisted in planning and executing the study in a manner to acquire planned outcomes and thus, created a nexus with the real-life global situation (Creswell & Creswell, 2018; Gray, 2017). Data collection was carried out through field survey among chosen small and medium-sized enterprises with the assistance of the questionnaire. The choice of selecting the participants were due to their vital significance in economic sustenance of our nation. The use of this data collection instrument was because of its appropriateness to the design of the study with regards to being relatively cheap, wider usage and more sample representative, sufficiency of time for participants to assign well thought out responses and simplicity in the administration the research instrument (Cooper & Schindler, 2014; Kothari & Garg, 2016).

In accordance with the Small and Medium Enterprises Development Agency of Nigeria (2013), the totality of micro, small and medium enterprises (MSMEs) as cited in Peter, Adegbuyi, Olokundun, Peter, Amaihian, and Ibinunmi (2018) stood at 37,067,416 with 36, 914,578 micro, 68,168 small and 4,670 medium enterprises. The Lagos State, the research ground, is said to have a share of 11,666 registered SMEs. 10 local government council areas out of the 20 acknowledged and approved local government councils were exerted as research study areas with the adoption of single-stage cluster sampling technique. The aim of selecting this sampling technique was due to the fact that it allowed the researchers to divide the population into favourable clusters by indiscriminately selecting the needed number of clusters as representative variables and examined all the cases in each of the randomly chosen clusters. This sampling technique is beneficial because it timely and inexpensive (Wilson, 2014).

The survey technique was segregated into two; which made up of section A and B. For section A, details of the participants were affirmed, while section B is planned in relation to the constructs in the study. The study observed tests of validity comprised of congruent, content, and criterion-related in nature. While the congruent validity was structured in accordance to preceding literature, content validity took cognisance of the specifics on the survey instrument, and the criterion-relation validity took a probe of the outcomes from other related participants (Booth, Colomb, Williams, Bizup, & Fitzgerald, 2016). Also, the reliability test was conducted with a Cronbach alpha of 0.814, 0.701, 0.691 for economic factors, social factors, demographic factors and 0.713 for insurance buying behaviour. These results were in consonance with statistical interventions of the soundness of the scale, and the safety of the internal consistency.

Since the target population comprised of all registered motor users in Lagos metropolis, the total sample size for the study was statistically determined by Taro Yamane's (1967) formula as cited in Ajay and Masuku (2014), given as:

$$n = \frac{N}{1 + Ne^2}$$

$$n = \frac{11,666}{1 + 11,666\,(0.05)^2} = 386$$

In assessing the above calculated sample size, the researchers considered as representatives as possible compared to the total population under study. Data gathering period was between September, 2020 to December, 2020. Most importantly, 243 copies out of the 386 copies of questionnaire assigned to selected SMEs operators/owners were found relevant for assessment of the research outcomes; providing 63% response rate. In bid to quantify gathered data successfully, multiple regression technique was employed. Accordingly, three Likert scaling measurements of 'strongly agree' 'agree', 'indifferent', 'disagree', and 'strongly disagree' were adopted

4.0. Results and Discussion

The study adopted multivariate method to test the relationship between the constructs with the intervention of the Statistical Package for Social Sciences (SPSS) version 22.0. In presenting the estimated model coefficients, the calculation obtained from the multiple regression model is given as shown in table 1.

From the results of the regression analysis presented above, it is clear that there is positive moderately relationship between economic factors and insurance buying behaviour. The model also shows the variations experienced by the dependent variable that could be explained by the independent variable (R square) which shows that economic factors are responsible for about 38.1% of variance in SMEs operators' insurance buying behaviour. This means that 61.9% of the insurance buying behaviour enjoyed by the insurers comes from other factors other than the predictor used in this model (economic factors). The generalisation of the results (Adjusted R square) indicates that true 29.2% of the variation in insurance buying behaviour is explained by economic factors (*income, price, and savings*). This result is almost close to reality as the difference between R Square and Adjusted R Square is not high. The standard error fit, which is a measure of the precision of the model,

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shows how wrong the statistical outcomes could be at 4% if one uses this model to make real life predictions. The above result is statistically significant as seen in the ANOVA table (p-value = 0.00, 0.021, 0.013) as they are less than the 0.05 confidence interval used in this study. A value greater than 1 shows that F-ratio yield an efficient model but 51.43 F-ratio indicates that this model is not very efficient.

Table 4.1: Multiple Regression Results for Economic Factors vs. Insurance Buying Behaviour

Model Summary								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.617ᵃ	.381	.292	3.97541	.381	51.434	3	240	.000

a. Predictors: (Constant), income, price of insurance, savings

ANOVAᵃ					
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	812.862	1	812.862	51.434	.000ᵇ
	Residual	2291.560	242	15.804		
	Total	3104.422	243			

a. Dependent Variable: Insurance buying behaviour

a.   Predictors: (Constant), income, price of insurance, savings

Coefficientsᵃ								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	11.875	1.682		7.060	.000	8.551	15.200
	Income	1.106	.154	.512	7.172	.000	.801	1.410
	Price of insurance	.902	.145	.691	6.163	.021	.711	1.440
	Savings	1.101	.164	.617	6.142	.013	.851	1.501

a. Dependent Variable: Insurance buying behaviour

Source: *Authors' computation, 2021*

Table 4.2: Multiple Regression Results for Social Factors vs. Insurance Buying Behaviour

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.421ᵃ	.178	.112	7.3212	.178	9.135	3	240	.021
a. Predictors: (Constant), religion, culture, family size									

ANOVAᵃ						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	281.628	1	22.216	9.135	.021ᵇ
	Residual	910.120	242	5.171		
	Total	310.471	243			
a. Dependent Variable: Insurance buying behaviour						
b. Predictors: (Constant), religion, culture, family size						

Coefficientsᵃ								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	7.190	1.319		4.123	.021	5.331	9.136
	Religion	.731	.124	.302	4.270	.031	.621	1.100
	Culture	.321	.113	.528	3.161	.058	.625	.623
	Family size	.417	.106	.601	2.183	.042	.512	.421
a. Dependent Variable: Insurance buying behaviour								

Source: *Authors' computation, 2021*

From the results of the regression analysis presented above, it is clear that there is positively low relationship between social factors and insurance buying behaviour. The model also shows the variations experienced by the dependent variable that could be explained by the independent variable (R square) which

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shows that social factors are responsible for about 17.8% of variation in SMEs operators' insurance buying behaviour. This means that 82.2% of the insurance buying behaviour that enjoyed by the insurers comes from other factors other than the predictor used in this model (social factors). The generalisation of the results (Adjusted R square) indicates that true 11.2% of the variation in insurance buying behaviour is explained by economic factors (*religion, culture, and family size*). This result is almost close to reality as the difference between R Square and Adjusted R Square is not high. The standard error fit, which is a measure of the precision of the model, shows how wrong the statistical outcomes could be if one used the regression model to make predictions or to estimate insurance buying behaviour. This indicates that one would be about 7% wrong if one uses this model to make real life predictions. The above result is statistically significant as seen in the ANOVA table (p-value = 0.031, 0.058, 0.042) as they are less than the 0.05 confidence interval used in this study. A value greater than 1 shows that F-ratio yield an efficient model but 9.14 F-ratio indicates that this model is not very efficient.

From the results of the regression analysis presented above, it is clear that there is positively moderate relationship between demographic factors and insurance buying behaviour. The model also shows the variations experienced by the dependent variable that could be explained by the independent variable (R square) which shows that demographic factors are responsible for about 51.6% of variation in SMEs operators' insurance buying behaviour. This means that 48.4% of the insurance buying behaviour enjoyed by the insurers comes from other factors other than the predictor used in this model (demographic factors). The generalisation of the results (Adjusted R square) indicates that true 48.1% of the variation in insurance buying behaviour is explained by economic factors (*age, gender, and marital status*). This result is almost close to reality as the difference between R Square and Adjusted R Square is not astronomical. The standard error fit, which is a measure of the precision of the model, shows how wrong the statistical outcomes could be if one used the regression model to make predictions or to estimate insurance buying behaviour. This indicates that one would be about 6% wrong if one uses this model to make real life predictions. The above result is statistically significant as seen in the ANOVA table (p-value = 0.015, 0.003, 0.008) as they are less than the 0.05 confidence interval used in this study. A value greater than 1 shows that F-ratio yield an efficient model but 5.91 F-ratio indicates that this model is not very efficient.

Table 4.3: Multiple Regression Results for Demographic Factors vs. Insurance Buying Behaviour

Model Summary								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.719[a]	.516	.481	6.3718	.516	5.913	3	240	.007

a. Predictors: (Constant), age, gender, marital status

ANOVA[a]					
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	128.628	1	14.126	5.913	.007[b]
	Residual	1922.605	242	7.919		
	Total	1304.242	243			

a. Dependent Variable: Insurance buying behaviour
c.   Predictors: (Constant), age, gender, marital status

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.205	0.731		3.114	.007	2.302	3.002
	Age	.518	.215	.312	2.004	.015	.513	.411
	Gender	.729	.105	.371	2.512	.003	.702	.433
	Marital Status	.162	.410	.511	1.214	.008	.432	.316

a. Dependent Variable: Insurance buying behaviour

Source: *Authors' computation, 2021*

4.1. Discussion of Findings

From the empirical analysis conducted and the test of hypotheses carried out, this study confirmed the relationship between socio-economic and demographic factors influencing insurance buying behaviour among SMEs operators/owners in

Lagos State, Nigeria; with respect to the research objectives and research questions raised.

The result shows that economic factors (comprising income, prices, and savings) has positive and moderate relationship with the insurance buying behaviour of SMEs owners/operators in Lagos State, Nigeria, thereby invalidating the null hypothesis and validating the alternate hypothesis at ($p = 0.000$). This result corroborates the findings of Ajemunigbohun, Aduloju, and Saka (2020); Dash (2018); and Fofie (2016). Ajemunigbohun et al (2020) pointed at economic variables as significant to insurance patronage, and thus a pedestal on major choices of their life; Dash (2018) had admitted that economic variables (such as income and prices of insurance) are core values in the behavioural disposition of insurance products.

The result shows that social factors (comprising religion, culture, and family size) has positively low relationship with the insurance buying behaviour of SMEs owners/operators in Lagos State, Nigeria, thereby invalidating the null hypothesis and validating the alternate hypothesis at ($p = 0.000$). This result is supported with the views of Badru, Yusuf, and Isola (2013), Ebitu, Ibok, and Mbum (2014), Hossain (2015, Jeremiah, Joseph, and Innocent (2019); who also derived a positive but low level of nexus between insurance awareness and patronage with respect to social factors. They justify the choices of social factors in measuring the behavioural attitudes of individuals to insurance products.

The result shows that demographic factors (comprising age, gender, and marital status) has positively low relationship with the insurance buying behaviour of SMEs owners/operators in Lagos State, Nigeria, thereby invalidating the null hypothesis and validating the alternate hypothesis at ($p = 0.000$). The result supported by Sorsa (2018) findings noting that age and gender factors influencing behavioural patterns of insurance purchase from individual business owner. The studies of Nebolsina (2020) and Shahriari and Shahriari (2016) pinpointed at marital status as required determining variable to demand for insurance products.

5.0. Conclusion and Recommendations

From the empirical analysis conducted and the test of hypotheses carried out, this study has been able to address the research objective raised at the onset. The results show that socio-economic and demographic factors have positive and moderate effects on the insurance buying behaviour among SMEs operators/ owners in Lagos, Nigeria, leading to the rejection of all null hypotheses at 0.05

level of significance. The findings show that socio-economic and demographic factors play a vital role in moderating insurance buying behaviour among SMEs owners and related industry. The responses of the respondents substantially prove that socio-economic and demographic factors influence insurance buying behaviour of SMEs to a moderate extent. In addition, the fact that it is only an insignificant number (2%) that would purchase insurance policies in Nigeria due to their perceived insurers' claims processes is a challenge that insurers in Nigeria will have to deal with. The findings of this research reveal that socio-economic and demographic factors are significant in influencing insurance buying behaviour among SMEs owners/operators. Thus, insurance providers in Nigeria should focus on the socio-economic and demographic proxies that will have greater effects on the buying behaviour of the SMEs owners/operators and other entrepreneurs or business-related industries.

Based on the justification adduced to in this study, the researchers recommended that insurance education, as a field of study, should be taken as seriously as possible so that it can help develop the peoples' minds psychologically and sociologically to get attracted to insurance in order to manage their future. More so, insurance providers in Nigeria should make attempt to make the business of insurance lovable and affordable to SMEs' operators/owners in a bid to sharpen their socio-economic and demographic risk attitudes. The SMEs operators should try to shift their desire to managing the thrust of risk off to the insurance providers for adequate business, economic and financial security. Stakeholders such as, insurance practitioners, government, academics and business industrialists should join forces and fuse their knowledge, legal and pecuniary based resource to help develop, subsume, execute and finance insurance programmes that will foster progress, dependable growth and advancement in Nigeria. Lastly, inordinate interest should be placed on impressive risk management communication and ideal risk financing techniques among SMEs' owners/operators.

6.0. Contributions to Knowledge and Suggestions for Future Research

The contribution of this study is seen in that within the limits of the research space, this study has established the relationships between socio-economic and demographic factors and insurance buying behaviour of SMEs owners/operators. This study is perhaps the first to have examined the relationship between the study constructs among SMEs in Nigeria. Despite the recommendations highlighted above, the study has some limitations. First, the study's findings are viewpoints of

SMEs owners/operators in Lagos State. This is just a representation of the study population, which may affect the generalisation of the entire population. This means that the generalisation of the findings should be made with caution. Given this implication, similar studies should be carried out in other industries in this country.

The study suggests that further research works should focus attention on behavioural attitudes of policyholders in Nigeria. Research work is thus encouraged to look at behavioural factors that can influence more preferences for insurance products in Nigeria. Lastly, future research work could direct attention at sociology and psychology of insurance.

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DEMAND FORECASTING AS A VERITABLE TOOL FOR HIGHER MANAGERIAL EFFICIENCY IN INDUSTRIES IN NIGERIA

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Abstract
This study aimed at exploring the benefits of demand forecasting and portrayed it as a veritable tool for increasing managerial efficiency in industries in Nigeria. The study is an effort to show that the utilisation of demand forecasting could become a veritable way of minimizing wastages, thereby maximizing profits, recovering and reviving of Nigeria's ailing and moribund industries. In Specific terms, limestone production and sales in Nigeria was used for a practical illustration. In doing this, the least squares approach and t-test statistics were used to analyse limestone production and sales in Nigeria from 2001-2010. Projections were also made for limestone production and sales from 2011-2014. 2011 was used as a base year to compare projections with actual realizations for limestone production and sales data. It was found that there was no significant difference between the projected and real values for the limestone production and sales in the base year, thus, re-affirming the efficacy of demand forecasting. It was therefore recommended among other things that managers rely strongly on demand forecasting throughout their operations.

Introduction

Evidently, the role of managers in any organization is very important. Jobber and Lancaster (2009) posited that no organization can rise above its management. This is because the manager of any organization is charged with all responsibilities of administration and decision-making (George, 2002). Banjoko (2002) added that the manager sets up the strategy of the organization, regulates the inputs of workers and ensures that the overall goals of the organisation are achieved. In order to achieve organisational objectives, Schuler (1983) observed that the managers must utilise available resources wisely. These resources according to Schuler include natural, human, financial and technological resources, which serve as unavoidable for organisational effectiveness. Stevenson (2012) noted that efficient management is a product of informed decisions, and informed decisions is a product of accurate data processing. Accurate data processing results in accurate information, which assists a manager to take the right, which is profitable to the organisation (Kress, 2007). According to Kress many organizations have failed due to poor managerial decisions stemming from wrong information.

Stevenson (2012) averred that the most important information needed by managers for decision making, particularly within an industrial setting include demand and supply trend, production rate, accurate predictions of consumer behaviour, currency exchange rate and the general trend in market variables. Stevenson (2012) therefore recommended that to increase proficiency, a manager should apply techniques such as demand forecasting. Picinkene (2008) reaffirmed that severe competition and rapid changes in the market have underscored the relevance of accurate information from forecasts. Jobber and Lancaster (2009) noted that the manager needs to comprehend the state of demand so as to develop proper business plans, as well as make strategic decision on the vision of the organisation, the technology to be used as well as infrastructural needs of the organization. Jobber and Lancaster (2009) defined demand forecasting as the prediction of the quantity of goods or services to be purchase by consumers. Wisner and Stanley (2008) added that efficient production planning for a product or service cannot be accomplished unless the volume of demand is known. Calvin (2007) observed that as organizations become more proficient in forecasting their demand, greater efficiency in running the business is achieved. According to

Nagarajan (2010) demand forecasting improves safety stock requirements and customer services which give rise to increased profitability and viability.

In his view, Stapleton (1974), posited that as demand forecasting puts forth future business scenario, it helps in reducing the risks involved in decision-making and drives the business planning tasks. Banjoko (2002) stated that the harsh business scenario of today has great implications for managers because of the increasing need to match demand with supply, which reduces wastage and maximizes profit. Today, with industrialization came an expansion in the number of items that need to be forecasted. Chukwu (2007) added that in today's unstable and troubled economic times, both private and public organizations as well as individuals are faced with the common challenge of making decisions under an atmosphere of uncertainty. Donaldson (1998) averred that when properly modelled, forecasting help to ameliorate the impact of uncertainties. It provides managers with the basic information required to make informed decisions.

Jobber and Lancaster (2009) stated that one great feature or benefit of forecasting is that it helps to control, minimize or even eradicating wastages in the industry. Forecasting is indeed a veritable tool to balance demand and supply in the industry. Kress (2007) stated that when demand is properly forecasted, wastages are eliminated thereby leading to profit is maximization. When there is maximum profit, growth and expansion becomes necessary. Growth and expansion industries come with employment opportunities which help to reduce or eradicate poverty in the nation (Ugbam, 2012). According to Donaldson (1998), forecasting is vital towards enhancing management's ability to drive the business and sustain long-term growth. Banjoko (2007) highlighted the importance of demand forecasts in making decisions regarding the feasibility and viability of a businesss.

George (2002) maintained that forecasting is also important in providing some useful insight into the development of new product lines. In other words, organizations will not put their scarce resources on projects that may likely fail. Industry studies, according to Flyvberg, Holm and Buhl (2005) study indicated that on average, organisations with more precise forecasting and planning competencies have lesser inventory lying dormant in the warehouse, proper-ordering ratings and faster cash-to-cash cycle periods than others. Furthermore, accurate forecasting supports higher earnings per share, higher return on investments as well as enhanced profit margins (Kress, 2007). Hence, forecasting is the safest means of ensuring greater managerial efficiency, as well as sustainable growth and expansion of commerce and industry.

Problem statement, research questions and objectives

Evidently, the numbers of ailing and moribund industries in Nigeria are on the rise. There have been rising cases of dismissal, disengagement and laying off of employees at various sectors of the Nigerian economy. This is partly because only a few organizations in Nigeria make effort to monitor the quality of information used in building demand models. It is indeed worrisome that managers who are the main drivers of the economy shy away from demand forecasting, despite its potentials in aiding their choices of decision-making. The major problem is that experts seem to be having conflicting opinions about the efficacy of demand forecasting. While some experts discredited demand forecasting other others applauded its potency. This inconclusive state of affairs created room for further investigations.

Aim of the study

This study aimed to explore the benefits of demand forecasting as a veritable tool for increasing managerial efficiency in industries in Nigeria. The study is an effort to show how the utilisation of demand forecasting could become a veritable way of minimizing wastages, in other to maximise profits and reviving ailing and moribund industries in Nigeria.

Literature Review
Conceptualising Demand Forecasting

Jobber and Lancaster (2009) defined demand forecasting as the prediction of the quantity of goods or service to be purchased by consumers. Lapide (2009) explained that the 1950s saw the development of the exponential smoothing forecasting methods by the industrialist, Robert G. Brown. According to Ugbam (2012), most of the forecasting software packages that are available today are based on Brown's method. Olalekan et al. (2012) narrated that theories such as game theory came into use towards the latter part of the century, as people realized its potential to influence the future. Olalekan et al. (2012) posited that the Delphi method, which is part of the subjective-intuitive methods, was propounded in the 1950's by the Rand Corporation in Santa Monica, California. Subsequently a wide variety of statistical time-series analysis evolved as people made effort comprehend seasonal and trend variations (Ugbam, 2012). Ugbam (2012) added that forecasting methods and systems became even larger in scale to accommodate the industrial growth and expansion of that generation. Technology also kept pace with this dramatic growth. Computer systems which are based on moving-average and exponential smoothing methods, which do not require so much historical data

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were, developed (Kress, 2007). Lapide (2009) maintained that the biggest change over the past few decades has been a movement from 'historical-based forecasting to demand-driven forecasting', which is a trend from forecasting models that are mainly based on analysing historical data to those that also incorporate the impact of demand-shaping activities, such as sales and marketing promotions.

Flyvberg, Holm and Buhl (2005) posited that no economy thrives where demand forecasting is not used by the managers of the economy. Ugbam (2012) added that the very objective of demand forecasting is to be as accurate and reliable as possible, so as enhance optimum utilization of resources. Unfortunately, Olalekan, Oyewole and Olawande (2012) alleged that most Nigerian managers seem to doubt the accuracy of demand forecasting. Hence, they avoid its utilisation. Accuracy is paramount in forecasting exercises and managers need to base their planning and decision-making on accurate information (George, 2009). In spite of this, some literature argue that most forecasts are inaccurate. However, Flyvberg et al (2005) noted that forecasts have most often remained remarkably imprecise for many years. Kress (2007) asserted that only a minority of firms produce forecasts that are within five percent of the actual result. Donaldson (1998) held that, "all forecasts are wrong but differ according to the extent of their wrongness'. Schuler (1983) was of the view that no one can accurately predict demand.

On the contrary, Lysons and Farrington (2006) adduced several reasons for the inaccuracy of some forecasts and maintained that demand forecasting remains a veritable tool for managerial decision making. Mendenhall, Reinmuth, Beaver and Duhan (1986) attributed inaccuracy to the uncertainty of the future and posited that projections into the future are prone to error and become even more conjectural as one extends further into the future. Calvin (2007) augured that forecasts are often based on assumptions, which could possibly be incorrect or altered by some unexpected circumstances such as war, economic, social or climatic factors. Hence, Calvin maintained that the inaccuracy of forecasts should not nullify the merits of forecasting. Schuler (1983) blames forecast inaccuracy on incompetency on the part of businessmen and managers who refuse to employ experts in forecasting. Waters (1997) posits that skilled people are more in a better position to forecast with great precision to the benefit of their organization. Banjoko (2002) believed that leaving the forecasting job in the hands of skilled professionals will help in addressing the inaccuracy problem. Freund (1983) noted that the reliability of the data is equally important because unreliable data will most likely yield unreliable forecast.

Kress (2007) is of the view that the development and administration of quality demand prototypes as well as the generation of precise forecasts is a professional

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domain that requires skills and technical knowhow of various disciplines such as modelling, statistics, mathematics, management sciences, information technology, data-mining as well as deep knowledge of business. In spite of these merits, Chukwu (2012) notes that only few organizations in Nigeria indulge in proper planning process when it comes to using appropriate skills, resources, tools and methods to ensure the initiation of precise and germane forecasts.

Forecast Assumptions

According to Waters (1997) forecasting techniques are based on following assumptions.

 i. The approaches are dependent on historical data, which assumes that the conditions that prevailed in past observations will be obtainable in the future,

 ii. As the forecast horizon reduces, forecast precision increases, and

 iii. Aggregate forecasts are usually more accurate in comparison to disaggregate ones.

In an attempt to explain the first assumption Kress (2007) asserted that the past and current activity of a process is a good indicator of future outcomes. Lapide (2009) noted that the implication of the second assumption is that short-term forecasts are more accurate than the long-term ones. Unquestionably, the more we delve into the future, the more speculative things will become (Ugbam, 2012). Olalekan et al (2012) explained that the understanding of the third assumption is that forecasting mistakes within items in a group have tendency to cancel out each other. For example, industry forecasting is likely to be more accurate than a forecast for individual firms.

Demand Forecasting Techniques

Numerous techniques are used in forecasting demands. These techniques vary in their degree of sophistication from the simple judgmental approaches to the complex statistical methods (Banjoko, 2002). There is a wide range of things to be forecasted and there are different situations in which demand forecasts are needed. The implication, according to Waters (1997), is that there is no single best method. Ugbam (2012) posited that the choice of a method depends on a number of factors such as time horizon, availability of data, the level of precision needed, forecasting budget size, and availability of experts, organizational flexibility and repercussions of a poor forecast. Several perspectives have been brought to bear on the classification of demand forecasting techniques. However, Olalekan et al (2012) observe that the

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most commonly used approach in research literature categorized them into two broad groups, namely qualitative and quantitative forecasting techniques. This categorization is based on the type of information needed for the forecast.

Qualitative Techniques

According to Wisner and Stanley (2008) qualitative techniques are based on management judgment and opinions and are commonly used when relevant historical sample database is not available. Mendenhall, Reinmuth, Beaver and Duhan(1986) noted that, the methods are generally fast and cheap but are particularly burdened by the problem of accuracy since human judgment is often prone to biases (Banjoko, 2002). Banjoko (2002) listed qualitative Technique to include, such as Panels of Executive Opinions, Consumer surveys and Delphi Technique. Banjoko (2002) explained that Panels of Executive Opinions make use of experts or specialists, who have special knowledge of the industry in question. They form panels, which are normally comprised of a mixture of internal and external personnel. Jobber and Lancaster (2009) explained that opinions could be taken individually or there could be group brain-storming sessions aimed at arriving at a consensus. While this approach is more reliable than a one-person's insight, Waters (1997) noted that sometimes dominant personality amongst the experts can lead mistakes, and as such, poor outcome.

Donaldson (1998) stated that Consumer surveys normally use telephone contacts and personal interviews as a data collection avenue. According to George (2002) the consumers are probe regarding their buying plans as well their projected purchasing behaviours. A large number of respondents are required for effective generalizations. Calvin (2007) concluded that this approach is suitable for industrial goods where there are just a few bulk purchasing customers. This is not the case with consumer goods. Schuler (1983) explained that Delphi Technique employs the help a panel of specialists to produce a more precise forecast. Each expert produces a forecast, which combines the opinion and judgment the given specialist. Mendenhall et al (1986) added that the respective forecasts are collated and concise by an external party and returned to the organisation for comments and reviews by the internal experts. Based on this, the experts make new forecasts. Stapleton (1974) remarked that this process lingers up until an ultimate forecast materialises. The advantage of this technique is that experts work individually and not in contact with each other. This removes the risk of dominant personality factor in the forecasting process.

Quantitative Techniques

These are statistical techniques and involve the analysis of objective data (Stevenson, 2012). It includes time series analysis, which involve the projection of historical data; associative methods, which utilizes casual or explanatory variables to make estimates; and the simulation methods, which mimic consumer's preferences that result in demand, (Wisner et al, 2008). According to Pilinkene (2008) time series or projective methods use historical data of actual demand to predict future demand. This is based on the supposition that the future could easily be predicted from the past events. Freund (1983) identified the four basic components of a time series, namely secular trend, seasonal variations, cyclical variations and irregular variations. However, Lysons and Farrington (2006) insisted on five components, which they listed as average, trend, seasonal, cyclical and random error. The average represents the mean of the observations over time. The trend is a steady increase or decrease in the average over a given period of time. Seasonal influences are predictable short-run cyclical behaviour owing to the time of day, week, month or season. Cyclical movement is the random long-run cyclical behaviour owing to the lifecycle of business or product, while Random error is the left over variation that cannot be explained by the four other components (Steveson, 2012).

There are several variations of the time series method but Lysons et al (2006) maintain that the most frequently used are the moving averages and the exponential smoothing methods. According to Wisner et al (2008) moving average smoothen out fluctuations that occurred in demand within the period. The average of two or more previous periods of actual demand is used as the next period's forecast. The longer the average period, the greater will be the smoothing. Jobber et al (2009) identify the shortfall of moving averages as the inability to predict a 'downturn or upturn in demand'. Exponential smoothing, according to Lysons et al (2006) overcomes the shortfalls of the moving average. It makes a new forecast by adjusting the previous forecast by a fraction of the difference between the previous forecast and the actual demand for that period. A new forecast is obtained by taking a proportion(An) of the latest observation and a proportion(1-a) of the previous forecast (Waters, 1997).

Donaldson (1998) explained that associative (causal) forecasts attempt to predict a dependent or criterion variable from one or more independent or predictor variables, whose values are either known or can be accurately predicted. Schuler (1983) hinted that if the independent variable(s) cannot be estimated, this method cannot be used. Mendenhall et al (1986) associative methods include ***correlation and***

regression analysis. Correlation measures the direction of the relationship between two variables (Ugbam, 2012). There are many diverse correlation methods. The most commonly known, which is the Pearson or product-moment correlation, measures the direction for the linear association between variables (Kress, 2007). The Pearson or product-moment correlation does not work well with curvilinear relationships. The main outcome of a correlation is called the **correlation coefficient** ("r"). Its numerical value ranges from -1.0 to +1.0. Lapide (2009) explains that when r is close to 0, it implies that a relationship does not exist between the variables under investigation. A positive 'r' implies that when one variable gets bigger the other becomes higher, while a negative 'r' implies that when a variable gets bigger, the other becomes smaller, which is known as 'inverse correlation' in most cases.

According to Flyvberg et al (2005) simple linear regression models explain the nexus between one dependent variable and another independent variable by utilising a straight line. Lysonsand Farrington (2006) stated that multiple regressions generally explains the nexus between one dependent variable and two or more independent variables. Wisner et al (2008) explain that simulation forecasting is based on the use of historical data. It mimics consumer preferences that result in demand for specific products and is leveraged on its ability to create and explore a wide range of scenarios. Being one of the most complicated approaches, it is less frequently used. However, with the widespread use of computers, Jobber et al (2009) pointed out that this techniquehas become possible. **Figure 1** below shows the demands forecasting techniques in a flowchart format.

Table 1 above, shows limestone production in metric tons in Nigeria from 2001-2010 from the month of January to December. The Table revealed a fluctuating production trends between years and months. In certain years, the production seems to be rising but declines after some years, and rise again. For instance, in January 2001 production stood at 2477 metric tons and fell to 2439 metric tons in 2003 and increases again in 2004 and 2005 to 2642 and 5882 respectively. It fell again in 2006 and 2007 and rose in 2008 and fell once more in 2009 before rising again in 2010 to 12663 metric tons. This fluctuating production trend seems to reflect in different years from the month of February to December, which shows that there is inconsistency or fluctuation in the production of limestone.

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FOR CAST TECHNIQUES
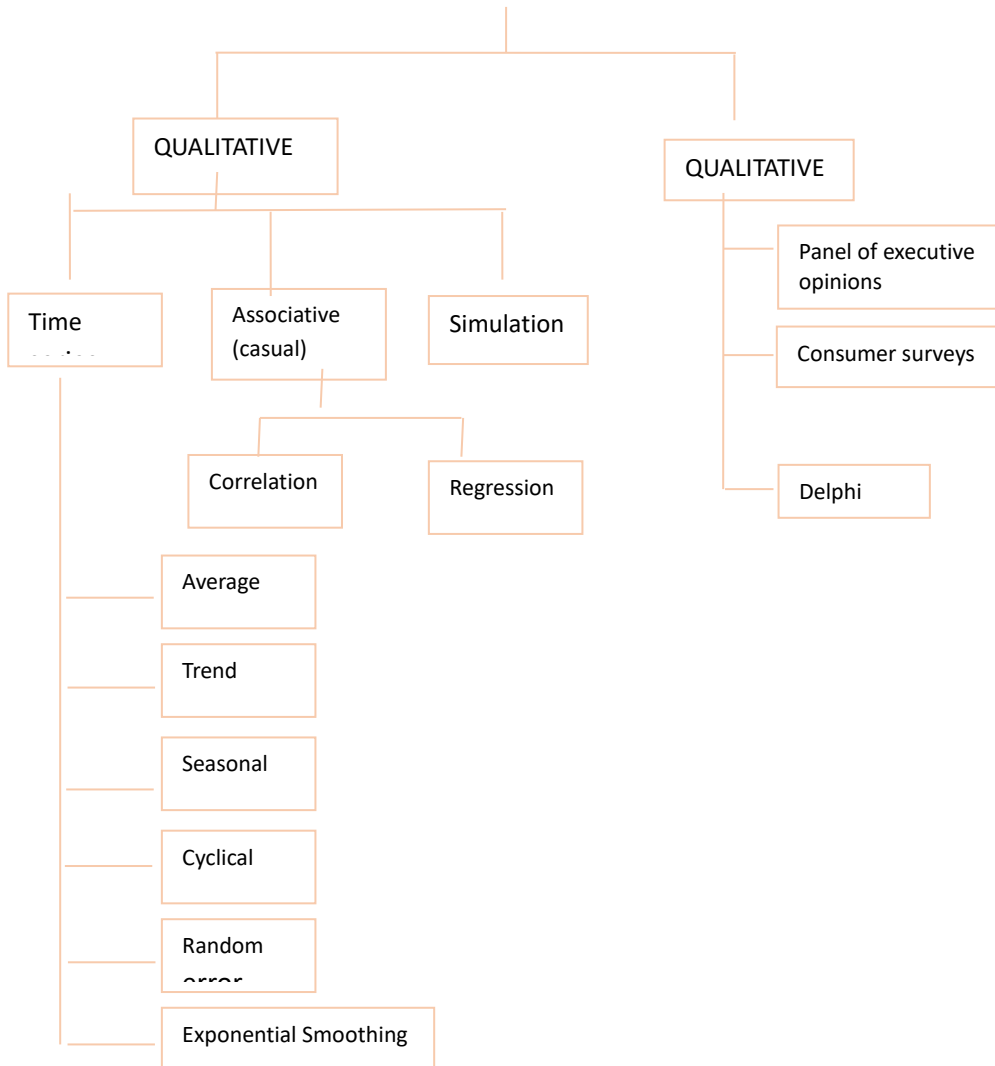
Fig. 1. Flowchart of demand forecasting techniques.

Practical Application

Table 1. Limestone Production (in Metric Tons) in Nigeria, 2001-2010.

MONTH	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
January	2477	2439	2315	2642	5882	4006	2632	8794	7659	12663
February	1733	3684	2027	2144	45188	1868	4610	6691	5532	6252
March	1840	2727	2200	4751	2261	3366	6154	7924	8399	7814
April	3229	2605	3304	2969	3673	4578	4900	4676	5900	9235
May	2787	2628	2402	4807	4352	2372	7402	8700	9897	10477
June	2287	1326	1650	2219	2090	5094	7682	12075	4560	10426
July	3952	3581	4715	5524	2158	3967	6797	8049	5296	9790
August	3370	1750	2916	7265	4978	6636	6427	8151	9113	5963
September	2430	3712	3366	3202	2965	4289	3619	6012	6558	11415
October	1974	3466	2647	2549	4654	7310	5569	9632	8680	9784
November	2642	2825	4800	5162	5958	5716	7363	202	10180	9921
December	3271	3747	4126	4474	6513	8865	8523	871	10897	13269

Source: Kamal (2011)

Table 2. Limestone Sales (in Metric Tons) in Nigeria, 2001-2010

MONTH	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
January	2233	2911	2227	2784	2120	3206	12385	4705	6831	10634
February	767	1355	4092	3073	5733	7622	7707	8330	9550	12722
March	1156	2987	4455	4621	5672	2531	3066	4386	5926	9827
April	2160	3452	2653	2353	2200	3278	7233	2256	7670	4494
May	1286	2502	1700	2191	1455	6956	7272	9922	9808	6653
June	1340	1611	3227	2400	2358	3040	5369	6270	6718	4027
July	1839	1851	3101	1940	6107	4148	7891	6038	4397	10027
August	2475	1865	2849	3527	3583	3539	6429	8566	10038	8420
September	1374	2764	2011	2353	5223	4706	8746	6968	9646	10328
October	1600	2360	2941	2213	5528	5394	8038	8460	8964	9990
November	1929	2962	4484	5635	4095	6013	6151	8327	5343	10645
December	3799	3861	3933	4313	6317	7286	8123	9505	9010	13846

Sources: Kamal (2011)

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Similar to production, Table 2 above revealed to certain extent a fluctuating trends in the sale of limestone in metric tons in Nigeria from 2001-2010. However, the trend revealed different movements in the sales of limestone between years and months. For instance unlike other months which has a rising and to certain extent a falling trends in the sale of limestone, December maintained an upward momentum in the sales of limestone. The sales rose consistently from 3799 metric tons in December 2001 to 13846 metric tons in 2010.

Table 3. Calculation of trends by Least Square Approach of times series analysis for production and sales of Limestone in Nigeria

Variable	Production	Sales
N	120	120
$\sum Y_t$	635,528	613370
$\bar{Y}$	5296.1	5111.4
$\sum t$	7260	7260
$\bar{t}$	00.5	60.5
$\sum t^2$	583220	583220
$\sum Y_t t$	48297158	47134424
B	68.39	69.63
Equation	$a = \bar{Y} - b\bar{t}$	$a = \bar{Y} - b\bar{t}$
A	1158.5	898.78
Trend equation	$Y_t = a + b_t$	$Y_t = a + b_t$
Y_t	$1158.5 + 68.39_t$	$898.78 + 69.63_t$

Source: Author's Fieldwork

Table 3 above is the time series analysis by least square approach for production and sales of limestone in Nigeria. The table shows that for production Y_t is equal to $1158.5 + 68.39_t$, while for sale, Y_t is equal to $898.78 + 69.63_t$. These trends will be used for further analysis in the proceeding section.

Projections of Limestone production and sales from 2011 to 2014

2011 data would be used to compare projected production and sales data with actual (real) production and sales data owing to the fact that the 2012-2014 actual (real) production and sales data could not be realised.

Table 4. Limestone Production and Sales in metric tons Forecast For 2011.

MONTH	ESTIMATED TREND (T_t)		SEASONAL INDEX (S_t)		FORECAST $(T_t \times S_t)$	
	Production	Sales	Production	Sales	Production	Sales
January	9433.69	9324.01	0.9900	1.0159	9339.35	9472.26
February	9502.08	9393.64	0.8160	1.2773	7753.70	11998.50
March	9570.47	9463.27	0.9309	1.0511	8909.15	9946.84
April	9638.86	9532.9	0.8873	0.8088	8552.56	7710.21
May	9707.25	9602.53	1.0457	0.9644	10150.87	9260.68
June	9775.64	9672.16	0.8548	0.9644	8356.22	9260.68
July	9844.03	9741.79	1.0808	0.7373	10639.43	7131.28
August	9912.42	9811.42	1.1361	0.9949	11261.50	9761.38
September	9980.81	9881.05	0.8581	0.9949	8564.53	9761.38
October	10049.2	9950.68	1.0018	0.9916	10067.29	9867.09
November	10117.6	10020.31	1.1035	1.0903	11164.77	10925.14
December	10186	10089.94	1.2975	1.3131	13216.34	13249.10
					117975.71	**116540.78**

Source: Kamal (2011)

Table 4 above, shows that the estimated trend of limestone production in January 2011 was 9433.69 metric tons and that of December 2011 were 10186 metric tons. In other word, there is an estimated increase in production between January and December 2011 with 752.31 metric tons. Almost similar estimation applies in terms of sales from January 2011 to December 2011. In January 2011 the estimated sales were 9324.01 metric tons, which rose to 10089.94 in December 2011. In other words there was an increase in the sale of limestone from January 2011 to December 2011 with 765.93 metric tons. The same rising trend seems to reflect in the forecasted production and sales of limestone. For instance in January 2011, the forecasted production and sales were 9339.35 and 9472.26 metric tons

respectively. These figures increased to 13216.34 and 13249.10 metric tons in December 2011 respectively. The total production of limestone in 2011 stood at 117975.71 metric tons while the total sale stood at 116540.78 metric tons.

Table 5. Limestone Production and Sales Forecast in metric tons for 2012

MONTH	ESTIMATED TREND (T_t)		SEASONAL INDEX (S_t)		FORECAST ($T_t \times S_t$)	
	Production	Sales	Production	Sales	Production	Sales
January	10255	10159.57	0.9900	1.0159	10151.83	10321.11
February	10322.96	10229.2	0.8160	1.2773	8423.37	13065.76
March	10391.15	10298.83	0.9309	1.0511	9673.12	10825.10
April	10459.54	10368.46	0.8873	0.8088	9280.75	8386.01
May	10527.93	10438.09	1.0457	0.9644	11009.06	10066.49
June	10596.32	10507.72	0.8548	0.7373	9057.73	7747.34
July	10664.71	10577.35	1.0808	0.9112	11526.42	9638.08
August	10733.1	10646.98	1.1361	0.9949	12193.87	10592.68
September	10801.49	10716.61	0.8581	0.8442	9268.76	9046.96
October	10869.88	10786.24	1.0018	0.9916	10889.45	10695.64
November	10938.27	10855.87	1.1035	1.0903	12070.38	11836.16
December	11006.66	10925.5	1.2975	1.3131	14281.14	14346.27
					127825.88	**126567.60**

Source: Kamal (2011)

Table 5 above, shows that the estimated trend of limestone production in January 2012 was 10255 metric tons and that of December 2012 were 11006.66 metric tons. In other word, there is an estimated increase in production from January to December 2012 with 751.66 metric tons, which was slightly higher than 2011. Almost similar estimation applies in terms of sales from January 2012 to December 2012. For instance, in January 2012 the estimated sales were 10159.57 metric tons, which rose to 10925.5 in December 2012. In other words, similar to 2011 there was an increase in the sales of limestone from January 2012 to December 2012 with 765.93 metric tons. The same rising trend seems to reflect in the forecasted production and sales of limestone. For instance in January 2012, the forecasted production and sales were 10151.83 and 10321.11 metric tons

respectively. These figures increased to 14281.14 and 14346.27 metric tons in December 2012 for production and sales respectively. The total production of limestone in 2012 stood at 127825.88 metric tons while the total sales stood at 126567.60 metric tons.

Table 6. Limestone Production and Sales Forecast in metric tons for 2013

MONTH	ESTIMATED TREND (T_t)		SEASONAL INDEX (S_t)		FORECAST (T_t x S_t)	
	Production	Sales	Production	Sales	Production	Sales
January	11075.05	10995.13	0.990	1.0159	10964.30	11169.95
February	11143.44	11064.76	0.81600	1.2773	9093.05	14133.02
March	11211.83	11134.39	0.9309	1.0511	10437.09	11703.36
April	11280.22	11204.02	0.8873	0.8088	10008.94	9061.81
May	11348.61	11273.02	1.0457	0.9644	11867.24	10872.31
June	11417	11273.65	0.8548	0.7373	9759.25	8363.40
July	11485.39	11482.54	1.0808	0.9112	12413.41	10399.44
August	11553.78	11482.54	1.1361	0.9949	13126.25	11423.98
September	11622.17	11552.17	0.8581	0.8442	9972.98	9752.34
October	11690.56	11621.8	1.0018	0.9916	11711.60	11524.18
November	11758.95	11691.43	1.1035	1.0903	12976.00	12747.17
December	11827.34	11761.06	1.2975	1.3131	15345.97	15443.45
Source: Kamal (2011)					**137676.09**	**136594.40**

Table 6 above, shows that the estimated trend of limestone production in January 2013 was 11075.05 metric tons and that of December 2013 were 11827.34 metric tons. In other word, there is an estimated increase in production from January to December 2013 with 752.29 metric tons, which was slightly higher than 2012. Almost similar estimation applies in terms of sales from January 2013 to December 2013. For instance, in January 2013 the estimated sales were 10995.13 metric tons, which rose to11761.06 in December 2013. In other words, similar to 2012 there was an increase in the sales of limestone from January 2013 to December 2013 with 765.93 metric tons. The same rising trend seems to reflect in the forecasted production and sales of limestone. For instance in January 2013, the forecasted production and sales were 10964.30 and 111169.95 metric tons respectively. These figures increased to 15345.97 and 15443.45 metric tons in

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December 2013 for production and sales respectively. The total production of limestone in 2013 stood at 137676.09 metric tons while the total sales stood at 136594.40 metric tons.

Table 7. Limestone Production and Sales Forecast in metric tons for 2014

MONTH	ESTIMATED TREND (T_t)		SEASONAL INDEX (S_t)		FORECAST (T_t x S_t)	
	Production	Sales	Production	Sales	Production	Sales
January	11895.73	11088.91	0.9900	1.0159	11776.77	11265.32
February	11964	11900.32	0.8160	1.2773	9762.72	15200.28
March	1203251	11969.95	0.9309	1.0511	120106	12581.61
April	12100.9	12039.58	0.8873	0.8088	12725.43	9737.61
May	-	12109.21	-	0.9644	-	11678.12
June	12237.68	12178.84	0.8548	0.,7373	10460.77	8979.46
July	12306.07	12258.47	1.0808	0.9112	13300.40	11160.81
August	12374.46	12318.1	1.1361	0.9949	14058.62	12255.28
September	12442.85	12387.73	0.8581	0.8442	10677.21	10457.72
October	12511.24	121457.36	1.0018	0.9916	12533.76	12352.72
November	12579.63	12526.99	1.1035	1.0903	13881.62	13658.18
December	12648.02	12596.62	1.2975	1.3131	16410.81	16540.62
Source: Kamal (2011)					1475263	145867.63

Table 7 above, shows that the estimated trend of limestone production in January 2014 was 11895.73 metric tons and that of December 2014 were 12648.02 metric tons. In other word, there is an estimated increase in production from January to December 2014 with 752.29 metric tons, which was similar to 2013. Almost similar estimation applies in terms of sales from January 2014 to December 2014. For instance, in January 2014 the estimated sales were 11088.91 metric tons, which rose to 12596.62 in December 2014. In other words, in 2014 there was a rapid increase in the sales of limestone from January 2013 to December 2013 with 1507.71 metric tons. The same rising trend seems to reflect in the forecasted production and sales of limestone. For instance in January 2014, the forecasted production and sales were 11776.77 and 11265.32 metric tons respectively. These figures increased to 16410.81 and 16540.62 metric tons in December 2014 for

production and sales respectively. However, there were no records for production in May 2014. The total production of limestone in 2014 stood at 1475263 metric tons while the total sales stood at 145867.63 metric tons.

The fitted trend equation for production is:
$Y_t = 1158.5 + 68.39t$
Where $t = 1, 2. \ldots \ldots \ldots \ldots \ldots 120$
Such that $t = 1$; represents January 2001
$t = 2$; represents February 2001
: :
: :
$t = 120$; represents December 2010
Hence $t + 1 = 120 + 1$; represents January 2011
: :
: :
$Y_{121} = 1158.5 + 8275.19 = 9433.69$
$Y_{122} = 1158.5 + 8343.58 = 95402.08$
: :
: :
$t + 48 = 120 + 48 = 168$ represents December, 2014
$Y_{168} = 1158.5 + 11489.52 = 12648.02$
Thus, the predicted value = Trend (T_t) x seasonal index (S_t)
$Y_{121} = 9433.33 \times 0.9900 = 9339.35$
$Y_{122} = 9502.08 \times 0.8150 = 7753.70$
: :
: :
$Y_{168} = 12648.02 \times 1.2975 = 16410.81$
The fitted trend equation for sales is
$Y_t = 898.78 + 69.65t$ is as defined above
$Y_{121} = 898.78 + 8425.23 = 9324.01$
$Y_{122} = 898.78 + 8494.86 = 9393.64$
: :
: :
$Y_{168} = 898.78 + 16697.84 = 12596.62$
The predicted value: Trend (Tt) x seasonal index (St)

$Y_{121} = 9324.01 \times 1.0159 = 9472.26$

$Y_{122} = 9393.64 \times 1.2773 = 11998.50$

: :

: :

$Y_{168} = 12596.62 \times 1.3131 = 16540.62$

Owing to the fact that the real data for 2012-2014 could not be realised as at the time of executing the research, we utilised only 2011 base year for our analysis.

Comparison of 2011 Projections with Real Data

Table 8. Limestone Production/Sales Projection and Real Data in metric tons for 2011

Month	Projected (production)	Projected (sales)	Real data (production)	Real data (sales)
January	9339.35	9472.26	10024	9942
February	7753.70	11998.50	8151	10002
March	8909.15	9946.84	8808	9765
April	8552.56	7710.21	8202	7994
May	10150.87	9260.68	9890	9670
June	8356.22	7131.28	8450	8250
July	10639.43	8876.72	10.740	8530
August	11261.50	9761.38	11150	9841
September	8564.53	8341.58	8945	8950
October	10067.29	8341.58	10550	8950
November	11164.77	10925.14	11279	10740
December	13216.34	13249.10	13483	12995

Source: Author's Fieldwork

Table 8 above shows limestone production/sales projection and real data for 2011. The above table is a reflection that there is a slim variance between the projected production/sales and the real data for production/sales. For instance, in the month of March, while the projected production was 8909.15 metric tons, the actual production was 8808 metric tons, which is a shortfall of 101 metric tons from the projected production. In the same month the projected sales were 9946.84

metric tons, while the real sales were 9765 metric tons, which amounts 181.84 shortfall from the projected sale, etc.

Test of Equality of Means

To confirm if there is a significant difference between the means of the predicted figures (projections) and real data for the year 2011, t-test statistics was used at .05 level of significance. Below are the results:

For Production:

$$t = \frac{\dot{X}_1 - \dot{X}_2}{\sqrt{(S_1^2/n_1 + S_2^2/n_2)}}$$

$$= \frac{9962 - 9831.31}{\sqrt{(2470600.727/12 + 2447049.182/12)}}$$

$= 130.69/640$

$= 0.204$

t = t-test statistics, hence, t-calculated.

For Sales:

$$t = \frac{\dot{X}_1 - \dot{X}_2}{\sqrt{(S_1^2/n_1 + S_2^2/n_2)}}$$

$$= \frac{9711.73 - 96379.08}{\sqrt{(2981517.704/12 + 1736853.182/12)}}$$

$= 32.65/627.05$

$= 0.052$

t = t-test statistics, hence, t-calculated.

Interpretation of Results

For production, since the calculated t-value (0.204) is less than the t-critical value (1.32), we therefore conclude that there is no significant difference between the mean of the forecasted figures and the real data. This implies equality of means. For sales, since the calculated t-value (0.052) is less than the t-critical value (1.32), we therefore conclude that there is no significant difference between the mean of the forecasted figures and real data. This also implies equality of means. Since the

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differences in means is found to be non-statistically significant, which implies equality of means, it is therefore found in this study that the projections made based on the least square model are fairly accurate and could be relied upon for planning and decision making purposes.

Limitations of the study

The analysis could have be more robust if the researchers were able to obtain the real data for 2012-2014. However, due to the fact that the real data for 2012-2014 could not be realised as at the time of conducting the research, the researchers therefore relied on only 2011 base year for the analysis, which is hereby acknowledged as the limitation of the study.

Conclusion and recommendations

When properly modelled, demand forecasts could help to ameliorate the impact of uncertainty in the business environment. It provides managers with the basic information required to make informed decisions. Forecasting can become a critical instrument for the enhancement of management ability to drive and sustain the long-term growth of business. The importance of demand forecasts in making decisions regarding the feasibility and viability of a business plan cannot be overemphasised. Forecasting is indeed important in providing some useful insight into the development of new products and product lines. It assists organizations to avoid putting their scarce resources on projects that may not be successful in future. Studies have shown that, on average, companies with more accurate demand forecasting and planning capabilities have less inventory, better perfect-order ratings and shorter cash-to-cash cycle times than others. More than that, accurate demand forecasts lead directly to higher earnings per share, higher return on assets and improved profit margins (Kress, 2007). Based on the above analysis, the current study submits and reiterates that forecasting is at the heart of business performance and potentially a significant driver of value in any economy. Therefore, it is proposed that managers of industries in Nigeria should always consider forecasting as a veritable tool for organisational efficiency. However, to maximize the benefit of demand forecasting, the following recommendations are noteworthy:

1. Given that the data used in demand forecasting is derived from multiple sources with possibilities of inaccuracy, there will be a need for strong control to enhance the liability of data used for demand forecasting.

2. Managers should see demand forecasting as an interdisciplinary activity that requires a combination of the technical skills of statisticians, economists and behavioural scientist and as such, should employ the services of experts in demand forecasting to minimize or even eradicate inaccuracies.

3. A combination of methods should be used by analysts in forecasting the demand for their products and services.

4. Ministries of commerce and industry as well as labour and productivity, at both the federal and state levels should embark on aggressive sensitization of managers on the importance demand forecasting.

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THE EFFECT OF INVENTORY MANAGEMENT ON THE PERFORMANCE OF MANUFACTURING FIRMS IN NIGERIA

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Abstract
Research study thoroughly examined Effect of Inventory Management on the Performance of Manufacturing Firms in Nigeria, a research of some selected quoted manufacturing firms, where inventory management were captured by inventory turnover, inventory conversion period and manufacturing firm size and return on asset was used in measuring performance. Study reveal the existence of a relationship between inventory management and performance of selected quoted manufacturing firms in Nigeria. In conclusion, it can be asserted from the result that inventory management is an engine device that drive the performance of manufacturing firms in Nigeria. Inventory turnover and manufacturing firm size positively influence the performance of manufacturing firms. Also, increase in inventory turnover and firm size affects and enhances performance of manufacturing firms in Nigeria. This study recommends that management of the manufacturing firms should embrace effective inventory management practices such as inventory turnover and inventory conversion period, which can improve performance. In addition, management of the firms must develop a working

strategic policies and guidelines principle on inventory management to control the staff and endeavor that optimal inventory levels are held, by this costs will be minimize and performance maximize.

Keywords: *return on asset; performance; inventory management; inventory turnover; inventory.*

JEL Classification: M10

1.0 INTRODUCTION

Inventories, consist of raw or unprocessed materials, work-in-progress (consumables or spare parts) and finished goods are crucial for manufacturing companies to function effectively. The performance of manufacturing firms is grounded o,n the capacity and the ability of the management in taking decisions such as allocation of resources for proper utilization, decisions can be qualitative or quantitative. Resources are very important in companies, firms, or organizations because they made-up part of the elements in achieving the business objectives. According to (IAS 2) International Accounting Standard 2, Inventory means tangible assets held in the course of carrying-out business operation, in the production process of such sale, or to be used in the production of goods or services for sale. Miller (2010) opined that inventory management simply means monitoring and supervision of supply, storage and availability of items in order for a satisfactory supply that is neither short nor excess. Inventory control means the availability of needed items at any time in any place necessary or demanded, by stocking enough inventory (Ogbo, Onekanma & Wanes, 2013). A total sum of similar operations necessary for acquisition, storing, sales and the disposal or use of stock items is called inventory control or management. Many organizations could not work effectively without inventory thus; they need to put into consideration how it could be managed.

Problems of Inventory have multiplied due to development to technology which has seriously increased the organization's strength to manufacture goods faster in greater quantities and with various designs Tersine, (2009), Godana and Ngugi (2014) and (Simon et al., 2018). Management visualizes excess inventory favorably but in recent times, people and managers began to discover how important inventory control is and its disadvantages when it is excess. Storing large inventories do tie down capital resources as well as generates unforeseen costs (Salawati, Tinggi, & Kadri, 2012). Similarly, excessive stock uses up land space, induces a financial

burden, and increases the likelihood of damages, spoilages likewise losses (Naliaka & Namusonge, 2015). Contrary, short or insufficient stocks oftentimes hinder business operations (Dimitrios, 2008). (Ogbadu, 2009). This study pursued to examine the Effect of Inventory Management on the Performance of Manufacturing Firms in Nigeria. Thus, serve as a valuable source of information to the researchers, organizations or companies, Governments, and the general public, also providing insight as well as adding to existing literature. Sequel to the identified research problems this research is keen towards providing answers to the question; is there a relationship between inventory management and performance of the selected quoted manufacturing firms in Nigeria?

Research Objectives

The research objective of the study in consideration was intended to investigate the relationship between inventory management and performance of the selected quoted manufacturing firms in Nigeria **Hypothesis**

H_O**:** there is no relationship between inventory management and the performance of the selected quoted manufacturing firms in Nigeria

2.0 REVIEW OF LITERATURE
2.1.1 Inventory

According to the International Accounting Standard 2 (IAS 2) Inventories simply means assets held for sale; production for such sale; or in materials form or supplies for absorption in the production process or services rendering. Inventories are held by a business firm to ease the production process. Inventory is made up of one of the biggest and uttermost substantial investments of any retailer or manufacturing firm. According to Akinyomi & Tasie (2011), inventories constitute an essential demand of working capital administration.

2.1.2 Reasons for Holding Inventories

Manufacturing organizations hold inventory for many reasons, such as:

Running Operations: A producer must possess some purchased items (raw materials component or work in progress) to start up the production process. Completing the production of finished goods can be hindered when a manufacturer is out of stock or even one item. In a work-Unit, they usually rely on the previous operation process to provide a part to work on. Suppose a line of work stops at a work-Unit, all other units next to carry on the process, will shut down due to

interruption in the other unit. To avoid that, adequate inventories must be available in stock to affirm a smooth running of business operation.

Lead Time: it means the elapses of time between when orders of goods are made and the exact time they were received. For example, an external or internal (department within an organization) supplier couldn't supply the requested goods on demand, as a result, the requesting firm must stock inventory of required goods because the bigger the size of goods the firm must store as inventory depends on how long the lead time.

Quantity Discount: Purchasing a large number of goods in most cases tends to a decrease in price known as discount. (Wangari, 2015) said that inventory is an important function in the production system and in reality not possible and economic-wise cannot be practicalized for every stock to get to the actual place and time it is being put to use, therefore it is necessary to keep a certain amount of inventory at any time.

2.1.3 What is Management?

Management simply means the process of organizing, coordinating, and controlling business activities to actualize desired goals or objectives. Inventory management simply means effective use of inventory in an efficient manner. It is greatly more concerned with the proper management of inventory to actualize a higher level of inventory in an organization's working capital. The importance of adequate control of inventory is the foremost; therefore, it becomes uneasy to tie down the little capital by holding unnecessary large inventory.

The main reason for inventory management is to minimize cost, maximize profit, and avoid stock-out. There is a need to minimize expenses or costs, so as not to spend excess or unfruitful expenses such as spoilage or storage costs to achieve effective and efficient inventory management. Cost can also be minimized by avoiding avoidable costs. Moreover making efficient stocks available at the right time ensures prompt production and selling without any delay. Inventory management prevents surplus stock that is unnecessary and helps in keeping inventory with an available storage capacity.

2.1.4 Techniques of Inventory management

Inventory management is vital in the sense that, it can be customized to reduce expenses or proliferate income in the process of fulfilling customer's demands by making sure that an adequate proportion of items of inventory are maintained at the

right quality, quantity, and that are accessible at the right time and in the right place. The techniques reviewed are as follows

Just in time technique (JIT): JIT is derived from Japanese philosophy, it denotes, rationality associated with assembling which consists of acquiring the right items of the right quality in the appropriate place and at a convenient time. Utilization of JIT brings about an increase in quality, profitability, and effectiveness, heightened correspondence, and reduces expenses and extravagant spending. Hutchins (1999) and Atnafu & Balda, (2018) characterize the Just in time technique as an act ready for instant feedback to any request, ruling-out unnecessary stocking which could tie down capital and create hidden cost. It furthermore mentioned accomplishing zero inventory is the aim of JIT.

Economic order quantity: as opined by Bowersox (2002) and Atnafu & Balda, (2018), management of inventory requires to be adequately arranged in a logical manner such that an organization can determine the exact time to order and at what quantity to order. Calculating the EOQ can determine that. One can engage the use of correlation to arrange inventory reestablishment on an ideal premise. For example, the arrangement can be slated to be occurring monthly, quarterly, half a year, or yearly. By that it makes firms to have insignificant limit costs or zero inside their circulation focuses. EOQ and Re-Order Point (ROP) are necessary instruments that associations can utilize to improve their inventory management or control.

2.1.5 Inventory Management Difficulties

Major wholesalers and retailers actors involved in downstream distribution channels do encounter difficult situations in ensuring that inventory is kept wisely, not lower or higher than necessary because of challenges in predicting demands and customers' anticipation about the availability of inventory items (Coyle et al., 2003 and Agu, 2016). The challenge is greater looking at the differences of products in respect to color/design, package type, and size. Further to more describe the problem, we assume there is an accurate demand forecast; notwithstanding, the total demand will have to be broken down in respect to specifications of the product into sub-total demand forecast to control the inventory or stock-keeping units in the company in order to fulfill the final customer's order. However, the sub-total demand forecasts could be diverse, reaching hundreds or thousands of categories; in such situations, they become difficult and time-consuming. The challenging aspect of forecasting demands appropriately normally turn-out in two problems, in such a way that is totally opposite, that is overstock

and stock-out. The more firms continue to run from not meeting demands when inventory is out of stock, this could lead to overstocking.

2.1.6 Performance Measure of Manufacturing Firms

Return on Asset: Return on Asset shows the percentage of how profitable an organization's assets are, in generating income. ROA is computed as Net income/ Average Total assets. The measured number tells more about what an organization can do with what it has, that is, how many dollars of assets they control. It is a useful number for comparing competing companies in the same industry. The number will vary widely across different industries. Measured numbers vary from one company to another. Return on assets indicates the capital intensity of the company, which will depend on the industry that requires large initial investments will generally have a lower return on assets. ROAs over 5 percent are generally considered good.

Return on Equity: in corporate finance, return on equity is a measure of the profitability of a business in relation to the equity, also known as net assets or assets minus liabilities. Roe is a measure of how well a company uses investments to generate earnings growth.

Earnings per share: EPS is the portion of a company's profit that is allocated to every outstanding share of its common stock. This is calculated by taking the difference between a company's net income and dividends paid for preferred stock and dividing the figure by the average number of shares outstanding. Earnings per share is a measure of how much profit a company has generated. EPS of a manufacturing firm can be on a quarterly or yearly basis.

Profit before Tax: this is a profit earned before a manufacturing firm pays or deducts its company income tax. PBT is profit after deducting the cost of goods sold, other expenses not excluding interest excluding any form of tax liability, etc., total sum is known as profit before tax PBT.

Profit after Tax: this means, a net profit earned by a manufacturing firm after deducting all expenses such as interest, depreciation, and corporate income tax. Profit after tax can be completely retained by a manufacturing firm to be used in the business. Declared Dividends are paid to the shareholders from net profit.

2.2 Review of Theories
2.2.1 Economic Order Quantity Theory

(Agu, 2016) F.Wilson, Haris is part of notable authors within the operation management who had developed Economic Order Quantity (EOQ) models to

determine optimal inventory levels that organizations should observe and keep. Blackburn, also agreed that many organizations, companies, and firms widely adopt the use of EOQ. The model was established by F. Haris in 1913 otherwise called Wilson Economic Order Quantity; in an elaborate form, Wilson accurately analyzes EOQ. While using EOQ, it was severally shown that cost of some inventory rises while other inventory costs decrease. Economic Order Quantity is an inventory management system that helps in minimizing ordering costs and total inventory holding costs.

Coleman (2002), Ogbo (2011) and Agu, (2016) mentioned that the model minimizes the aggregate of inventory holding cost and re-ordering cost. Ogbo (2011) & Agu, (2016) stated the fundamental fact necessary for calculating EOQ this consist, inventory holding costs; ordering costs; demand rate; lead time cycle, and price per unit all these are known and constant. The refilling is made, immediately an operation in stock is supplied to avoid inventory items being out of stock. Economic order Quantity recons with having buffer stocks as one of its demerit, which is maintained to cater for variations in lead-time and demand making it difficult to be observed in practice. The EOQ model requires that for every item stocked in the stores, there is a need to determine the point of order and the most cost-effective quantity to order.

2.2.2 Lean theory

Heizer & Render (2006) and Musau & Namusonge, (2017) mentioned that inventory management is a continuous provision of standard items with independent demand, and certain quantities should always be made available. Inventory systems focus on cost efficiency. According to Tempelmeier, (2011) and Musau & Namusonge, (2017), they mentioned that the theory was postulated so that, production, warehousing, and general supply chain decisions could be promptly executed. The lean theory was based on the EOQ model concepts, which strive to perfect as possible the quantity of independent material demanded. The theory frontal, the contingent of the diverseness of functional systems been engaged in monitoring the position of inventory, more so the diversity in inventory materials that could demand different treatment. Kros, Falasca, and Nadler, (2006) and Musau & Namusonge, (2017), stated that the theory is typically an extension of ideas of just in time (JIT). JIT is a pull-based system aimed to array production and business operation along the supply chain. Green and Inman (2005) examined the impact of lean theory on financial performance. The theory, according to

discovered stated that it might freeze out buffer stock also it reduce wastages in the production operation. Eroglu & Hofer (2011) and Musau & Namusonge, (2017) discovered that inventory leanness positively affects profitability. They opined that inventory leanness is the most accurate inventory control tool. Lean theory intensifies on what way producers can obtain flexibility in decisions pertaining to ordering, in order to minimize the stocks of inventory and prevent inventory-carrying costs. At the aggregate level, the empirical strength of the lean explanation lies in both the time and magnitude of its adoption.

2.3 Empirical review

Inventory management over the years has become another supply chain element that features prominently in empirical literature in relation to organizational or firm performance. Mogere, Oloko, and Okibo (2013) and Musau & Namusonge, (2017) carry out a study, using the Gianchore tea factory as a case study to examine in what way inventory control systems affect operational performance in the tea industry. Using survey research method, questionnaires are structured to collect data, and analyses were conducted using regression model, it was discovered from the study that the use of material requirement planning, distribution planning, and vendor-managed inventory had a positive influence on operations efficiency. Also, on organizational performance.

A study was conducted by Lwiki, Ojera, Mugenda & Wachira (2013) and Musau & Namusonge, (2017) to assess the manner in which inventory management practices in sugar manufacturing firms impact firms' financial performance. Primary data and secondary data were used, and analysis was carried out using a correlation model. It was discovered that inventory management impacted positively with both returns on sales and return on equity.

Anichebe and (Agu 2013, 2016) carried out a study on the Effects of Inventory Management on Organizational Effectiveness in selected organizations in Enugu, the study examined the impact of proper inventory management on organizational performances in Yemenite, Hardis& Dromedas, and the Nigeria Bottling Company all in Enugu, Enugu State. The use of the Descriptive method using the survey method of data collection was adopted. The study population is six hundred and fifty-eight (658). With a sample size of two hundred and forty-eight (248). Data were generated using questionnaires, oral interviews, observations, books, journals, and the internet. Pearson product-moment correlation coefficient and linear regression were used in the hypotheses testing. The Findings indicate that there is a

significant relationship between good inventory management and organizational effectiveness. Inventory management has a significant effect on organizational productivity. There is a highly positive correlation between good inventory management and organizational profitability. The study concluded that Inventory Management is very vital to the success and growth of organizations.

Edwin, Florence (2015) and (Agu, 2016) investigated the effect of inventory management on profitability of cement manufacturing companies in Kenya: A case study of listed cement manufacturing companies in Kenya. A cross-sectional data from 1999 to 2014 was gathered for the analysis of the annual reports for the three sampled firms listed at Nairobi Securities Exchange. An ordinary least squares regression technique was applied to establish the relationship between inventory management and a firm's profitability. The results revealed a negative relationship between inventory turnover, inventory conversion period, and storage cost with the profitability of the company. In addition, inventory level was found to be directly related to the firm's size and storage cost.

3.0 Methodology

This research adopted a descriptive and explanatory design focusing on the relationship between inventory management and the performance of manufacturing firms in Nigeria. This work adopted Edwin and Florence (2015) model, which showed the relationship between inventory management and profitability of cement manufacturing companies in Kenya. It is stated in functional form as,

$$PROF_{it} = f(INVM_{it})$$

In an explicit form, this model can be written as,

$$PROF_{it} = b_0 + b_1 INVM_{it} \quad e_{it +}$$

Where: PROF= Profitability of the cement manufacturing companies, INVM = Inventory management   e = Error term, i = sample of cross-sectional variables, t = Time dimension of the Variables and β_i = parameter to be estimated

Therefore, this research work was modified the model stated in the equation using return on asset (ROA) to capture the performance of manufacturing firms while, inventory management was captured by inventory turnover (INVT),

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inventory conversion period (INCP), and manufacturing firms size (FIRZ). Hence, the model put to use in the course of this research is in functional equation form;

$$ROA_{it} = f(INVT_{it}, INCP_{it}, FIRZ_{it})$$.

The estimation technique used for this research work includes descriptive analysis, correlation, and Panel data regression technique. In this research, it is expected that the coefficient of the variables or the parameters estimated is positive. This implies that the values of the estimated parameters (α_i) must be greater than zero. That is, α_1 α_2, α_3, α_4 and >0 If this is true, it means theoretically that the inventory management captured by inventory turnover, inventory conversion period, and manufacturing firm's size has a positive effect on the return on asset as a measure of performance of the quoted manufacturing firms in Nigeria.

4.0 Analysis of Data

Data extracted from the financial statement of the selected quoted manufacturing firms on the Nigeria stock exchange. Required data were extracted to compute the identified variables used in this study. The analysis was done such descriptive analysis, correlation analysis, Pooled panel least square model.

The descriptive analysis of the variables used for the investigation of the relationship between the performance of manufacturing firms measured by (ROA) and inventory management of the manufacturing firms measured by inventory turnover (INVT), inventory conversion period (INCP), and firm size (FIRZ) of the manufacturing firms. Table 4.1 revealed that the mean performance of the manufacturing firm measured using return on asset (ROA) and inventory management of the manufacturing firms captured by inventory turnover (INVT), inventory conversion period (INCP), and manufacturing firm size (FIRZ) were 14.98, 1.72, 35.14 and 22.01 respectively during the period under investigation.

The maximum and the minimum: performance of the manufacturing firms measured by return on asset (ROA) and inventory management of the manufacturing firms captured by inventory turnover (INVT), inventory conversion period (INCP), and manufacturing firm size (FIRZ) were: 34.90 & -1.91, 4.00 & -6.40, 57.69 & 12.59 and 65.99 & 3.92 accordingly. The standard deviation of 9.68, 1.83, 12.03, and 17.64 shows the actual rate that performance of the manufacturing

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firm measured by return on asset (ROA) and inventory management of the manufacturing firms captured by inventory turnover (INVT), inventory conversion period (INCP) and manufacturing firm size (FIRZ) are different from their average or expected value.

Table 4.1: Descriptive Analysis Result

	ROA	INVT	INCP	FIRZ
Mean	14.97910	1.719000	35.13767	22.00933
Median	13.42500	1.940000	32.87000	16.69500
Maximum	34.90000	4.000000	57.69000	65.99000
Minimum	-0.912000	-6.400000	12.59000	3.920000
Std. Dev.	9.681274	1.834154	12.03423	17.64430
Skewness	0.329804	-3.084861	0.428013	1.226552
Kurtosis	2.268959	14.15921	2.212558	3.602649
Jarque-Bera	1.211878	203.2417	1.691056	7.976129
Probability	0.545562	0.000000	0.429331	0.018536

Source: Researchers' Computation, 2021

The table above depicts that the performance of the manufacturing firms measured by return on asset (ROA) and inventory management of the manufacturing firms captured by inventory conversion period (INCP) and manufacturing firm size (FIRZ) is skewed positively with a skewness coefficient of 0.33, 43 and 1.23 respectively thus implies that the distribution of variables under investigation has a long tail to the right. therefore, the kurtosis of the performance of the manufacturing firms measured by return on asset (ROA) and inventory management of the manufacturing firms captured by inventory turnover (INVT), inventory conversion period (INCP), and manufacturing firm size (FIRZ) with

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kurtosis coefficient indexes of 2.27, 14.16, 2.21 and 3.60 respectively. The Jarque-Bera and the value of profitability show that inventory management of the manufacturing firms captured by inventory turnover (INVT) and manufacturing firm size (FIRZ) was not normally distributed and with an element of statistical significance which emphasized that inventory management of the manufacturing firms captured inventory turnover (INVT) and manufacturing firm size (FIRZ) of the manufacturing firms have an effect on the performance.

Table 4.2: Correlation Matrix

	ROA	INVT	INCP	FIRZ
ROA	1.000000	0.444634	-0.409214	0.017810
INVT	0.444634	1.000000	-0.126622	0.214717
INCP	-0.409214	-0.126622	1.000000	-0.378906
FIRZ	0.017810	0.214717	-0.378906	1.000000

Source: Researchers' Computation, 2021

Tables 4.2 shows the correlation values that exist between the performance of the manufacturing firms measured by return on asset (ROA) and inventory management of the manufacturing firms captured by inventory turnover (INVT), inventory conversion period (INCP), and manufacturing firm size (FIRZ). Table 4.2, it was seen that a positive correlation exists between the performance of the manufacturing firms measured by return on asset (ROA) and inventory management of the manufacturing firms captured by inventory turnover (INVT) and manufacturing firm size (FIRZ), showing the correlation coefficient of 0.44 and 0.02 respectively. Also, the study revealed a negative correlation between the performance of the manufacturing firms measured by return on asset (ROA) and inventory management of the manufacturing firm captured by inventory conversion period (INCP) with correlation coefficient of -0.41. However, the table shows a negative correlation between inventory turnover (INVT) and inventory conversion period (INCP) and inventory conversion period (INCP) and manufacturing firm size (FIRZ) as a measure of inventory management of the manufacturing firms

showing correlation coefficients of 0.13 and -038 respectively. In addition, a positive correlation was discovered between the inventory turnover (INVT) and manufacturing firm size (FIRZ) as a measure of inventory management of the manufacturing firms showing a correlation coefficient given as 0.21. Thus, it can be asserted based on this result that inventory management is an engine device to drive the performance of the manufacturing firms in Nigeria.

Table 4.3: Fitted Regression Model

Variable (Dependent): ROA				
Adopted Method: Least Squares				
Sample size: 150				
Observations: 50				
Variable	Coeffic.	Standard. Error	t-Statistic	Probability.
C	26.57545	6.140033	4.328225	0.0002
INVT	2.327330	0.839347	2.772785	0.0101
INCP	-0.359304	0.135009	-2.661327	0.0132
FIRZ	0.135030	0.093523	1.443817	0.1607
R-squared	0.674433	Mean dependent var		14.97910
Adjusted R-squared	0.632252	S.D. dependent var		9.681274
S.E. of regression	8.086896	Akaike info criterion		7.141933
Sum squared resid	1700.345	Schwarz criterion		7.328759
Log-likelihood	-103.1290	Hannan-Quinn criteria.		7.201700
F-statistic	5.187426	Durbin-Watson stat		1.903440
Probability(F-statistic)	0.006080			

Source: Researchers' Analysis, 2021

The fitted model presented in table 4.3, reveal that a positive relationship exists between the performance of the manufacturing firms measured by return on asset (ROA) and inventory management captured by inventory turnover (INVT) and manufacturing firm size (FIRZ) this implies, there is a positive impact of inventory management on manufacturing firm's performance. On the other hand, a negative

linear relationship exists between the performance of the manufacturing firms measured by return on asset (ROA) and inventory management captured inventory conversion period (INCP). The study further revealed a one percent increase in inventory management captured by inventory turnover (INVT) and manufacturing firm size (FIRZ) led to an increase of 2.33 also 0.14 percent respectively in the performance of manufacturing firms measured by return on asset (ROA). However, it was discovered that the inventory management measured by the inventory conversion period (INCP) limits the performance of manufacturing firms measured by return on asset (ROA) by 0.36 percent during the period under investigation. Thus, the result established a relationship exists between inventory management and return on asset as a measure of manufacturing firms' performance.

5.0 Findings

From Table 4.2, it was discovered that a positive correlation exists between the performance of the manufacturing firms measured by (ROA) and inventory management of the manufacturing firms captured by (INVT) and (FIRZ) showing a correlation coefficient of (r=0.44 and 0.02) respectively. In addition, a positive correlation was discovered between the (INVT) and (FIRZ) as a measure of inventory management of the manufacturing firms with the correlation coefficient given as (r=0.21). Also shows a negative correlation between the performance of the manufacturing firms measured by (ROA) and inventory management of the manufacturing firm captured by (INCP) with correlation coefficient of (r= -0.41). However, it was discovered that a negative correlation exists between (INVT) and (INCP) and (FIRZ) as a measure of inventory management of the manufacturing firms with the correlation coefficients of (r= -0.13 and -038) respectively. Thus, it can be asserted based on the result that inventory management is an engine device that drives the performance of the manufacturing firms in Nigeria.

However, as stated, the null hypothesis mentioned that no relationship exists between inventory management and performance of the selected quoted manufacturing firms in Nigeria, however, with table 4.2 result null hypothesis is now rejected. We now accept that there exists a relationship between inventory management and the performance of the selected quoted manufacturing firms in Nigeria.

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NEW TYPES OF BUSINESS DEVELOPED
IN THE PANDEMIC

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Abstract
The impact that COVID-19 had, especially on business, although it could
not be anticipated, was a real challenge for entrepreneurs, from which they
had to learn, and were determined to develop their creativity, coming up with
solutions. and proposals for survival. The pandemic has opened up a number
of opportunities for business owners to meet the ever-changing needs and
demands of consumers. Opportunities are identified and exploited only by

those entrepreneurs who think ahead, who eventually become successful entrepreneurs later. According to the United States Census Bureau, more than 4.4 million new businesses were created in the United States in 2020 - the largest number of new businesses recorded to date. The emergence of several types of business that developed in the pandemic was possible precisely due to digitalization and the evolution of technology.

Keywords: *entrepreneurship; economy; opportunity; technology; digitalization; pandemic.*

JEL Classification: M10

Introduction

The crisis caused by COVID-19 poses a threat to the economy with effects on people's living standards. In this pandemic context, teleworking, respectively social distancing, has determined certain sectors, such as retail, hotels, restaurants, and event services, to develop their creativity, coming up with solutions and proposals thus managing to survive; but at the same time, they have opened up a number of opportunities for business owners meeting the ever-changing needs and demands of consumers.

Digitization of companies will increase the importance given to the digital channels of marketing and sales of companies. It will also foster teleworking and consumption of technological products as more people will interact using hybrid communication mechanisms accessible from anywhere, and not exclusively in the physical environment of companies and their homes. [Almeida *et al*., 2020]

Understanding the complexity of the competitive landscape is crucial for firms when it comes to an understanding of the market and the customers that they intend to serve with an innovative offer. Identifying the unique value proposition of innovation and the attributes of differentiation remains a challenge for organizations. [Ikpe Justice Akpan *et al*., 2021]

In this time of crisis, opportunities are identified and valued only by people who think ahead, they eventually becoming successful entrepreneurs.

Small entrepreneurs were forced to start new businesses, precisely because of the pandemic that led to layoffs, sometimes even the permanent closure of the business.

Companies have adapted to the current context and changed consumer behaviors by identifying new activities in this crisis activity, entrepreneurs focusing on building new business and work models focused on digitalization, using new strategies.

Brief literature review new types of business that have emerged in the pandemic

The pandemic has an impact on people's lives and the business environment around the world. Unfortunately, managers have been forced to make quick and often wrong decisions. Innovation is a key process within the organization. Without new products, changes in production processes, changes in organization, marketing and management, the organization cannot survive regardless of its field or activity. [Gorzelany-Dziadkowiec, M., 2021]

Digitization, the evolution of technology has led to the emergence of several types of businesses that were born during the pandemic. In this sense, a new type of economy has emerged called "Gig economy", which is a challenge for both the workforce and the entrepreneurs. Such an economy has many advantages, including cheaper and more efficient services for users. The urban environment is the most suitable for the gig economy, due to the developed services and the advanced technology.

The gig economy is a relatively new phenomenon and is characterized by the fact that the availability and rapid spread of temporary, flexible jobs are becoming a normal thing, and employers prefer to hire independent and self-employed contractors instead of full-time employees. The spread of the gig economy significantly affects the development of labour relations and refers primarily to the payment of taxes by individuals working as freelancers. Therefore, such persons must accumulate and pay income taxes on their own. [Kozarezenko, Tochylina, 2019]

The number of people in non-traditional jobs (self-employed, temporary workers, gig workers) has steadily increased as the technology allows for more and more short-term employment and fixed employment costs continue to rise. increase. For many companies that need less than one full-time person for short-term work and for many workers who appreciate flexibility, this has created a large surplus. In weak economic periods, non-traditional work also serves as an alternative safety net. Non-traditional jobs will continue to become more common, although policy changes could slow or accelerate the trend. [Oyer, 2020]

According to a study by PricewaterhouseCoopers, over the next 30 years, almost 80% of working people will have more than one jobs, respectively they will undertake several activities at the same time, with the goal of earning as much money as possible.

There are still no precise regulations for all types of contracts and activities that employees carry out, a fact which leads to abuse. The legislation is ambiguous

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regarding the fixed-term employment contracts, the minimum payment of the hours worked in this regime or the night work and on weekends.

Another advantage of the gig economy is that companies offer employees the opportunity to exploit and develop entrepreneurship spirit, creativity, and innovation, thus gaining a competitive advantage.

The concept and practice of innovation have evolved throughout history, going through different phases or stages. Each successive innovation phase is based on the accumulated knowledge and learning of previous phases, thus accelerating the speed and the scope of innovation in the new phase. For example, while it took 15 years after the Spanish Flu pandemic (1918–1920) to discover the virus (in 1933), it took only few weeks to discover the COVID-19 virus. [Sang M. Lee, Silvana Trimi, 2021]

Business ideas derived from creativity involve relative thinking in terms of how they come to fruition. In order for ideas to enter the market, there needs to be some form of action by businesses affected by covid-19. This involves ideas undergoing an iterative process when they are refined and developed further. To do this requires shaping the idea into business solutions that can gain acceptance by stakeholders when they enter the marketplace. [Vanessa Ratten, 2020]

Nowadays, people are free to choose what is good for them, they can have a service when they need it, in conclusion, their requirements can be met.

Covid-19 has changed the world of retail and the customer. Based on the comparison with the previous period, there was an increase in average spending and a decrease in the frequency of purchases. Consumer confidence has fallen; people are worried about the future. Retailers have invested billions in anticoronary measures and E-commerce is breaking records. [Lenka Svajdova, 2021]

According to the 7th edition of the Sierra Quadrant Barometer on the state of business, 62% consider themselves optimistic about the future of the economy, considering that Romania is heading in the right direction, 12% are pessimistic and the rest (26%) they avoided answering, considering that there are still quite a few unknowns about the economic outlook. About overcoming the economic crisis we are in, 71% of businessmen surveyed believe that overcoming the crisis period, at the level of the entire economy, will occur only in the second half of 2022.

Asked what are the strengths of the economy in view of the exit from the crisis, 47% of respondents indicated the return of consumption, 19% are based on attracting EU funds, 13% indicated relatively low logistics costs in Romania, 11% mentioned labor.
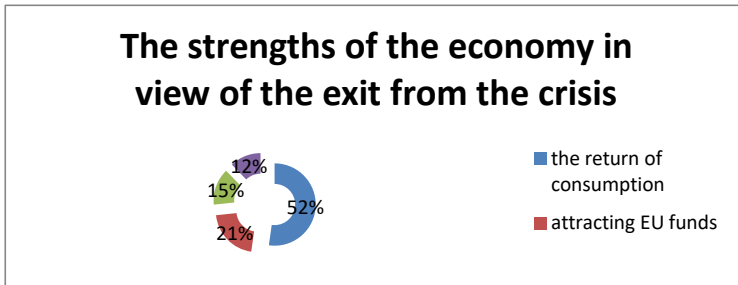
Figure 1. The strengths of the economy in view of the exit from the crisis
Source: Personal processing according to the data provided by
https://www.sierraquadrant.ro/analize

According to investors, the biggest challenge today remains the pandemic and its effects (restrictions, declining consumption, etc.), mentioned by 58% of them. The top of the fears are also the dynamics of inflation (43%), the increase of the euro exchange rate (38%), the accentuation of the financial blockage (27%) and the limited access to financing (13%). [sierraquadrant.ro/analize]

According to Sierra Quadrant Barometer, since the beginning of the pandemic, the vast majority of Romanian companies have restructured their businesses: 67% of investors said they have reorganized their businesses, so as to meet the challenges posed by declining consumption, restrictions on increasingly limited access to finance.

The main decisions were aimed at optimizing logistics costs (rents, utilities, fleet, etc.), mentioned by 50% of respondents, reconfiguring offers (16%), reducing supplier credit (14%), staff reductions / lowering salaries (12%) and digitization of companies' activities (8%). [sierraquadrant.ro/analize]

"Business restructuring has been the watchword in 2020 and 2021 and will continue. The COVID year saw significant declines in many areas of activity, and timely measures saved many businesses. But not all. Unfortunately, there are a large number of companies that are in financial difficulty and are on the verge of survival, and the prospects are not the most encouraging, "said the barometer. [sierraquadrant.ro/analize]

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Romanian companies have restructured their businesses

- optimizing logistics costs
- reconfiguring offers

0%
8%
12%
14% 50%
16%
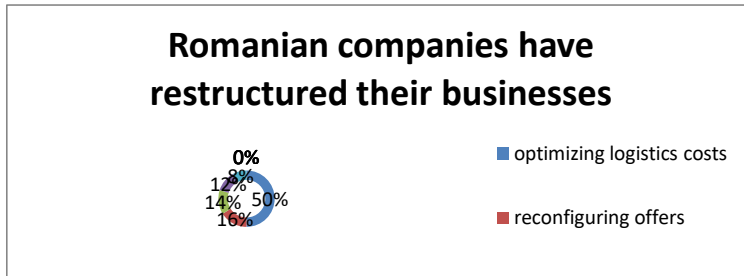
Figure 2. The majority of Romanian companies have restructured their businesses
Source: Personal processing according to the data provided by
https://www.sierraquadrant.ro/analize

The economy will gradually recover, but the prospects for rapid improvement this year are slim. Some sectors will continue to perform well this pandemic year and grow, such as online commerce, and in other sectors the recovery will be slower.

There is a clear trend, which shows the shift in consumption from offline to online for many categories of consumers and for many categories of products, involves a re-evaluation of long-term brand strategies towards digitalization. [Gârdan et al., 2021]

Entrepreneurs too will need to implement retrenchment policies to enforce a cutback in expenses, trigger revenue generation, have shorter reporting cycles and implement prudent financial planning with customer-centric policies. Product reengineering, pivoting towards essential products, special prices and discounts, clubs for loyal customers, product packets suiting the needs of customers and innovative market practices can help in enhancing revenue generation. {Richa, Ashok, 2021]

One of the new trends in consumption is referring to the common-based peer production that is using collective intelligence and implies building of networks without traditional hierarchies. Within this process, the old boundaries between production, distribution and consumption are becoming more and more blurred and the distinction between online and offline business environment is not so clear anymore. [Gârdan, D.A., Gârdan, I.P. 2019]

There is a clear trend, which shows the shift in consumption from offline to online for many categories of consumers and for many categories of products, involves a re-evaluation of long-term brand strategies towards digitalization. [Gârdan et al., 2021]

Statistics on pandemic business development

According to the **United States Census Bureau**, more than 4.4 million new businesses have been established in the United States in 2020 – the largest number of new businesses recorded to date. As a benchmark, this is an increase of 24.3% compared to 2019 and 51.0% higher than the 2010-2019 average. Half a million new businesses were launched in January 2021 alone. Data from the **European Company Survey (ECS)** show how and why new small business entrepreneurs have progressed in the last year and why many could benefit from the results. The European Business Survey collects data from more than 20,000 entities on workplace practices in the areas of work organization, human resource management, skills use, competencies strategies, digitization, direct employee participation and social dialogue.

At the same time, it brought to the fore the workplace practices that work excellently in achieving mutually beneficial results in which employees must be modelled, supported, and motivated for an engagement as intensive as possible in order to achieve performance, thus enabling companies to thrive.

Entrepreneurs were interviewed, in early 2021, to find out their opinion about how their role as entrepreneurs was during a pandemic. Their answers show that they are optimistic, self-confident and have a digitally oriented thinking.

Among the results of the study, we find:

1. Of the respondents, 57% listed creativity as one of the most important qualities an entrepreneur should have during a pandemic. This characteristic helps people to develop their own businesses, due to the fact that a large part of them have lost their jobs. At the same time, therapists have made online video conferencing available to clients, replacing traditional therapy sessions with the online ones. Due to at home isolation, some parents were forced to produce and sell pastries from their own kitchens.

2. Just over a quarter (25.1%) of the interviewed entrepreneurs said that, at the beginning of the pandemic, they were employed and were laid off or fired and the lack of income led most of them to start their own business. Easily accessible advanced technologies, home isolation and leisure were many of the opportunities that led to the opening of new businesses.

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3. Another important aspect is the fact that 80% of the businesses opened during the pandemics sell their products directly to the final consumer. The product range is quite diverse considering the complex global digital infrastructure, which allows everything from selling ads in a podcast to delivering goods sold through an Amazon or Shopify showcase, according to the new "Direct-to-consumer" distribution trend. The respondents listed the following examples: physical products (retail goods, face masks, and other Etsy-style clothing and crafts), software (applications), and services (both in-person and remote). All of these were at the top of the list of products and services that business people have offered to the consumers.

4. More than half of the new entrepreneurs launched new companies with less than € 10,000 in financing and almost half of that group had less than € 5,000 available on the day the new business opened. Nearly 80% of the surveyed entrepreneurs took money out of their own bank accounts to start the new businesses, while about a third borrowed money to invest in the business with friends and family.

5. An advantage in starting a business during the pandemic is digitalization, a fact which no longer requires a very large budget, a reason why 59% of the companies surveyed employ as few people as possible. Due to digitalization, the resources that the company must have can be quite limited, most often being a computer or a phone. There is a lot of emphasis on advanced technology, as a result 70% of those surveyed said that their new business was based on advanced technology, used by the company from the beginning.

In the following paragraphs we will review some types of businesses that entrepreneurs can develop in this pandemic context:

Handmade products

Given the current context caused by the COVID-19 pandemic, many authentic local producers and craftsmen have entered the digital commerce era, which fosters revenue growth and superior customer experience. People are increasingly inclined to shop online when shopping becomes difficult. The need for at home isolated consumers to buy quality products, directly from producers, at decent prices and in conditions of complete safety and comfort is the key to the producers. The pandemic has closed shops and fairs, with the internet providing a chance for small local producers to survive. Online stores and social networks such as Facebook, Instagram, TikTok are a good way for food, handmade and craft manufacturers to

make themselves visible in the marketplace and turn their passion and skills into a thriving business on online sites such as Etsy. In uncertain times, hobbies can become successful businesses and the virtual space makes it possible to interact with what can be seen in an online storefront.

Products for pets

The market for pet products is booming all over the world and the lockdown period caused by the COVID-19 pandemic has influenced the acquisition or adoption of an unreasoning friend. According to a study by Reveal Marketing Research[1], 2 out of 10 Romanians have bought a pet during the state of emergency. The owners always take care of their pets: they feed them, give them medical treatment, wash them, trim them, play with them. For the purchase of pet care products, owners turn to online retailers and service providers. In this context, pet products, such as food, hygiene, toys, and clothing, are in high demand. Channelling our love, attention and life on the pet in a profitable business can be an inspired choice in the current period.

Beauty kits

The restrictions imposed by the Covid-19 pandemic have greatly altered the behaviour of the consumer of beauty products. When the hairdressing, beauty and cosmetics salons were closed, people had to take the whole beauty routine in their own hands, having the comfort of their own house and the desire to look good always. Cosmetics and personal care products are an excellent solution to capitalize on consumers who prefer to indulge at home at the expense of a salon. Looking good when walking in front of the mirror is a good way to always stay in a good mood and avoid giving way to negative thoughts.

Commercial cleaning service

Against the background of the current pandemic, the companies that offer hygiene and cleaning services can experience a real explosion of revenues. The priority of using professional cleaning is a matter of the utmost importance for hospitals, office spaces, schools, kindergartens, hotels, restaurants, and other public

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[1] https://reveal.ro/reveal-trends/studiu-reveal-marketing-research-animale-de-companie-in-pandemie-2-din-10-romani-declara-ca-si-au-cumparat-un-animal-de-companie-in-starea-de-urgenta/
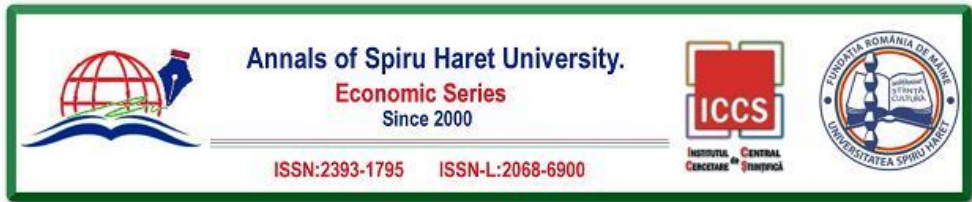
enterprises. Currently, the zero priority of employers is to continuously disinfect their spaces to ensure that employees and their customers feel safe and secure. As the doors reopen and the activities of all institutions resume, the market for cleaning products will continue to grow to stop the spread of viruses. You need to protect the health and safety of your employees in every aspect of their work.

On-demand services

Home delivery services have expanded greatly since the outbreak of the pandemic, with more and more consumers opting for online orders. With the closure of food and non-food stores, closed or open service companies and with the global quarantine, consumers want to receive the ordered product the same day. This new reality has also generated new demands from the people. More and more people are giving up going to pharmacies, supermarkets or preparing food at home. Thus, they resort to the option of ordering the necessary products or already ready-made dishes that they crave. Q-commerce involves the delivery of any type of product in the shortest time, just a few minutes: not only food from restaurants or supermarkets, but also other essential items such as: medicines, books, toys, flowers, personal care products and so on. At the same time, you can create your own independent courier service in which to deliver various commission-type services.

Virtual courses and personalized trainings

The coronavirus pandemic is a time of crisis that causes emotions, anxiety, and stress in people of all ages. We all know that exercise and sports bring benefits to our lives, whether we choose fitness, cardio workouts, yoga, Pilates or dancing. Despite all the rules and restrictions imposed by the pandemic, the message to keep exercising remains valid if you want to stay healthy. Thus, virtual training courses and personal training sessions entered the market in a favourable context. The passion for sports can be transformed into an at home business. Sports entrepreneurs have the chance to transpose their skills and knowledge into the online environment, either directly through Skype video calls and the Zoom platform, or indirectly through pre-recorded videos on YouTube, Facebook or Instagram. Personal trainers from the gyms can keep in touch with the clients they train through social networks, they can do the online trainings with them from home, they can send them diet plans. Online training courses are convenient, providing a form of connection and community while at home, in isolation. The

courses offer a variety of skill levels to reach every audience, they are designed especially for sports enthusiasts and for those who want to get started in the secrets of this activity.

Home improvement / modernization

Telework has caused people to spend most of their time at home, due to the restrictions imposed by the pandemic, thus they are increasingly concerned about arranging and modernizing their homes.

In the first three months of the pandemic, 57% of the consumers have invested in home improvement projects, realizing how important it is to live in a home where they feel comfortable, a house adapted to the needs of the whole family, but also to the new pandemic context. Parents who work from home, but other workers as well are a well-defined target segment as they need a dedicated space to carry out their activity.

Virtual activities for remote work

The pandemic has led to an increase in the number of companies implementing permanent policies for remote work. To maintain high productivity, most companies using advanced technology have focused on promoting their own programming systems. The planning and coordination of remote virtual activities has a great impact on the evolution of companies, thus creating a variety of opportunities by offering specialized assistance.

Resumes editing and online consulting

Many people have lost their jobs during the pandemic. Launching an online resume editing and consulting business for entrepreneurs who are personally interested in coaching and professional consulting, gives those with knowledge of professional etiquette the opportunity to help others transfer their skills and mission to their resume. The evolution in the digital space creates facilities for sharing and editing tools. Zoom and digital collaboration tools like Google Docs don't require much funding.

Maintenance and sanitation of computers or devices

The pandemic has led people to be more aware of hygiene, but also to develop a sufficiently high dependence on technology to keep in touch with events and more. Thus, entrepreneurs have tried to combine technology with the sanitation of

computers and devices, managing to adapt to the rapid changes that appear on the market, being able to work remotely, or even in a physical store.

Audio video transcription or word processing services are a successful business which meets the requirements of many fields of activity. It is very important that the person providing these services has excellent language skills, to transcribe the written text so that it can be read easily and without grammatical errors. At the same time, they need to know and follow the proper punctuation rules. These transcription services are used by entrepreneurs, law firms, lawyers, health care providers, bloggers, and insurance agents to save time and money.

Writing a book

Writing a book can also be a profitable business, provided it is well conceived. Nowadays, with the open access to information and the evolution of technology in the online environment, the publication of a book may be possible given the information that is quite numerous and easy to obtain in this regard. The passion for reading has been and will remain one of the hobbies through which people can disconnect from everyday stress, discovering a new imaginary world.

Many of today's successful business owners have started with limited resources and budgets. Statistics show that 60% of the start-ups have started at home and 58% of them have less than $ 25,000 at the beginning of the business.

Conclusions and future research directions

Innovation, creativity, digitalisation and risk-taking are factors that help entrepreneurs grow their own business during or after the pandemic. However, there are more niche markets or gaps in the digital market that entrepreneurs can occupy, taking advantage of the low purchasing power, thus easily penetrating the business world.

Most business men choose to start a business in the field in which they have gained experience as employees, or in a field they are passionate about. There are few who have their own business idea, but without an in-depth knowledge of the field and without proper motivation, success is not guaranteed.

The ability of companies to adapt to a changing market steams from the introduction of new products and services, while also representing a way for companies to survive during the pandemic.

Similarly, the use of advanced technology, of digitalization that has spread during the pandemic, is seen as a way of compensating for the lack of physical presence at work imposed by the rules of social distancing and is vital for survival.

The entrepreneurs aim to meet the current needs of the consumers during the pandemic, by giving up their unprofitable businesses for a while and opening a new business tailored to the specifics of the market.

Although there are entrepreneurs who do not have the opportunity to reorient themselves during this period or launch new products or services, they have demonstrated their creativity in the way their products or services reach end customers.

The emergence of the gig economy creates many opportunities for employees who work for a certain period, do not have a fixed work schedule, the goal being to have more jobs to earn extra income.

In the context of an ongoing pandemic, then, we should, expect entrepreneurs to find novel ways to provide essential goods and services, to fulfill increased demand for items that are particularly important during a pandemic, and to invent new products that assist in surviving, managing, and stopping the spread of the disease. For instance, digital retailers might expand their operations as customers not only turn to them to satisfy basic needs but also to make their homes more comfortable for sustained periods of isolation. [Storr *et al*., 2021]

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JOB SATISFACTION OF NURSES DURING COVID-19 PANDEMIC

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Abstract

Job satisfaction of medical workers is an essential element of providing healthcare services. Ample empirical evidence supports the cause-and-effect relationship between employee job satisfaction and patient security and quality of care provided. This paper considers the job satisfaction of nurses during the Covid-19 pandemic with regard to their years of employment, age, professional education, job position, possibility of advancement, relationship with the superiors,

and organization of work. A standardized survey with a job satisfaction scale was used for data collection. The survey was completed from 23 June to 13 July 2020 by 27 out of the 50 nurses working at the Covid-designated hospital in Leskovac, Serbia. The results showed that the employees with fewer years of employment were more satisfied than their more experienced co-workers. The results on the entire job satisfaction scale showed that 2.6% of the respondents were very dissatisfied, 28.3% neither satisfied nor dissatisfied, while only 9.3% were very satisfied with their job. One of the main reasons for such response distribution is the lack of career advancement options. This research found that organizational commitment, job satisfaction, and years of experience are significant predictors of successful work for the nurses.

Keywords: *hospital work; nurses; pandemic; satisfaction; work conditions.*

JEL Classification: I11, J28, M54

Introduction

According to recent studies, in today's world an average person changes 14 to 16 jobs during their lifetime [US Bureau of Labor Statistics, 2019]. American psychologist Amy Wrzesniewski [1997] states that people experience work in three ways: as a job, as a career, and as a calling. Those who regard it as a calling show the highest degree of satisfaction with their employment. Job in these terms is a common research topic, considering its existential significance for every individual. It is especially significant in times of extensive changes in the work structure and requirements, which is a result of modern-day dynamic development of social communities [Knežević, 2016].

With regard to job satisfaction, a review of the evidence-based literature suggests that there is no single, generally accepted, definition of the term. Vroom [1962] in his definition on job satisfaction focuses on the role of the employee in the workplace. Thus, he defines job satisfaction as affective orientations on the part of individuals toward work roles which they are presently occupying [Vroom, 1962]. Job satisfaction is the key ingredient that leads to recognition, income, promotion, and the achievement of other goals that lead to a feeling of fulfillment [Kaliski, 2007]. Some authors recognize it as highly complex [Habazin, 2013; Campbell, 2021]. In the field of healthcare, the job satisfaction of nurses is one of the main factors profoundly influencing the quality of the entire healthcare service.

Job satisfaction among the nursing population varies according to age, job position, years of employment, work environment, number of employees, employee interrelations, work conditions, two-way communication with the superiors, salary, and the possibility of career advancement. Therefore, it is reasonable to assume that work overload, dissatisfaction with the work conditions, poor interpersonal relationships, and bad communication are the chief factors of job dissatisfaction [Lučanin, 2010; Hawken, 2005]. Nurses work to improve their patients' health, which involves disease prevention, treatment, and rehabilitation. They help the patients deal with the difficulties of their condition, participate in the implementation of diagnostic methods and interventions during treatment, and are essentially involved in the entire life of their patients during their stay in healthcare facilities at all levels. This is why their daily task performance is directly related to the degree of quality of provided healthcare service, as confirmed by Barać et al. [2015]. Other studies also indicate varying degrees of importance of job satisfaction, as well as a strong connection between job satisfaction and satisfaction with one's work environment.

Theoretical background and literature review

Numerous job satisfaction studies were also accompanied by the development of suitable theories. Both the empirical results and their theoretical interpretations attempted to answer which factors influence job satisfaction [Habazin, 2013; Lisa et al., 2021]. The global and the analytical approach are two thorough approaches that measure job satisfaction. The global approach defines job satisfaction as a general affective attitude towards work and the employing organization. It answers the clearly posed question, "How satisfied are you with your job"? The analytical approach examines job satisfaction through various aspects, such as salary, the degree of work independence, management style, and so on. These aspects are used to examine the structure of satisfaction, i.e. what makes employees satisfied or dissatisfied. Both approaches have their advantages and disadvantages. They most commonly involve the use of a questionnaire or a survey asking the respondents to provide their subjective assessments. However, such investigations are limited by the fact that the respondents' statements do not necessarily reflect their honest opinions or feelings, as they are often prone to being dishonest or provide socially acceptable responses. Consequently, it is of paramount importance for the surveys to be anonymous [Conrad et al.,1985]. This paper examines the job satisfaction of nurses at the Covid-designated hospital in Leskovac, Serbia, in terms of years of employment, age, professional education, and job position.

Research aim

The aim of this research is to determine the degree of job satisfaction of the nurses employed at the Covid-hospital in Leskovac in relation to their years of employment, age, professional education, and job position. We can also point to some similar research which was conducted during the Covid 19 pandemic [Danesh, et al., 2021; Pniak et al., 2020; Babamiri et al., 2020].

Method

The respondents comprise 27 nurses employed at the Covid-hospital in Leskovac out of 50 employed nurses in total, which is more than a half, specifically 54% of all nurse employees. The data were collected from 23 June to 13 July 2020. The research was approved by the Ethics Committee of the Covid-hospital in Leskovac by its decision no. 8155/2. The research was conducted anonymously, using a standardized measuring tool – the job satisfaction survey [Spector, 1985], intended for examining opinions pertaining to job satisfaction. All the respondents were acquainted with the research method and procedure prior to the survey. The first part of the survey contains questions regarding general socio-demographic information about the respondents, namely their gender, age, professional education, job position, and years of employment at their current job, while the second part contains 14 questions specifically focused on job satisfaction through the following indicators: possibility of career advancement, relationship with superiors and other co-workers, rewards, work activities, work organization, and communication. Each claim includes a five-point Likert scale of responses from *very dissatisfied – 1* to *very satisfied – 5*.

Results

Out of 27 nurses who participated in the survey, 44.4% were male and 55.6% female. According to age, 40.7% were aged 20 to 35, 44.4% were 36 to 50, and 14.8% were 51 or over. With regard to education, the majority of nurses received either a vocational nursing college or bachelor's degree in applied studies [63%], while 37% of the respondents only had a high school diploma. In terms of their total years of employment, 51.9% have been employed for 5 years or less, 18.5% from 6 to 15 years, 22.2% from 16 to 30 years, and 7.4% have been employed for 31 years or more.

Examination of nurses' job satisfaction during a pandemic posed an immense challenge, considering their work in uncommon or even emergency conditions. The increasing pressure on the employees is a result of the growing number of

hospitalized patients, hospitals operating over capacity, and the employees facing a new disease that elicits new kinds of fear and anxiety, one of the reasons being non-standardized protocols and frequent changes from the authorities. Therefore, this research is an attempt to identify specific predictors of job [dis]satisfaction of the nurses employed at the Leskovac General Hospital during the Covid-19 pandemic. The survey results are presented in Table 1.

It is apparent that adequate equipment is one the main prerequisites for successful work. Equipment plays a crucial role in nurses' job satisfaction, especially under the circumstances such as a pandemic, when its protective function is necessary for safe work performance. The results show that 25.9% or slightly over one quarter of the surveyed nurses were dissatisfied with the equipment that they were assigned or that they used at work.

The second examined predictor of job satisfaction is the available time for job performance. The results indicate that 70.4% of the surveyed nurses were satisfied with the available time for job performance. This also suggests that the respondents spent more time at their job than during normal circumstances, because the pandemic required a different working hours regime.

With regard to the available time for direct work with patients, the number of respondents who were satisfied with this aspect was much lower, specifically 40.7%. This is because nurses working in red Covid-19 zones had to follow special epidemiological protocols, which occupied a significant amount of time out of their effective performance.

Considering that the pandemic and the resulting difficult work conditions often require momentary decision making, particularly in situations when patients' lives are at stake, it is encouraging to learn that over a half of the respondents stated that they had the opportunity to make momentary decisions. Specifically, 51.9% of the nurses expressed satisfaction with their job autonomy.

Considering the responses given regarding job autonomy, it was reasonable to expect that the nurses' responses regarding their satisfaction with the opportunities to utilize all their knowledge, capabilities, and skills would be similarly distributed. Indeed, 59.3% of the respondents were satisfied with how much they were able to utilize their personal capacities.

On the other hand, the results concerning the job satisfaction predictor pertaining to external acknowledgement and validation of the nurses' work show that 7.4% of the respondents were dissatisfied with this aspect. Since this is a small percent of the total number of respondents, such results may be linked to the average salary of nurses in Serbia, which is among the lowest in the region.

Table 1. Survey results

Job satisfaction of nurses		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
Satisfaction with the adequacy of work equipment	F	1	7	13	6	-
	P	3.7	25.9	48.1	22.2	-
Satisfaction with the available time for job performance	F	-	3	-	19	5
	P	-	11.1	-	70.4	18.5
Satisfaction with the available time for direct work with patients	F	-	7	4	11	5
	P	-	28.9	14.8	40.7	18.5
Satisfaction with the job autonomy – opportunities to make decisions	F	-	2	2	14	9
	P	-	7.4	7.4	51.9	33.3
Satisfaction with the opportunities to utilize personal capacities [knowledge, capabilities, skills]	F	1	2	3	16	5
	P	3.7	7.4	11.1	59.3	18.5
Satisfaction with the external acknowledgement and validation of their work	F	1	2	3	16	5
	P	3.7	7.4	11.1	59.3	18.5
Satisfaction with direct cooperation with their co-workers	F	-	1	8	15	3
	P	-	3.7	29.6	55.6	11.1
Satisfaction with the direct cooperation with their superiors	F	1	2	11	10	3
	P	3.7	7.4	40.7	37.0	11.1
Satisfaction with the way patients treat them	F	-	-	5	20	2
	P	-	-	18.5	74.1	7.4
Satisfaction with the opportunities for professional development and continuous education	F	1	4	15	5	2
	P	3.7	14.8	55.6	18.5	7.4
Satisfaction with the financial compensation for their work	F	2	9	9	6	1
	P	7.4	33.3	33.3	22.2	3.7
Satisfaction with the management and work organization	F	1	5	16	4	1
	P	3.7	18.5	59.3	14.8	3.7
Satisfaction with the clarity of work instructions	F	1	5	10	10	1
	P	3.7	18.5	37.0	37.0	3.7
Satisfaction with the opportunities to share their ideas with their superiors	F	1	7	6	12	1
	P	3.7	25.9	22.2	44.4	3.7
Note: In the survey participated 27 nurses, F – frequency, P – percent						

Source: Authors

In any work process that takes place during an emergency, such as a pandemic, it is crucial that all the employees act as a harmonious and well-coordinated unit. This is why good direct cooperation with the co-workers is a significant job satisfaction predictor for any employee. The presented results indicate that over a half of the respondents [55.6%] were satisfied with the direct cooperation with their co-workers.

Somewhat smaller percentage of the respondents [37%] expressed satisfaction with the direct cooperation with their superiors, which may indicate that the cooperation between co-workers with the same status and job roles is better than that between employees with a different status, such as nurses and their superiors.

Another important predictor of job satisfaction is how patients treat nurses. During the pandemic, all medical personnel faced an increased risk in their employee-patient relationships. Therefore, it is important to learn how the nurses felt about the way their patients treated them. The results show that 74.1% of the respondents were satisfied with this aspect of their job.

The opportunity for professional development and continuous education is an important job satisfaction predictor for any employee, including nurses. However, the fact that more than a half of the respondents [55.6%] were neither satisfied nor dissatisfied, i.e. neutral, regarding this aspect can be concerning. Yet, the very fact that the respondents work in red Covid-19 zones and are constantly at risk of becoming infected is enough to explain why they are currently not concerned with professional education and nursing seminars, which are regularly organized when the healthcare system, as well as the entire country, operates in normal circumstances.

Generally, adequate work compensation is directly associated with the degree of job satisfaction, which is also the case with the surveyed nurses, as expected. Cumulative percentage of the respondents who were dissatisfied or very dissatisfied with their financial compensation and those who were neither satisfied nor dissatisfied amounts to 74%, which means that almost three-quarters of the respondents believe they are insufficiently financially compensated for their work.

The work process greatly depends on the management and task organization within the institution, which, as a rule, is an important predictor of job satisfaction. The majority of the respondents are neutral regarding the management and work organization in the Covid-19 work regime at the Leskovac General Hospital. A significant percentage of them [59.3%] were neither satisfied nor dissatisfied with this aspect of the job.

Hospital work flow during a pandemic should proceed flawlessly, guided by specific protocols. This is why clear instructions are always preferable, especially

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in an emergency setting, which is the case with any pandemic. Unfortunately, a pandemic entails a variety of risks and minimizing them sometimes requires the hospital management to be able to make *ad hoc* decisions as well as to communicate them to the staff through clear and unequivocal instructions. The survey indicates that there are as many nurses who were satisfied with the clarity of work instructions as those who were neither satisfied nor dissatisfied [37% each].

Finally, the possibility of employees communicating freely and sharing ideas with their superiors has a considerable influence on their job satisfaction. The results show that a little over one-quarter of the respondents [25.9%] were dissatisfied with the opportunities they had to share their ideas with their superiors. This casts a shadow on the superior-subordinate relationship as an aspect of job satisfaction, especially during a pandemic, when the entire healthcare institution could benefit from any potentially problem-solving observation or idea.

Discussion

Among other things, the obtained results showed that the majority of surveyed nurses disagreed with the claim that their job offers the same career advancement opportunities as is the case with other professions, which is why they expressed dissatisfaction with this predictor of job satisfaction. In addition, the findings support the continuous efforts to amend healthcare work plans so as to give nurses more authority and responsibility in managing the patient treatment process.

Even though there have been numerous studies on the job satisfaction of nurses, what is lacking are those studies that would incorporate the ethical perspective of management and its influence on the work climate in healthcare institutions. The results of such studies would presumably help the improvement of the work atmosphere by prompting the managing personnel to show more respect, support, and candid care towards the nursing staff, who are the crucial link in the chain of everyday healthcare tasks [Nissanholtz-Gannot et al., 2017; Jang, 2017]. Likewise, there is a low positive correlation between the job satisfaction of nurses and their education and even a negative one in terms of the type of tasks they perform, indicating that the degree of job satisfaction increases or decreases depending on the level of education. One study found that the competences of managers in Slovenia [leadership style, personal traits] positively correlate with the job satisfaction of nurses [Lorber & Skela-Savič, 2012; Mueller & McCloskey, 1990]. In 2012, a Taiwanese hospital conducted a study on medical charting by the nursing staff and determined that the optimization of medical charting gave the

nurses more time to care for their patients directly, which generally increased their job satisfaction [Hsieh et al., 2016; Schermerhorn et al., 1991; Bjørk et al., 2007; Cowin, 2002; Aiken et al., 2001].

Implications for Occupational Health Nursing Practice

The investigation of the job satisfaction of nurses, especially during the Covid-19 pandemic, is very significant, nevertheless extremely challenging. The immense pressure they face every day due to growing number of hospitalized patients and overloading of hospitals, as well as the fear from the unknown, have led to the changes of their daily activities and their overall job satisfaction. Hence, the intention of this study is to examine various predictors of job satisfaction of nurses in the Covid-designated hospital.

The findings of this study put additional value to the existing literature concerning occupational health and safety of nurses generally, and their job satisfaction specifically. The results have shown that overall organization of management and working practices should be improved, as well as the exchange of ideas and practices with the operative and executive management to increase the job satisfaction of nurses. Additionally, the results shed light on the importance of financial compensation for the nurses, so that they could direct their energy towards patients instead of own financial security. Therefore, the government and hospital management should put efforts towards the improvement of these aspects of nurses' job satisfaction.

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THE ECONOMIC CRISIS CAUSED BY THE COVID-19 PANDEMIC

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Abstract

In the midst of wave 4 of the pandemic, the demand for commodities seems unbridled, and the value of stock and real estate assets reaches record after record. On the other hand, container bottlenecks in the world's ports, production syncopes against the background of the crisis of raw materials, components and microprocessors, or the explosion of energy prices in Europe are less bright aspects of the period we are living in. The pandemic is not coming to an end, but since the fall of 2020, when most of the movement restrictions have been lifted, the world's population has pivoted unseen from thrift to excess. Inflation at the end of the year will be more than double compared to the last quarter of 2020, according to the NBR projections. According to some analysts, such as Valentin Tătaru, the chief economist of ING Romania, inflation could reach 6% already this autumn. The injection of money into the economy, in theory, should only begin from now on, after the approval of the National Recovery and Resilience Plan (PNRR). The almost EUR 30 billion that would help areas such as health, education, energy, energy, construction and transport over the next six years, as well as the capital market, should be a safety net in the most pessimistic scenarios. However, the labour crisis, the resolution of which is not even in the medium term, is the real time bomb that can undermine economic growth and, by extension, the absorption capacity of European funds. The areas with high

shortages of specialists are well known – construction, HoReCa, medical services and technology.

Keywords: *pandemic; economic crisis; deficit; GDP.*

JEL Classification: O11, O21

Introduction

"Companies around the world have gone from seeing the effects of this pandemic as minor to considering them a serious threat, according to a perception study by a specialist company in the UK. 41% of respondents say that the situation is now very serious, while 51% of them see it as a serious threat to the global economy" - said Daniela Șerban – ARIR President (2020). Radu Burnete, Executive Director of the Concordia Employers' Confederation (2020) recommends prudence - Both in interpretation and in predictions. "It is certain that now the economy is in a dive, but if it is a very short one we will recover quickly. If it stretches over several months or all year, then the economic effects will be massive and we can already talk about a Marshall Plan for Romania. Unfortunately, we have not been thoughtful in the years of economic growth and now the state does not have very many resources to spend in difficult times. We have entered this crisis with the largest budget deficit in the European Union, -4.4% of GDP.

"I think there will be employers who will discover that some of their employees are more productive from home or simply by chatting online. That's also a big investment in technology and it's likely going to translate into a competitive advantage for those who will invest in having some digital systems that work seamlessly." - Radu Burnete explains.

It is important not to block the financing of active companies. We remember that in 2008, financing and active lines of credit were frozen, which caused a rapid collapse in the real estate and construction sectors, dragging the entire economy after it - says Daniela Șerban - President of the Association for Investor Relations on the Romanian Stock Exchange

1. Economic crisis in Romania

The Covid 19 crisis has significantly affected the Romanian economy, which in 2020 recorded a contraction of minus 3.9% through various channels – interruptions of the supply chain in the industry, especially the automotive sector; decrease in external demand; border closures and internal restrictions. In the future,

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analysts expect a strong, large-scale recovery, with annual growth of more than +7% in 2021 and above +4% in 2022, with consumer spending and fixed investments being the key factors in the recovery. [Tablou economic de la BNR: Revenirea din criza generată de pandemie este semnificativ mai rapidă decât s-a anticipat atât pe plan extern, cât și pe plan intern. Care sunt riscurile și oportunitățile pentru România? (economedia.ro)]

Following the severe impact that Covid-19 has on the economy, inflation fell at the beginning of 2020 and remained in the target range until the first quarter of this year. Thus, the National Bank of Romania has maintained a relaxed monetary policy to mitigate the recession by reducing the reference interest rate and launching its first quantitative easing program. [Criza Covid-19 a influențat semnificativ economia României în 2020 – Capital]

Amid the recovery and rising energy prices, inflation rose to almost 5% in the middle of this year and well above the target range. To stop this growth, we expect the NBR to begin a gradual tightening of monetary policy by stopping quantitative easing and raising the benchmark interest rate. However, the inflation forecast remains high, at over 4% by the end of 2021 and gradually decreasing below 3.5% during 2022.

However, there are significant risks of the increase/worsening of the above forecast due to the following factors: (i) sustained increases in raw material prices and international transport costs; (ii) continuous disruptions to the supply chain; (iii) tightening labour market conditions; (iv) the rapid and continuous growth of domestic credit; (v) the increase in the current account deficit and (vi) the substantial depreciation of the leu.

Romania's public finances will continue to deteriorate and become a cause for concern. A strong pro-cyclical fiscal stimulus generated an annual deficit of -4.4% of GDP in 2019. As a result of fiscal stimulus, loan guarantees and subsidies for SMEs, this ratio has risen sharply to -9.2% in 2020. However, the downward trend of the public debt-to-GDP ratio in recent years has reversed, registering an increase to 47% in 2020 compared to 35% of GDP in 2019. External finances are another concern as the current account deficit has steadily increased from 0.2% of GDP in 2014 to 5.1% in 2020. [Criza Covid-19 a influențat semnificativ economia României în 2020 – Capital]

Analysts expect that in the first half of 2021 the current account deficit will reach the value of 6% of GDP. 17% of the deficit in 2020 and 44% of that recorded in the first half of this year was financed by foreign direct investment (FDI), well below the expected level of 75% and down from a recent high of 192% in 2016.

FDI net coverage of deficits will remain below 50%, as capital flows will gradually return to emerging markets. Together with the increased fiscal deficits this could lead to an increase in the need for external financing at critical levels. Moreover, the downward trend of the external debt-to-GDP ratio from 77% of GDP in 2011 to 49% in 2019 has reversed. In 2020, the ratio reached 58% and is expected to remain above 50% in the coming years. [Criza Covid-19 a influențat semnificativ economia României în 2020 – Capital]

2. Economic crisis in Europe

In a new discussion paper, economists at the EU's bailout fund have suggested a simplification of the bloc's fiscal rules. Their contribution comes a week after the Commission relaunched a review of the EU's fiscal rules.

The European Stability Mechanism's economists are unlikely radicals. The ESM is responsible for providing emergency fiscal support to member states in case of financial distress.

In their discussion paper [Fiscal rules (europa.eu)], the authors praise the EU's fiscal framework for having helped to improve fiscal coordination and for having contributed to a position that allowed the EU to react to the economic shock delivered by the pandemic.

Still, they see a need for the EU's fiscal rules to change. The economists claim that a "new economic reality necessitates a fresh look at the European fiscal rules."

The pandemic crisis radically changed the economic landscape, triggering temporary suspension of the fiscal rules. The crisis brought higher debt-financed spending, with its aftermath potentially further burdening public budgets. The monetary policy response to the crisis kept interest rates low and debt-servicing burdens manageable, making higher deficit and debt levels tolerable for the markets.

Post-pandemic fiscal rules should provide credible policy guidance. Well-designed and transparent rules can boost fiscal performance and prevent policy missteps. In the mediumterm, revised rules can help phase out pandemic-related discretionary fiscal measures. In the long-term, they can strengthen commitment to fiscal positions stablising public debt levels.

Fiscal rules were needed to prevent negative spillovers, inflation risks stemming from diverging fiscal positions, and potential overburdening of the European Central Bank (ECB). Monetary union sustainability required the prevention ofspillovers from unsound national fiscal policies.

The two reference values – 3% of GDP for the deficit and 60% of GDP for the public debt, while political in character, reflected the prevailing economic reality with the 3% deficit ceiling regarded as sufficient to stabilise the economy during downturns. Together with a nominal growth of 5%, including inflation of 2%, it would stabilise debt at about 60% of GDP, not far from the EMU average at the time. Meanwhile, fiscal rules enabled the ECB to focus on its core mandate, maintaining price stability.

The European pandemic crisis response alleviates pressure on governments but cannot replace fiscal rules reform that would better handle high sovereign debt and recognise new economic realities. Grants from the European Recovery and Resilience Facility create fiscal space without burdening governments' balance sheets. Still, rising indebtedness implies governments will need to rollover increasing amounts of debt and finance newly issued debt. Repeated failures of a rules-based system to reduce public debt imply a risk that the Eurosystem and other central banks will be called upon to stabilise government bond markets in future times of stress.
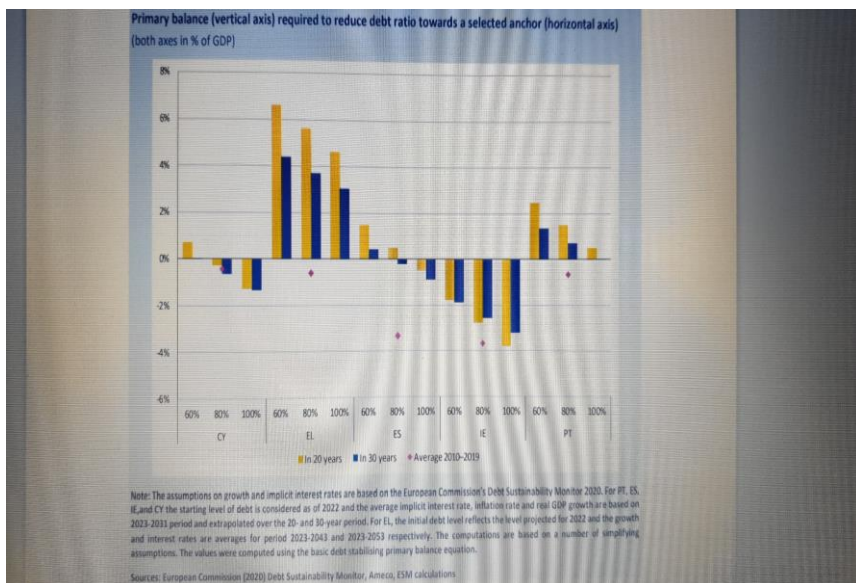
Figure 1. Primary balance to reduce debt ratio towards a selected anchor
Source: Fiscal rules (europa.eu)

Some countries, such as Germany, France, Italy, have achieved a primary surplus of 3.5% of GDP and above and maintained it for up to five consecutive years. However, the post-pandemic debt level is higher, widening the distance to the 60% reference value and the period in which sovereigns would need to maintain high primary surpluses far beyond those maintained in the past.

Moreover, high primary surpluses achieved in the past accumulated from strong economic growth at rates substantially above those that can be expected in the longer-term. Finally, maintaining high primary surpluses for extended periods would work against the need for investment in modernisation and a greening of European economies, so inhibiting growth.

The updated European Fiscal Board (EFB) recommendations (2020) suggest a country-specific debt adjustment speed. The 2020 EFB report's proposals included an expenditure ceiling rule, a benchmark based on the trend growth of potential output, and a debt adjustment speed based either on a matrix reflecting a fixed set of variables or on a case-by-case macroeconomic scenario prepared by an independent assessor.

These measures would translate into three-year expenditure ceilings, which would encourage countercyclical fiscal policy, with its direction and speed depending on both debt levels and macroeconomic conditions, so increasing debt in bad times and reducing it in good times. The EFB 2020 proposal suggested the 60% debt-to-GDP reference value should not necessarily be achieved within the 15 year maximum set in their 2018 proposal, and could be achieved at a different speed. It also considered a differentiated debt target. [Fiscal rules (europa.eu)]

Empirical evidence suggests benefits do flow from national expenditure rules. Manescu and Bova (2020) analysed the performance of 14 national expenditure rules. Using the European Commission's fiscal rules database, 28 they concluded that such rules reduce spending procyclicality and correlate to relatively higher compliance rates. Expenditure ceilings tend to achieve better results than expenditure growth targets. A higher rate of compliance with expenditure rules could reflect governments' ability to exercise direct control over expenditures.

3. Economic recovery measures

Another strand of proposals suggests abandoning traditional deficit and debt sustainability metrics in favour of debt stocks compared to the present value of GDP or interest rate flows with GDP flows. Furman and Summers (2020) propose to shift away from traditional metrics in favour of debt stock as a percentage of the

present value of GDP, or real interest payments as a share of GDP. Hughes et al. (2019) suggest keeping the interest payments/revenue ratio commonly used by rating agencies as an alternative metric.

Post-pandemic, governments will have to address investment shortfalls and ensure additional funding to meet targets set by key European initiatives and also to boost growth. Productive investment enhances growth and reduces risks to medium-term debt sustainability. The European Green Deal sets ambitious goals in the commitment to a zero-carbon transition and keeping pace with the digital revolution, while rebuilding Europe's social cohesion will also demand substantial investment efforts.

The European Commission has projected that the current 2030 climate and energy targets will necessitate €260 billion of extra investment each year, about 1.5% of 2018 GDP. The European Investment Bank (EIB) estimated an overall infrastructure investment gap of about €155 billion per year (about 1% of 2018 GDP) to attain the goals the EU wishes to achieve by 2030, including 'climate and energy' and broadband penetration. A similar gap of 1% of EU GDP exists in information and communications technology compared to the US. [ESM economists want to raise public debt limit to 100% of GDP – EURACTIV.com]

Any change to the future fiscal framework and its adoption timeline will depend on political, legal, and economic factors, and should be carefully calibrated. The pandemic crisis required the activation of the general escape clause, and the aftermath generated questions about the duration of the clause and the relevance of existing rules. Key decisions on fiscal guidance for 2023 will be taken between March and May 2022, and the discussions on any new rules will be shaped by both economic arguments and political considerations. [ESM economists want to raise public debt limit to 100% of GDP – EURACTIV.com]

Taking decisions on fiscal guidance and potential reform of the fiscal framework matters for market perceptions. Markets' attention has shifted from the immediate crisis response to post - 2021 fiscal policy plans. As the pandemic crisis abates, markets will increasingly scrutinise EU sustainability and national policy responses. Temporary fiscal support will have to be gradually phased out to maintain sustainable debt levels.

The deficit reference value has been a reasonable and emprically backed anchor. The fiscal deficit growth elasticity implied that a 1% decrease in output would lead to a 0.5% deficit increase. With a deficit at about 1.5% of GDP in normal times, a 3% output gap – consistent with a typical recession – would push deficit to 3% of

GDP.57 The 60% limit for debt-to-GDP reflected the average value in the euro area, and was linked to the 3% deficit limit through the basic debt accumulation equation. In a steady state, a country's debt-to-GDP ratio should converge to a level that equals the deficit ratio divided by the nominal growth rate of GDP, at the time expected to hover around 5%. The framework's simplicity made political buy-in easier. [ESM economists want to raise public debt limit to 100% of GDP – EURACTIV.com]

Conclusion

A vigorous economic recovery is taking place in Europe, in developed economies, in many regions of the globe. In the Romanian economy, the recovery, in terms of GDP dynamics, goes beyond numerous forecasts. The International Monetary Fund (IMF) (2021) speaks, in its latest estimate, of 7% increase in Gross Domestic Product (GDP), and the World Bank's estimate is approaching this forecast. "More recent data available suggests even higher growth. It seems that we have underestimated the resilience of the domestic economy in the very critical period of 2020, its benevolent sectoral diversity. On the other hand, the pandemic and its effects in the economy and society leave deep traces, and the gdp return to the pre-pandemic level does not equate to the disappearance of economic and social wounds", notes Daniel Dăianu.

It is essential that, in the years to come, the public debt that has already reached the threshold of 50% of GDP, even if it will grow, stabilizes (public finances are sustainable), and this desideratum depends essentially on budgetary consolidation – which, in turn, depends on a firm step of average annual adjustment of the budget deficit of 1.5 percent of GDP (a cumulative reduction of the deficit of about 6 percent of GDP) in the range of about 6 percent of GDP) in the range 2021-2024. It is worth mentioning that Romania is under the incidence of the Excessive Deficit Procedure (EDP), even if the rules will be reactivated only from 2023.

The recovery of the real economy from the crisis generated by the pandemic is significantly faster than anticipated both externally and internally, paving the way for a high economic growth rate in 2021. With the foreshadowing of the gradual reduction of multiple uncertainties, the expectations regarding the evolution of the Gross Domestic Product (GDP) for next year are also favorable.

The impact on prices generated by the particularly rapid return of demand in the economy, simultaneously the jump in commodity prices and the visible bottlenecks in some segments of the production chains, is expected to moderate significantly in the course of 2022.
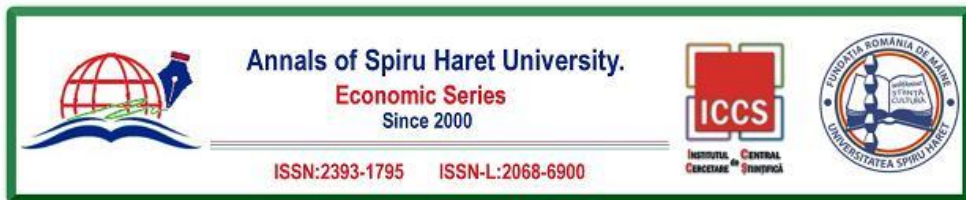
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THE BEHAVIORAL THEORY OF THE FIRM: FOUNDATIONS, TENETS AND RELEVANCE

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Abstract

The Behavioral Theory of the Firm has for over fifty years shaped a section of economic thought on the nature and functioning of the firm. In this paper, this theory is reviewed with a focus on its foundations, tenets and relevance. The paper posits that the Behavioral Theory of the Firm set out to distinguish from previously known analytical models of the firm. It drew in an interdisciplinary model and explored the firm in more diverse ways than before. The foundations of the theory, its tenets and relevance are discussed. Often traced to Richard Cyert and James March, whose A Behavioral Theory of the Firm (1963) text seemed to commence this theory, the evidence shows that their seminal work was one of several other contributions to its development. What is not in dispute is that the seeds for a Behavioral Theory of the Firm were sown at the Carnegie Mellon University in or around the mid-20th century. Broadly the Behavioral Theory of the Firm conceives the firm as a unit of production with goals, and a dominant coalition that harmonizes different interests of its stakeholders into those goals.

Keywords: *behavior; stakeholders; production.*

JEL Classification: D10

Introduction

Firms are essential components of modern economies. Since the transition from subsistence and retail economies, firms have played a central role in

institutionalizing economic activities. Attempts to define the firm have gained ground but remain a work in progress. However, a firm can be conceived as a business unit that owns assets and is in the business of using inputs to produce outputs that are sold to the market (Carrizosa, 2007). Its boundaries are before it sends goods into a market.

It is widely acknowledged that firms are production units that are independent from their proprietorship, which is represented by a manager. The workings of independent firms may provide insight into the functioning of an industry, which is a combination of different firms (Hart, 2011). Ultimately a theory of the firm will review its internal structure, organization and boundaries. It will also examine the behavior and strategies firms adopt in the particularities of market contexts and dynamics (Dietrich & Krafft, 2012).

Studies on the firm include attempts to define its nature, scope and boundaries. There are several theories of the firm that cover these issues. This paper briefly looks at competing theories but focuses mainly on the behavioral theory of the firm. It posits that the behavioral theory of the firm offers more analytical fronts to explain the firm and its behavior. Thus, the paper analyzes the historical foundations, tenets and relevance of the behavioral theory of the firm. The objectives are to present the foundations of the theory and how it can be applied to studies that intend to explain the day-to-day orientations of firm behavior.

Theory is a fundamental aspect of the production of knowledge as affirmed by Kawulich (2009). Theories tend to explain a phenomenon and predict future occurrences and observations. A theory organizes ideas into an explanatory form, providing guidance to researchers making observations about reality (Collins & Stockton, 2018). Without theory, a research project may be incomplete.

The paper is structured into three respective sections: the foundations of the Behavioral Theory of the Firm; the tenets of the theory, and the relevance of the theory. It is envisaged that the behavioral theory of the firm improves on previous theories of the firm that sought to explore its operational contingencies.

Foundations of Behavioral Theory of the Firm

The Behavioral Theory of the Firm was advanced by, among others, Richard Cyert and James March (1963) then of Carnegie Mellon University in the United States of America. Cyert's preference for interdisciplinary models of social analysis, and March's sociological background could account for their determination to integrate behavioral science with economics in a new approach to studying the firm.

The Behavioral Theory of the Firm seeks to explain how and why firms make decisions related to their goals, perceptions of uncertainty, and the environment. It takes its inspiration from behavioral economics, psychology, and organizational approaches. It is particularly relevant when addressing questions about firms' response to environmental changes (Cerrato, Alessandri, & Depperu, 2015).

The Behavioral Theory of the Firm has its roots in the Carnegie School of Fresh Water Economics, whose genesis is from the 1940s on to the 1960s. The Carnegie School was a group of scholars based at Carnegie Mellon University United States of America in this period. Cyert, March and Herbert Simon led the school. The focus of the Carnegie School was on how organizations behave in terms of decision making. In their analysis, they explore the relationship between decision making in firms and the objectives, goals, and expectations of firms.

Classifications of economic thought in the United States of America around water bodies pits Fresh Water Economics, located at institutions near freshwater Great Lakes, and Salt Water Economics based at Salt Water Ocean Bodies. The Great Lakes include Lake Erie, Lake Superior, Lake Michigan, Lake Huron and Lake Ontario. The Salt Water Ocean Bodies in this case comprise the Pacific and Atlantic Oceans respectively.

As such, Fresh Water Economics is linked to institutions such as Carnegie Mellon, Chicago, Minneapolis, and Rochester. Salt Water Economics is emphasized at institutions such as Harvard, Massachusetts Institute of Technology (MIT), and the University of California at Berkeley. The critical distinction between the two economic schools is about what extent governments should intervene in economic activity. Salt Water Economists promote a bigger role for government in economic activity, while Fresh Water Economists advocate for lesser government intervention in economic activity (see Arnold 2011/2014).

Behavioral theorists of the firm posit that the behavior of firms represented by the actions they take, comes from a nexus of relationships between its stakeholders. Stakeholder goals impact how the firms make decisions related to both internal and external conditions. A major work that set the foundations of the theory was Cyert and March's *A Behavioral Theory of the Firm* (1963). It provides a framework for examining economic crises as environmental dynamics that firms encounter and which determine decisions they make to survive.

Competing Theories of the firm

Theories of the firm are those that seek to explain and predict the nature of the firm, including its existence, behavior, structure, and relationship to the market

(Kantarelis, 2007; Spulber, 2009). A firm can is as an organization that carries out production in an economic system. The economic system and changes therein affect firms and direct their actions as and when they occur. A firm is founded by an authority (an "entrepreneur") who directs resources towards production. A firm consists of a system of relationships that come into existence when the direction of resources is dependent on an entrepreneur (Coase, 1993). Depending on the theory used to explore the firm, the decisions about resource allocation and direction may lie in the hands of the entrepreneur or manager. Nonetheless, other factors eventually determine how those decisions are made and how the firm behaves, as further indicated in this section.

Theories of the firm are concerned about five main areas of studying the firm. First, theories of the firm are concerned about its existence: how and why do firms emerge. Second, the boundaries of the firm are of interest to theories of the firm. They inquire about which transactions are performed internally and which are negotiated externally on the market. Third, theories of the firm are interested in how firms are organized. They are interested in knowing how and why are firms structured in a specific way. For example, they ask whether firms are organized in the forms of hierarchy or decentralization. What is the interplay between formal and informal relationships in the firm? Fourth, heterogeneity of the firm actions and performances is of concern to the theories of the firm. What drives the different actions and performance of firms? Fifth, the theories of the firm are interested in tests of the postulations of different theories of the firm (Hubbard, 2008; Richman and Mache, 2008).

There are four main theories of the firm: transaction cost theory, managerial theory; principal-agent theory; and behavioral theory. The transaction cost theory of the firm emerged in 1937 and was formulated by Ronald Coase. It was a neoclassical theory that considered the processes of profit maximization. Transaction cost theory emphasized analysis of the costs of conducting transactions (buying and selling of goods and services) and the decisions related to that process. The managerial theory, as proposed by William Baumol (1959 and 1969), Robin Marris (1964), and Oliver E. Williamson (1966) emphasize the role of managers in the formation, organization, and performance of the firm. This theory clarified that managers maximize their utility (benefits) and in the process, satisfy the utility of shareholders and entrepreneurs. The principal-agent theory evolved from managerial theories. Principal agent theorists such as Spence and Zeckhauser (1971) and Ross (1973) indicate that managers are more knowledgeable than the

entrepreneur and so they are vital to the goals of the firm. Because of their expertise, they cannot be directed by the entrepreneur. Behavioral theories of the firm (the 1960s) focused on decision making in the firm and how it shapes how the firm behaves internally and externally.

Tenets of The Behavioral Theory of the Firm

Behavioral theorists slightly differed from the aforementioned competing theories because they give priority to goals as the axis of firm behavior. They propose that goals are the result of multiple stakeholders. A firm's behavior tends to be conditioned by factors that prompt a behavior to arise. These factors are called stimuli (singular stimulus). All responses are made towards a stimulus (Anderson cited in Reese, 1989). The stimulus determines they type of response of behavior that is elicited. Environmental conditions are the stimuli that elicit behavior from firms.

Färe and Primont (1994/2003) link behavioral theories of the firm to behavioral economics. They propose that in determining which theories to use to study the firm, one must form assumptions. The choice of an economic model of the firm depends, in part, on what assumptions one is willing to make about the economic behavior of the firm. Behavioral theories of the firm are linked to a broader paradigm of behavioral economics that challenges neoclassical versions of economic behavior. Hayes (2018) argues that investors generally do not behave as predicted by traditional financial theory. Traditional financial theory assumes that each individual behaves rationally to maximize utility. Rather, Hayes contends, people often behave irrationally and can be driven by their emotions, particularly when the economy is in turbulence. Behavioral finance theory, an emerging field, focuses on describing how people behave than how they should behave as prescribed by financial theory.

The neoclassical theory of the firm examines the behavior of firms concerning the inputs they buy. It also analyzes the production techniques they adopt. Neoclassical theory is further interested in the quantity at which firms produce, and the price at which they sell their output. It is assumed that the producers, whether they are monopolists or perfect competitors, aim at maximizing profit. It is assumed that firms produce to the point where marginal cost equals marginal revenue. Firms spend on inputs to the point where marginal revenue is equal to the marginal cost of the inputs (Xiao, 2004). The objective of profit maximization governs decision making in a variety of areas, including resource allocation,

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production technique, pricing adjustments, and quantity produced (Chen & Murphy, 2018).

The neoclassical theory has some very clear shortcomings. It overlooks the organization of production in a firm. It downplays the conflicts in the varying interests in a firm's key constituencies. These constituencies comprise workers, managers, owners, and consumers. The neoclassical theory does not seek to understand how these conflicts are resolved. Nor is it concerned about the way the firms achieve their goal of profit-maximization.

One of the main shortcomings of neoclassical theory is its inadequacy in determining the size of the firm and its boundaries. It gives limited attention to the firm's size or extent. The neoclassical theory would not be concerned about how firms merge or disintegrate and the effects or consequences of this kind of firm behavior. The neoclassical theory explains how firms function but does not give a lot of attention to the structure of the firm (Hart, 1989).

The behavioral theory of the firm was founded in response to the inadequacies of neoclassical theories of the firm. It suggests that the firm does not only exist to maximize profit, but there are other goals associated with its formation, operations, and existence. These goals are derived from a variety of stakeholders who coalesce to structure its behavior. Firm goals provide the context of the firm's behavior.

The Behavioral Theory of the Firm is a recent theory. It is recent in the sense that it emerged less than one hundred years ago. Some studies name Herbert Simon as the founding father of Behavioral Theory of the Firm. Simon, a member of the Carnegie School, wrote 'A Behavioral Model of Rational Choice,' which is viewed as the genesis of the theory.

According to Dutt (2010), Simon called for a new direction away from the neoclassical rationality. He preferred a new direction that took examined the costs and limitations that shape firm behavior. Simon was emphatic on behavioralists examining the actual process by which people (and firms) made decisions. His model paved the way for behavioral approaches to the study of the firm.

Nelson and Winter (1982) explain further the role of Simon in advancing behavioral theory. They argue that this concept of bounded rationality [or rationality with limitations] meant rationality was not a given among firms. Real-life decision problems were too complex to comprehend, and therefore firms cannot maximize over the set of all conceivable alternatives. This bounded reality gives the varying contexts of firm behavior.

Pervan and Višić (2012), on the other hand, attribute the rise of the behavioral theory of the firm to Richard Cyert, James March and Herbert Simon of the

Carnegie School (see also Zbaracki and Bergen, 2015). Cyert and March contested neoclassical assumptions of economic behavior and proposed that firm behavior can be analyzed through exploring the nature of the firm and decision making in the firm. They suggest that firm behavior is influenced by organizational expectations, organizational choice, and organizational goals. Behavior is also determined by its environment and perception of uncertainty (Soni 2014; Dasgupta, 2003). Rulz (2010) has furthered the debate by identifying the complex process of goal formation and decision making in the firm.

Because of its recognition of cognitive processes, the Behavioral Theory of the Firm is described as a psychological approach. Detzer and Herr (2014) trace the origin of the theory to psychologists who, in the 1960s and 1970s, began to examine economic decision-making processes. They detailed heuristics and biases of humans that make their decisions under uncertainty. Biases meant that their decision tended to be irrational.

Prior research has shown that behavioral responses can be assessed as follows: (1) well-defined endpoints that are practical to measure, (2) well understood relative to environmental factors that cause variation in the response, (3) sensitive to a range of stimulants (which elicit the response) and adaptable to different entities, and (4) ecologically relevant (Rand cited in Little and Brewer, 2001).

A Behavioral Theory of the Firm: 1. focuses on a small number of key economic decisions made by the firm. These decisions include price and output decisions and internal allocation, and market strategy decisions. 2. Develop process-oriented models of the firm which view decisions of the firm as the result of a well-defined sequence of behaviors in that firm; and study the decisions by studying the process. 3. Link models of the firm to empirical observations of both the decision output and the process structure of actual business organizations. The models are based on observations and empirical tests of firms concerning the actual behavior of identifiable firms. 4. Develops a theory which can generalize beyond the specific firms studied. This generalization involves summarizing concepts and relations that enhance scientific understanding of the behavior of a variety of organizations in a variety of decision situations (Cyert & March cited in Argote & Greve, 2007).

Behavioral theories of the firm make some assumptions about the nature and behavior of firms that differ from neoclassical suppositions of the firm. According to March (2008), firms are characterized by 1) imperfect environmental matching (firms do not perfectly fit with their environmental circumstances) 2) Bounded

rationality (limitations to make rational decisions), and 3) Unresolved conflicts which lead them to keep shifting goals and changing behavior.

Behavioral theorists of the firm also define and examine the firm as an organization (Becerra, 2009; Tommaso and Dubbini, 2000). Accordingly, the modern "representative firm" is a large, complex organization (Cyert & March, cited in Schrader, 1993) with goals. Mindful of the diversity in and of firms, behavioral theorists have also considered the firm as heterogeneous units with different characteristics (Tecce, Pisano and Shuen, 2008).

The goals of the firm are those objectives that an organization is ostensibly designed to achieve (Mansfield, 2013). Moreover, firm behavior is influenced by the goals and expectations of firms and their coalition of stakeholders (Soni, 2014; Dasgupta, 2003). There are five main goals pursued by firms: (a) production goal (b) inventory goal (c) sales goal (d) share of the market goal and (e) profit goal (Kumar, 2017).

Rulz (2010) has studied goal formation in firms and describes it as a complex process because of the different interests and constituencies that firms have to cater. In firms, there are multiple stakeholders with multiple expectations, which result in ever-changing goals (Ledenyov & Ledenyov, 2018). As such, goals set by firms tend to be flexible and revisable from time to time depending on past attainments, conditions prevailing in the economy, and changes in the aspirations of the various groups within the firm (Kumar, 2017). The interactions between the various groups are not always smooth. Lindblom (cited in Tsoukas and Knudsen, 2006) suggests that the firm is often viewed as a 'political coalition' between different interest groups for which a truce should be constantly found.

The goals of the firm are normally the underlying motivations for decisions made within and by the firm. This has led behavioral theorists of the firm to study the firm as a decision-making unit with greater emphasis on its decision-making processes (Brannon, Thommesen, & Marshall, 2003; Simon cited in Dutt, 2010). They focus on how decisions, judgments, or responses related to the situation of the firm are reached. Dosi and Marengo (2007) propose that firm behavior is problem-solving activities that are a product of physical and cognitive acts within a procedure, leading to the achievement of a specific outcome.

In making decisions, behavioral theorists argue, those decision-makers in the firms are affected by bounded rationality. In other words, the rationality of individuals who make decisions is limited by the amount of information in their possession. They are also constrained by the cognitive limitations of their minds

and the finite or limited time frame the managers have to decide (Simon, 1957). According to Azid, Asutay, & Burki (2007) firms do not function rationally. There are other reasons why firms could act in different ways.

Similarly, real-life decisions are too complex to comprehend, and therefore, firms cannot maximize the set of all conceivable alternatives. This bounded reality gives the varying contexts of firm behavior (Nelson & Winter, 1982). This contrasted with the neoclassical view that firms have perfect, logical, and deductive rationality.

Besides the bounded rationality of its decision-makers, firm behavior is also induced by environmental incentives and constraints (Luthans, Avey, & Luthans, 2008). For example, firms tend to solve their pressing problems rather than develop long-run strategies that could be standard practice across a wider sector or industry (Tecce, Pisano & Shuen, 2008). Wolff and Resnick (2012) have attributed the unpredictability of firm behavior to natural, cultural, political, and economic processes. As such, to analyze firm behavior, each firm should, therefore, be studied for its unique contexts.

According to behavioral theory of the firm, three sets of conditions also shape firm behavior: (1) conditions inside the firm, (2) conditions in the industry and, in particular, in rival firms; and (3) conditions in the economy as a whole (Cyert & De Groot, 1987). Of importance is who the firm interacts with. More specifically, Jirasek (2016) states, the interaction of a firm with both its customers and competitors leads to certain behavioral patterns that could be followed to understand the motives behind particular actions of the firm. The behavior of firms in the market place has become a central point of inquiry for behavioral theorists of the firm (Todeva, 2007; Stremțan, et al., 2009).

Besides externally produced factors, firm behavior may also be determined by its internal dynamics (Huff, Huff, & Bar, 2000). This accounts for the different ways firms react to changing environmental (competitive) conditions from ways that are known of their competitors. After studying firm behavior over some period of time, Liberman and Asaba (2006) and Cyert and March (cited in Tsoukas & Knudsen, 2006) suggest that firms may either imitate other firms or adapt to their environments. They are influenced by the behavior of their rivals, who they think may obtain a competitive edge through the actions that they take. Several studies have explored adaptation as one of the main forms of firm behavior (Abatecola, 2012; Tsoukas & Knudsen, 2006; Gibbons, 2005; Teece, 2007; Tsoukas & Knudsen, 2006; Williams, 2007; Sternard, 2012). They view the firm as an
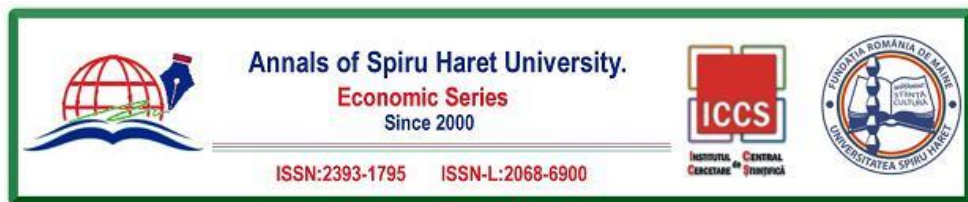
adaptive institution whose short-term behavior is determined by its 'standard operating procedures.

According to Wong and Candolin (2015), behavioral adjustments represent the first response to altered conditions. This adjustment to conditions is referred to as adaptation. Firms adapt to survive. Behavioral theory or its institutional theoretical strand, explains how the firm adapts to a symbolic environment of cognitions and expectations and a regulatory environment of rules and sanctions.

The theory assumes bounded rationality; additional key borrowings from the behavioral theory of the firm are uncertainty avoidance (Argote & Greve, 2007). A summary of the core premises of behavioral theories of the firm as given by Argote and Greve are: bounded rationality, problemistic search, the dominant coalition, standard operating procedures, and slack search. These premises and concepts serve to explain how decision making and firms generally function.

Bounded rationality identifies the limitations of a decision-maker at a cognitive level and at a contextual level, which shapes the decision-making process (Simon, 1990). The decisions made with inadequate knowledge are rationalized by the lack of knowledge. Accordingly, the principle of bounded rationality is that perfect decisions are never possible, because of either the limitations of knowledge or the inability of the decision maker to behave rationally (Ballester & Rojas, 2012). Different contexts influence the decisions make, rendering some of them to be non-rational (Hernandez & Ortega, 2019).

Problemistic search is a concept used to describe how in terms of behavior, firms search for solutions to problems after receiving feedback about performance. When the firm's performance falls below expectation, it initiates a search for solutions. This may result into performance to the aspired level (Posen, Keil, Kim and Meissner, 2018). Sometimes firms use benchmarking to determine what they should achieve, and undergo problemistic search to attain those levels of performance. There two types of performance aspirational levels: historical aspiration and social aspiration. Historical aspirational level is about the firm's past performance in relation to the present while social aspirational level is the firm's current performance in relation to its competitors in the market (Kim, Finkelstein, & Haleblian, 2015).

The dominant coalition is the group that institutes and modifies the general management logic of the organization (Leone, 2016). It is assumed by Bowen (2005) that all firms have some kind of dominant coalition that makes decisions from within. The coalition tends to play a leading role in the organization and

shape the general direction it takes. It influences the missions and goals of the coalition and the implementation of these missions and goals. This is in spite of the various interests' different stakeholders within and outside the organization may have.

Standard Operating Procedures (SOPs) are instructional mantles that tells employees of firm how to do what they do. The document defines expected practices and sets quality standards (Gough & Hamrell, 2009). According to De Treville, Antonakis and Edelson (2005), the use of Standard Operating Procedures (SOPs) that guides employees, generally improves the outcomes of production at firms. The SOPs are relevant to different firms and contribute to the effective management of the system. They promote transparency and can assist in building transparent systems with components to prevent error and mechanisms for correction (Amare, 2012).

Slack refers to the resources and inputs that an organization may have and which may not have been used to advance the goals of the firm (Daniel, et al., 2004). They are reserve resources that can be deployed if need be to realize objectives of the firm. Slack search involves the process of the organization developing such resources and inputs even when they might not be using them to solve any immediate problems (Argote & Greve, 2007).These concepts are important ideas that can be used when applying the theory to studies of the firm.

Relevance and Limitations of Behavioral Theory of the Firm

The influence of the Behavioral Theory of the Firm has been widely emphasized (Gavetti, Greve & Levinthal, 2012) because it set the agenda for studying the behavior of firms at an organizational and strategic level. Unlike previously existing economic theories of the firm that in a limited way viewed the firm as a black box, churning inputs into outputs, in other words, its typical production function, the behavioral theory of the firm broadens the scope of analyzing the firm into a variety of possibilities. It examines the internal and external dynamics of the firm, it focuses on decision making related to production, scheduling, and inventory, and identifies the circumstances that surround decisions, and outcomes from a rational and non-rational perspective (Todeva, 2007). The behavioral theory of the firm also promoted an interdisciplinary model for studying the firm. This ideally synthesizes many disciplines and enriches the scope of ideas that can be developed about the firm (Jones, 2009). While this may prove problematic in agreeing on the methodological focus of studies on the firm, it

provides a platform for digging into crates of methods that can create new knowledge about firms.

One of the limitations of the Behavioral Theory of the Firm is that the behavior of the firm is taken as highly variable. It is very difficult to define a firm using the behavioral theory of the firm. The theory also assumes that the behavior of the firm can be as diverse as the heterogeneity of its decision-makers, and environment. The use of interdisciplinary frameworks to examine firms makes it a very broad terrain of analysis, that could retreat from the core operational tendencies of firms, which are largely economic organizations.

Conclusions

This paper concludes that theories of the firm explain the nature and operations of the firm. The behavioral theory of the firm which is the main focus of discussion emerged as a response to the analytical inadequacies of the neoclassical theory of the firm. Its founders, based at Carnegie Mellon University sought interdisciplinary methods to conceptualize and predict firm behavior. Behavioral science was central to the construction of this theory.

Because of the numerous contributors to the theory and the strands and tributaries that evolved out of it, it is concluded that the nomenclature of the behavioral theory of the firm is in actual sense behavioral theories of the firm. This plurality of thought may equate behavioral theory of the firm to an entire field of analysis of firm behavior, that a mere set of ideas that define and explore the firm.

Central to its perspective is the fact that the behavior of the firm is generated by relationships between its stakeholders, which account for its decisions. The goals of the firm, which unify the vast interests of its stakeholders are the primary hinges of decision making in the firm.

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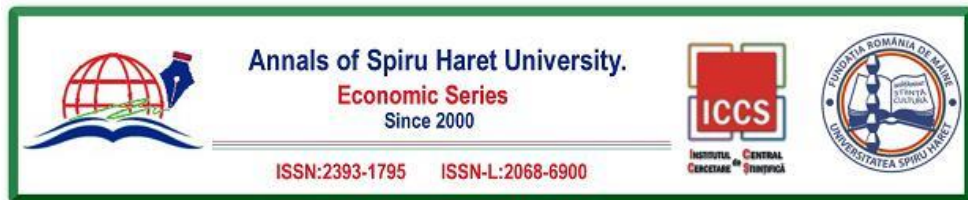
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BOARD CHARACTERISTICS AND CORPORATE SOCIAL DISCLOSURE OF LISTED FIRMS IN NIGERIA

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Abstract

This study examined board characteristics and corporate social disclosure of listed firms in Nigeria. Five (5) years' time series and cross sectional data from 2016-2020 was sourced from the annual financial reports of the firms in the study. Diagnostic test was done on the data and panel least squares regression method of data analysis was employed. The results indicated that board size and frequency of board meetings have no significant effect on corporate social disclosure while board independence was positive and significant for corporate social disclosure of listed firms in Nigeria. On the basis of these findings, the study recommended that independence of the board should be sustained in order to achieve a higher degree of corporate social disclosure that will promote better environmental well- being for all.

Introduction

Corporate social responsibility is normally carried out and reported by organizations or firms within the environment or society in which such firm is located. It constitutes the commitment shown by firms to contribute to the economic and social development of that society where they exist. Firms embark on social responsibility and disclose same not only for the purpose of making profit but rather to give back to the society as a result of the fact that such businesses have benefited from the society either through the use of its resources or patronage of its citizens (Reverte, 2016). As observed by Cho *et al.* (2015), company(s) are able to provide evidence to interested stakeholders of its commitment to helping society through corporate social responsibility disclosures in its annual reports or dedicated corporate social responsibility reports. These Corporate social responsibility disclosures tends to boost the reputation of the company because when its annual report reveals that it is socially responsible, stakeholders hold the company with high esteem (Beck et al., 2018). Also stakeholders use corporate social responsibility information to ascertain whether a company is a good corporate citizen (Bhatia & Chander, 2014).

The Commission of the European Communities (2001) and Dibia (2015) defined corporate social responsibility as the integration of social and environmental concerns by corporations in their business operations and in their interaction with their stakeholders on a voluntary basis. Appah (2011) relates it to complex issues such as environmental protection, human resources management, health and safety at work, relations with local communities, relations with suppliers and consumers. While, Branco and Rodrigues (2006) noted that corporate social responsibility is now seen as a source of competitive advantage and not as an end in itself. Consequently, corporate social disclosure is an obligation an organization has to protect and enhance the society in which it functions. It demands that corporate entities behave in a manner that preserves and protects our social foundations, values and institutions (Singh, 2006). Nwachukwu (2008), assert that social responsibility is seen as the intelligent and objective concern for the welfare

of society which restrains individual and corporate behavior from ultimately destructive activities, no matter how immediately profitable and which leads in the direction of positive contributions to human betterment. Therefore, organizations that neglect a clear CSR strategy can soon be cut off from important resources that might contribute to its expansion.

For any firm or organization to be socially responsible and disclose same, the firms' board of directors remains a potent channel through which such governance obligation can be exercised. Companies act through two organs, the shareholders and the board of directors. The principal objective of the board of directors is to ensure that the company is properly managed. It is also the responsibility of the board to oversee the effective performance of the management in order to protect and enhance shareholder value and to meet the company's obligations to its employees and other stakeholders. The directors have a statutory duty to act at all times in what they believe to be the best interests of the company as a whole so as to preserve its assets, further its business and promote the purposes for which the company is formed. The call to this duty has been heightened in the wake of the several accounting, leadership and governance scandals that hit major corporations around the world. These scandals birthed a turnaround from the usual traditional function of firms to a much more focused and more accountable firm where all parties interested in the well-being of the firm (stakeholders) ensure that managers take measures to safeguard the interests of the stakeholders. So, whether board characteristics and corporate social disclosure have any relationship on listed firms in Nigeria is still a mixed reaction. This study therefore seeks to empirically investigate the effect of board characteristic on corporate social disclosure of listed firms in Nigeria. In line with the above the following objective is sought and hypothesized:

Research Objective
1. To determine the effect of Board Characteristics (Board size, Board Independence and Board meeting Frequency) on corporate social disclosure of listed firms in Nigeria.

Research Hypothesis
The following null hypothesis is stated:
1. Board Characteristics (Board size, Board Independence and Board Meeting Frequency) has no significant effect on corporate social disclosure of listed firms in Nigeria.

Literature Review
Corporate Social Disclosure

The continuous interactions of businesses with the environment and the exchange between them confer some responsibilities on business to the society in which they operate, and vice versa. Corporate Social disclosure as a subject has received increased academic attention in the time past. People's expectation of the business about its responsible role in society is mounting and the research in this area shows that there has been expansion in a range of instruments that plan to develop, evaluate and communicate socially responsible practices says Golob and Bartlett (2007). Communicating information on social responsibility is now a must for businesses socially engaged (Toukabri, Ben and Jilani, 2014). Thus, accountability is now considered as inherent in the principle of responsibility, one not existing without the other. Omran and Ramdhony (2015) agree that the call for disclosure of non-financial information has grown in response to the awareness that financial statement omits salient information about the firm. Furthermore, they observed that the need for non-financial information has increased significantly over the years since financial statement only portrays a limited picture of the firm mainly of financial metrics. Huang and Watson (2015) on their part also acknowledged that disclosing non-financial information is essential to reduce information asymmetry existing between management and key stakeholders. Thus helping investors to better assess the firms' key performance areas which lend support to a broader view of corporate performance that encompasses the society at large. In the words of Uwuigbe (2012), corporate social disclosure has become one of the requirements for firms' usefulness to the society in which they operate. It has emerged as an important issue in today's corporate reporting. According to him, these disclosures have increased globally in both size and complexity over the past two decades, despite some variations among countries in different regions. Corporate disclosure of social and environmental impacts constitutes what some advocates consider to be a critical pillar of the CSR movement. Corporate disclosures provide the firm the opportunity to spread value information mainly to financial stakeholders such as stock analysts, capital markets and institutional investors and thereby get evaluated on its financial measures. Despite the necessity for disclosures on social and environmental issues, variety of factors relating to characteristics of the board have been pinpointed as capable of having effect either positively or negatively on firms motives in providing these reports which is the focus of this study. According to many studies, firm's size and the characteristics of

industry seem to play the most important role in the disclosure of social and environmental issues, (Da Silva Monteiro and Aibar-Guzmán, 2010; Brammer and Pavelin, 2008; Magness, 2006). This study therefore explores the effect of board characteristics on corporate social disclosure of listed firms in Nigeria.

Corporate Governance and Board Characteristics

In the wake of accounting, leadership and governance scandals at major corporations worldwide, corporate governance has emphasized issues that go beyond the traditional focus to touch on corporate ethics, accountability, disclosure, and reporting (Gill, 2008; Honggowati et al., 2017). More focus is given to long term relationship that deals with checks and balances, incentives for managers and communications between management and investors and also on the transactional relationship, which involves dealing with disclosure and authority (Khan, 2010). The split in control and ownership of modern corporations were cited as the problem whereby managers act in their own self-interest, which is but inverse with that of other stakeholders (Rusmanto et al., 2014). Presently, corporate governance is concerned with ways in which all parties interested in the well-being of the firm (stakeholders) ensure that managers take measures to safeguard the interests of the stakeholders (Sanda et al., 2010).

Corporate governance traditionally specify the rules of business decision making that apply to the internal mechanisms of companies (Gill, 2008).This set of norms and laws, first and foremost, served to shape the relations among boards of directors, shareholders, and managers as well as to resolve agency conflicts (Gill, 2008). It further defines how organizations are controlled and how managers are accountable to the stakeholders of these companies. In this regard, board characteristics play a significant role in driving the idea of corporate governance in firms. Board characteristics are definite attributes of the board of directors of a firm that has a direct bearing on their role as mangers of the firm. The board characteristics brought under review in this study will include board size, board independence, board meeting frequency etc.

Board Size

The board of directors of a company play a significant role in deciding the strategies and policies that drive the firm either to success or failure, hence it constitution is of paramount importance to the overall performance of the firm. A larger board may bring a greater number of experienced directors (Xie et al. 2001)

who can organize and divide various functions (control, monitor, advice and the establishment of strategies), including the tracking of social responsibility. Various studies have shown a strong link between the size of the board of directors and the preparation of reports (Buniamin, Alrazi, Johari and Abdul-Rahman; 2008). Some studies revealed a positive relationship between board size and corporate disclosure (Gandía 2008; Kent and Steward 2008), that is voluntary disclosure. Conversely, several studies found no empirical association between board size and a company's level of information disclosure (Cheng and Courtenay 2006; Donnelly and Mulcahy 2008). It is assumed that a larger board size could increase experience and the generation of new ideas around the adoption of responsible strategies and the disclosure of same. Hence the variable is brought into this study proxied by the number of persons on the board of each listed firm in Nigeria.

Board Independence

The strength of corporate governance is measured as the proportion of independent directors on the board. Arguably, an independent board serves as an important check and balance mechanism in enhancing boards' effectiveness. The board of directors is responsible for running the company, and takes responsibility for forming and monitoring plans and strategies (Weir and Lauing 2001). Goodwin and Seow (2002) argue that sound governance by board of directors influence the quality of reporting. Some members of this board can be independent, and could affect the content of social reports, since they are usually assumed to represent the stakeholders (Haniffa and Cooke 2005). The independent directors usually possess great experience and, at the same time, are independent from management (Patelli and Prencipe 2007). They have an important role in creating or achieving balance, and in enhancing board effectiveness (Haniffa and Cooke 2002). In developing countries, there are several studies which found a positive relationship between the proportion of independent directors and high levels of voluntary disclosure (Cheng and Courtenay 2006; Akhtaruddin *et al*., 2009; Jo and Harjoto, 2011; Rouf 2011). Higher proportion of independent directors enhances financial reporting (Barako *et al*., 2006) and much more corporate social reporting. It is expected that the existence of independent directors on corporate boards would result in more effective monitoring of the board and limit managerial opportunism (Fama and Jensen, 1983; Mohd-Ghazali and Weetman, 2006). Board independence may be perceived as a tool for monitoring the board resulting in more voluntary disclosure of corporate information. This variable was proxied by the ratio of non-executive director to total number of directors on the board (i.e. number of outside directors).

Frequency of board meetings

Board meetings are often held at a definite time period and interval. These meetings are held to consider policy issues and problems faced by an entity. Literature holds that board meeting frequency often suffices for board diligence. Board meetings are held to improve on the effectiveness of the board and the level of monitoring. Osei (2011) measures the frequency of board meeting as the natural logarithm of a number of the board meeting held throughout the financial year.

The literature on accounting disclosure is vast and investigates a broad array of issues (Hassan & Marston, 2010). Accounting disclosure is very important to all stakeholders; it provides them with the necessary information to reduce uncertainty and helps them to make suitable economic and financial decisions (Alhazaimeh et al., 2014). Prominent among them includes disclosure quality practices considering either mandatory or voluntary items or both (Bonaimé, 2015; Hermawan et al., 2018), determinants of environmental accounting and disclosure (Omnamasivaya & Prasad, 2016), effect of real-time reporting on disclosure (Tian, 2015), economic consequences of disclosure (Elbannan & Elbannan, 2015); use of voluntary disclosure in determining the quality of financial statement (Oluwagbemiga, 2014), and earnings non-synchronicity and voluntary disclosure (Gong et al., 2013). However, there is a dearth of literature on the area of board characteristics and corporate social disclosure. It is on this bases that this study intend to look into this area of board characteristics and corporate social disclosure of listed firms in Nigeria

Theoretical Review

There are several theories attempting to explain why and how companies disclose their corporate social responsibility activities. The study is anchored on the following theories.

Legitimacy Theory

The development of legitimacy theory can be traced to Prabhu (1998). Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995). Omran et al, (2015) assert that legitimacy theory relies upon the fact that a "social contract" exists between an organization and the society in which it operates. Consequently, corporations try to legitimize their actions (through the board) by engaging in corporate social reporting to obtain approval from society (societal approach) and thus, guarantee

their continued existence. Coffie et al. (2018) argued that corporate social disclosure attempts to legitimize the behavior of a firm through the provision of information to stimulate the perception of stakeholders as well as the society at large about the firm. Invariably, Legitimacy theory allows firms to carry out their activities within the society they exist as they meet the changing demand of that society as well. Hence firms ought to be flexible such that they will respond appropriately as the society changes its demand. Consistent with this fact is that corporate social disclosure is closely related to social pressure; responding to this pressure will largely depend on the firm's specific features and its corporate governance. Hence, a positive relationship between these factors is expected. Based on this argument, this study, therefore, expects board size, board independence, and frequency of board meetings which are some of the components of board characteristics to have a positive relationship with corporate social disclosure.

Agency Theory

This theory was birthed by Jensen and Meckling (1976) when they posited that an agency relationship applies where individual(s), the principal, enters into a contract with another individual(s), the agent, to carry out some functions that includes decision making. In company setup, managers act as the agents of the company owned by shareholders who are the principal delegating duties or discharging their responsibility to a third party. Due to the different interests of the parties that make up a company, agency costs may arise. The shareholders often employ monitoring tools to stem down the tides of deterioration while the managers try to convince and reassure the principals of a safe haven with respect to their activities and decisions. The theory is appropriate in the current study because the board members are assigned the responsibility of day to day running of an organization. Since they are agents of the shareholders they ought to continuously disseminate the relevant information to the shareholders for optimal decision making. Information sharing is not free from conflict especially if the shareholders perceive that board members may induce the firm management depending on the level of information access because they have even the confidential information which if misused may lead to insider trading.

Empirical Review

A major fall-out from the scandals that had befallen major corporations around the world and Nigeria inclusive is that the eyes of the investors have been focused

on the board and how they see to the interest of the stakeholders. A review of prior studies that evaluated the corporate social disclosures of companies revealed that a majority of these studies focused primarily on the quantity of disclosures provided in company annual reports (e.g., Bhatia & Chander, 2014; Cahan et al., 2016; Ali, Frynas, & Mahmood, Z. (2017); Nurleni & Bandang, 2018; Wasiuzzaman & Wan Mohammad, 2020). Other studies focused on the quality of CSR disclosures provided by companies (e.g., Chauvey et al., 2015; Noronha et al., 2015; Muttakin & Subramaniam, 2015). Only a small minority of studies reviewed combined both quantity and quality of disclosures when investigating the CSR disclosure of companies (e.g., Alotaibi & Hussainey, 2016; Appuhami &Tashakor, 2017), which have yielded inconsistent findings.

Garcia et al. (2020) investigated and analyzed the determinants of voluntary disclosure of corporate social performance (CSP) through a literature review of articles in EBSCO, ISI, and JSTOR databases published from 1987 to 2015, to discover the theoretical perspectives and the variables used in measuring the determinants of CSP disclosure (the independent variables). They confirmed that there was no single explanation for what determined CSP disclosure, and the theories that support a relationship between CSP disclosure and its determinants are legitimacy, institutional, stakeholder, agency, and voluntary disclosure.

Coffie et al., (2018) in their study found that board size and CSR disclosure have positive and statistically significant relationship. Suggesting that firms with a large board in Ghana will disclose more activities on CSR and at the same time ensure the quality of the disclosure. While Onuorah et al. (2018) from the Nigerian perspective also indicated that voluntary social disclosure is higher as the board increases. Miras-Rodríguez et al. (2018) also found that board size correlated positively to CSR reporting practices using data from five (Brazil, China, India, Russia, and South Africa) emerging economies.

Bansal, Lopez-Penez and Lazaro (2018) investigated the effect of board independence on corporate social responsibility disclosure examining the moderating role of family ownership. Panel research design was adopted and a sample of 29 companies was drawn from 29 countries for a period 2006 to 2014. Data was analyzed using Tobit regression analysis. Results of the study revealed inverse and significant influence of board independence on corporate social responsibility disclosure. Moreover, family ownership had significant moderating effect as reported. It was concluded that family ownership reduces the level of information asymmetry between independent director and management.

Muhammad et al (2017) investigated the impact of board characteristics on corporate social disclosure. The study sought to explore the link between corporate governance characteristics and corporate social responsibility disclosure of listed companies in the Pakistan stock Exchange (PSX). 179 companies from financial and non-financial sectors are studied from 2009 to 2015. The data is collected from their annual reports and websites. Binary logistic regression analysis was employed to test the models. The results reveal that board size, number of meetings and board independence were significant corporate governance characteristics that establish the link with corporate social responsibility disclosure. This study also found that the trend of CSR disclosure is increasing in financial as well as non-financial sector. Additionally, as the companies disclose their CSR activities, it led to better financial performance as compare to their counterpart.

Akbas (2016) finds that only board size has a positive and statistically significant relationship with environmental disclosure while board independence, board gender diversity, and audit committee independence are unrelated with environmental disclosure. Wonsuk and Abebe (2016) using the resource dependence and stakeholder theories suggest that the extent to which firms build relationship with certain stakeholders is closely tied to the personal and social background of board members. This in turn influences the allocation of resources to corporate philanthropy. Therefore, organizations with good board structure are considered to be stronger corporate leaders, more financially and environmentally conscious relative to companies with weak board composition. This indicates that a close correlation may occur between board characteristics and company CSR. Opusunju & Ajayi (2016) showed a positive association between foreign directors, board size, and ownership structure and corporate social responsibility disclosure for Dangote group of companies. Das et al. (2015); Khan (2010) find a positive correlation between board size, ownership structure, and independent non-executive directors and corporate social responsibility disclosure.

Muhammad & Sabo (2015) examines the impact of Board Characteristics on Corporate Social Responsibility Disclosure of listed food product firms in Nigeria over the period 2005-2014. A sample of six firms out of eleven food product firms listed on the floor of Nigerian Stock Exchange was studied. The study made use of secondary data generated from Annual Reports and Accounts of the sampled firms and the Nigerian Stock Exchange Fact book. The data was analyzed by means of descriptive statistics, correlation and regression analysis using STATA 12. The study reveals that board size and women on board show a significant positive

association with corporate social responsibility disclosure of the sample firms. While managerial ownership shows a significant negative effect on corporate social responsibility disclosure. However, board independence indicates an insignificant association with corporate social responsibility disclosure. While the control variable (Size) shows an insignificant negative relationship with corporate social responsibility disclosure. Based on the findings, the study recommends among others, that firms in the food product should have a competent size of 9 to 15 of board members, so as to encourage corporate social responsibility disclosure. Also, the proportion of non-executive directors on the board should be maintained and the appointment should be strictly based on experience and expertise as this will also ensure more corporate social responsibility disclosure. Also, women participation on the board should be encouraged as much as possible since women may have different skills compared to their men counterpart as this will help in ensuring full disclosure of all CSR related information.

Methodology

Both historical and descriptive research design was adopted for this paper. This design gives accurate information of how things occur. Owing to the fact that this paper combines cross sectional and times series data, a panel data analysis was carried out. The population of this study comprised all the companies quoted in Nigeria Stock Exchange. Purposive sampling technique was used to select sample size of ten (10) companies. Secondary Data covering a period of five (5) years (2016-2020) was used for this study and the data sourced from the audited annual report of the sampled companies.

Model Specification and Measurement of Variables

The general expression of the model is stated thus as:

Corporate social disclosure = f (BSZ, BIND, BMF)

Expressing the model in its econometric form:

$$CSD_{it} = \beta_{0_{it}} + \beta_1 BSZ_{it} + \beta_2 BI_{it} + \beta_3 BMF_{it} + e_{it}$$

Where:

β_0 = Intercept;

β_{1-3} = Unknown Coefficients

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BSZ (Board Size) = measured by the total number of directors on the board of the company.

BIND (Board Independence) = measured using the percentage of independent board directors i.e total number of non-executive board directors over total number of directors in the firm.

BMF (Frequency of Board Meeting) = measured by using total numbers of the meeting held in a year.

CSD (Cooperate Social Disclosure) = measured using 1 and 0, where there is a financial disclosure one (1) is giving and where there are no financial disclosure then zero (0) is being used.

E = Error term

The *apriori* expectations are predicted as: $\beta_1 > 0$; $\beta_2 < 0$; and $\beta_3 > 0$

Pre-Estimation Tests
Stationarity/ Unit Root Tests

To avoid running a spurious regression, a unit root test was carried out to ensure that the variables employed in this study are mean reverting i.e stationary. For this purpose the Augmented Dickey Fuller (ADF) test was utilized and the result of the test is presented in the table below.

Table 1: Augmented Dickey Fuller (ADF) Test

Variable	ADF Stat	5% Critical Value	P-value	Level Form
Board Size	-10.01125	-2.923780	0.0000	1st difference
Board Independence	-5.679397	-2.923780	0.0000	1st difference
Board Meeting Frequency	-11.76634	-2.923780	0.0000	1st difference
Corporate Social Disclosure	-7.405577	-3.508508	0.0000	1st difference

Source: Researcher's Output, 2021

Table 1shows the result of the first test required to know the individual stationarity of the variables. The Augmented Dickey-Fuller (ADF) unit root test result can be interpreted using either the t-statistic or the p-value. A variable is stationary if the ADF t-statistic in absolute term is greater than the ADF 5% critical value or the p-value is less than or equal to 0.05 level of significance. The result shows that all the variables are stationary at 1st difference. According to Gujarati and Porter (2007), a non-stationary time series can be made stationary through integrated series by differencing. Hence, since all the variables are stationary, we proceed to carrying out regression analysis in panel structure by using fixed effect model test and random effect model test, after which, Hausman test was done to know which effect is preferred.

Table 2: Hausman test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	0.546492	3	0.9086

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
BZ	0.003057	0.003192	0.000001	0.8843
BM	0.022050	0.026161	0.000044	0.5367
BI	0.693993	0.675780	0.001236	0.6045

Source: Research Output 2021

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Table 2 shows the result of the Hausman test carried out to determine the preferred effect specification considering the panel nature of the variable. The Hausman test is used to differentiate between fixed effects model and random effects model in panel data. The null hypothesis is that the random effect is preferred while the alternate hypothesis is the fixed effect is preferred. In this case, random effect is preferred that is the null hypothesis due to higher efficiency with a probability of chi-square of 0.908 greater than 0.05 level of significance.

Table 3: Panel regression result summary

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.288360	0.141994	2.030788	0.0481
BZ	0.003192	0.010257	0.311251	0.7570
BM	0.026161	0.019295	1.355859	0.1818
BI	0.675780	0.218131	3.098045	0.0033
R-squared	0.334287			
Adj. R-squared	0.290871			
F-statistic	7.699619			
Prob(f-statistic)	0.000285			
Durbin Watson Stat	1.996621			

Source: Researcher's Output 2021

Table 3 gives a summary of the regression result from the random effect specification as determined by the Hausman test carried out. From the result, it was observed that the coefficient of all the explanatory variables were positive (0.003192, 0.026161 and 0.675780). This implies that all variables of board characteristics investigated in this study has a positive relationship with corporate social disclosure of firms listed in Nigeria. However, only board independence shows a significant effect (p-value 0.0033) at 5% level of significance. The R-squared was 0.334 while the adjusted was 0.291. This simply mean that the level of variations in corporate social disclosures of listed firms can be moderately explained by board characteristics especially board independence.

The f-statistic of 7.6996 was significant at p-value of 0.000285 implying that the model was well fit to predict the extent of the relationship subsisting between the dependent and the independent variables. The value of Durbin Watson stat of

1.996 which is close to 2 gives an evidence of the absence of auto-correlation among the variables as such can be relied upon for predictions.

Test of hypothesis

The study earlier hypothesized that board characteristics (board size, board independence and frequency of board meetings) does not have significant effect on the corporate social disclosure among listed firms in Nigeria. From the table 3, board size, board meetings frequency and board independence has a positive effect on corporate social disclosure with only board independence being significant. Furthermore, the F-statistic of 7.69961 with p-value of 0.000285% level of significance is less than 5% level of significance hence the null hypothesis cannot be sustained and the alternate hypothesis is upheld . The study concludes that board characteristics have a significant effect on corporate social disclosure of listed firms in Nigeria.

Discussion on findings

The findings of this current study corroborate some empirical studies (Khan, 2010;Opusunju and Ajayi, 2016; Das et al (2015); Muhammad et al (2017) but are inconsistent with Muhammad et al (2017). The important role board of directors' play in the structural formation of any corporate entity which brings about efficiency and success cannot be overemphasized. Akhrtaruddin et al (2009) argue that board size has an influence on the level of voluntary disclosure since it is a strategic decision made by the board of directors. This is evidence from the findings in this study depicting a positive relationship. The board size is also very likely to affect its ability to monitor and evaluate management. It may also reduce the likelihood of information asymmetry as a result of the pool of expertise and collective experience. The significance of board independence as reported by the results, confirms that the independent directors act as the check and balance mechanism. They act as a tool in constraining managers' attitude and behavior thereby enhancing boards' effectiveness. Board of directors meets for the purpose of deliberating on issues of pertinent importance towards the success of the firm and to safeguard all stakeholders' interest. Having determined that board meeting frequency could affect corporate social disclosure of firms positively; members of the board need to ensure that every meeting is effective with all issues thoroughly and carefully x-rayed bearing in mind the overall interest of all stakeholders. With regular and effective meetings, board members are more likely to be well informed

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and knowledgeable about the firm and be able to make meaningful impact that will generate both social and economic benefits. Other board characteristics other than those considered in this study could also be x-rayed as an area for further study to understand their effect on corporate social disclosure.

Conclusions and Recommendation

Board of directors no doubt remains a potent mechanism for implementing corporate governance in any organization. This study using legitimacy and agency theories background, explores the effect of board characteristics on corporate social disclosure. In testing the hypothesis of this study, a sample of 10 firms listed on the Nigerian stock exchange from various sectors were examined from 2016-2020. The findings of the study based on random effect specification regression analysis showed that board size, board meetings and board independence all have a positive link to corporate social disclosure with significance in board independence. From the findings of this study and practical implications, it is evident that large boards, number of meetings and board independence are likely predictors of CSR disclosure. Management of organisations must ensure the sustenance of the independence of the board which serve as the check and balance for inside directors to promote a higher level of corporate social disclosure which will in turn create an environment where all stakeholders' needs are met. However, management must harness the largeness of the board size and the frequency of board meetings to create the effectiveness that is expected from the board of directors.

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Appendix 1

Company	Crossed ID	Year	BZ	BI	BM	CSD
Beta Glass	1	2016	11	0.9	4	1
Beta Glass	1	2017	10	0.9	0	1
Beta Glass	1	2018	10	0.9	4	1
Beta Glass	1	2019	8	0.9	4	0
Beta Glass	1	2020	8	0.9	0	1
Cadbury	2	2016	9	0.7	9	1
Cadbury	2	2017	9	0.7	5	1
Cadbury	2	2018	7	0.7	4	1
Cadbury	2	2019	8	0.6	5	1
Cadbury	2	2020	10	0.8	4	1
CAP	3	2016	6	0.7	6	1
CAP	3	2017	7	0.7	6	1
CAP	3	2018	4	0.8	6	1
CAP	3	2019	10	0.7	6	1
CAP3	3	2020	6	0.8	6	1
Chellarams4	4	2016	6	0.5	4	1
Chellarams4	4	2017	6	0	0	0
Chellarams4	4	2018	5	0	0	0
Chellarams4	4	2019	5	0.4	4	1
Chellarams4	4	2020	6	0.5	0	1
Cutix	5	2016	6	0.8	4	1
Cutix	5	2017	7	0.9	4	1
Cutix	5	2018	7	0.9	4	1
Cutix	5	2019	7	0.7	5	1
Cutix	5	2020	7	0.7	5	1
Dangote	6	2016	13	0.8	6	1
Dangote	6	2017	14	0.8	4	1

Dangote	6	2018	15	0.8	7	1
Dangote	6	2019	14	0.8	6	1
Dangote	6	2020	15	0.8	5	1
Flour Mills	7	2016	14	0.8	5	1
Flour Mills	7	2017	14	0.8	4	1
Flour Mills	7	2018	14	0.8	4	1
Flour Mills	7	2019	14	0.8	2	1
Flour Mills	7	2020	14	0.8	4	1
Grelf	8	2016	5	0.6	3	1
Grelf	8	2017	5	0.6	4	1
Grelf	8	2018	5	0.6	4	1
Grelf	8	2019	5	0.6	4	1
Grelf	8	2020	4	0.6	4	0
Lafarge Cement	9	2016	17	0.8	6	1
Lafarge Cement	9	2017	11	0.9	5	1
Lafarge Cement	9	2018	17	0.8	4	1
Lafarge Cement	9	2019	16	0.8	4	1
Lafarge Cement	9	2020	11	0.8	8	1
Guiness	10	2016	11	0.7	7	1
Guiness	10	2017	11	0.8	5	1
Guiness	10	2018	11	0.8	4	1
Guiness	10	2019	13	0.8	4	1
Guiness	10	2020	13	0.8	4	1

Appendix 2

Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	0.546492	3	0.9086

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
BZ	0.003057	0.003192	0.000001	0.8843
BM	0.022050	0.026161	0.000044	0.5367
BI	0.693993	0.675780	0.001236	0.6045

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Appendix 3

Dependent Variable: CSD
Method: Panel EGLS (Period random effects)
Date: 09/29/21   Time: 15:35
Sample: 2016 2020
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.288360	0.141994	2.030788	0.0481
BZ	0.003192	0.010257	0.311251	0.7570
BM	0.026161	0.019295	1.355859	0.1818
BI	0.675780	0.218131	3.098045	0.0033

Effects Specification		S.D.	Rho
Period random		0.000000	0.0000
Idiosyncratic random		0.239777	1.0000

Weighted Statistics			
R-squared	0.334287	Mean dependent var	0.920000
Adjusted R-squared	0.290871	S.D. dependent var	0.274048
S.E. of regression	0.230775	Sum squared resid	2.449823
F-statistic	7.699619	Durbin-Watson stat	1.996621
Prob(F-statistic)	0.000285		

Unweighted Statistics			
R-squared	0.334287	Mean dependent var	0.920000
Sum squared resid	2.449823	Durbin-Watson stat	1.996621

PERCEIVED ORGANIZATIONAL CULTURE, CO-WORKER SUPPORT, WORK PERFORMANCE, AND EMPLOYEE DEMOGRAPHICS AS CORRELATES OF ORGANIZATIONAL COMMITMENT

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Abstract

This study investigates the perceived organizational culture, co-worker support, work performance, and employee demographics as correlates of organizational commitment within Nigeria's manufacturing industry. The current sample was taken from ten manufacturing organizations in Oyo and Lagos States of Nigeria. Data retrieved were analyzed and presented in tables. Nevertheless, this paper applied a cross-sectional survey approach, of which the survey forms were randomly disseminated. However, out of 500 surveys, 476 were suitable for investigation and analyzed with Statistical Packages for Social Sciences (SPSS vs. 27). The objectives of this paper were to find out if there are correlations between perceived organizational support, co-worker support, work performance, employee demographics, and organizational commitment and to determine how organizational commitment can be enhanced and made consistent within Nigeria's manufacturing sector. The present results established a strong and significant positive correlation between perceived organizational culture, co-worker support, work performance, employee demographics, and organizational commitment within Nigeria's manufacturing industry. Therefore, the management

of manufacturing industries should ensure a good and consistent strategy that makes employees committed to organizational culture, encourage support among co-workers and increase better work performances.

Keywords: *values; cooperation; tasks; obligation; manufacturing; Nigeria.*

JEL Classification: L60, M14, M54, J24

Introduction

Organizational commitment (OC) is the power of identity between individuals and organizations (Doan *et al.,* 2020). Meyer and Allen (1991) opined that organizational commitment reflects in three (3) components: continuance, affective and normative commitments. They suggested that these three parts should be considered three components, not three types of commitments. They further indicated that continuance commitment is the consciousness of the benefits and costs linked to departing the organization. Hence, workers with a solid continuance commitment stick around the organization since they have to. Employees get attached to the organization as they consider themselves a significant part of its affective commitment. Hence, employees with a robust affective commitment stick around the organization because they like it. Also, normative commitment is a worker's sense of obligation to stay with an organization. Therefore, workers with a solid normative commitment conclude that staying with the organization is an obligation and an ethical standard. However, scholars are still researching factors that significantly impact organizational commitment (Doan *et al.,* 2020).

Lately, many focuses have been on the significance of organizational culture. It is vital to work organization, society, and any group of people; and cannot be over-emphasized. Thus, organizational culture is the fundamental values and beliefs that are the basis for an organization's management system (Choi & Ruona, 2011). It influences employee and organizational performance and long-term efficiency (Cameron & Quinn, 2011). Moreover, organizational culture drives the behaviors of employees (Choi & Ruona, 2011; van den Heuvel *et al.*, 2014).

Furthermore, co-worker support has been noted as the observed level of helpful exertion amongst colleagues, sociability, open communication, a spirit of cooperation within the workgroup, warmth, reliance amongst workgroup (Bateman, 2009). As their relationship advances, workers will require help from their colleagues. Thus, co-workers are essential in enhancing employees' well-being and solidifying their

relationships within the workplace (Khairuddin *et al.,* 2021). Significantly, co-worker support reduces workers' propensities to quit their works (Shoaib *et al.,* 2009).

In addition, performance represents one of the most important aspects of a work organization. Al Mehrzi and Singh (2016) stated work performance as an individual's result or level of success during a specific period in carrying out tasks. Moreover, Yang *et al.* (2016) state that works performance is basically what employees do or do not do. Hence, work performance is an individual's capacity to execute activities that add to organizational development (Eliyana & Ma'arif, 2019), and it is positively linked to job satisfaction (Nimalathasan, 2010).

This paper, therefore, covers the concepts of perceived organizational culture, co-worker support, work performance, employee demographics, and organizational commitment. Consequently, it is essential, as the growth of a nation's manufacturing industries measures its economic strength. In the book *("How Rich Countries Got Rich… and Why Poor Countries Stay Poor")*, Eric Reinert (2019) articulates the importance of manufacturing for a country. The organizational commitment of employees is directly related to the performance of manufacturing companies. So, several manufacturing companies who know this fact have focused on finding dynamism that improves their workers' commitments.

Thus, the current investigation seeks to enhance organizational commitment within Nigeria's manufacturing sector. Investigating the impacts of organizational culture, co-worker support, work performance, and employee demographics on organizational commitment within Nigeria's manufacturing industry will add to the general literature on commitment within the manufacturing industries. It will also remain relevant for human resources management practices and employment relations within Nigeria's manufacturing sector.

Literature Review

This study's literature review deals with concepts such as organizational culture, co-worker support, work performance, employee demographics, and organizational commitment.

1.1 Organizational Culture and Commitment

Organizational culture is a significant influencer of employee commitment and endurance on their jobs (Desselle *et al.,* 2018). Hence, a positive connection between organizational commitment and perceived organizational culture has been

established (Acar, 2012). Also, Shim, Jo, and Hoover (2015) opined that workers dedicated to an organizational culture tend to be more dedicated to their organizations. Furthermore, Messner (2013) indicated a positive link between perceived organizational culture and organizational commitment, advising an organizational culture change strategy to increase organizational commitment. Moreover, Aranki *et al*. (2019) noted a positive link between perceived organizational culture and organizational commitment, signifying that organizational culture helps retain employees. In addition, Jigjiddorj *et al.* (2021) have established a positive correlation between organizational commitment and perceived organizational culture. Besides, Agwu (2013) noted an essential connection between perceived organizational culture and employees' obligation to Nigeria's civil service. Going by the findings above, would there be any significant link between perceived organizational culture and organizational commitment within Nigeria's manufacturing industry? The tentative statement below will help in investigating:

H1. There is a significant correlation between perceived organizational culture and commitment among employees within Nigeria's manufacturing sector.

1.2 Co-worker Support and Organizational Commitment

Perceive colleague support is perceived to happen when employees feel that co-workers support, encourage, and care about their welfare (Singh *et al.,* 2018). Employees consider co-worker support important because it assists in meeting their needs for association, esteem, and appreciation. It further provides a breather during stressful times. According to Khairuddin *et al.* (2021), co-worker support influences organizational commitment. Also, Limpanitgul *et al.* (2014) noted a significant relationship between colleague support and organizational commitment. Thus, perceived co-worker support produces observed responsibilities among workers, resulting in their commitment to the organization. Moreover, the extent to which employees receive value and support from their colleagues impacts their motivation and satisfaction on the job, increasing their commitment to their organization (Brinkmann & Stapf, 2005). Reinforced by the studies on co-worker support and organizational commitment shown above, this paper hypothesized that:

H2. There is a significant link between co-worker support and organizational commitment among employees within Nigeria's manufacturing industry.

1.3 Work Performance and Organizational Commitment

Elizur and Koslowsky (2001) noted a significant link between work performance and organizational commitment. Similarly, organizational commitment relates to

effectiveness and work performance (Meyer & Herscovitch, 2001). Compared to indifferent people, committed employees are disposed to be persistent on-task sets and fulfill set goals (Kaplan & Kaplan, 2018). Also, the study of Uygur (2007) demonstrated a positive connection between organizational commitment and employee work performance. Also, Özutku (2008) opined a positive relationship between organizational commitment and work performance. Furthermore, Rifat and Akgün's (2011) study displayed a positive association between organizational commitment and work performance. Berberoglu (2015) noted a positive link between organizational commitment and work performance. Dost *et al.* (2011) also indicated a relationship between work performance and organizational commitment. Furthermore, Goddy (2014) specified a substantial correlation between organizational commitment and employee performance. Folorunso *et al.'s* (2014) study exposed that organizational commitment significantly relates to employees' work performance amongst the educated workforce of Oyo State-owned tertiary institutions. Moreover, Ahmad *et al*. (2014) showed a substantial link between employees' work performance and organizational commitment. Parveen (2019) clarifies a connection between organizational commitment and work performance. In knowing the relationship of work performance with organizational commitment within Nigeria's manufacturing industry, this paper has proposed the following statement:

H3. There is a significant relationship between work performance and organizational commitment among employees within Nigeria's manufacturing sector.

1.4 Employee Demographics and Organizational Commitment

Olanrewaju and Kanisola (2010) concluded that gender significantly impacts organizational commitment. Akinbayo (2010) also indicated a significant correlation between gender and organizational commitment. Furthermore, Agwu (2013) found a substantial variance in the organizational commitment of male and female employees in the Bayelsa state civil service, indicating that male employees show more organizational commitment than female employees. In their study, Khalili and Asmawi (2012) noted a significant distinction in the organizational commitment between men and women. Besides, concerning the link between age and organizational commitment, Irving *et al.* (1997) discovered that age did not significantly correlate with an organizational commitment. On the other hand, Meyer and Allen (1991) noted a significant relationship between age and organizational commitment. Agwu (2013) also indicated a considerable variance in

workers' organizational commitment of different ages. Moreover, Saif *et al.'s* (2012) study established marital status as a dependable influencer of organizational commitment. Hence, married individuals have more family responsibilities and need more job steadiness and security.

Concerning the correlation between working experience and organizational commitment, Akinbayo (2010) found no substantial variance between organizational commitment and the respondents' working experience. Instead, Ellemmer *et al.* (1998) found a significant link between organizational commitment and working experience (in years). In addition, Agwu (2013) noted a significant change in employees' organizational commitment with different years of work experience. Furthermore, a study has shown that education negatively correlates with an organizational commitment regarding the link between education and organizational commitment. This is because it is more difficult for individuals who have low levels of educations to change their jobs and thus offer a more significant obligation to their organizations (Khan *et al.,* 2013). Akintayo (2010) opined that more qualified workers tend to be more committed as they become aware of the organization's attitude regarding being less qualified. Educational qualification helps in the development of organizational commitment. Individuals' academic qualifications increase their sense of belongingness concerning organizational commitment (Nawaz & Kundi, 2010). Therefore, the stated literature has inspired the following hypothesis:

H4. Employee demographics significantly correlate with organizational commitment among employees within Nigeria's manufacturing industry.

Furthermore, the literature review above stimulated the following hypothesis:

H5. There is a joint influence of perceived organizational culture, co-worker support, work performance, and employee demographics on organizational commitment among employees within Nigeria's manufacturing industry.

This paper increases the literature by looking into the correlation among perceived organizational culture, co-worker support, work performance, employee demographics, and organizational commitment to suggest a pragmatic model to considerably inspire and intensify organizational commitment within Nigeria's manufacturing industry.

Methodological Background

This paper adopted a cross-sectional survey approach. Questionnaires were distributed amongst participants to test the paper's hypotheses and gather data

about their views on perceived organizational culture, co-worker support, work performance, employee demographics, and organizational commitment among employees within Nigeria's manufacturing industry. Surveys were handed to 500 employees from ten manufacturing organizations in Oyo and Lagos States of Nigeria. The ten manufacturing organizations are Nigeria Breweries, Sweetco Foods Limited, Eagle Paints, Da Viva, Filade Marble Works, GlaxoSmithKline, Rite Foods Ltd, 7up Bottling Company, Peach Manufacturing Company Limited, and Eleganza Industrial City Limited Ikeja. Data retrieved from participants were analyzed and presented in tables. However, the current investigation respects the ethical matters linked to gathering, quantifying, and keeping private data. Thus, the current researchers encouraged voluntary participation. Altogether, 476 questionnaires were recovered and considered suitable to use. The data retrieved was cleansed and analyzed with the Statistical Package for Social Sciences (SPSS v 27). The present investigation piloted reliability analyses to achieve the measure's local reliability.

This paper's questionnaire has segments:

3.1 Section A – Employees' demographics

This segment has the participants' demographics, like gender, marital status, age, education qualification, and work experience.

3.2 Section B: Perceived organizational culture scale (POCS)

This investigation assessed employees perceived organizational culture with the 24-item scale developed by Cameron and Quinn (2011), measuring organizational culture. The questionnaire asked the participants to answer each question item through a 5-point Likert scale (1=strongly disagree, 5=strongly agree). The initial Cronbach's alpha of the 24-item measure was 0.80, but a Cronbach's alpha coefficient of 0.90 was derived for this measure's reliability in this paper.

3.3 Section C: Co-worker support scale (CWSS)

This segment measures the respondents' perception of colleagues' support with a measure developed by Smith et al. (2013). This measure contains 11 items with a 4-point Likert rating scale. Participants are to stipulate their agreement or divergence with the statements, as listed in the questionnaire. The initial reliability coefficient of the measure was 0.89. In this paper, a Cronbach's alpha reliability of 0.92 was derived.

3.4 Section D: Work performance scale (WPS)

This section measures the employee work performance. It has an 18-item scale developed by Koopmans (2015). This scale measures the three (3) main scopes of

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work performance: task performance, counterproductive work behavior, and contextual performance. This measure has a 5-point rating scale (0 = seldom to 4 = always for the contextual and task performance, and 0 = never to 4 = often for counterproductive work behavior). The developer recorded an initial Cronbach's alpha reliability coefficient of 0.79, while the current study derived a Cronbach's alpha reliability coefficient of 0.81.

3.5 Section E: Organizational commitment scale (OCS)

This paper measured organizational commitment with an 18-item scale developed by Meyer and Allen (1991), having a Cronbach's alpha of 0.89. The measure contained three subscales, with first measuring affective commitment (six items, statement sample: "I would be very happy to spend the rest of my career in this organization"), second measuring continuance commitment (6 items, statement sample: "It would be very hard for me to leave my job at this organization right now even if I wanted to"), and the third measuring normative commitment (6 items, statement sample "I do not feel any obligation to remain with my organization"). It has a 5-point response scale (1 - strongly disagree, 5 - strongly agree). However, this paper noted an 0.95 Cronbach's alpha coefficient.

Nevertheless, the current study conducted a pilot investigation to identify any possible difficulties in advance and validate the scale's effectiveness.

Results

4.1 Descriptive Statistics

The results from the data analyzed in the current study are shown below:

Table 1 below displays those 162 respondents were 20-34 years old, 203 were 35-49 years old, and 111 participants were 50 years old plus. Likewise, the table shows that 352 respondents were male, whereas 124 were female. The grouping of participants by work experience indicates that more respondents had 11-15 years of work experience (214; 45.0%) next, participants who had 1-5 years of work experience (171; 35.9), and respondents with 6-10 years work experience (91; 19.1%). Moreover, the results showed that 118 (24.8%) participants had other professional qualifications, 239 (50.2%) were Master of Science/ Master of Technology holders, and 119 (25.0%) were Higher National Diploma/Bachelor of Technology licensed. Besides, the current results further included that 180 participants were single, whereas 296 were married.

Table 1. Demographics of participants within Nigeria's manufacturing industry

Characteristics	Category	Frequency	Percent (%)
Age	20-34	162	34.0
	35-49	203	42.6
	50 and above	111	23.3
	Total	476	100.0
Gender	Male	352	73.9
	Female	124	26.1
	Total	476	100.0
Work Experience	1-5	171	35.9
	6-10	91	19.1
	11-15	214	45.0
	Total	476	100.0
Educational qualification	Other Professional Qualifications	118	24.8
	M.Sc./MTech	239	50.2
	HND/BTech	119	25.0
	Total	476	100.0
Marital Status	Single	180	37.8
	Married	296	62.2
	Total	476	100.0

Source: Author's fact-finding

4.2 Inferential Statistics

The resulting matrix from Table 2 shows that perceived organizational culture strongly and positively correlates with organizational commitment within Nigeria's manufacturing industry (r= .961; p<.01). The value p is adequate. Thus, the stated hypothesis, namely, there is a significant correlation between perceived organizational culture and commitment among employees within Nigeria's manufacturing industry, is confirmed. The current findings indicate a strong and significant positive correlation between co-worker support and organizational commitment within Nigeria's manufacturing industry (r= .885; p<.01). The value p is appropriate. Thus, the stated hypothesis is established: there is a significant link between co-worker support and organizational commitment among employees within Nigeria's manufacturing industry. In addition, Table 2 indicates a strong and

significant positive relationship between work performance and organizational commitment within Nigeria's manufacturing industry (r= .999; p<.01). The value p is adequate. So, the stated hypothesis, namely, there is an essential link between work performance and organizational commitment among employees within Nigeria's manufacturing industry, is confirmed.

Moreover, further analysis reveals that all the employee demographics under study (gender, age, marital status, educational qualification, and work experience) have a significant positive link with organizational commitment (r=.561; p<.01; r= .535; p<.01; r=.536; p<.01; r= .558; p<.01; r= .507; p<.01) respectively. All the p values are adequate. Thus, the stated hypothesis, namely, employee demographics significantly correlate with organizational commitment among employees within Nigeria's manufacturing industry, is confirmed.

Further analysis revealed that perceived organizational culture strongly and positively correlates with co-worker support and work performance within Nigeria's manufacturing industry (r= .946; p<.01; r= .962; p<.01), respectively. The p-values are adequate. It also showed that colleague support has a significant and positive correlation with work performance (r= .887; p<.01). The p-value is sufficient.

Table 2. Zero-Order correlations showing the correlation between perceived organizational culture, co-worker support, work performance, employee demographics, and organizational commitment within Nigeria's manufacturing sector.

Variables	Gndr	Age	M St.	Edu Q.	Wk Exp.	POC	CWS	WP	OC	Mean	SD
Gender	1						.			1.26	.439
Age	.519**	1								1.89	.750
Marital Status	.325**	.547**	1							1.62	.485
Educational Qual	.548**	.267**	.058	1						2.00	.706
Work Experience	.373**	.572**	.219**	.362**	1					2.09	.896
Perceived Org Cul.	.481**	.482**	.533**	.506**	.465**	1				71.46	12.29
Co-worker Support	.506**	.500**	.584**	.360**	.441**	.946**	1			32.96	6.18
Work Perf.	.556**	.537**	.546**	.553**	.495**	.962**	.887**	1		35.79	8.82
Org. Com	.561**	.535**	.536**	.558**	.507**	.961**	.885**	.999**	1	53.64	8.89

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

Source: Author's fact-finding

Additionally, Table 3 shows that perceived organizational culture, co-worker support, work performance, and employee demographics significantly, jointly, and positively influence organizational commitment within Nigeria's manufacturing industry (R = .989, R2 = .988, F = 31018.021, p < .01). The p-value is adequate. These results show that perceived organizational culture, co-worker support, work performance, and employee demographics significantly, jointly, and positively induced a 98.9% variation in organizational commitment within Nigeria's manufacturing industry. Thus, the assumption is confirmed that there is a collective impact of perceived organizational culture, co-worker support, work performance, and employee demographics on organizational commitment among employees within Nigeria's manufacturing industry.

Table 3. Multiple regressions presenting the joint influence of perceived organizational culture, co-worker support, work performance, employee demographics on organizational commitment within Nigeria's manufacturing industry.

Model	R	R-squared	Adjusted R-squared	F	Sig
1	.989	.988	.988	31018.021	.000[b]

Predictors: (Constant), Work Performance, Work Experience (in years), Marital Status, Gender, Educational Qualification, Age, Co-worker Support, Perceived Organizational Culture.

Source: Author's fact-finding

The current findings revealed that perceived organizational culture significantly and positively correlates with organizational commitment within Nigeria's manufacturing industry. This view assumes that an increase in abiding by the behavioral expectations guiding employees in behaving in ways in line with its culture increases their disposition to be committed to their organizations within Nigeria's manufacturing industry. This paper corroborates Acar (2012), who indicated a positive connection between organizational commitment and perceived organizational culture. It also supports Desselle *et al.'s* (2018) view that perceived organizational culture has been recognized as a significant influencer of employee commitment and endurance on their jobs. It further corroborates Messner's (2013) position that there is a positive association between perceived organizational culture and organizational commitment, recommending an organizational culture

change tactic to intensify organizational commitment. The current results also corroborate the position of Aranki *et al.* (2019), who noted a positive link between perceived organizational culture and organizational commitment, signifying that organizational culture helps retain employees. These results further sustained the position of Jigjiddorj *et al.* (2021) that a positive correlation exists between perceived organizational culture and organizational commitment.

Similarly, the current findings have established a significant and positive link between colleague support and organizational commitment within Nigeria's manufacturing industry. This result implies that workers within Nigeria's manufacturing sector will be more committed to their organizations as much as they get supports from their colleagues/co-workers. The current results support Eisenberger *et al.* (2001), which opine increased colleague support makes employees feel recognized and more committed to the jobs. These results also corroborate the study of Khairuddin *et al*. (2021), which established that co-worker support influences organizational commitment. This paper also confirms Limpanitgul *et al.* (2014), who noted a significant connection between co-worker support and organizational commitment. Perceived colleague support produces observed responsibilities among workers, resulting in their commitment to the organization. The current results further corroborate the findings of Brinkmann and Stapf (2005). They noted that the extent to which employees receive value and support from their colleagues impacts their motivation and satisfaction on the job, increasing their commitment to their organization.

Furthermore, this paper posits that work performance is significantly related to organizational commitment among employees within Nigeria's manufacturing industry. Hence, it confirms Kaplan and Kaplan's position (2018), who opined that committed employees are disposed to be persistent on-task sets and fulfill set goals. The current investigation supports Rifat and Akgüns (2011), as they displayed a positive correlation between organizational commitment and work performance. It also corroborates the findings of Berberoglu (2015), who noted a positive link between organizational commitment and work performance. Moreover, this paper confirms Folorunso *et al.'s* (2014) view that organizational commitment significantly relates to employees' work performance amongst the educated workforce of Oyo State-owned tertiary institutions. It also corroborates the position of Goddy (2014), who specified a substantial connection between organizational commitment and employee performance. Besides, the current findings support Ahmad *et al.'s* (2014) view that showed a considerable link between employees'

work performance and organizational commitment; and Parveen's (2019) position clarifies that there is a correlation between organizational commitment and work performance.

The current results indicate that perceived organizational culture strongly and positively correlates with co-worker support. It assumes that the more workers within Nigeria's manufacturing industry understand and observe their organization's culture, the more they tend to support their co-workers. Also, this paper established that perceived organizational culture strongly and positively correlates with work performance within Nigeria's manufacturing industry. This view indicates that employees' work performance within Nigeria's manufacturing sector will improve and increase with the rate they recognize and observe their organization's culture. Moreover, the current results expose that colleague support has a significant and positive correlation with work performance. It infers that employees' work performance within Nigeria's manufacturing industry will improve and increase by identifying and observing its culture.

In addition, this paper has established that all the employee demographics under study (marital status, gender, educational qualification, age, and work experience) have a significant positive link with organizational commitment. Thus, it confirms Akinbayo's (2010) position that signified an essential correlation between gender and organizational commitment. It also supports the view of Agwu (2013) that found a substantial variance in the organizational commitment of male and female employees in the Bayelsa state civil service, indicating that male employees show more organizational commitment than female employees. The current investigation supports the view of Meyer and Allen (1991) that there is a significant link between age and organizational commitment. It also corroborates Agwu (2013), who indicated a noteworthy difference in the organizational commitment of employees of different ages. The current findings confirm the position of Saif *et al.* (2012) that marital status significantly encourages organizational commitment, indicating that married individuals have more family responsibilities and need more job steadiness and security. This paper further confirms the findings of Khan *et al.* (2013) that educational qualification significantly relates to organizational commitment. They noted that it is more difficult for individuals who have low levels of educations to change their jobs and thus offer a more significant obligation to their organizations. Besides, the current findings corroborate the finding of Agwu (2013) that there is a substantial variance in employees' organizational commitment with different years of work experience.

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According to the current findings, this paper has achieved the study's aim: to suggest a pragmatic model to inspire and increase organizational commitment within Nigeria's manufacturing sector. Hence, the model in figure 1 below:
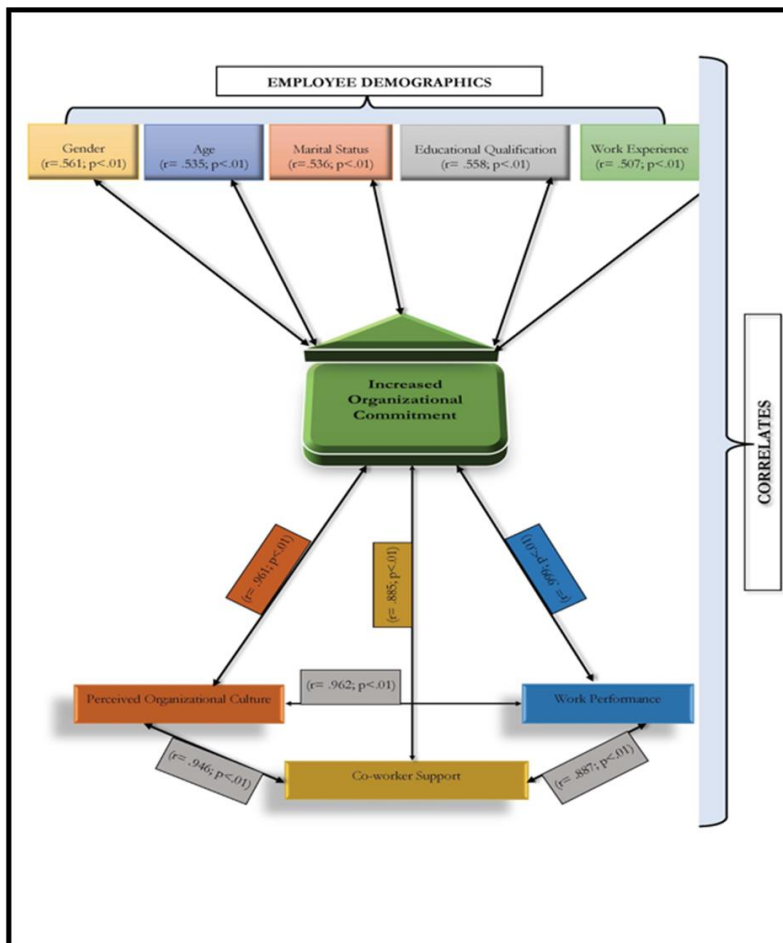
Fig. 1. Model for inspiring and increasing organizational commitment within Nigeria's manufacturing sector.
Source: Author's findings

Conclusions

The current investigation established that perceived organizational culture, co-worker support, work performance, and employee demographics correlate significantly, independently, and positively with organizational commitment. Thus, these stated factors have been proven to correlate with organizational commitment within Nigeria's manufacturing industry. Also, joint influences of these correlates (perceived organizational culture, co-worker support, work performance, and employee demographics) cannot be disregarded. This paper's results have significant implications for Nigeria's manufacturing sector's management, human resources, and recruitment departments. They can stimulate and increase organizational commitment by establishing and encouraging organizational culture, reassuring co-worker support, and creating an enabling atmosphere for an individual's capacity to execute activities that add to organizational development. However, the following recommendations are helpful:

• This paper recommends that the management of manufacturing industries ensure a good and consistent strategy that makes employees committed to organizational culture. Furthermore, the management of manufacturing industries should create a work atmosphere that encourages support among co-workers and increases better work performances.

• Also, this paper recommends qualitative empirical studies to understand the employees' organizational commitment better. These in-depth qualitative inquiries could disclose issues that would allow a more thorough operationalization of the concepts linked to commitment.

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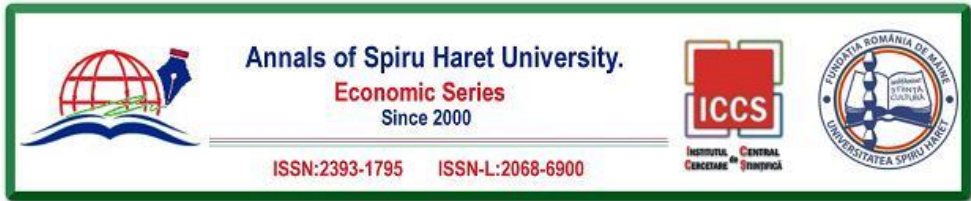
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A PERCEPTION STUDY OF SEABORNE CARGO INFRASTRUCTURAL CAPACITY IN LAGOS PORT COMPLEX

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Abstract
The study aims to analyse the seaborne cargo infrastructural capacity in Lagos Port Complex. The research adopts expository research design, with Lagos Port Complex as the sample frame. 230 questionnaires was administered using purposive sampling technique. Mann Withney U-test was used for the analysis. The research reveals that Port infrastructural capacity based on infrastructural adequacy or inadequacy is of moderate effect in the stance of 'adequacy of port storage facilities', 'port-oriented traffic', 'obsolete handling equipment' and 'level of workforce' of r-value |-0.210|, |-0.207|, |-0.245|, |-0.212| respectively. Therefore, it can be said that the port infrastructural capacity of the Lagos Port Complex (LPC) is relatively poor considering eleven (11) independent variables, where only four (4) have moderate effect on

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infrastructural adequacy of the port and the remaining seven (7) were of no statistical significant effect on infrastructural capacity of the port.

Keywords: *infrastructural-capacity; seaborne-cargo; port; cargo.*

JEL Classification: R40, R42

Introduction

The importance of the maritime industry cannot be over-emphasized due to its impact on the economies of nations. The roles of seaports have now become obviously important as economies grow and nations continue to engage in international trade. This is made pertinent not just because of the number of vessels calling at seaports but because of size and volumes of cargoes these vessels now transport at a single time of visit to seaports (Stephens & Ukpere, 2011). Hence, ports infrastructural capacity now serves as bedrock in receiving and dispatching of cargoes (Prakash, 2005). The maritime industry embraces virtually all sorts of businesses and their associated activities aside its primary core businesses such as shipping activities, ship construction and repairs, as it has become industrial hubs for just-in-time manufacturing. Among all activities at the port, the infrastructural base for the port performance is second to none and cannot be handled with negligence. Cargo volumes are increasing from time to time due to changes in the volume of goods attracted to this country and the orientation of Nigeria's economy, which is an economy driven externally (importing more than exporting). The driving force is not of a concern in this research, but to what extent port infrastructural capacity can be harnessed to maximize revenue at possible smallest tariffs charges per unit of cargo handled at the port.

Therefore, in this paper, the infrastructural capacity is a function of the intermodal system available, storage facilities, ship design, port/berth design, cargo handling equipment/system, prevailing technological advancement, administrational structure (legal/policy/political framework) that ensure the functionality of the system.

The introduction shall have a page at the most, however not less than half a page. The text must provide answers for four questions. (1) What matter does the paper cover? (2) Why is the studied matter important? (3) How does the author intend to answer to this matter? (4) What is the relation between the paper and the already existent specialized literature? This introductory section shall be written clearly and any confusion in communicating the four answers might result in paper rejection.

Theoretical foundation: Port demand and growth in seaborne cargo management

According to Jean-Paul (2008) seaborne cargo accounted for more than 90% of global trade in year 2006 in terms of volume and about 70% in terms of value (Jean-Paul, 2007). It is estimated that container ships carried about 52% of all seaborne cargo (value terms) in 2019 (United Nations Conference on Trade and Development (UNCTAD), 2019). The last two decades has witnessed containerization dominance of international trade, as over 70% of them were moved in containers and by container vessels (UNCTARD, 2019). According to the data from Containerization International (Containerisation International, 2019) and United Nations (UN 2008, 2016), there has been a great increase [from 84.6 million TEUs (20-foot equivalent unit) in 1990 to 485 million TEUs in 2007] in container traffic (Lee & Meng, 2015). In it all, a meager share of 18% goes to the developing economies. Among the developing economies, Asia has the largest share (UNCTAD, 2008).

Maritime transportation and total transport system costs have been on the decline. This is attributed to increase in carrying capacities of vessels and efficient connections at seaports to the land transportation systems. To maintain the momentum, seaports have to improve on their handling capacities and efficiency, which had come at a huge cost (UNCTAD, 2019). Though the operating cost is shrinking, the infrastructural investment base and associated cost are increasing. Nations that failed to adopt the current technological innovation trends may not only lose patronage of their seaports,but may have to pay more to move their cargoes through those that have developed and adopted these innovations.

In Nigeria, the Governor of Lagos State is making effort to improve the intermodal connection of the Lagos transport system. This is being done by integrating the rail, water and road transportation to compliments each other in order to reduce total costs and time lost in the Lagos metropolitan area and for transiting cargoes to other parts of Nigeria. Diversion of over 2 million commuters off road to water transportation is one of the key elements of the drive by the state where local ship building is highly encouraged (Ugbodaga, 2017). This is in line with the advent of the Cabotage act to ensure local content, though the maintenance is still outsourced and openned up for the private enterprises to participate; it is indeed a welcome idea in the maritime industry in Nigeria. Starting somewhere is essential at the moment, though it is essential to start off on a good note. But irrespective of the caution made, the country lacks data and technical know-how for planning in order to

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start well. Therefore, it is required of the country to start somewhere first and later transcend through proper management strategy to a greater height beyond the sphere of political influence, into a sphere where the socio-economic importance is given priority for a sustainable transport management system.

Custom has influence on maritime operation involving international movement of consignment. The total cost, ease of import and export, turnaround time, compliance of consignment to the local and international law. Therefore, it is required of the custom activities to cost effective as possible not compromising the law associated to every region. This led to Nigeria Custom Embracing Authorized Economic Operators (AEO) programme proposed by the World Custom Organization (WCO). AEO is a programme works by assigning a certification to carriers/shippers/shipping agents that will be allowed to move cargo across international boundaries (into and out of Nigeria) without any check at the borders and seaports but at the destinations of these cargoes by the nation's customs eliminating time lost to cargo inspection at borders and seaports, thereby increasing cargo transit times.

Research methodology

The sample frame utilised for this study is the Apapa Port Complex (NPA) Lagos workforce. The total workforce population is 573 as at 2017. Utilising Cochran (1977) formula:

$$n_0 = \frac{Z^2 pq}{e^2}$$

where

$e = the\ desired\ level\ of\ precision$

$p = the\ (estimated)\ proportion\ of\ the\ population\ that\ will\ be\ sampled$

$q = 1 - p$

$z = z - value\ (found\ on\ Z\ table)$

$e = 0.05$

$p = 0.5$

$$q = 1 - 0.5 = 0.5$$

$Z = Z - Score\ for\ the\ 95\%\ level\ of\ confidence\ (1.96)$

$$n_0 = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2}$$

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$$n_0 = \frac{0.9604}{0.0025}$$
$$n_0 = 384$$

Modifying the Cochran formula for sample size calculation in smaller populations we then have:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

where

$n_0 = Cocharan's\ sample\ recommendation$
$N = population\ size$
$n = is\ the\ new\ adjusted\ sample\ size$
$n_0 = 384$
$N = 573$

$$n = \frac{384}{1 + \frac{(384 - 1)}{573}}$$

$$n = \frac{384}{1.668412}$$

$$n = 230.15898$$

$$n \approx 230$$

230 questionnaires were administered to the NPA Lagos Port Complex workforce. The sampling technique for the data collection was purposive sampling technique and Mann Whitney U-test technique was adopted for the analysis.

Mann Whitney-U test

$$U_1 = R_1 - \left(\frac{n_1(n_1 + 1)}{2}\right)$$

or

$$U_2 = R_2 - \left(\frac{n_2(n_2 + 1)}{2}\right)$$

$R\ is\ the\ sum\ of\ ranks\ in\ the\ sample\ and\ n\ is\ the\ number\ of\ items\ in\ the\ sample$

Data analysis and findings

Mann-Whitney U test is used in analyzing the statistical significant difference between the variables considered and they are presented as follows: From Table 1, 162 respondents who said the port infrastructural capacity is inadequate (100.51, 103.91, 99.90, 103.45, 97.43, 105.13, and 104.23) have higher mean ranking compared to the 35 respondents (minus one (1) respondent who did not make his opinion known) who said the port infrastructure is adequate (92.03, 76.27, 94.83, 78.39, 86.97, 70.64, and 74.77); Compared to the mean ranking for "Port Capacity Utilization", "Adequacy of Storage Facility", "Port Competiveness", "Policy Oriented Traffic", "Adequacy of Handling Equipment", "Obsolete Handling Equipment", and "Level of Workforce Competence" respectively. At the point where the ranked mean of the 162 respondents who said the port infrastructural capacity is inadequate were lower in value 96.56, 98.48, 97.42, and 97.48 than the mean ranking of the 35 respondents who agreed that the port infrastructure is adequate 110.31, 98.59, 106.33, and 106.06 respectively. In the case of "Berth Capacity Exertion", "Modern Handling Equipment", "Port Automation", and if the port is a "Going Concern" respectively.

From Tables 1 and 2, the respondents who said the port infrastructure were inadequate have a significant higher mean rank (103.91) than the respondents who said the port infrastructure were adequate (92.03). The level of "adequacy of storage facilities" within the port, $U = 2039.5$, $p = 0.003$, $r = -0.210$, is of a moderate effect (Cohen, 1988). There is a significant difference in the mean rank of port inadequacy (103.45) and adequacy (78.39) on "Policy Oriented Traffic", $U = 2113.5$, $p = 0.004$, $r = -0.207$, is of moderate effect. There is a significant difference in the mean rank of port inadequacy (105.13) and adequacy (70.64) on "Obsolete Handling Equipment", $U = 1842.5$, $p = 0.000$, $r = -0.254$, it is of moderate effect still. And likewise, significant differences were recorded in the mean ranks port inadequacy (104.23) and port adequacy (74.77). On "Level of Workforce Competence", $U = 1987.0$, $p = 0.003$, $r = -0.212$ this is also considered a moderate effect. However, the independent variables such as "Port Capacity Utilization", "Port Competitiveness", "Berth Capacity Exertion", "Modern Handling Equipment", "Port Automation", "Adequacy of Handling Equipment", and "Going Concern" did not differ on port infrastructural adequacy or inadequacy. Therefore, it can be said that, the "adequacy of storage facilities", "Policy Oriented Traffic", "Obsolete Handling Equipment", and "Level of Workforce Competence" have medium statistical significant effect on port infrastructural capacity.

Table 1: Ranking of Adequacy of Port Infrastructure

	Adequacy of port Infrastructures	N	Mean Rank	Sum of Ranks
Port Capacity Utilization	No	162	100.51	16282.00
	Yes	35	92.03	3221.00
	Total	**197**		
Adequacy of Storage Facility	No	162	103.91	16833.50
	Yes	35	76.27	2669.50
	Total	**197**		
Port Competiveness	No	162	99.90	16184.00
	Yes	35	94.83	3319.00
	Total	**197**		
Policy Oriented Traffic	No	162	103.45	16759.50
	Yes	35	78.39	2743.50
	Total	**197**		
Berth Capacity Exertion	No	162	96.56	15642.00
	Yes	35	110.31	3861.00
	Total	**197**		
Modern Handling Equipment	No	162	98.48	15954.00
	Yes	34	98.59	3352.00
	Total	**196**		
Port Automation	No	162	97.42	15781.50
	Yes	35	106.33	3721.50
	Total	**197**		
Adequacy of Handling Equipment	No	155	97.43	15101.00
	Yes	35	86.97	3044.00
	Total	**190**		
Obsolete Handling Equipment	No	162	105.13	17030.50
	Yes	35	70.64	2472.50
	Total	**197**		
Going Concern	No	162	97.48	15791.00
	Yes	35	106.06	3712.00
	Total	**197**		
Level of Workforce Competence	No	162	104.23	16886.00
	Yes	35	74.77	2617.00
	Total	**197**		

No = Inadequate port infrastructural capacity, Yes = Adequate port infrastructural capacity

Source: Author's Field Survey

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Table 2: Mann-Whitney U Test Statistics[a]

	Port Capacity Utilization	Adequacy of Storage Facility	Port Competitiveness	Policy Oriented Traffic	Berth Capacity Exertion	Modern Handling Equipment	Port Automation	Adequacy of Handling Equipment	Obsolete Handling Equipment	Going Concern	Level of Workforce Competence
Mann-Whitney U	2591.0	2039.5	2689.0	2113.5	2439.0	2751.0	2578.5	2414.0	1842.5	2588.0	1987.0
Wilcoxon W	3221.0	2669.5	3319.0	2743.5	15642.0	15954.0	15781.5	3044.0	2472.5	15791.0	2617.0
Z	-.842	-2.944	-.527	-2.904	-1.476	-.011	-.937	-1.098	-3.564	-.869	-2.980
Estimated r	-0.060	-0.210	-0.038	-0.207	-0.105	-0.001	-0.067	-0.080	-0.254	-0.062	-0.212
Asymp. Sig. (2-tailed)	0.400	0.003	0.598	0.004	0.140	0.991	0.349	0.272	0.000	0.385	0.003

a. Grouping Variable (Dependent Variable): Adequacy or Inadequacy of port Infrastructural Capacity

Source: Author's Field Survey

Discussion and Conclusion

Port infrastructural capacity based on infrastructural adequacy or inadequacy is of modearate effect in the stance of "adequacy of port storage facilities", "port-oriented traffic", "obsolete handling equipment" and "level of workforce" of r-value |-0.210|, |-0.207|, |-0.245|, |-0.212| respectively. Port infrastructural capacity can be easily influenced working on the infrastructural components mention earlier on that have moderate effect on the infrastructural capacity of the country's port operation. The inappropriateness of the management approach had failed to achieve statistical significant deduction in the "port capacity utilization", "port competitiveness", maximization of berth capacity ("berth capacity exertion"), "modern equipment", "port automation", "adequacy of handling equipment and whether the strategy adopted can ensure the port to remain a "going concern in the long run.

Therefore, it can be said that the port infrastructural capacity of the Lagos Port Complex (LPC) is relatively poor considering eleven (11) independent variables, where only four (4) have moderate effect on infrastructural adequacy of the port and the remaining seven (7) were of no statistical significant effect on infrastructural capacity of the port.

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CRADLE TO CRADLE IS A SUSTAINABLE ECONOMIC POLICY FOR THE BETTER FUTURE

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Abstract

This paper is about the cradle to cradle (C2C) concept that is correlated with circular economy (CE). The C2C notion means; products should be without producing any waste. It is considered as a biometric procedure to design the products and materials in healthy ways. The C2C model is sustainable for present and future generations. In the past few years, C2C concept has grown wide interest among the nations of the world and the demand for environment friendly products has been increasing day by day globally. During the 20th and 21st centuries environment friendly and C2C certified products are increasing around the world. The C2C notion is based on the idea of non-waste production systems that do not harm the environment. Within the C2C framework, two distinct metabolisms: the biological metabolism and the technical metabolism are identified. In the study the development of C2C approach around the world is discussed. As the global natural resources are decreasing; C2C becomes new efficient strategy in production arena. Sustainable products, healthy materials, responsible consumption, and environmental responsibility are essential issues for the 21st century. The objective of C2C is the production without waste and elimination of the harmfulness from the products. C2C inspires that all products to be manufactured with alternative materials. This article tries for the successful implementation of C2C in the society.

1. Introduction

The term cradle to cradle (C2C) was coined by Walter R. Stahel (**1946- ???),** a Swiss architect and industrial analyst, in 1976, in opposition to the current linear economic system. It is a registered trademark that is owned and licensed by McDonough Braungart Design Chemistry, LLC (MBDC). The concept of C2C was firstly developed during the 1990s by the American architect William Andrews McDonough and the German chemist Michael Braungart. In 2002, they have popularized it in their book "*Cradle to Cradle: Remaking the Way We Make Things*" [McDonough & Braungart, 2002]. The C2C pattern represents a new standpoint for the design and development of products and services as, "*Cradle-to-cradle design enables the creation of wholly beneficial industrial systems driven by the synergistic pursuit of positive economic, environmental and social goals*" [Braungart et al., 2007]. C2C is the production and building concept for the 21st century. It focuses on an ideological transition from 'less bad' to 'more good'. Sustainability rests on three main factors: humans, the economy, and the environment. To achieve a sustainable world based on the C2C atmosphere in the society, products should be beneficial in health, environmental, and economic terms [Toxopeus et al., 2015]. The C2C policy suggests that industry must protect and enrich ecosystems and biological metabolism of the nature should be safe [McDonough & Braungart, 2002]. The C2C strategy is considered as a universal, economic, industrial, and social framework which seeks to create systems that is not only efficient but also must be essentially waste free [Lovins, 2008]. The new C2C policy takes solid steps to create products with positive effects instead of reduced negative externalities. It leads to an unlimited use of resources, and finally consequences in a CE. The CE structure has been inspired from the fundaments of the C2C concept [Braungart et al., 2007]. The C2C design concept is one of the most promising approaches for CE in terms of consumer goods [Korhonen et al., 2018]. The C2C structure may be formed in such a way that nature of designing and producing of goods must neutralize the effects on global natural resources [McDonough & Braungart, 2002]. C2C indicates that sustainability is built on

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ecological benefit and eliminates negative effects on the natural world [Hou & Li, 2014].

C2C means benefit as much as possible of the product by recycling it and reintroducing it in new forms and uses to serve both the economy and the environment. It is a revolutionary change of the organizations in the products and services design, and production and distribution [Burchard-Dziubińska, 2017]. The C2C concept supports the principle of nature that, "*there is no waste on the earth*" and "*waste equals food*". The waste of one process becomes the food for another which is called as nutrients. There are two types of nutrients: biological nutrients and technical nutrients [Bhise & Kashikar, 2014]. Technical nutrients should be non-toxic, non-harmful synthetic materials and have no negative effects on the natural environment. Biological nutrients are organic materials that decompose into the soil without affecting the natural environment. Technical nutrients are considered for industrial recycling whereas biological nutrients return to the soil and feed environmental processes. If more waste creates in the environment, the more nutrients are available for producing new products [McDonough & Braungart, 2002; Bjørn & Strandesen, 2011].

The technological or biological nutrients are classified as: upcycling and downcycling [McDonough & Braungart, 2013]. Downcycling is the recycling process of waste where the recycled material is of lower quality than the original material. For example, steel scrap from end-of-life vehicles is often contaminated with copper from wires and tin from coating. This contaminated scrap yields secondary steel that does not meet the specifications for automotive steel and therefore, it is mostly applied in the construction sector [Pires et al., 2019]. On the other hand, upcycling is the process of transforming byproducts, waste materials, useless, or unnecessary products into new products or materials seeming to be of greater quality and *useful or valuable.* The C2C design aims to avoid downcycling materials and uphold upcycling ones. In C2C process materials can be used several times without downcycling and ultimately will be non-toxic waste [Zhuo et al., 2014].

The C2C model has been implemented by a number of companies, organizations and governments in the EU, China, and the USA. C2C is a biometric attempt for designing the products and systems that models materials as high-quality nutrients circulating in productive, healthy and safe metabolisms. By C2C strategy waste can be reduced or eliminated by the process of reused. It creates a cyclical process instead of a linear one like the cradle to grave approach. For

example, when an animal dies, waste is created. That waste breaks down and becomes nutrients for another process [*Lovins, 2008*]. The focus on recovery of resources, recycling and reuse can be designated as C2C resource management [Kumar & Putnam, 2008]. The C2C concept is eco-effectiveness (effectiveness means "doing the right things") and eco-efficient approaches in a unique in manufacturing that indicates exact counterpart of eco-efficiency (efficiency means "doing the things right") [Cradle to Cradle Certified, 2020]. The cradle to grave (C2G) policy indicates that the raw materials are extracted from the finite resources of the earth to produce valuable and useful goods, after use disposed in the form of Landfill and where it is of no use to anyone [Allan & Phillips, 2021].

2. Literature Review

William McDonough and Michael Braungart biological and technical cycles are closed without damaging effects on the environment. To achieve the C2C procedure they have indicated that waste can be transformed into food, the sun can be used for renewable energy only, and diversity, species, cultural and innovation diversity must be enjoyed efficiently. They have used eco-effectiveness for the shortcomings of eco-efficiency that aims as far as possible to reduce and compensate the harmful effects on the environment. Eco-effectiveness aims for the development without harmful effects on the environment [McDonough & Braungart, 2002].

Anders Bjørn, and Maria Strandesen have identified three inherently critical points of the C2C concept as [Bjørn & Strandesen, 2011]: i) 100% closed loop recycling of technical nutrients, ii) environmental benefit of biological nutrient addition, and iii) compatibility with continued economic growth. Walter Stahel and Geneviève Reday-Mulvey have provided that C2C has influential impact on job creation, economic competitiveness, resource savings, and waste prevention [Stahel & Reday-Mulvey, 1981]. M. E. Toxopeus and his coauthors have tried to explain why the eco-effective C2C vision in practice provides only eco-efficient approach by analyzing several conflicts between theory and practice [Toxopeus et al., 2015]. Nikolay Minkov and his coauthors have analyzed C2C certified for external communication in the context of environmental labeling and declarations. In addition, they have compared with the established standardization labeling typologies, namely Type I and Type III [Minkov et al., 2018]. Viktoria Geng and Cornelius Herstatt have studied the potential intersections between C2C and the Fuzzy Front End (FFE) theory. They have applied FFE success factors to C2C and

derive enablers for successful C2C implementation. They have examined almost 140 companies and 400 products in this respect [Geng & Herstatt, 2014].

Nii A. Ankrah and his coauthors have analyzed the cradle to cradle philosophy in business sector. Business sites are categorized as the core activity of organizations that are co-located on the site, with classifications, such as science or technology parks, research parks, office parks, retail parks, light and heavy industrial areas, and export processing zones [Ankrah et al., 2015]. Anders Bjørn and Michael Hauschild have shown controversies between LCA and C2C. They have revealed that C2C defines a desirable sustainable future but it has some inherent faults to perform well with environmental impacts, waste treatment and energy generation [Bjørn & Hauschild, 2012]. Helen Kopnina shows the ways how CE and C2C can be used in university teaching. She emphasizes on upcycling policy rather than downcycling. She stresses on both theory of sustainable production and sustainability and practical research on CE and C2C models [Kopnina, 2018].

3. Methodology of the Study

The C2C policy is a supporting tool that organizations can use at the product level. C2C is inspired by nature as well, also had an influence on the development of the CE concept [Sherwin, 2013]. Throughout the study we have used the secondary data sources. The reliable data are collected from: i) national and international journals, ii) various publications of foreign governments or of international bodies and their subsidiary organizations, iii) various research reports of research scholars, iv) books of famous authors, research note books, hand books, theses, magazines, and newspapers, v) websites, and vi) public records and statistics, historical documents, and other sources of published information. Also we have taken help from the unpublished data that are collected from diaries, letters, unpublished biographies and autobiographies, and also from scholars and research workers, trade associations, and other public/private individuals and organizations [Mohajan, 2020a].

We have taken attempt to discuss C2C certification in the beginning that helps consumers to recognize C2C products. Then we have tried to highlight the fundamental principles of C2C: i) waste equals food, ii) use current solar income, and iii) celebrate diversity. Later we have thought that five pillars of C2C, namely material health, material reutilization, renewable energy and carbon management, water stewardship and social fairness are vital at the present world. The reliability

and validity are essential issues in any research. In this article we have tried our best to maintain the reliability and validity throughout of the research [Mohajan, 2017, 2018, 2020b].

4. Objective of the Study

The general objective of this article is to analyze the successful implementation of C2C policy in the global society. It is considered as a vision for a sustainable world inspired by nature. Some other special objectives are as follows:
- to highlight three qualitative principles and five pillars of C2C,
- to show the arrangement of C2C, and
- to explore the benefits and barriers of C2C policy.

5. C2C Certification

C2C certified is the global standard for the products that are safe, circular, and responsibly made. It is an effective vision for the world. It is a scheme for the certification of products that meets the criteria and principles of the design approach. Its positive results show that it does do more good instead of doing less bad [CCPII, 2011]. The C2C philosophy with positive growth drive force to innovate and expand is well-received in many manufacturing companies. The attempts of Michael Braungart and William McDonough have played a leading role in the consultancy firms Environmental Protection Encouragement Agency (EPEA) and McDonough Braungart Design Chemistry (MBDC) to support companies in their effort to develop C2C products [Toxopeus et al., 2015]. The "*Cradle to Cradle Products Innovation Institute*" (C2CPII) was founded by Braungart and McDonough [McDonough & Braungart, 2002]. In 2010, a license to manage the program was granted to the C2CPII, a not-for-profit organization. It helps consumers to recognize C2C products, and is regarded as the best way of labeling a product's sustainability [Cradle to Cradle Certified, 2020]. In 2012, MBDC was transferred to the Cradle-to-Cradle Product Innovation Institute to ensure the independence and openness of the certification process [MDBC, 2016].

Product certification is awarded at five different achievement levels as; Basic, Bronze, Silver, Gold, and Platinum, with specified criteria for each level. It is the process of certifying that a certain product has passed performance tests and quality assurance tests. The establishment of 100% C2C policy in the society at platinum level possible if all the limited natural and man-made resources must be used efficiently [CCPII, 2012].

6. Fundamental Principles of C2C

The C2C concept supports "zero emissions, zero resource use and zero toxicity" that is, a product should not create any waste or emit any pollutants into the environment [Baumgartner & Zielowski, 2007; McDonough et al., 2003]. The C2C design aims not to reduce the linear material flows and production but make nutrients to live in circular cycles, where value once created, remains the same. C2C is a development paradigm that focuses on eco-effectiveness [Toxopeus et al., 2015]. In nature, waste creates by one creature must become a nutrient for another. Also in the earth all energies come from the sun and use of renewable energies must be increased. All the materials of nature must be non-toxic and safe for humans and the environment [McDonough et al., 2003; Toxopeus et al., 2015]. The C2C concept is based on three fundamental and qualitative principles [McDonough & Braungart, 2002; Kumar & Putnam, 2008]: i) waste equals food, ii) use current solar income, and iii) celebrate diversity.

6.1 Waste Equals Food

The elimination of the very concept of waste and encourages to be inspired by endless nutrient cycles of nature. Hence, all products and industrial processes should be designed in such a way to enable the perpetual flow of the nutrients within one of the two distinct biological and technical metabolisms [Llorach-Massana et al., 2015]. Technical nutrients are inorganic or synthetic materials manufactured by humans, such as plastics and metals. These can be used in continuous cycles as the same product without losing their quality. Biological nutrients are organic materials which are used once decompose into the soil. These nutrients provide food for bacteria and microbiological life forms without affecting the natural environment. Technical nutrients should be designed for industrial recycling whereas biological nutrients should be designed to return to the soil and feed environmental processes [Braungart et al., 2007]. C2C indicates that a product can reenter in a biological cycle or a technical cycle at the end of its life. For example, organic waste materials will become food for bugs, insects and other small forms of life will take as food; decompose it and return it to the natural environment which we then indirectly use for food of human beings [McDonough & Braungart, 2002]. All materials and emissions are seen as beneficial for the environment. Products shall be deliberated in a way that they pose no danger to human health and can be recycled continuously [CCPII, 2016].

6.2 Use Current Solar Income

It indicates that the energy of fuelling a closed loop C2C must all come from the sun or other forms of energy, such as renewable energy from photovoltaic, geothermal, wind, hydro, and biomass [McDonough & Braungart, 2002]. It enhances the elimination of the use of fossil fuels in production. The renewable energy sources are widely and abundantly available without practical restrictions [Toxopeus et al., 2015]. The C2C renewable energy resources can highly reduce the environmental problem, energy problem and satisfy the human requirements as well use of renewable energy must be increased as much as possible. The use of renewable energy makes energy consumption no longer relevant as an environmental impact for the C2C [CCPII, 2016]. Implementation of 100% renewable energy (platinum level) for products manufacturing and materials recycling has not been obtained by any product yet. Present world is still far to achieve an energy system based 100% on renewable energies. In 2008, only the 12.9% of the world energy demand was supplied by renewable energies [IPCC, 2011b]. It is expected that in 2050, only 15% of consumed energy will come from renewable sources [IPCC, 2011a; Resch et al., 2008].

6.3 Celebrate Diversity

It avoids one-size-fits-all solutions, i.e., design products that are technically diverse [Llorach-Massana et al., 2015]. To improve a system's resilience, diversity is necessary. It tries to design products and systems with local environments, economies and cultures in mind. It does not try to reduce negative impacts on the environment [McDonough & Braungart, 2002]. It eliminates the instability and imbalance provided by a narrow view of production [Kumar & Putnam, 2008]. Biodiversity, cultural and conceptual diversity improve relationships, creativity and innovation. The ultimate goal of the C2C theory is to connect the natural resources and the artificial ingredient harmoniously [Toxopeus et al., 2015].

7. Five Pillars of C2C

Five pillars of C2C are as: material health, material reutilization, renewable energy and carbon management, water stewardship and social fairness [CCPII, 2018]. Material health indicates that the knowledge of the chemical ingredients of every product classify as biological or technological nutrient. It ensures that materials should be safe for humans and the environment. Material reutilization describes the process of returning components of a product into the different

cycles. It is required prior to design concept to assure that material loops can be carried out. Water Stewardship is also vital in the C2C project; as clean water is essential to life as a precious resource. The production of goods should neither harm nor reduce water quality. Therefore, the used water with the chemical ingredients in the production process must be clean and pure as of drinking quality. Renewable energy and carbon management represents that the whole project should be run solely on by renewable energy sources. Social fairness represents the objective of making a positive impact on the life of local communities in the form of creating employment with fair wages and elevating their quality of life. It respects human rights and contributes to a fair and equitable society. Clean air and climate protection protect environment, promote renewable energy, and reduce harmful emissions [Toxopeus et al., 2015; Cradle to Cradle Certified, 2020]. Above five pillars of C2C reflect several components of CE. So that C2C can be considered as part of CE [Lieder & Rashid 2015; Korhonen et al., 2018].

8. Application and Arrangement of C2C Policy

There are lots uses of C2C globally. Some renowned uses of C2C are in research institutes, factories, all kinds of architectures, office spaces, private residences, etc. The arrangement of C2C needs to augment the clean environment policy.

8.1 Low Carbon Policy

Control of carbon emissions from fossil fuel is low carbon policy, which is still in its infancy in the world. The C2C indicates low carbon community, such as low carbon in building, energy efficient utilization, green transportation hierarchy, resources recycling, and low carbon life initiate [Hou & Li, 2014].

8.2 C2C Policy in Business Sites

The C2C is a sustainable business strategy that mimics the natural recycling cycle and waste is reused. But when and how to apply the C2C concept successfully in business is still controversial [Zhang & Huang, 2019]. The C2C ideology affects consumers' values and ultimately changes consumer spending habits. By the proper use of raw materials producers can accelerate the repeated purchase frequency of consumers [O'Lear, 2010].

Business sites have been associated with poor environmental management, pollution, traffic congestion, and reduced quality of life. The development of

business site is laid by the clustered development in regional planning. Business sites are clustered of development schemes where different organizations are gathered for the mutual benefits, such as modern services, physical infrastructure and services of other local companies [Bergman & Feser, 1999]. C2C policy contributes to the success of a positive relationship between business sites and the social, cultural, and natural environment. Business organizations educate and encourage manufacturers to design their products in such a way that they can be reused and remanufactured. These supply nontoxic materials to the consumers around the world according to their demand [Tudor et al., 2007].

8.3 C2C in the Industrial Sector

The industrial sectors take necessary steps of low carbon policies in production and distributions. The materials and manufacturing processes of the industries must be material health, material reutilization, renewable energy & carbon management, water stewardship, and social fairness. Products meet the standard of C2C certified. For example, industries applied C2C principles in the design of PVC-free commercial carpet tiles that are separable into component materials for carpet-to-carpet recycling [McDonough & Braungart, 2002].

Factories must try to:
- use100% renewable energy for production,
- successfully eliminated hazardous ingredients from textile manufacturing
- disclose all product ingredients into the public reach, and
- maximize human and environmental health.

9. Benefits of C2C Policy

C2C is essential and beneficial for companies when a product is performed in a sustainable way. The C2C concept incites businesses to be aware and to do better. It minimizes damage to the environment. C2C will create better conditions for work and living in the society. It replaces waste as a new nutrition for a new product. Some scholars have claimed that C2C propel the "*third green wave*" and the "*next industrial revolution*" [Bakker et al., 2010; Reay et al., 2010]. It lies on eco-effectiveness that is an "*an alternative design and production concept to the strategies of zero emission and eco-efficiency.*" C2C removes harmful substances, such as carcinogens and toxic materials from the industrial cycle and to find safe alternatives to them that creates healthier and more cost-effective workforce [Braungart et al., 2007].

10. Barriers in Implementation of C2C

C2C plan is a useful tool for the present and future. The C2C strategy has many successes for steps of the improvement of environment in future. The C2C certification cannot guarantee environmental protection for all types of products. Yet it has some drawbacks [Llorach-Massana et al., 2015]. As the technological and biological nutrients are limited in the world, unlimited growth is not possible by using C2C approaches. Due to resource scarcity, technological limitations and political incoordination, apply of renewable energy in every stage of the society is not possible that hinders the implementation of C2C atmosphere. Absorption of all the biological nutrients is not possible that creates a negative effect on nature and biodiversity. Consequently, biological nutrient cycles are not feasible at large scale and C2C policy is not possible in all stages at all times. In fact waste management is not possible in all over the world and C2C approach is not full effective.

The main criticism of the C2C concept is that some aspects of a product's lifecycle, such as transportation or use, are not considered [McDonough & Braungart, 2002; Llorach-Massana et al., 2015].

11. Conclusion and Recommendation

The C2C policy provides safety of humans and environment that develops optimization strategies for social improvement. It deals with environmental features of production and company activity that provides an innovative and interesting perspective. It supports continuous improvement of the products that is beneficial for all global people and the planet. It can be applied to any system in modern society. In the study we observe that C2C policy encourages products to be manufactured with alternative materials that are both nonhazardous and biodegradable. The C2C attitude helped the society to think about the significances of environmental unfriendly products before producing. The C2C policy helps to think both producers and consumers at least to about harmful effects of toxins in various products and try to produce clean and sustainable products. The C2C process has gained popularity amongst companies as a way to distinguish more environmentally friendly products. The C2C approach encourages human to think about the fruitful results of environmental unfriendly products and to think about toxins in various products.

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THE EFFECT OF GOVERNANCE ON GROWTH OF SHADOW ECONOMY IN WEST AFRICA

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Abstract
Engagement in shadow economy activities doubles as a survival strategy against distortional government interventions resulting in unfavourable socioeconomic conditions and as an impediment to growth and development in developing economies. This study provides scientific evidence of the aspects of governance which minimize the size of the shadow economies of 15 West African countries from 1996 to 2019 using panel autoregressive distributed lag (pooled mean group estimator). Shadow economy (% of GDP) was used as the dependent variable while control of corruption; government effectiveness; voice and accountability; regulatory quality, rule of law and political stability were the used as measures of governance. The result revealed significant long run effect of all the measures of governance (except government effectiveness) on the size of shadow economy in West Africa. However, only control of corruption and rule of law were found to have significant negative effect on the size of shadow economy in West Africa.

Keywords: *shadow economy; governance; socioeconomic condition; West Africa.*

JEL Classification: O17

1. Introduction

The complex nature of modern economies and economic history of developed countries tout governance as an important requirement for economic growth and development. Consequently, modern economies often strive to ensure that public institutions, policies and regulations corroborate market mechanism for achievement of set socioeconomic objectives. However, most developing countries are usually characterized by underdeveloped public institutions whose distortional intervention often results in inhumane socioeconomic conditions for the underprivileged majority. Consequently, the less privileged majority resort to shadow economic activities for economic survival. According to Medina and Schneider (2018) the shadow economy encompasses economic activities which are concealed from official authorities for monetary, regulatory and institutional reasons such as avoidance of taxation and social security contribution; government bureaucracy and weak contract enforcement laws.

Although existence of shadow economies is a global challenge, shadow economies in developing countries are usually larger than shadow economies in developing counterparts (Vo and Ly 2014; Medina and Schneider, 2018). Despite serving as a survival strategy for the less privileged majority in developing countries; large shadow economy may have adverse effect on the economy as growing shadow economy may weaken the ability of governments to positively influence the economy. For instance, increasing shadow economy may reduce tax revenue which may in turn result in shortage of public goods and services required for socioeconomic development. In order to meet up with its responsibilities, government may be forced to increase tax paid by firms who operate in the official economy. Thereby, increasing the transaction cost and reducing the competitiveness of such firms (Schneider, 2010). Similarly, the concealed nature of shadow economic activities excludes firms who operate in the shadow economy from beneficial government intervention which may aid their expansion and growth. In sum, large shadow economies result in a lose-lose situation in which an economy fails to develop due to inefficient utilization of available resources. Since governance is a multidimensional phenomenon, it is pertinent to investigate the aspects of governance which influence the size of shadow economy.

Empirical studies have been conducted using different methodologies to analyse the effect of governance and non-governance factors on the growth and size of shadow economy in different countries and regions of the world (Schneider 2010; Wibowo and Indrayanti, 2020; Fapohunda 2013; Adriana 2014; Mahzar

2014). However, extant studies are yet to reach a consensus on the effect of governance on the size of shadow economy. Besides, studies on focusing on the effect governance on shadow economy in West African countries are relatively scarce. Consequently, this study investigate the effect of six aspects of governance (control of corruption, rule of law, political stability, regulatory quality, government effectiveness and voice and accountability) on the size of shadow economy in West African countries. This follows the neoclassical theoretical perspectives to growth of shadow economy which viewed engagement in shadow economic activities as an ingenuous way to circumvent distortional government intervention in the economy.

This study offers valuable contribution to the extant literature by investigating the effect of different aspects of governance (control of corruption, rule of law, political stability, regulatory quality, and voice and accountability) on the size shadow economy in 15 West African countries from 1996 to 2019 using the Panel-ARDL pooled mean group estimation technique. The empirical evidence from this study reveals control of corruption, rule of law, political stability, regulatory quality, and voice and accountability as statistical significant long-run determinant of the size of shadow economy in West African countries. The subsequent sections are organized as follows. Section two presents reviewed literature. Section three focuses on research methodology. Section four presents results and discussion while section five focuses on conclusion and recommendation.

2. Literature Review
2.1 Related Theoretical Review
Several theoretical perspectives exist on the expansion of the shadow economy; however these theories fit into three main stream theoretical perspectives namely dependency perspective, modernization perspective and neoclassical perspective. The three theoretical perspective viewed shadow economy from different perspective, thereby providing different explanations for its expansion.

2.1.1 Modernist Theoretical Perspective
The modernist theoretical perspective viewed shadow economy as a temporary phenomenon which diminishes with the modernization of an economy. Although, different in analogy Harris-Todaro theory of migration and unemployment and Arthur Lewis theory of unlimited supplies of labour are prominent modernist perspectives to growth of shadow economy. The duo recognizes the existence of a dual economy with relatively developed modern sector and an underdeveloped

traditional sector with surplus unskilled labour (Jhingan 2011). The high income obtainable in the modern sector attracts labour from the traditional sector to the modern sector which however fails provide sufficient employment due to slow rate of industrialization and development (Chaudhuri 2000). Implicit in the modernist perspective is the notion that shadow economy is an ephemera challenge of developing countries which will disappears as such economies progress. However, shadow economy has been increasing in developing and developed countries (Jütting and Laiglesia, 2009; Rothernberg et al 2016). Similarly, shadow economy has been found to grow with the development of the formal economy (Heintz and Pollin 2003). This suggests that shadow economy and formal economy are more of complements rather than substitutes (Huang et al. 2020).

2.1.2 The Dependency Theoretical Perspective

The dependency theoretical perspective viewed the expansion of shadow economy in developing countries as a deliberate creation of the developed capitalist countries for the perpetual exploitation of the underdeveloped countries (Sassen 2019). According to the neo-colonial dependence faction of the dependency theory informality and underdevelopment persisted in developing countries due to unequal power relations between developed and developing countries (Todaro and smith 2015). Such parasitic relationship increase informality in developing countries through pro-capitalist doctrine of globalisation (Sahu 2010; Meagher 2016). This unequal power relations are preserved by developing countries elites who inhibit genuine pro-masses reforms for personal reward from developed countries controlled international capitalist organizations (Leys 1975). The false paradigm faction of dependency theoretical perspective attributed expansion of shadow economy and underdevelopment in developing countries to application of unsuitable and complex developed-economy models which leads to misleading and inappropriate policies (Todaro and Smith 2015). In sum, dependency theoretical perspectives assume that shadow economy is directly linked to the official economy (Amara 2016). This implies that the growth of shadow economic activities is required for the growth of the official modern capitalist economies. (Williams and Round 2007)

2.1.3 The Neoclassical Theoretical Perspective

The neoclassical theoretical perspective focused on the effects of government intervention in the economy and the response of economic agents to such

intervention (Maloney 2004). The motivation of economic units to participate in the shadow economy emanates from anti-market government intervention which increases the burden of institutional cost (Gindling 2013). Thus, the neoliberal perspective sees the growth of shadow economy as a response of free market forces to distortional government intervention. This perspective sees participation in the informal economy as ingenuous, rational and industrious way participants in the shadow economy use to create income opportunities and alleviate their poverty in the face of high cost of legality. In support of the neoliberal perspective, empirical studies shows that countries with a higher tax burden or heavier regulations (such as time-consuming business registration, high-cost labor regulation) tend to have a higher share of informal economy in their total GDP (Jonasson 2012).

2.2 Related Empirical Review

Comprehensive studies exist on the effect of governance on the size of shadow economy. Torgler and Schneider (2007) analysed the effect of institutional quality and tax morale on the shadow economy with panel and time series data of countries. Analysing more than 25 measures of governance and institutional quality using pooled ordinary least squares regression and fixed effect regression models, their findings revealed a positive relationship between institutional quality and shadow economy and a negative relationship between tax morale and shadow economy. Remeikienė et al. (2014) investigated the country-level determinant of shadow economy that has the strongest impact on the scope of shadow economy in Greece between 2005 and 2013 using simple and multiple regression analysis. The finding of the study reveals that tax rate is the strongest country-level determinant of shadow economy in Greece during the study period. The authors suggested a review of the tax rate in order to discourage economic agents from participating in the shadow economy.

Wibowo and Indrayanti (2020) analysed the effect of institutional variable of governance on shadow economy in seven developing ASEAN countries using multiple regression technique. The empirical findings from the study revealed that voice and accountability; political stability; government effectiveness and control of corruption are significant and negatively related to shadow economy; regulatory quality has a positive and significant effect on the amount of shadow economy. Rule of law has no significant effect on shadow economy. The result of the study suggests bureaucratic/institutional reforms, recruitment of human resources, transparency in the management of government budgets and taxation system with the help of information technology, and non-conflicting regulations for minimization of the informal sector.

Luong et al. (2020) investigated the interactions between rule of law, economic growth and the shadow economy in 18 selected transition economies from 2002 to 2015 using GMM method. The empirical findings reveals a statistically significant negative impact of economic growth on shadow economy and a negative relationship between the size of shadow economy and the quality of rule of law in transition economies. The study recommends improvement of the quality of rule of law and growth for the reduction of shadow economy. Bayar et al (2018) studied the effect of corruption and rule of law on shadow economy in 11 transition economies in Central and Eastern Europe using panel co integration and causality test which takes care of heterogeneity and cross section dependence. The findings of the study reveal complementarity between corruption and the size of the shadow economy and a bilateral causality between control of corruption and shadow economy in the studied countries. However bidirectional causality was discovered between rule of law and shadow economy in some of the studied countries.

Heinemann and Schneider (2011) studied the possible impact of overall degree of religiosity; specific impact of different religions; proximity between religion and the state on the shadow economy by analysing cross-sectional data of 162 countries using ordinary least square regression analysis. The result from the study suggested that summary measures of general religiosity or indicators of religious competition do not have significant impact on shadow economy but a difference in dominant religion does. Islam or Eastern religions dominated countries are found to have smaller shadow economies than Christianity dominated countries. Furthermore, countries which combine governance with religion are found to have smaller shadow economies. They opined that this may be due to the potency of normative influence of religion in protecting state interest.

Kar and Saha (2012) investigated whether the claim by recent Latin American studies that increase in the size of informal economy reduces the harmful effect of corruption on inequality is applicable to developing countries in Asia where corruption, inequality and shadow economy are enormous. Using Panel Least Square and Fixed Effects Models for the estimation of the data of 19 countries in Asia, their findings shows that corruption increases inequality in the absence of the shadow economy but reduces inequality in the presence of larger shadow economies. This shows that corruption and shadow economy have a negative interaction effect on inequality. The empirical findings of other studies also reveal complementarities between corruption and shadow economy (Borlea et al. 2017; Dreher and Scheider 2010, Wibowo and Indrayanti 2020). Results from Dreher et al. (2009) however reveals that shadow economy and corruption are substitutes.

Mazhar (2014) analysed the effects of regulatory discretion on shadow economy using panel data of 162 countries from 1999 to 2007. Using Arellano-Bond estimator to investigate the dynamics and causal effect of the relationship the result of the study revealed that increase in regulation increases the size of the shadow economies. Enste (2010) studied the impact of density of regulations on the size of shadow economy in 25 OECD countries for the time period 1995-2005. The empirical findings reveals labour and product market regulations, overall regulations and poor quality of official public institutions and administration as the main causes for the development of the size of shadow economies.

Saputra and Nugroho (2013) studied the determinants that have significant influence on the shadow economy for BRICS countries and Indonesia by analysing panel data for 6 countries using estimated generalised least square panel data analysis. The findings of the study shows that the performance of government, intensity of regulatory economic framework, tax burden significantly affects shadow economy. Furthermore, the result suggests that Indonesia has relatively good performance in the key determinants of shadow economy compared with BRICS Countries. Gasparenien et al. (2016) investigated the impact of shadow economy determinants on the size of shadow economy in Ukraine from 2005 to 2012 using multiple regression analysis. The result of the study reveals that tax rate, overall employment rate, import of goods and services, GDP and participation of working-age people in the labour market explains 99% of the changes in shadow economy in Ukraine. Furthermore, the overall employment rate has a bidirectional impact on the scope of shadow economy in Ukraine, hired work increases the opportunities to earn legal wages, but probability of paying illegal wages is still high.

Fapohunda (2013) examined the role of the informal sector in combating the menace of unemployment in Nigeria; the extent to which government policies and programmes have facilitated the sector, and how informal sector enterprises and settlements can be upgraded and progressively integrated into the urban development mainstream. The study was carried out using desk and literature review of relevant articles, publications, web-based research as well as Federal Office of Statistics data on efforts and policies of the Nigerian government aimed at enhancing the performance of the informal sector. Government has developed policies and programmes to combat the menace with little impact. The study suggested improved access to credit and other resources, education and training as well as leadership and organisation as the best way to maximize informal sector ability to alleviate unemployment and eventual integration into the formal sector.

Adriana (2014) investigated the relationship between the size of the shadow economy and the unemployment rates in Romania quarterly data from 2000 to 2010 using Toda-Yamamoto approach, multivariate co-integration and vector error correction models (VECM). The Toda-Yamamoto causality test results, suggest a strong evidence of causality running from the unemployment rates to the shadow economy when a sufficiently high lag order is selected. The VECM models which analyse shadow economy using the currency demand approach reveals a general downward trend in size of informal sector for the study period.

Bracco and Onnis (2016) investigated the effects of immigration and immigration amnesties on the shadow economy in Italy from 1995 to 2006 using two stage least square and ordinary least squares regression. The result of the study reveals a strong correlation between the official measures of shadow economy and a significant positive relationship between immigrant population, propensity to evade tax, overall share of the shadow economy, and share of irregular jobs. Ocran (2018) estimated the size and trends of the informal sector in Ghana from 1960 to 2008 using the Tanzi currency demand approach as analytical framework for the assessment. The model for the study was estimated using ordinary least squares technique. The result of the study shows that the size of the informal economy in Ghana has been increasing over the past four decades. Specifically, the size has doubled from the 14% of GDP in 1960 to 30% by 2004. Thus, there has been an upward trend. For shrinking of the informal sector, the study suggested, the use of presumptive tax schemes due to its collection simplicity, economy and less burdensome implementation. Beyond the desire of incorporating the informal sector into the tax net, the study also suggest provision of infrastructural and technical support to informal sector organizations.

Generally, only few of the empirical evidences focused on the effect of all key aspects of governance on the size of shadow economy. The few available evidences discovered different effects of different aspects of governance on the size of shadow economy. Furthermore empirical evidences on the effect of governance on the size of shadow economy in West African countries are relatively scarce. From this perspective this study will contribute to the literature by examining the effect of key aspects of governance on the size of shadow economy in West African countries. This study will also test the applicability of neoclassical theoretical perspective on the growth of shadow economy.

3. Methodology
3.1 Data Description and Sources

This study analysed annual panel data of 15 West African countries from 1996 to 2019. Specifically, the West African countries studied are Nigeria, Benin, Burkina Faso, Ghana, Gambia, Guinea, Guinea Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Senegal, Sierra Leone and Togo. Study period and country selection was based on data availability. Panel study is opted for due to its appropriateness in addressing the study objective and its ability to circumvent data shortage challenges common to developing countries. The data analysed were sourced from Medina and Schneider (2018) and World Governance Indicators. The dependent variable, shadow economy % of gross domestic product (SHA) measures the share of legal economic and productive activities which contributes to gross domestic product but are concealed from government records (excluding illegal or criminal activities, do-it-yourself or other household activities).

The descriptions of aspects of governance studied are given as follows. Control of corruption (COR) measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of the state by elites and private interests. Government effectiveness (EFF) measures the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Political stability measures the likelihood of political instability and/or politically-motivated violence, including terrorism.

Regulatory quality (REG) measures the Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Voice and accountability (ACC) measures the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Rule of law (LAW) measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

3.2 Model Specification

A framework of analysis to determine the effect of governance on the size of shadow economy in West African countries is developed by including control of corruption, government effectiveness, political stability, regulatory quality, voice and accountability and rule of law as explanatory variables in the estimation model.

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Although literature records other factors such as religion, inequality and access to credit as determinants of shadow economy size, we exclude these factors following the neoclassical theoretical perspective that anti-market government intervention drives the growth of shadow economy.   The specified equation for shadow economy is as follows

$$SHA_{it} = \beta_0 + \beta_1 COR_{it} + \beta_2 EFF + \beta_3 STA_{it} + \beta_4 REG_{it} + \beta_5 ACC_{it} + \beta_5 LAW_{it} + e_{it} \ldots . (1)$$

In generalized Panel ARDL (p, q, q…q) specifically with the Pooled Mean Group form we have;

$$\Delta Y_{it} = \theta_i \left[Y_{i,t-1} - \lambda'_i X_{i,t} \right] + \sum_{j=1}^{p-1} \delta_{ij} \Delta Y_{i,t-j} + \sum_{j=0}^{q-1} \beta'_{ij} \Delta X_{i,t-j} + \varphi_i + e_{it}$$

Where:

Y_{it}: is the dependent variable (SHA)

θ_i: group − specific speed of adjustment coefficient (expected to be < 0)

$\left[Y_{i,t-1} - \lambda'_i X_{i,t} \right]$ = error correction term

X_{it}: independent variables (COR, EFF, STA, REG, ACC, LAW)

δ_{ij}: is the coefficient of the lagged dependent variable

β'_{ij}, δ_{ij}: are short-run dynamic coefficients

λ'_i: vector of long run relationships

φ_i: unit specific fixed effects

p, q: are optimal lag orders

i: number from 1 … N

t: number from 1 … T

e_{it}: error term

3.3 A priori Expectation

Theoretically, it is expected that control of corruption; government effectiveness; political instability and absence of violence/terrorism; regulatory quality; voice and accountability and rule of law would have negative effect on the size of shadow economy in West Africa.

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3.4 Estimation Technique

The pooled mean Group (PMG) technique is used to estimate the specified panel autoregressive distributed lag model (ARDL model). This method is an intermediated estimation technique which assumes short-run group specific intercepts, coefficients and error variances, and restricts long run coefficients to be homogeneous across the study groups. The Pooled mean group technique is intermediate in that it combines the averaging feature of mean group (MG) estimation technique which allows both long-run and short run estimates to vary across groups and the pooling feature of dynamic fixed effect technique (DFE) which restricts long run and short run slope coefficients and error variances to be the same (Pesaran et al.1999).

Pesaran et al. (1999) assumes that all the variables in panel ARDL model is either integrated of order one $[I(0)]$ and order two $[I(1)]$ and imperfectly correlated. The error correction estimate is expected to be negative and statistically significant. However scholars are divided as to whether the maximum absolute value of ECT should be 1 or 2. According to Olarewaju et al (2017) the ECT must be less than 1, negative and significant. Conversely, Loayza and Lanciere (2004) opined that absolute value of the ECT must be negative and not exceed 2. Narayan and Smyth (2006) however concluded that an ECT absolute value between 1 and 2 suggests an error correction process which rapidly converges to equilibrium path after fluctuating around the long run value in a dampening manner.

The Im-Pesaran-Shin (IPS) and Breitung panel unit-root tests are used to ensure that the variables in the study are either integerated of order zero $[I(0)]$ or $[I(1)]$. Given the number of observations (T) and number of cross sections (N) Pesaran cross sectional dependency test is used to test for cross-sectional dependence which are usually common with panel data. We also estimated the correlation matrix for the variables to ensure that no two variables in our model are perfectly correlated. The optimal lag structure of the model is automatically chosen using Akaike Information Criterion.

4. Results and Discussion
4.1 Descriptive Statistics

Descriptive statistics is employed to reveal the descriptive properties of the variables used in this study. The result of the descriptive statistics for each of the variables are illustrated in Table 1 below

Table 1: Descriptive Statistics

	SHA	COR	EFF	STA	REG	ACC	LAW
Mean	40.69195	-0.711527	-0.842192	-0.598946	-0.645070	-0.469064	-0.744581
Median	40.24000	-0.720858	-0.857168	-0.435910	-0.605752	-0.450000	-0.722409
Maximum	62.33000	0.176479	0.160328	1.048930	0.338653	0.597521	0.154609
Minimum	20.26175	-1.701552	-1.884888	-2.436677	-2.023813	-1.553702	-2.008507
Std. Dev.	7.512383	0.368187	0.418549	0.737407	0.384744	0.517401	0.452766
Jarque-Bera	4.035560	2.825519	7.411881	21.46730	11.20532	13.45053	5.325711
	(0.132950)	(0.243470)	(0.024577)	(0.000022)	(0.003688)	(0.001200)	(0.069749)
Observations	360	360	360	360	360	360	360

Source: Authors' computation using E-view 10 (2021)

As shown in Table 1 above, the mean and median values of corruption control (COR), government effectiveness (EFF), political stability (STA), regulatory quality (REG), rule of law (LAW) and accountability (ACC) are all negative values. Furthermore, the maximum values of all the governance indicators except political stability (STA) are below 1. Given a possible minimum value of -2.5 and a maximum possible value of 2.5 of these governance indicators, the aforementioned statistics shows that West African countries still have a lot to improve on in achieving maximum performance in these indicators of governance. The average size of shadow economy (% of GDP) among the studied group is 40.7% while the minimum and maximum size of shadow economy is 20.3% and 62.3% respectively also shows that West African countries have a large shadow economy. The standard deviation values of the governance indicators shows that the governance indicator values are more concentrated around the mean while the standard deviation value of shadow economy shows that there is a large variance between the shadow economy data and its mean. The probability values of Jarque-Bera statistics shows that Shadow economy, corruption control and rule of law are not normally distributed while voice and accountability, regulatory quality, political stability and government effectiveness data are normally distributed at 5% significance level.

4.2 Correlation Matrix
The correlation matrix is employed to ensure that the regression model is free of multicollinearity. The pair wise correlation coefficients for the variables used in the study are shown in Table 2 below:

Table 2: Correlation Matrix

	SHA	ACC	LAW	REG	STA	EFF	COR
SHA	1						
ACC	0.07	1					
LAW	-0.06	0.69	1				
REG	-0.06	0.55	0.83	1			
STA	-0.03	0.46	0.66	0.55	1		
EFF	0.07	0.57	0.80	0.85	0.50	1	
COR	-0.14	0.62	0.84	0.81	0.53	0.79	1

Source: Authors' computation using E-view 10 (2021)

As shown in Table 2 above, the pair-wise correlation coefficients confirm that no two explanatory variables in our study have perfect negative or positive correlation.

4.3 Unit Root Test

Im-Pesaran-Shin (IPS) and Breitung (BTG) unit root tests are used to investigate the presence of unit root in the variables under study. The results of both tests are shown in the table 3 below.

Table 3:   Im-Pesaran-Shin (IPS) and Breitung (BTG) Panel Unit-root test

Variable	IPS			BTG		
	Order		Prob.	Order		Prob.
SHA	I(0)	Intercept, Trend	0.0000	I(0)	Intercept, Trend	0.0104
COR	I(1)	Intercept	0.0000	I(1)	Intercept , Trend	0.0000
EFF	I(1)	Intercept	0.0000	I(1)	Intercept, Trend	0.0000
POL	I(1)	Intercept	0.0000	I(1)	Intercept, Trend	0.0000
REG	I(1)	Intercept	0.0000	I(1)	Intercept, Trend	0.0000
LAW	I(1)	Intercept	0.0000	I(1)	Intercept, Trend	0.0000
ACC	I(1)	Intercept	0.0000	I(1)	Intercept	0.0000

Source: Authors' computation using E-view 10 (2021)

As shown in table 3 above, the probability values of the IPS and BTG panel unit root tests for each of the variables under study confirms at 1% level of significance

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that control of corruption (COR), government effectiveness (EFF), political stability (STA), regulatory quality (REG), rule of law (LAW) and accountability (ACC) are stationary at first difference while shadow economy % of GDP (SHA) is stationary at level.

4.3 Lag Selection

The optimal lag for the panel ARDL model is automatically selected using Akaike Information Criterion (AIC).   The optimal lag of the panel ARDL model for this study is lag structure (1, 2, 2, 2, 2, 2, 2) with the least AIC value of 3.384812.

4.4 Panel-ARDL Estimates

Table 4 shows long-run and short-run coefficients of the effect of governance on shadow economy.

The empirical result shows that the long-run coefficients of control of corruption (COR), political stability (STA), regulatory quality (REG), rule of law (LAW) and accountability (ACC) are statistically significant at 5% level while the long-run coefficient of government effectiveness (EFF) is not statistically significant at 5% level of significance. This is demonstrated by the p-values of the variables. From the result the p-values of COR, STA, REG, LAW, ACC and EFF are 0.0000, 0.0000, 0.0000, 0.0000, 0.0111 and 0.5177 respectively.   However, only the long-run coefficient of rule of law and control of corruption conforms to a priori expectation.

The short-run coefficients of the independent variables are all statistically insignificant. This is demonstrated by the respective p-values of the independent variables which are far above 5% level of significance. However, the coefficient of error correction term (ECT) is negative and less than 1 in absolute value.   ECT coefficient value of -0.559743 suggests an above average speed of adjustment of short-run deviation from long-run equilibrium. This shows that about 56% of the short run deviation from long-run equilibrium shadow economy is corrected yearly. Specifically it takes 1.79 years ($^1/_{0.559743}$) for the current year deviation from equilibrium to be corrected. The p-value of the coefficient of Pesaran cross sectional dependence test shows that the estimates are free from cross sectional dependence.

**Table 4: Panel-ARDL Long Run and Short Run Estimates of the Effects
of Governance on the Growth of Shadow Economy**

Dependent Variable: SHA

Variable	Coefficient	Stand. Error	t-Statistics	Probability
Long-Run Estimates				
COR	-8.885980	0.881881	-10.07617	0.0000
REG	7.351559	0.558941	13.15265	0.0000
LAW	-4.671736	0.830702	-5.623842	0.0000
STA	2.175157	0.259859	8.370538	0.0000
ACC	1.291994	0.501682	2.575325	0.0111
EFF	0.564127	0.869639	0.648691	0.5177
Short-Run Estimates				
ECT	-0.559743	0.133942	-4.179005	0.0001
D(COR)	2.8884198	3.256931	0.885557	0.3775
D(COR(-1))	2.689826	2.631360	1.022219	0.3086
D(REG)	-0.187847	2.614669	-0.071844	0.9428
D(REG(-1))	-1.668254	1.485693	-1.122879	0.2636
D(LAW)	-0.109172	3.165164	-0.034492	-0.9725
D(LAW(-1)	0.641936	1.208874	0.531020	0.5963
D(STA)	0.640695	1.291744	0.495992	0.6207
D(STA(-1))	1.586329	1.508007	1.051938	0.2948
D(ACC)	-1.617713	1.278058	-1.265759	0.2079
D(ACC(-1))	-1.274311	1.779142	-0.716250	0.4751
D(EFF)	-2.862546	1.748316	-1.637316	0.1040
D(EFF(-1))	-2.237188	1.256538	-1.780439	0.0774
CONSTANT	23.91929	5.666761	4.220980	0.0000
TREND	-0.269808	0.083495	-3.231421	0.0016
Pesaran C D	0.060901			0.9514

Source: Authors' computation using E-view 10 (2021)

4.4 Policy Implications of the Results

This study examined the effect of governance on the size of shadow economy in West African Countries from 1996 to 2019. The results of the long-run panel ARDL coefficients revealed significant effect of control of corruption (COR), political stability (STA), regulatory quality (REG), rule of law (LAW) and accountability (ACC) on the size of shadow economy (SHA) in West African countries. Government effectiveness (EFF) was however found to have insignificant effect on the size of shadow economy in West Africa. Similarly, the short-run panel ARDL coefficients revealed insignificant effect of all explanatory variables on the size of shadow economy in West Africa.

Specifically, the result implies that a unit increase in control of corruption (COR) index will decrease the size of shadow economy (SHA) in West Africa by about 8.89%. The negative significant long-run relationship between corruption control and shadow economy agrees with empirical studies which concludes that countries with sincere anti-corruption mechanism have smaller shadow economies (Huynh, C.M. and Nguyen 2019; Wibowo and Indrayanti 2020; Goel and Saunoris 2014; Dreher and Schneider 2010). This relationship may be explained by the adverse effect of corruption on the socio-economic conditions in developing countries which makes operating in the official economy either impossible or too costly for the less privileged majority. Similarly, a unit increase in rule of law (LAW) index will decrease the size of shadow economy (SHA) in West Africa by about 4.67%. The negative significant long-run effect of rule of law on shadow economy agrees with a empirical studies which conclude that countries which promote rule of law have smaller size of shadow economy (Luong, Nguyen and Nguyen 2020; Jamalmanesh, Meidani, and Mashhadi, 2014; Togler and Shneider 2009; Dreher, Kotsogiannis and McCorriston, 2009). This relationship may be explained by the confidence of economic agents in the ability of the justice system to enforce property rights and other benefits of participating in the official economy.

Furthermore, contrary to a priori expectation the result suggested that a unit increase in political stability (STA), regulatory quality (REG) and accountability (ACC) will increase the size of shadow economy in West Africa by about 2.18%, 7.35% and 1.29% respectively. The positive significant long-run relationship between political stability and the size of shadow economy in West Africa disagrees with empirical studies which concludes that unstable polity and insecurity increase the size of shadow economy through hindrance of property right

enforcement and rapid changes in policies which increase cost and risk of operating in the official economy (Wibowo and Indrayanti (2020); Razmi, Falahi, and Montazeri 2013). This may be due to the fact that secure and stable environment are generally conducive for economic activities. The positive significant effect of regulatory quality with the size of shadow economy in West Africa agrees with empirical studies which conclude that intensive market regulations increase the size of shadow economy in countries where the less privileged majority earn by engaging in shadow economic activities (Mazhar 2015; Schneider 2010; Enste 2010).

The positive significant long-run relationship between voice and accountability and the size of shadow economy in West Africa disagrees with empirical studies which submit that democratic countries with transparent government which encourage freedoms of expression and economic freedom are more likely to have smaller shadow economies (Wibowo and Indrayanti 2020). This may be due to the fact that re-election and political power of politicians in developing democracies is usually determined by the less privileged majority who earn a living in the shadow economy. Government emanating from such democracy may lack the political will to formulate and implement policies which disrupt shadow economy activities. The result also showed a positive insignificant effect of government effectiveness (EFF) on the size of shadow economy in West Africa. Consequently, the study estimated that a unit increase in control of corruption (COR) index and rule of law (LAW) index will decrease the size of shadow economy in West Africa by about 8.89% and 4.67% respectively.

5. Conclusion and Recommendations

In this paper, the model developed underlined the effect of governance on the size of shadow economy in West Africa from 1996 to 2019. The long-run and short-run coefficients of the panel auto regressive distributed lag model were employed in the analysis. The analysis identified statistically significant effect of corruption control, rule of law, political stability, regulatory quality and voice and accountability on the size of shadow economy in West Africa. Even though shadow economic activities serve as an economic survival strategy for the less privileged in the face of unfavourable socio-economic conditions; increasing size of shadow economy may be detrimental to the attainment of the socioeconomic potentials of West African countries. In order to reduce the size of the shadow economy, the study arrived at the following recommendation, which were found to be necessary.

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- Anticorruption agencies must promote sincere and non-selective anti-corruption mechanism which creates humane socioeconomic conditions and deemphasize the need for the less privileged majority to engage in shadow economic activities for survival. The government can achieve this by making sure that anti-corruption agencies are free from all forms of political interference.

- The three arms of government especially the executive must ensure strict adherence to the rule of law in order to boost confidence of economic agents in the ability of the justice system to enforce property rights and other benefits which encourage participation in the official economy.

- The Government should minimize all forms bureaucracy which makes government intervention targeted at attracting shadow economy participants to the official economy counterproductive.

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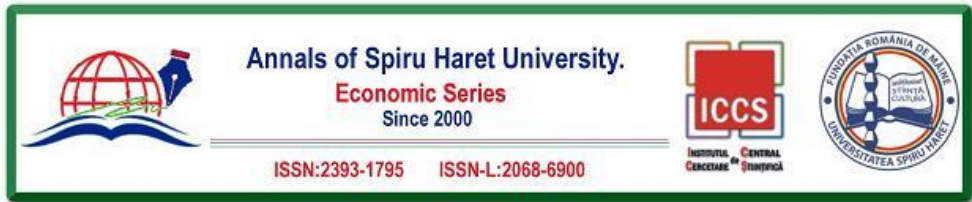
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AMELIORATING ADVERSE EFFECTS OF GLOBALIZATION ON EMPLOYMENT RELATIONS IN ZIMBABWE

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Abstract

Globalisation has been associated with accelerated deregulation and withdrawal of government from the workstation, (Sweeney, 2004). The advent of globalisation has forced organisations in Zimbabwe to deal with implications such as loss of market, response to competition, technological and legislative changes. A conundrum that have witnessed a change in human resources policy, employee compensation, business strategies among others. These changes have also resulted in massive shift in employment relations between employers and t employees and relations between employees and their unions. Subsiquent to this background, this article's objectives are to identify challenges occasioned by globalisation on employment relations in Zimbabwe and proffer mechanisms to ameliorating the adverse effects of globalisation. A qualitative phenomenological research was adopted making use of interviews, researcher field notes and memoirs to gather data on participants' experiences. Results were analysed using Nvivo 10 and manual coding. Results identified six main challenges namely (1) strife between employers and employees (2) dwindling employee democracy (3) employee marginalisation (4) increased disputes (5) general dissatisfaction of all parties and (6) disunity among unions and workers. The study recommended four mitigating strategies namely contextualising globalisation; making use of training and education; increased employee involvement; and use of dialogue and communication. If these factors are considered a fair globalization can be achieved.
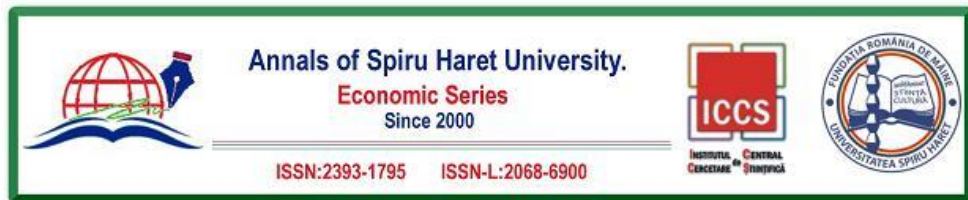
Introduction

The advent of globalisation has had both positive and negative impact on employment relations across the globe and indeed on Zimbabwe in particular. In the late 1980s the globalisation phenomena deepened at an accelerated rate, evidenced in the collapse of the Berlin Wall in Germany, collapse of Soviet Union and victory of capitalism over socialism epitomised by the end of the cold war in 1989. Arguably these events helped in inspiring a new world order towards adoption of global collaboration, neo-liberal strategies and capitalism (Brahm, 2002). Governments became inclined more than ever to solve international problems through constructive engagement and dialogue, and creation of free trade systems by promoting liberalisation of markets and deregulation (Schiphorst, 2001).

As the tidal waves of globalisation grew, Zimbabwe joined the globalisation bandwagon, and perhaps it was the abatement of ideological conflicts and the triumph of globalisation over socialism that left Zimbabwe with one choice of adopting trade liberalisation and labour market deregulation (Saunders, 2007). Backed by World Bank's polices of Economic and Structural Adjustment Program (ESAP) and through the influence of the Tripartite Negotiating Forum (TNF) and direct lobbying by employer boards like the Employers' Confederation of Zimbabwe (EMCOZ), Zimbabwe formulated a new employment relations policy that was legalised into a new labour legislation in 1992 (Sachikonye, 1990). These changes ushered in a new era with new challenges like industrial disharmony among others in Zimbabwean employment relations. It is out of the backdrop of these challenges that this study drew its research problem and objectives.

Problem statement, research questions and objectives

A plethora of challenges emerged as a result of massive labour deregulation and market liberalisation in Zimbabwe. The influence and dictates of investors, transnational companies, international trade policies and international monetary institutions on Zimbabwean labour markets led to unstandardised form of employment regulations in Zimbabwe (Schiphorst, 2001). In fact, it led to the

disintegration of trade unions into industry specific unions and creation of industry specific collective bargaining forums (National Employment Councils - NECs) and reduced union bargaining power. Contracts of employment became more and more unfavourable for employees. There was an increase in fixed-term contracts, casual labour, labour brooking, sub-contracting and part-time employment as permanent employment contracts dwindled (Sachikonye & Raftopoulos, 2018). Employment relations became synonymous with continued employee marginalisation. In 2008 Zimbabwe was put on the International Labour Organisation (ILO) agenda for breaching the declaration on Fair Globalisation Protocol, and in 2017, it was found in breach of Convention 87 and 89 accused of infringing worker rights (Ncube, 2017). Despite these points and pessimistic views against globalisation, the World Bank (2018) argued that globalisation is not always bad and Zimbabwe needs to embrace it to improve its economic environment. In view of this, solutions should be crafted to ameliorate the adverse impact of globalisation on Zimbabwean employment relations.

Research questions
- What forms of challenges are occasioned by globalisation in Zimbabwean employment relations?
- What mechanisms could address the challenges of globalisation in the sphere of employment relations in Zimbabwe?

Research objectives
- To identify the challenges prevalent in Zimbabwean employment relations as a result of the impact of globalisation.
- To suggest mechanisms to address challenges posed by globalisation on employment relations in Zimbabwe.

Literature Review
Globalisation and its hallmarks on employment relations in Zimbabwe
Globalisation is a growing phenomenon the world over identified with increased competition, labour market flexibility and deregulation of employment laws (Dunning, 1997). Perhaps the most adverse effects of globalisation that Zimbabwe has suffered to date is the United States of America, Britain and European Union economic sanctions and isolation that characterised its economy since 2000 to date. Today Zimbabwean organisations are being exposed to

international markets where they have to trade and compete with international giants. In order to survive, the organisations will have to develop and acquire new competencies that either meet the globalisation yardstick or they in some instances adopt some strategies internally like low wages, long working hours, declaration of economic zones and applications for exemptions from adhering to strict labour legislations as a means to adapt and survive (Sachikonye & Raftopoulos, 2018).

These developments have had negative effects on employment relations leading to increased disputes and rise of labour litigations. In 2015 alone nearly over 30 000 permanent employees lost their jobs after the Supreme Court ruling on the **Don Nyamande & Anor v Zuva Petroleum** case upheld the global common law right that any part to an employment contract can terminate the contract upon giving a prescribed notice. What followed from the Don Nyamande Supreme Court ruling was a massive termination of employment contracts. Mucheche (2017) commented that, employment relations were in tatters, and labour wrangles increased as never before imagined.

However, it is not necessary true that globalisation heralded predominately negative effects in employment relations. In fact, globalisation has created an imperative for individual employees to develop specific skills, competencies, and abilities to match global labour market requirements. In organisations it led to new style of operations, management, structure, new processes and practices (Utpal & Pragya, 2014). Globalisation brought about equity and fairness in work places. Employees in Zimbabwe regardless of gender, race, ethnicity, tribe, religion and creed are treated the same in wages, promotions, discipline and any workplace relations factors. Kanyenze (2011) observed that the influence occasioned by globalisation necessitated workplace democracy like collective bargaining, fair labour standards, right to organise and removed discriminations in employment relations.

The concept of Workplace democracy is described by Brione and Nicholson, (2012, p. 11) as the idea of giving employees a greater voice in the firms they are employed. Bendix (2007, p.654) defined it as *"industrial democracy"* which takes the form of "*increased employee participation, both in the decision making process and in profits of the undertaking."* Exenberger and Hartmann (2007) postulated that the dawn of globalisation and technological changes cajoled firms to reorganise and flattered the need to hire improved skills and competencies. This resulted in flooding of the workplace with educated enlightened workers whose knowledge needed management to work towards involving employees in decision-making.

International Labour Organisation (ILO) moved in to ensure globally acceptable labour standards by promulgating conventions to set minimum standards of employee rights and workplace democracy (International Labour Organisation, 2003). The main four ILO conventions that are fundamental to workplace democracy are:

• Freedom of Association and Protection of the Right to organise Convention, 1948 (No. 87)

• Forced Labour Convention, 1930 (No. 29)

• Right to Organise and Collective Bargaining Convention, 1949 (No. 98)

• Abolishment of Forced Labour Convention, 1957 (No. 105)

Zimbabwe ratified these four main ILO conventions that afford employees right to participation and involvement on issues that affect them (Gwisai, 2006). Brione and Nicholson (2012) citing Pateman (1970) argued that there are three forms of participation namely (1) full participation, (2) partial participation, or (3) pseudo participation (see Table 1 below).

Table 1. Types of employee participation approaches

Full Participation	Partial Participation	Pseudo Participation
Worker representatives have equal power to determine outcome in the decision-making process	Worker representatives influence the decision-making process but do not have equal power to decide the outcome	Participation is used by management to persuade employees to accept ready-made managerial decisions

Source: Brione & Nicholson (2012, p. 18)

With particular reference to Zimbabwe, Gwisai (2006) postulated that the decentralisation of collective bargaining in Zimbabwe by creating works councils to engage in collective bargaining pertaining to all issues affecting employees took away the right of employers to make unilateral decisions. The worker participation model of the Zimbabwean works council fit well in the description of Bendix (2007) of plant-level committees or councils which she argued are the most common and popular example of employee participation. However, collective

bargaining agreements that come from these Works Councils are not binding on the employer as they are merely recommendations (Khabo, 2008). Decisions of the Works Council get implemented only if the employer agrees with them. In several cases, works councils are used as communicative information dissemination forums (Kanyenze, 2011).

Although globalisation entrenched workplace democracy in Zimbabwe, it also brought with it negative impacts like weakening the power of unions (Chiripanhura & Makwavarara, 2000). Works council took away union participation at workplace negotiations and in most cases workers committees enter into unfavourable decisions. In this regard, Hatcher (2007, p. 1) argued *"worker freedom have shown little sign of increasing and with globalisation of the workplace the hope of democratic workplaces for many is an unrealised dream".* Sweeney (2004, p. 102) summed it, "*with the dawn of globalisation, democracy clearly stops at the workplace door."*

Lee and Vivarelli (2006) argued that the decadence of workplace democracy through dissolution of union power was caused by powerful global firms which influence workplace legislation to safeguard their investments. Edwards (1997) concurred that globally networked capitalist organisations control the commercial highway. They have power over national and global economics such that their influence on workplace relations tilts employment law to their advantage to protect their business interests. In the process, workplace democracy suffers.

This development has also impacted on workplace relations in collective bargaining. Grogan (2000, p. 263) defined collective bargaining to be a process by which, *"employers and employees collectively seek to reconcile their conflicting goals through a process of mutual accommodation".* The approach to collective bargaining by unions and workers committees has drastically changed in modern Zimbabwe. It is best described by Salamon's (2000) cited by Bendix (2007, p. 656) as "*a philosophy or style of organisational management which recognises the need and rights of employees, individually or collectively, to be involved with management in areas of the organisation's decision making beyond that normally covered by collective bargaining.*"

Bendix (2007) added that globalisation has changed collective bargaining and indeed the generality of worker employer workplace relations significantly due to the rise of an enlightened worker, increased skills, competences, worker self-direction and self-monitoring. These transformations have forced unions to evolve with changing times and adopted cooperation and involvement with management

through participation in higher joint decision making in order to adapt and solve global challenges affecting both employers and employees. Unfortunately, many at times the emerging workplace relations are not even. The employee does the majority of the compromises and regrettably occasioning worker marginalisation. Perhaps, the Zimbabwean employment relations situation can better be elucidated by globalisation theories discussed below.

Understanding Zimbabwe's employment relations through theory

The single causal logic theory in its quest to explain globalisation, have sought to locate a causal effect in a specific sphere of influence like political, technological or economical domain, and it is functional in nature placing human behaviours as caused by a determinant factor in the structural framework (fredda, 2015). The causal logic theory's assumptions are similar to the behaviourist psychologists' viewpoint that human actions are born from a stimulus-response paradigm. In this case, the **causal factors of globalisation** are the stimulus, which lead to **employers' business actions/decisions**, which is the response. This line of thought collaborates with Fredman's (2005) understanding of globalisation as an imposed process by forces like trade, technology and internationalisation of markets.

Applying this model in the Zimbabwean situation, it can be argued that investment by transnational companies were driven by the need to open markets, make profits and exploitation of resources, such that the actions taken by employers were more concerned with achieving business goals of profiteering as compared to improving the lives of employees (Majaya, 2018). Since the introduction of a liberalised economy in Zimbabwe in 1992, employment relations deteriorated and became synonymous with disputes and industrial actions (Knight, 2005), job losses increased (Tekere, 2001), poverty rose (Chitiga, 2004), and employers became sore controllers of the labour market (Knight, 2005).

However, the theoretical explanation given by the single causal logic theory has been widely criticised for lacking certainty in its assumption (Held, 1999). Conclusions derived from such theoretical assumptions are highly subjective as they are dependent on individuals' viewpoints. As such, the multi-causal logic theory covers this gap by taking a multivariate approach through acknowledging the diversity of structural factors contributing to globalisation and the social relations of the process.

The multi-causal logic theory of globalisation

Macdonald (1997) argued that any theory of globalisation and employment relations that does not address work-place social relationships is inadequate. He therefore concurred with Giddens' (1990) four-dimensional model of globalisation that social relations are central in the understanding of globalisation and its impact on workplaces. The theory incorporates social relations at work and explains how each actor in the globalisation jamboree act, and interacts with the complex structural factors. As Tejada (2015) puts it, Giddens's theory proposes that globalisation unfolds in a complex interaction involving four societal dimensions namely world capitalist economy; nation state system; world military order and international division of labour as projected in Figure 1 below.
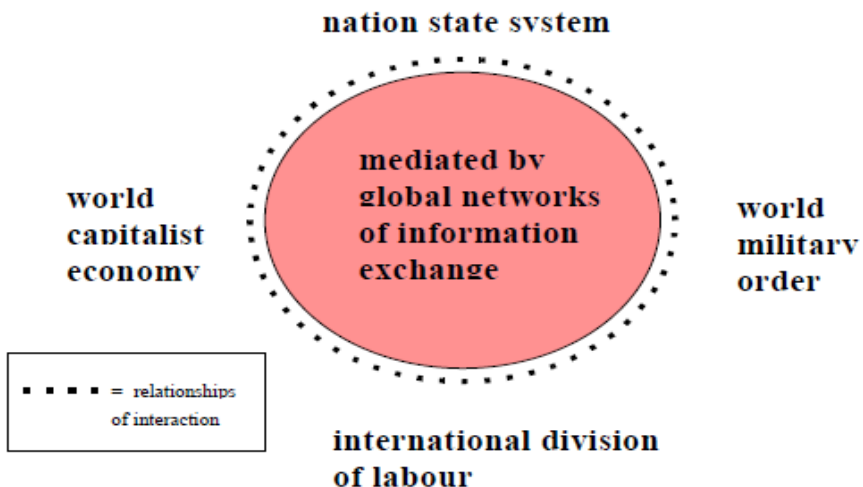

Figure 1: Giddens' four dimensional theory of globalisation
Source: Giddens, (1990).

Held and McGrew (2008) in their analysis of the four dimensional theory, concurred with Giddens (1990) that the world capitalist economy is a driver of globalisation as many national policies hovers around the interests of powerful

transnational corporations whose financial power in some cases surpass budgets of some nations. They further observed that the concept of international division of labour have forced all nations, economies and societies to depend on one another due to industrialisation. For example, resources are found in Africa, advanced technology in Europe and cheap labour in Asia (Backhaus, 2003). Therefore, there is currently massive global interdependence.

Georgantzas, Katsamakas, and Solowiej (2010) concurred with this observation about how employers in transnational corporations affect the environments they operate in by influencing the general social life and giving pressure on governments to liberalise the labour market. They argued that as the power of transnational corporations grow with increasing influence in the world market, it affects individual citizens, labour groups and nations lose control in directing labour market policy. For example, Giddens (1990) argued that globalisation through transnational companies growth brought outsourcing and international division of labour led to rearrangement of labour markets globally and caused social unevenness. Employment has considerably grown in areas where jobs go and unemployment and poverty has increased in nations where jobs are outsourced. These developments according to Majaya (2018) have affected Zimbabwe's employment relations that have seen an increase in out-sourcing, labour broking, sub-contracting and part-time employment contracts.

In view of this theoretical proposition, the whole spectrum of employers' influence on labour relations hovers around their massive control of the economy and its drivers. It therefore follows that the interests of employers, investors, transnational companies and international monetary organisations significantly influence the laws that nations promulgate to govern workplace relations. In fact, activities of these players to employment relations through their economic muscle over nation states lead to policy changes that directly affect human way of life across the globe (Georgantzas, Katsamakas, & Solowiej, 2010).

In Zimbabwean, employers influence policy and labour legislation by way of collaborated effort in the Tripartite Negotiating Forum (TNF) through their associations (Mahapa & Bhembe, 2014). To date due to efforts by employers, the TNF has agreed on scrapping off development levy on companies, removal of 2.5% sales tax introduced by government in 1997 and mandated government to create an environment conducive to conduct business by reforming the labour laws, conforming to international standards, and that government pursue policies essential to successes in the global economy and ease of doing business (Kanyenze, 2011).

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In 2015, Zimbabwe adopted more labour market reforms through the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMAsset) after calls from employers and foreign investors to promote ease investment environment. Zimbabwe Government Report (2018) noted that the government has improved business-operating environment, and reduced production cost and developed ease of doing business to boost and attract investment. The government introduced six bills highlighted in Table 3.2 below in support of employers, transnational companies and investors to promote ease of business. Despite these reforms, the World Bank still rate Zimbabwe low on the ease of doing business index, rating it at 159 on the global ranking (World Bank, 2018). Table 3.3 below illustrates the Zimbabwean rankings on World Bank ranking index on ease of doing business.

Table 2: Zimbabwe ease of doing business World Bank ranking per topic

Rankings on Doing Business topics - Zimbabwe
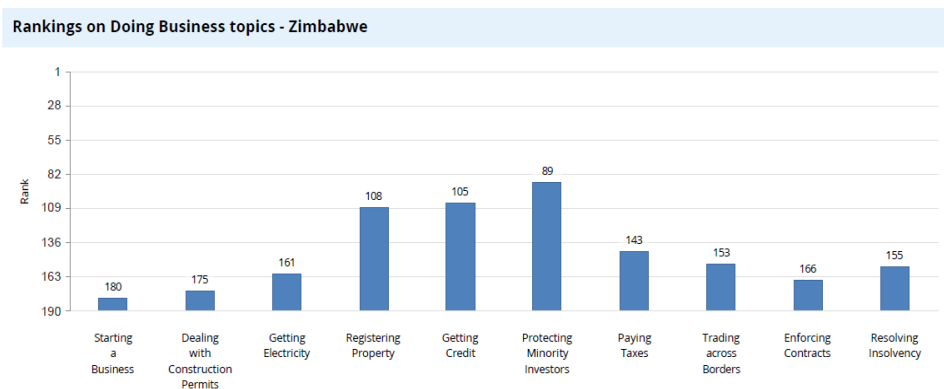
Source: World Bank (2018, p. 2).

According to Besley (2015) the World Bank require nations to make reforms on employment relations policy looking at easiest ways employees can be hired, removal of rigid working hours and protection of investors from lawsuits. The new administration led by President Emmerson Mnangagwa has embarked on improving and liberalising the labour market to lure investment (Chinamasa, 2017). The President has assured transnational companies and investors with the motto, "**Zimbabwe is open for business**" thus possibly igniting unfolding of new developments in the Zimbabwean labour market.

A synopsis of major concepts in view of current developments

In view of extant literature on globalisation and its hallmarks on employment relations in Zimbabwe and the current new political dispensation in Zimbabwe and continuous efforts underway to bring investors in the country for purposes of reindustrialisation, it is palpable that reindustrialisation may come at a cost for the proletariats if pertinent facts are not made clear. If investment is to come to Zimbabwe especially after two decades of economic sanctions from Britain, Europe and the United States, serious strides have to be made by the Mnangagwa administration towards improving the current World Bank rankings on ease of doing business (Davies, 2018). This may mean conceding to some contentious reforms, which may have varying significant effects on the labour market and general lives of employees (Campbell, 2018). Transnational companies and investors have adopted a bystander approach whilst assessing the seriousness of the new Zimbabwean administration in liberalising the labour market (Majaya, 2018).

That said, it is highly probable that as government's attention drift towards putting in place investment friendly policies, which have been accepted worldwide as liberalisation of the labour market, most of the affirmative action policies in workplace democracy, job security, labour laws and collective bargaining that have helped better employee welfare might be stifled. whenever capitalist globalisation takes a central role in directing national policy, it usually ends up with serious deregulation, unjustified capitalist profiteering, and death of unions, unemployment and poverty (Ukpere, 2009). To avoid such consequences, this study derived at two objectives namely (1) identifying current challenges occasioned by globalisation, and (2) proposing possible remedies. The following section provide the methodological steps followed to address these objectives.

This section must comprise referrals to specialized literature, compared against the paper's subject, emphasizing the most important and relevant contributions on which the author will ground his/her argumentation. In the reviewing process there shall be taken into consideration the share of referrals to papers published in international journals recognized by the scientific community. This section must stress the fact that the author is familiar with the knowledge level in the studied area, that he/she has sufficient scientific training, allowing him/her to have a pertinent opinion over the studied issues. (Times, 12)

Research methodology

This study followed a phenomenological enquiry entrenched into an interpretivist paradigm. Data was collected using interviews, researcher field notes and participants memoirs. A sample of fourteen participants selected through a purposive sampling technique and snowballing took part in the study. Research ethics were followed and adhered to. All participants were informed adequately about their rights, purpose of the study and that their identity will be kept confidential. Voluntary informed consent forms were signed between the participant and the researcher. Interviews were semi-structured, and this allowed the participants to freely air their opinions and views whilst at the same time ensuring that the interviews followed a specific guide and standard as defined from the scope of the study and objectives. Transcript of responses were coded and analysed using both electronic data analysis system in form of Nvivo 10 and manual coding. Participants were given code names like *"Ryan"* in order to maintain confidentiality. These are not real participants' names. After data coding, emerging themes were captured and supported by participants' reflections through verbatim quotes. Steps that were followed from data collection to analysis are illustrated in Figure 1 below.
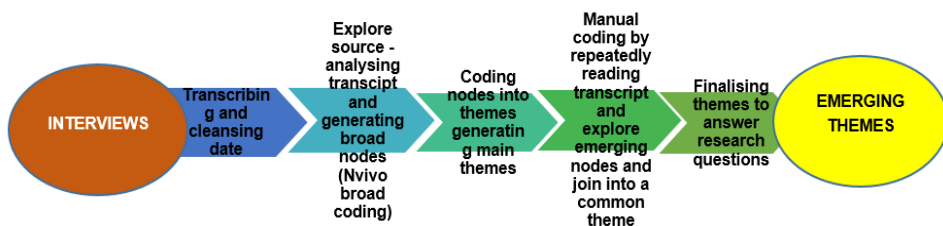
Fig. 2. Steps taken from data collection to analysis

Data presentation and discussion of findings

The objective of this article is to identify challenges posed by globalisation on employment relations in Zimbabwe and propose mechanisms to ameliorate these challenges.

Challenges occasioned by globalisation in Zimbabwean employment relations

Participants' discourses revealed a clear understanding of globalisation and its impact on employment relations as elucidated in Ryan's response who noted, *"We are now looking at the workplace level where we have managers, workers committees and the works council,"* (Ryan, Transcript, 14 July 2019, p.3). Participants identified a number of challenges brought about by globalisation. These were grouped into six themes namely (1) strife between employers and employees (2) dwindling employee participation and democracy (3) employee marginalisation (4) increased disputes (5) general dissatisfaction from both employees and employers (6) disunity among unions and workers.

Increase disputes or strife between employers and employees

Research findings showed that employment relations between employers and employees degenerated into conflict and mistrust. Both parties harbour different interpretations and expectations from developments happening in the global community. The quote by Ray is indicative:

"I would like to believe that the relationship is now complicated. For example, you have employees comparing wages with those in developed world and surrounding countries yet the operating economic environment is different. You take for instances doctors are constantly on industrial job action requesting better condition of work similar to those given to doctors in the region and in stable economies. This has continuously put pressure on employment relations," (Ray, Transcript, 14 July 2019, p. 3).

Another participant highlighted that:

The relations at the workplace were terribly affected. Employers were subjected to massive retrenchment and job losses. Employees and unions embarked in nationwide industrial actions and collective job actions, which became rampant in the late 1990s. Government had to create the retrenchment board to ensure there is sanity. Employees saw employers as cruel whilst employers saw unions and affirmative groups as enemies of business. Law suits between the parties increased like never before as each party tried to put the other to order." (Jacob, Transcript, 27 June 2019, P. 4).

Sachikonye and Raftopoulos (2018) supported these findings and argued that globalisation led to massive changes in work environments resulting in negative effects on employment relations ultimately leading to increased disputes and rise of labour litigations. Mucheche (2017) added that, employment relations were in

tatters, and labour wrangles increased as never before imagined. Research findings further revealed that Zimbabwean work environments have become highly "*volatile and are continuously changing*" (Mary, Transcript 12 April 2019, p 3). In cases where disputes are arising and especially involving technically skilled employees, such employees were reported to be highly prone to turnover by leaving the organisation for better conducive working environments. Jacob noted that, *"Employees are highly mobile and organisation are now required to adopt employee retention strategies and reduce conflicts and disputes at the workplace," (Jacob, Transcript, 27 June 2019, P. 4).*

The findings have been supported by literature as Utpal and Pragya (2014) argued that globalisation has also led to high migration of skilled employees as employees continue to individually develop themselves, attain better skills and have become more informed such that organisations are also changing their strategies to ensure good work relations and conditions of service to retain such rare skills. Indeed, Zimbabwe has lost a substantive number of its skilled workforce as labour migration has become more and more prevalent due to globalisation.

Dwindling employee democracy

The results showed that globalisation has in some instances annihilated employee democracy in some industries or organisations. Emerging practices like labour brooking, subcontracting and part-time contract of employment arrangements have made it impractical for employees to organise themselves and in fact made it impossible for them to enjoy workplace democracy. In this regard, Hatcher (2007, p. 1) argued *"worker freedom have shown little sign of increasing and with globalisation of the workplace the hope of democratic workplaces for many is an unrealised dream".* Research findings agree with literature as evidenced in Mark's response:

"If you look at the relationship, there is a shift currently on this issue of workers committees. In the telecoms industry and Non-Governmental Organisations (NGOs), works councils and employee representations do not matter, in some cases they do not exist. The company in which you are doing an interview now, we do not have a workers committee. There is no need of employee representation. We do not need one. If any they do it at the broker's offices or at the premises of the out-sourced company," (Mark, Transcript, 10 August 2019, p. 4).

Sweeney (2004) postulated that with the arrival of globalisation and its influence in employment relations, workplace democracy is slowly fading away

and its establishment ultimately vanishing in some organisation. Those who are still practising it, employee involvement has become more consultative meetings rather than genuine engagements and collective bargaining processes. One research participate summed it when he said "*Most of the employees we have in industries currently are predominately contract employees on fixed term contracts who do not have job security. They do not participate meaningfully in workplace collective bargaining because they are afraid their contracts may be terminated or that they will soon be out of jobs,*" (Ryan, Transcript, 14 July 2019, p. 2).

Employee marginalisation

Results identified that globalisation initiated unequal employment relations between employers and employees. As a result, the gap between employee power and workers or union power has widened at the disadvantage of the proletariats thereby causing employee marginalisation. Research findings showed that market competition was viewed as an element of globalisation that fuel employee marginalisation in Zimbabwe.

*"When you operate in Zimbabwe, you will be competing with another company operating in China producing similar products. You will find issues of competitiveness in the global market coming into play to influence workplace relations. Chinese companies produce high volumes at a very low cost due to advanced technological machinery. For local companies to survive the global competition, they ignore some employee benefits and welfare to try to reduce costs to reach the competitive edge," (*Mark, Transcript, 10 August 2019, p. 5).

Mary also amplified this finding and noted, *"For example, in the manufacturing industry there is push for wages to go down. The argument is that, the market for products is the same and for Zimbabwean products to be competitive on the global market, cost of labour must go down*," (Mary, Transcript, 12 April 2019, p. 4).

Simon added that, "*Look at the Chinese backyard companies that are here in Zimbabwe. No employee is given protective clothing, they do not have pension schemes, medical services and National Social Security Service is not there. The employees are not protected and their contract of employment is not known. There are no inspections done on such work sites because they are said to be special economic zones, they are not involved in collective bargaining, the employer pays the way he feels. They do not have trade unions or workers committees to represent their interests. Employees are exposed to hazards and disadvantages.*"

Sachikonye and Raftopoulos (2018) pointed out that Zimbabwe suffered economic sanctions and trade global isolation for nearly two decades and with

current move towards engagement and attraction of investors, current organisations are exposed to international competition. With recent engagement efforts to lure the West to invest in Zimbabwe, the labour market has been highly liberalised (Davies, 2017) and Chinese companies have benefited tremendously from declaration of special economic zones. This has seen increased abuse of employees, breach of labour laws, low wages and increased working hours.

Disunity among unions and workers committee

Employment relations among unions and between unions and workers committee members or employees has become one of disunity and conflicts.

You would realise that the relations are strained. Most of the employees we have in industries currently are predominately contract employees on fixed term contracts who are not members of unions in their respective industries. Unions and workers committee members are disjointed. Contract employees do not have job security and in most cases they agree with their employers at workplace level behind the back of the union. (Ryan, Transcript, 14 July 2019, p. 3)

Findings from Mary added that there are now several unions in one industry and many at times unions spent majority of their time in squabbles, in-house fighting and law suits against each other. She noted, *"The ZCTU has been in active politics and there are currently more than 19 splinter unions. Critical issues regarding employee conditions are ignored as rival unions tore each other apart."* (Mary, Transcript 12 April 2019, p. 1).

Chiripanhura and Makwavarara (2000) supported these findings and argued that in as much as globalisation brought workplace democracy in Zimbabwe, it also entrenched continued weakening of union power. Kanyenze (2011) added that Zimbabwe now have two mother unions Zimbabwe Congress of Trade Unions (ZCTU) and Zimbabwe Federation of Trade Unions (ZFTU) and these unions struggle along political lines a scenario that has compromised employee representation and weakened union power. Subsequently, there has also been existence of several unions in each industry and these small unions are aligned either to the ZCTU or ZFTU and they do not collaborate or supplement each other but rather struggle for membership and are premised on outwitting one another (Sachikonye & Raftopoulos, 2018). This infighting has made trade unionism in Zimbabwe weak and their voice unworthy. The employees at workplace level no longer take their unions seriously as much time is spent in political unionism bickering than employee representation.

General dissatisfaction from both parties

When asked, **"***Are employers and employees satisfied with the current labour relations environment in Zimbabwe in wake of globalisation?"* responses showed that both employers and employees are dissatisfied. There is general dissatisfaction and perhaps frustrations, the following quotes were used to describe the participants' perceptions:

- *It is very difficult to say satisfied because the antagonism is still there. Clashes are going to continue and with the current economic challenges in Zimbabwe I would say no one is satisfied,* (Jacob, Transcript, 27 June 2019, p. 4).

- *Both parties are not satisfied. Employers think the current labour relations favour employees while employees feel that it favours the employer (Lucia, Journal, 10 September 2019, p. 3).*

- *Both parties are not satisfied as they accuse the labour regulations for several shortfalls* (Ben, Transcript, 12 April 2019, p. 3).

- *I do not think both parties are satisfied (Patience, Transcript, 8 May 2019, p. 3).*

- *Employers and employees are not satisfied (Sarah, Transcript, 15 September 2019, p. 3).*

- *It is not satisfying in any way (Simon, Transcript, 12 May 2019, p. 4.)*

- *On production terms there is satisfaction but legally and on relations concepts I would say no (Ray, Transcript, 14 July 2019, p. 3).*

- *I think the satisfaction is more inclined to the employer (Mark, Transcript, 10 August 2019, p. 5).*

The prevalence of dissatisfaction from both employers and employees is best explained in literature by the single causal logic theory of globalisation. Fredman (2005) argued that employees have factors arising from globalisation that cause dissatisfaction namely poor wages, non-provisions of employee democracy, long working hours, poor contracts of employment among others. At the other hand, employers are dissatisfied with issues of employee rights like high involvement of unions/workers committee in decision making, right to industrial action or strict legislations in retrenchment and employee conditions of service.

With these barrage of challenges and general dissatisfaction of parties with the labour relations environment in Zimbabwe, it is imperative that possible remedial mechanisms be proposed as outlined below to improve workplace relations

Mechanism to address challenges of globalisation

Research findings came up with four mechanisms to address the challenges of globalisation namely, (1) contextualisation of globalisation, (2) training and education, (3) employee involvement, and (4) dialogue and communication were identified.

Contextualisation of globalisation

The need to put globalisation into context was significantly popular with interviewees. Practices from developed communities, Investors, transnational corporations and recommendations from ILO conventions and International Monetary Institutions should be in sync and harmony with local laws, values and norms. One research participant noted "*Globalisation is now dominant but we need to contextualise it within the environment in which the parties live in, that is the workplace. If you take the concepts being ushered by globalisation in its totality there will be conflict and to mitigate these conflicts there should be effective engagement*," (Patience, Transcript, 8 May 2019, p. 4).

Legislative responsibility of government was identified as a central component in ensuring promulgation of laws that bring globalisation into context and in line with local requirements. *"Government should correctly interpret global trends and not to put unnecessary pressure on employers and employees*" (Ray, Transcript, 14 July 2019, p. 4). Further findings were that the Labour Act should cover majority of aspects that are imported through globalisation, for example, Special economic Zones, Outsourcing/labour broking, maternity leave, Small to Medium Enterprises (SMEs) and informal businesses. Hence, *"Each and every legal framework should be assessed in its totality and the Labour Act should speak to each policy whether it is a borrowed concept or domestic policy, (Ryan, Transcript, 14 July 2019, p. 5)"*.

Workplace policies in Human Resources Management (HRM) particularly those in transnational corporations require to be in line with local laws. Jacob, an interviewee who works for a transnational company noted that, in his organisation they have desisted from forcing HRM policies on companies, instead, they have encouraged blending of the policies with local laws. Findings encouraged employers to implement management tools like total quality management to balance the needs of the company through (1) efficiency, (2) quality products, (3) avoiding reworks, (3) avoid unnecessary expenses like injuries, and (4) desist from trying to achieve global competitive edge by reducing employees' wages and conditions of service.

Training and education

Participants generally agreed that investment and effort should be put both at organisational and national level to train employees and employers on globalisation and its challenges. Findings showed that employers have implemented a number of training methods including exposing employees to global trends through conferences, exchange programs with sister companies in transnational corporations, in-house training, recruitment of immigrants, skills development to equip employees to adapt to technological changes and avail reading materials like policies, newsletter and pamphlets.

According to one participant, trade unions "*rolled out training exercises across the country working together with employers to educate employees and managers on globalisation,*" (Ryan, Transcript, 14 July 2019, p. 5). Results proved that the unions have invested much on educating what globalisation is, the import of labour market flexibility, casualisation of labour, fixed term contracts and labour broking. However, unions felt this is not enough and noted that the government can do more by embracing globalisation and sharing information with unions and employers.

Involving employees

The involvement of employees in decision making and devising of solution to address challenges of globalisation stood out as a critical method in achieving workplace harmony. Kuda one of the research participants and a president of one of the leading labour movements in Zimbabwe noted, *"This concept influenced co-determination in Germany where employees were encouraged to come up with solutions to problems."* The following quote from Jacob illuminated the concept of employee involvement:

"We also use high level employee involvement. We have taught our employees and worker representatives that they should not always come with a list of problems, but for each problem that they raise to management they should put down their proposed solutions which should be in line with business values and principles," (Jacob, Transcript, 27 June 2019, p. 4).

There is need for employers to be sincere in their approach and implementation of employee involvement and participation programs. Brione and Nicholson (2012) citing Pateman (1970) came up with three forms of participation namely (1) full participation, (2) partial participation, or (3) pseudo participation. It is strongly recommended that effort should be put in moving towards full participation rather than window dressing forms of employee involvement.

Dialogue and communication

Multiple respondents viewed dialogue and communication as a critical strategy that can be used to address challenges of globalisation. *"My view which I still hold up to now, is that, negotiations is the only key to a common solution and for the common good,"* (Kuda, Transcript, 12 June 2019, p. 4). Study results identified three levels of engagement where negotiations can be conducted in order to deal with globalisation and its impact on employment relations.

- National level negotiations in the Tripartite Negotiating Forum (TNF)
- Industry level negotiations in the National Employment Council
- Workplace level negotiations in the works council

In the Tripartite Negotiating Forum (TNF), employers' associations, unions and government join up in purposeful dialogue and there is an opportunity to address vast issues affecting employment relations namely establishment of national social security and amendments to the Labour Act. Ryan noted that the TNF is vital in giving direction to the national policies regarding labour administration and that all social partners should be involved in policy formulation to ensure each party's concerns are covered. He noted:

"When we talk of industrial relations we are talking of partnership between government, labour and business. If government think of coming up with policies and new laws, there should be extensive engagement with unions and business," (Ryan, Transcript, 14 July 2019, p. 5).

TNF is highly influential in social dialogue and findings strongly recommended the social partners to legalise the TNF through an enactment of Parliament so that its decision become legally binding on the parties.

However, one respondent (Kuda) although he was agreeable to the importance of the TNF and its role in social dialogue at national level, he was opposed to its legislation to become a legal board. He noted, "*Contrary to my view, they are setting it before parliament. My view is that you cannot legislate love in order for people to love one another. You educate people to live by love of one another"* (Kuda, Transcript, 12 June 2019, p. 4).

Regarding industry level negotiations, findings showed that National Employment Councils (NECs) are involved in setting conditions of service and codes of conduct for their respective industries and agreements are published through Collective Bargaining Agreements(CBAs). For example, in addressing the challenge of casualisation of labour and fixed-term contracts the NEC for Food Industry, "*...entered into an agreement with employers to have employees who will*

*have worked for a year and above to be engaged on permanent basis," (*Ryan, Transcript, 14 July 2019, p. 5). Research participants noted that CBAs should always be compatible with the Labour Act and national policy. The Ministry responsible for Labour Administration verify and ratify the agreements to ensure compliance with national laws and policies.

At the workplace level, it was observed that policy communications and feedback are carried out in the works council through dialogue between management and workers committee members. Each party's interests are shared in the works council through negotiations in good faith and the parties are able to work out their differences. Effective communication was identified to be of great importance in making employees and employers understand each other's side of the story before implementing any changes inspired by globalisation. Ray, an interviewee and Human Resources Officer shared his experiences through an interview extract below on how his organisation had managed to handle changes brought in by technology using communication and engagement with employees.

Interviewer: At the workplace level, what do you think the employer and employees should do to address challenges of globalisation?

Ray

The problem with employees is that of high expectations. Employees should be made to moderate their expectations considering the capacity of their companies through effective communication by management. For employers as they adopt new trends of technology or changes in the organisation it should not come as a surprise to employees. Communication and collective action is the only way to go if there is to be successful managing of challenges posed by globalisation.

Interviewer: From your previous experience, either as an individual or in practice, what strategies have you implemented to address the challenges posed by globalisation in the area of employment relations.

Ray

We have introduced artificial intelligence in our automation systems such that our employees are well informed and educated on the new changes and those affected were advised well in time. Even when we introduced the biometrics system, we engaged employees and informed them on how the new system works. The process saw the retrenchment of human resources clerks and we advised them and gave them enough time to prepare. We informed them of these developments before implementation.

Fig. 3. Field work, participant's response
Source: Author's Fieldwork *(Ray, Transcript, 14 July 2019, p. 4)*

The findings showed that collaborated effort and in-depth dialoguing and communication between the parties to the employment relations system is essential in addressing challenges of globalisation at the workplace level.

Recommendations

Globalisation has become a dominant issue in work organisation and quite unpopular with employees because of changes it occasioned such as deregulation, liberalisation, and casualization of labour, retrenchments, downsizing, rightsizing, mergers and acquisitions. As such, the below recommendations are necessary to assist Zimbabwean organisations, investors and their managers to develop better human resources policies and organisational strategies that addresses challenges posed by globalisation.

Willingness to build a collaborative labour relations culture

There is need for employers and employees to constantly assess the challenges posed by globalisation in Zimbabwe and make organisational introspections regarding the nature of employment relations prevailing at their respective workplaces. It is pertinent to figure out whether the existing employment relations in an organisation is one that is predominately of strife or collaboration with workers. The burden regarding the nature of labour relations prevailing in any organisation rests to a greater extent on the shoulders of the managers as they are the ones who design workplace policies, procedures and human resources manuals.

Unions and employees just like their employers are also accountable for the ensuing employment relations culture at their respective workplaces. In fact, each work environment face different challenges and there is no single prescription in dealing with such challenges. Both employers and employees should be committed in building a positive employment relations culture through collective bargaining, dialoguing and mutual communication of issues of interest.

Institutionalise industrial democracy at all workplaces

Each Zimbabwean workplace should have basics that build the main ethos of a sound labour relations environment by affording employee participation through workers committees, collective bargaining, and involving employees in discussing challenges posed by globalisation and collectively work with them to find solutions. For example, it is not only unfair but unethical for employees to become aware after a merger has already been completed. Companies in Zimbabwe that are

involved with outsourcing, labour brokering and those in special economic zones should at least afford employees basic rights like employee representation through workers committees in order to ensure that employee concerns reach management.

Workplace democracy is a fundamental employee right, which regardless of whether an organisation operates under a special economic zone, uses outsourcing or not, such global rights are absolute to the extent that an employee should enjoy them. According to the Zimbabwean Labour Act, employees should be able to advise their employers regarding unsafe workplaces, health threatening work environments and any other work-related issues that affect them through a workers committee. The Zimbabwean government through the Ministry of Labour should therefore investigate these emerging issues and ensure that all workplaces in Zimbabwe comply with the basic dictates of the Labour Act.

A need to put globalisation factors into context

It is imperative for employers, employees and trade unions to identify and understand the effects of globalisation at workplace level in the Zimbabwean context. Employers should desist from coping and pasting developments in the global community through imposing policies that adversely affect employees' welfare without prior information or education on such policies. Rather, consultative efforts should be done, the pros and cons of such new ventures identified and employees should be informed of such major changes to ensure that all contexture effects are assessed.

Similarly, Zimbabwe as a country should not blindly implement recommendations coming from the globalisers without projecting possible impact on labour relations and perhaps the misalignment of such new prescriptions to the Zimbabwean Labour Act. A good example is the establishment of special economic zones, which this study's findings observed that they breach the Labour Act in every respect and lead to employee exploitation. There is need to work towards ensuring that current employees in the Zimbabwean labour market who are not covered by the bulk of the provisions in the Labour Act are incorporated through crafting of new proviso that cover outsourcing, labour brokering, fixed-term and casual contracts in the Zimbabwean Labour Act.

A need for training, education and informed representation from unions/worker representatives rather than radicalism

Globalisation has left a big mark in employment relations by introducing concepts like workplace democracy and worker rights. Similarly it has also

unleashed quite a sophisticated work environment, one with automation, global competition, ease of doing business conditions, investor superiority and dominance of capitalism, which elements have swept off the fit of unions and worker representatives from old school practices of radicalism. This study's findings showed that the challenges occasioned by globalisation on employment relations have pointed to more pronounced adverse effects on employees. Now that, unions and employees in Zimbabwe are well informed of this uneven ground, they should therefore invest in a lot of training and education. Employees and unions need to gather as much information and knowledge as possible on all aspects of interest as they relate with global factors in order to have their facts and arguments right. If they are to stand a better chance in discussing better deals with their employers at the workplace level, they need to create a more informed employee and negotiator. Gone are the days where worker representation was appointed in terms of one's arrogance or antagonism with management. The contemporary work environment requires a more constructively contributing and convincingly arguing employee to negotiate and match with mostly well qualified experienced management team representing employers at the negotiating table.

Government and Ministry responsible for labour administration to carry out employment relations inspections

The government though the Ministry responsible for labour administration need to accelerate its inspection responsibilities on workplaces and not to ultimately delegate these to National Employment Councils (NECs). The Ministry should formulate national standards in workplace democracy and ensure these are followed. Perhaps, punitive measures are required in legislation for those companies or individuals who breach employment relations standards. Serious efforts should be directed to ensuring that workplaces are not perverters of workers marginalisation. The onus rest on government as the regulator of national labour laws to ensure a fair globalisation is attained and achieved in workplace relations.

Conclusion

This article managed to identify that globalisation has brought challenges and changes to Zimbabwean employment relations. The majority of the identified challenges had had massive effects on employees as compared to their impact on employers. Generally, both employers and employees reported unhappy with the current employment relations. The study identified mitigating factors that can help

to ameliorate the adverse impact of globalisation on employment relations. Lastly, the study proffered recommendations that need to be considered in an effort to address challenges posed by globalisation.

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THE EFFECT OF SPIRITUALITY ON ISLAMIC LEADERSHIP EFFECTIVENESS

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Abstract
Islamic studies have sparked a lot of interests among different cultural backgrounds and no longer foreign to the world community. Among issues that have gained attention among scholars was spirituality from the Islamic standpoint. Therefore, this study attempts to explore the connection between Islamic spirituality (belief, rituals and repentance) and its influence on Islamic leadership effectiveness. The study contributes to the new knowledge

pertaining to Islamic leadership in management by integrating the Islamic tradition with contemporary literature whereby Islamic spirituality constructs were developed from the Islamic tradition sources that correspond to leadership studies from contemporary literature. Using a purposive sampling of non-probability technique, the survey data used for this empirical research was drawn from Muslim employees working in uniform bodies in Sarawak, Malaysia. Most of the respondents hailed from support group scheme of service and there are three uniform bodies involved in this research namely the Malaysia Royal Customs Department, Malaysia Royal Police and Malaysia Royal Navy. Employing multiple regression analysis and using SPSS and SmartPLS software, the study tests several hypotheses that the components of Islamic spirituality were exerted to have statistically mixed influences on Islamic leadership effectiveness. The study found four out of seven hypotheses were indeed supported. The findings did provide a better understanding of the roles of Islamic spirituality on Islamic leadership effectiveness amongst three uniform bodies in Malaysia.

Keywords: *belief; repentance; ritual; Islamic; leadership effectiveness; Sarawak.*

JEL Classification: D83, Z12, M12

Introduction

Presently, Islamic conception has turned out to be more noticeable in the growth of society and it is no longer become unfamiliar among the world community. In addition, the administration and management created based on the Islamic concept is also becoming more and more popular among civil service around the world. Al-Qardawi (2001) mentioned that among the signs of Islamic reawakening are the number of people who pray in the mosque rising, growing in sales of religious books and the spread of hijab among women. Al-Qardawi (2001) also believed that the reason for these reawakening is due to the publics' spiritual needs in their lives. This has directed to the enthusiasm to learn more about Islamic and in fact, it is shown that the society has the willingness to be governed by Islamic Rules such as the society in Turkey and Morocco (Zandi, Sulaiman, Naysary, & Rashed, The Relationship between Spirituality and Leader's Effectiveness: A Perspective from the Holy Qur'an, 2013a) where the Islamic ruling parties are often voted by the public. The concern of religiosity and spirituality also has been prolonged in the

business setting and workplace (Zandi et al., 2013a). Agreeing to Kouzes and Posner (2012) the development of spirituality, religion and faith in the world of commerce are due to the leader as well the business where they seek for those meaning and higher purpose. In addition, the management discipline is moving towards emerging spirituality and religion into their concern (Kazmi, 2004). Islamic thoughts are very widespread where Khraim, Khraim, Al-Kaidah, and Al-Qurashi (2011) mentioned that Islam guides our life completely since its covers and regulates life in every aspect through the socio-economic system. Since Islam comprehends and covers all facets of life, it undeniably embraces other parts such as in leadership and human spirituality.

Although all the relevant information is shared and taught in the Qur'an, the literature on leadership from the Islamic viewpoint is still limited. Furthermore, the management principles as introduced by the Prophet Muhammad S.A.W. as well of his leadership should not be gone in implementing management and leadership principles from the Western viewpoint (Shirazi B, Langford DA, & Rowlinson SM, 1996). The management in the organizations also should think of how to establish it to make the organization become more competitive as compared to others as well as becoming more effective and efficient in providing their services. However, in Malaysia, little initiatives have been made in order to enhance civil service. Tjiptoherijanto (2012) stated that in the year 1990 the Malaysian Government declared the date of October 31st as the Civil Service day which is also known as Hari Q or Quality Day in which the purpose is to strengthen the values of quality principles in an organization. Since many researchers' belief that there is still lack of research regarding Islamic perspective in management, thus this research proposes to examine about this problem and explore more about Qur'an way of leadership (Zandi et al., 2013a). On the other hand, the research will also examine the relationship between Islamic spirituality concept (which consists of belief, ritual, and repentance) and the effectiveness of the leadership.

In this research perspective, spirituality is measured from the Islamic standpoint, as a result, it will contribute specifically in the academic area where there is still lack of studies conducted in term of leadership in Islamic perspective. In fact, there is still lacking literature review on leadership effectiveness from Islamic context (Zandi et al., 2013a). In addition, Zandi et al. (2013a) also mentioned that the number of researches in this area conducted in non-western countries is still minimal. Ali and Weir (2005) also identified that the research from the Islamic perspective is still lack and not much of the current study

emphasizing on the topic from an Islamic perspective. Shirazi et al. (1996) on the other hand point up the philosophies of the management as emphasized by the Prophet Muhammad S.A.W. and his way of leadership should not be ignored in adopting the management and leadership principles from the western. It is also supported by Kazmi (2004) who his study stated that the research in Islamic perspective should emphasize for the management to see how this viewpoint could help and offer the new ideas or views to the current management problems. According to Ather and Sobhani (2007), the organization needs the Islamic leadership quality as an important character for its improvements, however, there is still lack of those quality practised by its leaders and human resource. To date, the number of organizations and institutions around the world that using Islamic approach of services has rapidly grown. Zandi et al. (2013a) stated that the Islamic banks, schools and other institutions around the world have grown rapidly as well in western countries.

While in Malaysia, Islamic value policy in public administration has been introduced in 1985 which this value needs to be adapted to produce one identity and unity of public administration in Malaysia (Portal 1 Klik, 2016). Several studies have been carried out in a way of examining the practices of Islamic principals in Malaysian Public Services. Based on a study conducted by Latif (2007), the practices of applying Islamic Principles in ethics of Civil Sectors have successfully decreasing discipline issues. The uniform bodies selected within Kuching area include Malaysia Royal Customs Department, Malaysia Royal Police and Malaysia Royal Navy. To be more specific the research was conducted with uniform bodies in Sarawak concerning on how the leadership effectiveness in the public sector can be measured besides using the existing resources which typically focusing on western theories. Hence, this research also attempts to discover into this issue by investigating the concept of leadership based on Qur'an and examining the relationship between spirituality dimension and leadership effectiveness from the Islamic point of view.

Literature Review
Islamic Leadership Effectiveness

Senam et al (2015) stated that the purpose of leadership in Islam is to serve and assist the organization members, community as well as the society at large by leading and guiding people to what is good in this world and the Hereafter or in Arabic it is called as Al-Falah. From western scholar, leaders are genuinely

transformational when they increase awareness of what is right, good, and important to their followers, and when they support to raise their followers' need for achievement and self-actualization. Moreover, leaders also will transform when they foster in followers higher moral maturity, and when they move followers to go beyond their self-interest for the good of their group, organization, or society (Bass, 1998).

Therefore, leadership effectiveness can be accomplished when people look beyond their own interest for the good sake of their group, organization and society (Wilmore & Thomas, 2001). This study focuses on Islamic Perspective, therefore, it is essential for us to comprehend several terminologies related to leadership in the Islamic context, the terms that are associated to characterize leadership based on Islamic literature and Muslim scholar are "Al-Khalifah", "Al-Imamah", "Al-Imarah" or "Amir" and "Al-Wilayah" (Abdallah et al., 2019).

Iman (Belief) a Variable under Spirituality

Ibrahim (1997) stated that belief or Iman has provided leaders with an advantage to lead successfully as it provides greater values and Al-Ghazali (2004) in his study on characteristics of a Muslim added that Belief serves to function a harness for wrongdoings. Thus, Iman or belief can be defined as the leader's awareness to Tawhid (Tauhid) which means belief in Allah's S.W.T. attributes that lead the leader to depend on Him, trust Him, seek His help and observed His commands in relation to his work (Nayal Rashed, 2007). An earlier study conducted by Zandi et al. (2013a) has revealed that leaders' level of spirituality will influence the leaders' effectiveness, where one component of spirituality which is leader's Belief or Iman was found to be positively and significantly associated to leadership effectiveness in a business context. Thus, leaders' belief in daily practices and decision making in the workplace will generate internal harmony for reaching stability, precision, and satisfaction in the leaders' sentiments and rationality (Sami & Naveeda, 2021).

Ibadat (Ritual) a Variable under Spirituality

Guidance and leadership in Islam are not limited only to rituals and religious matters because for all Muslim it is a way of life and it is a responsibility for Muslims to ensure all activities including works, business, and economics are obeyed to Islamic principles as specified in the Al-Qur'an and Sunnah (Senam et al., 2015). Thus, in the Qur'an, Allah S.W.T. clearly mentioned in the following

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verses in Surah Al-Imran and Surah Al-An'am that our whole life is devoted to Ibadat (Ritual) and to remember Allah S.W.T. Thus, the positive impact of Islamic leadership in contemporary and modern perspective has also been proven empirically in an earlier study where Islamic leadership can increase organizational performance (Wan Norhayate, Marlisa, & Aizzat, 2014; Zandi et al., 2013a; 2013b). However, other studies have found that Rituals or Ibadat was found to be positive but insignificant correlated to business leadership effectiveness (Zandi et al., 2013a).

Taubat (Repentance) a Variable under Spirituality

Studies conducted by Zandi et al. (2013b) reveal that repentance or Taubat is one of the spirituality components that were found to be negatively and insignificant associated with business leadership effectiveness. In the modern English definition, the word "repentance" can be well-defined as the action of turning from sin and the dedication of self to the amendment of one's life such as to feel regret, sorrow, or "to be sorry". On the other hand, in Islamic and Arabic the repentance is taken from the word "Taaba"/ "Yatoobu" which means "to return". Precisely, Taubat or repentance is denoting to the action of leaving from what Allah has prohibited and returned to what Allah has commanded. It has been proven in Qur'an, where repentance is vital for all human being particularly for Muslims.

Theoretical Background

The theoretical framework shown below was developed based on the discussed literature reviews and adopted from the previous study conducted by Zandi et al. (2013a), Indri (2018), and Ghencea et al. (2020). Therefore, researchers decided to adopt the spirituality dimensions which consist of belief, rituals, and repentance as independent variables that are predicted to influence the Islamic leadership effectiveness. In addition, the ritual and repentance are also predicted to mediate belief towards the Islamic leadership effectiveness among uniform bodies in Sarawak namely Malaysia Royal Customs Department, Malaysia Royal Police and Malaysia Royal Navy. The research framework is shown in Figure 1, followed by seven hypotheses of the study.

H_1: *Belief has a positive influence on repentance.*
H_2: *Belief has a positive influence on rituals.*
H_3: *Belief has a positive influence on Islamic leadership effectiveness.*
H_4: *Repentance has a positive influence on Islamic leadership effectiveness.*

H5: Rituals has a positive influence on Islamic leadership effectiveness.

H6: Belief has a positive influence on Islamic leadership effectiveness mediated by repentance.

H7: Belief has a positive influence on Islamic leadership effectiveness mediated by rituals.
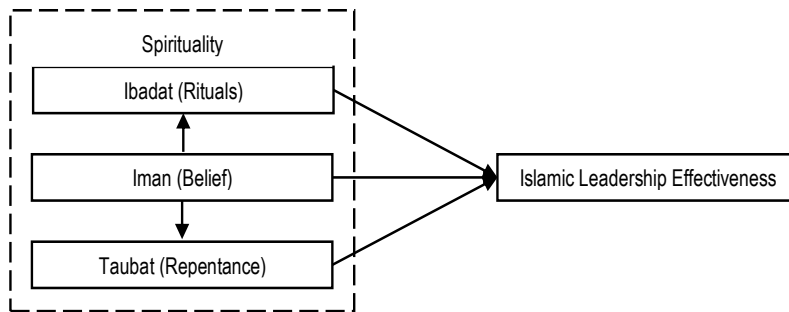
Figure 1. Research Framework

Data and Demarcation

To ensure that the sample characteristics corresponded to the nature of the study, a non-probability purposive sampling technique was adopted to verify that the collected data were indeed from valid sources. For this study, the questionnaire was used as an instrument to gather relevant information from respondents. The questionnaire was divided into three sections; Section A (Demographic profile), Section B (Independent Variables), and Section C (Dependent Variable). The scaling technique required respondents to indicate a degree of disagreement with each series of statements. A Likert 5-point scale was used to differentiate the degree of agreement and disagreement (eg. Rahmawati et al., 2021; Ramadania et al., 2021). The target population for this study is both male and female government servant in the Malaysia Royal Customs Department, Malaysia Royal Police and Malaysia Royal Navy at Kuching, Sarawak. Sample size estimation was determined using G*power 3.0 analysis (Faul et al., 2007). By using G-Power Analysis software, with the effect size of f square 0.15, α error pro 0.05, power Gf 0.95 with 3 tested predictors. 119 respondents are needed as the minimum sample for this study. 300 survey questionnaires were distributed to the target population and 123 survey questions were returned and usable to be further analyzed. Figure 1

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depicted the research framework that contained statements of three variables investigated. The variables were examined using multiple items (Hayduk & Littvay 2012) and the data was then analysed using SmartPLS 3.0 (Ringle et al., 2015) to assess the hypotheses.

Results and Discussion

Respondents' Profile

Below are the demographic profiles of the respondents involved in this study. Most of the respondents were male (58.5%) while female comprises of 41.5 percent, 38.2 percent of them work with Royal Customs, followed by police 35 percent, and Royal Marine in 26.8 percent.

Table 1. Respondents' Profile

Variables	Items	Frequency	(%)
Gender	Male	72	58.5
	Female	51	41.5
Occupation	Jabatan Kastam Diraja Malaysia (JKDM)	47	38.2
	Polis Diraja Malaysia (PDRM)	43	35
	Tentera Laut Diraja Malaysia (TLDM)	33	26.8
Income Level [RM]	1000 or less	1	0.8
	1001 – 2000	21	17.1
	2001 – 3000	48	39
	3001 – 4000	40	32.5
	4001 – 5000	8	6.5
	5001 and above	5	4.1
Education Level	SPM or below	48	39
	Diploma/STPM/Certificate	34	27.6
	Bachelor Degree	39	31.7
	Master Degree	1	0.8
	Doctorate/Ph.D.	1	0.8

More than 71 percent of the respondents earned RM2001-RM4000 monthly. Majority of the respondents had SPM certificates (39%), followed by those who possessed a bachelor's degree (31.7%) and diploma/ STPM (27.6%). The Table 1 shows the detail.

Measurement Model

Table 2 demonstrates the findings of construct reliability (CR) and convergent validity testing. The results verify that the constructs (or variables under investigation) to have high internal consistency (Roldán & Sánchez-Franco, 2012).

Table 2. Measurement Model Assessment

Construct	Item	Loadings	CR	AVE	Convergent Validity (Ave >
Belief	B1	0.891			
	B2	0.864			
	B3	0.895	0.944	0.772	Yes
	B4	0.862			
	B5	0.882			
ILE	B6	0.913			
	B7	0.912			
	B8	0.799	0.939	0.630	Yes
	B9	0.846			
	B10	0.869			
	B11	0.836			
Repentance	B12	0.780			
	B13	0.889	0.890	0.670	Yes
	B14	0.785			
	B15	0.818			
Rituals	C1	0.854			
	C2	0.862			
	C3	0.697			
	C4	0.828			
	C5	0.795	0.946	0.745	Yes
	C6	0.822			
	C7	0.762			
	C8	0.787			
	C9	0.723			

*No item was deleted as loading Composite Reliability > .708 (Hair et al., 2010, & Hair et al., 2014)

From the sufficient average variance extracted (AVE) to corroborate the convergent validity (Hair et al., 2017). There were no items deleted as Cronbach's Alpha and composite reliability were above 0.708 (Hair et al., 2010; 2014).

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Discriminant Validity

Table 3 displays the HTMT criterion to evaluate discriminant validity (Ringle, et al., 2015). The result specifies that discriminant validity is well-established at HTMT0.90 (Gold et al., 2001).

Table 3. HTMT Criterion

	Belief	ILE	Repentance	Rituals
Belief	–			
ILE	0.728	–		
Repentance	0.833	0.873	–	
Rituals	0.746	0.663	0.789	–

Criteria: Discriminant validity is established at HTMT0.90

The findings indicated that it is appropriate to proceed with the structural model assessment to test the hypotheses of the study as there is no issue of multi-collinearity between items loaded on different constructs in the outer model.

Structural Model Assessment

A 5000-bootstrap re-sampling of data is conducted to examine the hypotheses of this study (Hair et al., 2017). Table 4 demonstrates the assessment of the path co-efficient, which is represented by Beta values for each path relationship. The results for direct effects indicate that belief was indeed to have positive influence on repentance and rituals but not on the Islamic leadership effectiveness. Meanwhile, repentance and rituals were shown to be have contradicted results on Islamic leadership effectiveness. Repentance is capable to influence Islamic leadership effectiveness but not rituals. For mediating effects, belief is seen to support the notion of influencing Islamic leadership effectiveness mediated by repentance. Rituals on the other hand do not mediate the relationship between belief and Islamic leadership effectiveness. The findings contradicted with previous study where leader's belief was found to be positively and significantly linked to leadership effectiveness (Zandi et al., 2013a). This study however parallels with Zandi et al. (2013a) that shown repentance has a positive influence on leadership effectiveness.

Table 4 also displays the quality of the model. Belief was shown to carry substantial effect size f^2 on repentance and rituals (H1 and H2). H4 was also found to pose substantial effect size f^2 on Islamic leadership effectiveness (Cohen, 1988). The coefficient of determination represented by R^2 which explains whether spirituality (belief, repentance and rituals) could explain Islamic leadership effectiveness indicates substantial effect (Chin, 1998). Besides, multi-collinearity between indicators is assessed.

Table 4. Path Coefficients and Model Quality Assessment

Direct Effect	Beta	S.E.	t-value	p-value	5.00%	95.00%	Decision	f^2	R^2	VIF	Q^2
H1: Belief -> Repentance	0.737	0.052	14.064	0.000	0.622	0.829	Supported	1.187	0.543	1.000	0.359
H2: Belief -> Rituals	0.698	0.075	9.308	0.000	0.522	0.816	Supported	0.953	0.488	1.000	0.354
H3: Belief -> IFE	0.210	0.138	1.521	0.129	-0.091	0.450	Not Supported	0.046	0.623	2.553	0.377
H4: Repentence -> IFE	0.561	0.090	6.214	0.000	0.374	0.721	Supported	0.326		2.563	
H5: Rituals -> IFE	0.078	0.134	0.580	0.562	-0.143	0.377	Not Supported	0.007		2.288	
Mediating Effect	Beta	S.E.	t-value	p-value	5.00%	95.00%	Decision				
H6: Belief -> Repentence -> IFE	0.414	0.070	5.894	0.000	0.275	0.541	Supported				
H7: Belief -> Rituals -> IFE	0.054	0.092	0.592	0.554	-0.094	0.244	Not Supported				

Path Coefficient 0.01, 0.05 (Hair et al. 2017)

Lateral Collinearity: VIF 3.3 or higher (Diamantopoulos & Sigouw 2006)

$R^2 \geq 0.26$ consider Substantial (Cohen, 1989)

$F^2 \geq 0.26$ consider Substantial (Cohen, 1989)

$Q^2 > 0.00$ consider large (Hair, 2017)

All indicators for variables satisfy the VIF values and there are consistently below the threshold value of 5.0 (Hair et al., 2014) and 3.3 (Diamantopoulos & Siguaw, 2006). Therefore, it can be concluded that collinearity issues do not reach critical levels in any of the variables and is not an issue for the estimation of the PLS path model. The predictive relevance values of all exogenous (independent) variables towards endogenous (dependent) variable were larger than 0, indicating that the independent variables could predict the Islamic leadership effectiveness, as presented by Q^2 using blindfolding procedure (Hair et al., 2017).

Besides that, the researchers also would like to recommend for future research to expand the sample size as to improve the accuracy of the data obtained and it will be more representative where the issues of time constraints are very subjective

because some other researcher will be tied in tough schedule while some are not. Therefore, the extended time frame could be more useful for the researcher to distribute and collect the questionnaire from a large scale of respondents. The researcher would also like to propose other factors that drive leadership effectiveness among Muslim workers such as integrity, responsibility, sincerity, and workers' competency that may lead to an improvement in leadership effectiveness.

Conclusions

In conclusion, most of the respondents from support group scheme of service and there are three uniform bodies involved in this research which are Malaysia Royal Customs Department, Malaysia Royal Police and Malaysia Royal Navy. The Pearson's correlation analysis shows that belief, ritual, and repentance have a positive relationship and high correlation towards leadership effectiveness with Pearson correlation value of 0.678, 0.612, and 0.770 respectively. According to regression analysis, only 62.4% of the variance in the leadership effectiveness has been significantly explained by the Iman (Belief), Ibadah (Rituals), and Taubat (Repentance), Meanwhile, the remaining 37.6% were explained by the other factors that are not included in the module. Standardized coefficients of beta value show that Taubat (Repentance) is the most influenced factor towards the leadership effectiveness of the Muslim workers in uniform bodies.

The result is unexpected because most of the previous studies have mentioned that the Ibadat has negative and insignificant result but in this research, we found that Ibadat also has a positive relationship and significant towards leadership effectiveness as same as Iman and Taubat.

Acknowledgments and Author Contributions Statement

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through this, the generality of the society will benefit from the profit made by the companies and their economic status will increase.

Keywords: *Direct Taxes, Performance, Quoted companies, Company Income Tax, Education Tax.*

JEL Classification: *H_2, H_3*

Introduction

Tax is a compulsory levy imposed on a subject or upon his property by the government to provide security, social amenities and create conditions for the economic well-being of the society (Appah and Oyandonghan, 2011; Appah, 2004; Jhingan, 2004; Bhartia, 2009). Tax is one of the major sources of government revenue, and it has been in existence for several years. The primary economic goal of developing countries like Nigeria is to increase the rate of economic growth and hence the per capita income, which leads to a higher standard of living.

Taxation, as one of the major fiscal policies of the government, is seen as a veritable tool in regulating the economy, enhancing economic growth and providing social amenities for the citizenry. It is therefore one of the basic functions of every modern government to provide an effective and efficient tax system that will help to generate enough revenue to finance its activities.

The relationship between taxation and firm performance has been a subject of various studies. The extent to which taxation affects the performance of companies depends largely on the type of tax being imposed and the sector of the economy in which the firm operates.

In Nigeria, the direct taxes imposed on companies include Company Income Tax (CIT), Petroleum Profit Tax (PPT), Capital Gains Tax (CGT) and Education Tax (ET). Company Income Tax is a tax imposed on the profit of companies while Education Tax is imposed on all companies registered in Nigeria at a rate of 2% of the assessable profit.

since direct taxes paid by these organizations do not have any significant effect on their profitability.

Keyword: *direct taxes; company income tax; education tax; profit after tax; profitability.*

JEL Classification: G00, M10

INTRODUCTION

Every modern state or nation requires a lot of revenue to provide and maintain essential services for its citizens. The responsibility shouldered by the government of any nation, particularly the developing nations, is enormous. The need to fulfil these responsibilities largely depends on the amount of revenue generated by the government through various means. Taxation is one of the oldest means by which the cost of providing essential services for the generality of persons living in a given geographical area is funded. Globally, governments are saddled with the responsibility of providing some basic infrastructures for their citizens. Functions or obligations the government may owe her citizens include but are not restricted to: stabilization of the economy, redistribution of income and provision of services in the form of public goods (Abiola & Asiweh, 2012). These taxes are levied on income, property and goods of individual, households, firms as well as expatriate. Hence, one case says that there are different forms of taxation which are direct and indirect taxation. Direct Taxation is the process of levying taxes on income or capital generated by the factors of production such as land, labour, capital and entrepreneurship (Anyaduba, 1999 as cited in Eyisi 2015). Direct Taxation is usually imposed on individuals and companies. The burden of direct taxation is not usually shift-able. The following aspects of Direct Taxation are currently in force in Nigeria are as follows: Personal Income Taxation; Companies Income Taxation; Petroleum Profit Taxation; Capital Gains Taxation; Education Taxation (Iyoha, 2008).

Indirect Taxation is the one levied on goods and services. It is often levied at a point on a goods or services but the burden may be shifted to whoever it is intended should be the final consumer. The following types of Indirect taxation are currently in firm in Nigeria including: Stamp Duties; Excise Duties; Custom Duties on exports and imports; Mineral Royalties; Casino Taxation; and Value Added Taxation (Jhingan, 2008).

Both direct taxation and indirect taxation are instruments for generating increased government revenue among others and there is need to create and run adequate tax structure for effective and efficient tax administration.

Statement of the Problem: It is really a statement of fact that companies fails to reach their objectives as a result of their inability to meet up with their tax payment. Having realized that taxation is one of the most important sources of revenue for the various tiers of the government and a major way of sourcing financial support to the Nigeria government at large, it is of paramount importance that multiple taxation should be eradicated by the Nigeria government as it leads to the collapse of businesses. Some companies in Nigeria needs tax holiday in order to recoup the money invested in infrastructures so that there will be room to pay dividend to those who invested in them and employ more hands Oji (2019). This study was setup to find the problems that tax have created on some quoted companies. However, literature has not contributed much in exploring the effect of direct tax payment on the financial performance of those companies in developing countries, like Nigeria. This situation raises a serious concern about the issue of aligning the tax system to the specific requirements of a particular country's growth need, as it has to balance both shortterm and long-term impact of the policy. This study therefore seeks to examine the effect of the direct taxes on the performance of selected export companies in Nigeria.

Objective of the Study: The general objective of this study was to examine the effect of direct taxes on the performance of selected export companies in Nigeria. However, the specific objectives are to:

i. Evaluate the effect of company income taxes on the profit after tax of selected export companies in Nigeria. ii. Ascertain the relationship between education taxes and profit after tax of selected export companies in Nigeria.
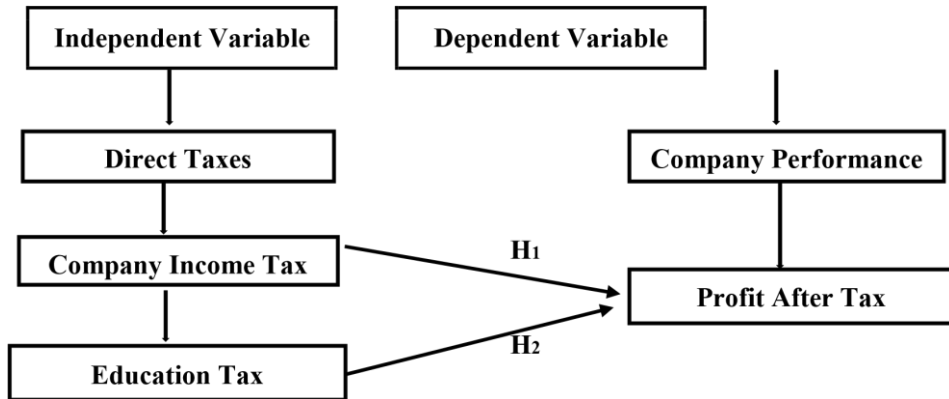
Statement of Hypotheses: For the purpose of this study, the following hypothesis stated in their null form were tested.

H_{01}: Company income taxes has no effect on profit after tax.

H_{02}: There is no significant relationship between education tax and profit after tax.

LITERATURE REVIEW Fig. 1 Conceptual Framework

Concept of Tax

Tax is a compulsory contribution imposed upon persons and firms by a public authority to cover government expenses (Attamah, 2004 in Yahaya and Bakare 2018). Attamah opined that tax is a good source of revenue to government, as it is regularly imposed annually or as government thinks fit. He affirmed that income from taxes on people and firms play critical roles in any nation's economic growth and development. According to Udabah (2014), tax is an obligatory transfer from tax payers to the public authority. The Institute of Chartered Accountants of Nigeria (2014) and the Chartered Institute of Taxation of Nigeria (2002) defined tax as an enforced contribution of money to government pursuant to a defined authorized legislation. New Webster Dictionary also defines it as a charge imposed by government authority upon property, individuals or transactions to raise money for public purposes.

Company Income Tax

This is a tax on the profit companies usually, allowance is made for capital expenditure before calculating taxable profit. This tax is also progressive in nature because the higher the income the higher the tax and vice versa. The tax year or Assessment runes from 1st January every year to 31st December the same year. Company income tax is payable to the federal inland revenue service, a government department that is charged with assessment and collection of the company's income tax. (Okauru 2015). The law required that every company taxed

under CITA must file returns every year to the Board of Inland Revenue. These returns must be in a prescribed form. Information to be field which include a complete form declaring the income of the company, the audited financial statements of the company for the relevant year of assessment, income tax and capital allowance computation, a self-assessment of tax liability of the company. There must be a federation signed by a directed or secretary of the company stating that the information contained in the returns made, and the profits stated are correct and returns must be made within six months after the end of the company's accounting year. The company income tax rate has varied over the years depending on the appropriation bill as passed to date and it is fixed to be 30% on the annual profit of a corporation.

Education Tax

Education tax is the kind of tax imposed on all companies incorporated in Nigeria. This tax is viewed as a social obligation placed on all companies in ensuring that they contribute their own quota in developing educational facilities in the country. The tax usually charged as 2% of accessible profits of the companies. All the companies subject to company income tax (CIT) are also liable to education tax (EDT) (Abata 2014). Tertiary Education tax is imposed on every Nigerian resident company at the rate of 2% of the assessable profit for each year of assessment. The tax is payable within two months of an assessment notice from the FIRS. In practice, many companies pay the tax on a self-assessment basis along with their company income tax.

Educational tax is also prepared and submitted with annual self-assessment of company's income tax to designated banks. (Ababa 2014)

Corporate Performance

Successful firms represent a key ingredient for developing nations. Many economists consider them similar to an engine in determining their economic, social, and political development. To survive in a competitive business environment, every firm should operate in conditions of performance. Definitions of this concept may be abstract, or general, less or clearly defined. Omar and Zineb (2019). Organizational performance, according to Cho and Dansereau (2016), refers to the performance of a company as compared to its goals and objectives. In addition, Tomal and Jones (2015) define organizational performance as the actual results or output of an organization as measured against that organization's intended outputs. The effectiveness of an organization consists in the efficiency of

each of its individual employees; thus, employee performance can be defined, in part, as a function of leadership (Mastrangelo, Eddy & Lorenzet, 2014). According to Mastrangelo et al. (2014), competent leaders influence their followers.

Profit after Tax

Profitability depends on the ability of a firm to generate revenue which is capable of absorbing all expenses, including tax and then leave a balance that could be pooled back into the business for expansion. Peavier (2012) in Cordelia and Amah (2018) defined profitability as the organizational performance indicator which reveals the return on sales and return on investment. Profit after tax is the net amount earned by a business after all tax expenses have been deducted (Ezegwu & Akubo, 2014). In conclusion, when businesses make profit and pay little taxes, they will have enough fund to re-invest and expand. By so doing more employment opportunities spring up and the economy of the country improves. The reverse becomes the case when tax rates are high and there are not adequate tax incentives to reduce the tax burden on firms (Hammed 2018).

Theoretical Review

- **Deterrence Theory:** The classical school of thought based its reasoning on deterrence theory to explain why people may not want to comply with tax regulations. This represents economists' initial attempt to gain an understanding of tax compliance. This theory is based on economic analysis of maximizing the perceived gains of tax evasion, encouraged by the fact that they were not caught to serve as deterrence to others. Whereas psychological factors may equally exert some influence, the classical school of thought is based on deterrence theory which states that tax payer is assumed to maximize the expected utilities of the tax evasion gamble, tax evaders weigh the benefits of tax evasion against the possibility of being caught and punished by tax authorities (Alabede, 2011). This simply means the more inefficient and porous the tax administration is, the greater the level of tax evasion and the lesser the amount of revenue collected.

- **Benefit Received Theory:** This theory proceeds on the assumption that there is basically an exchange relationship between tax-payers and the state. This theory will help explain the reason tax payer evade tax, whether it is as a result of no benefit derived in return for tax paid or not (Igbasan, 2017). The benefit received theory of taxation asserts that households and businesses should purchase the goods and services of government in basically the same manner in which other

commodities are bought. It follows the same principle as the market. The individuals who receive the benefit of a good or service should pay the tax necessary to supply that good or service. For example, gasoline taxes are typically earmarked for the financing of highway construction and repairs. Those who benefit from good roads pay the cost of those roads.

- **Responsive Regulation Theory:** Responsive regulation theory entails administration of determinate law by officials who tailor their regulatory behaviour according to the compliance posture adopted by individuals subjected to the relevant law. The hallmark of responsive regulation is the pursuit of cooperation by the regulate with the regulator Abata, (2014). Regulatory pyramids offer the advantage of handing tax officers a set of tools that can be applied without having to have a detailed understanding of why non-compliance has occurred. One starts with the expectation of co-operation; escalation on the pyramid occurs only when one sees the other defaulting and becoming non-co-operative (Okauru, 2015).

Empirical Review

Ezugwu and Akubo (2014) did an empirical study on the effect of high corporate tax rate on the profitability of corporate organizations in Nigeria. The study employed causal research design and multi-regression statistical tool. The population used comprised 45 corporate organizations in Lagos while the sample size was 41. The secondary data employed was collected from the Federal Inland Revenue Services (FIRS). The data analysis was done with the aid of Statistical Package for Social Sciences (SPSS version 17) and it was found, a positive relationship between corporate tax rate and realized profit of companies. It was therefore recommended that the Nigerian Corporate tax rate of 30% should be reduced to avoid negative economic effects in the Country. Chude and Chude (2015) studied the impact of company income taxation on the profitability of companies in Nigeria using Brewery Industry as a case study. The research employed secondary data on all the variables. All data were obtained from the published financial statements of the Brewery Companies. The Augmented Dickey-Fuller (ADF) unit-root test was carried out to test the effect of CIT on EPS at 5% level of significance. The result indicated the existence of a longrun equilibrium relationship and a positive significant impact of CIT on the EPS (P-Value 0.000 < 0.05). The study concluded that CIT affects the profitability of Nigerian Breweries significantly and recommended more improvement on tax administration.

Oladele and Agbaje (2017) examined the impact of corporate taxes on performance of selected companies quoted on the Nigerian Stock Exchange (NSE)

in Nigeria. Secondary data obtained from the annual reports of fifteen selected manufacturing companies listed on the NSE, covering six years 2010-2015, from fact-book. Data sourced were analyzed using Correlation and Regression analysis; with the aid of E-view econometrics package. Study confirmed existence of significant relationship between corporate tax and performance of manufacturing companies in Nigeria. Also, a high corporate tax rate could impair profits; thereby distorting investment decision. It is recommended that, more incentives be given to manufacturing companies especially during this era of campaign for use of made in Nigeria goods.

Nekasa, Namusouge and Makokha (2017) employed a mixed research design to evaluate the effect of corporate income tax on financial performance of companies listed on the Nairobi Securities Exchange (NSE) in Kenya. A Sample of 59 out of a target population of 69 companies publicly listed companies in 2015 was extracted from the NSE website. The secondary data were obtained from the NSE data base, Capital Markets Authority (CMA) database, journals and other publications. The regression result revealed that corporate income tax had significant positive influence on financial performance of companies listed on the NSE in Kenya. The study supported the view that corporate income tax has a significant effect on financial performance and encouraged policies that could ensure that firms promptly pay their corporate taxes to the government.

Olaoye and Alade (2019). examined the effect of corporate taxation on the profitability of some selected firms in Nigeria from 2007 to 2016 using secondary data which was sourced from various publications of the firms' financial report. The study employed pooled ordinary least square as the estimation technique. The analytical results revealed that the coefficient of corporate tax on profit after tax was positive with the value of 2.418830 and its P-values were 0.0000, the coefficient of value-added tax was 14.51298 and its p-value was 0.0000. Equally, the coefficient of withholding tax was positive with the value of 7.256489 with p-value 0.0000. Furthermore, education tax result depicts that the coefficient is 36.28245 and it p-value is 0.0000. However, the study concluded that corporate tax rate and education tax as the major taxes paid by companies have positive and significant effects to influence profit after tax. It is also clinched that value-added tax rate and withholding tax being used as other variables that could have effects on profit after tax equally revealed positive and significant effects on profit after tax. Therefore, the study recommended that the government and relevant tax authorities should improve in the administration of corporate taxes to avoid non-compliance.

METHODOLOGY

Research Design: The research design used for the purpose of this study was non-experimental research design because it helps to determine whether any relationship exist between direct tax and profitability of selected quoted companies in Nigeria.

Data Collection, Instrument and Data Analysis: The relevant information used for the data analysis were collected from the audited statement (secondary data) of the selected companies between 2009 and 2018 to determine the effect of direct taxes on the profitability of quoted companies in Nigeria. The instrument used to gather information for the study are from the internet, relevant journals and audited report of the selected quoted companies in Nigeria, for the period under review. Data collected from secondary sources of audited financial statement of the selected export companies in Nigeria were analysed from panel data using regression analysis from E-view. **Model Specification:** The functional form of a simple linear regression model adopted in this study is given by; y = f(x). To capture the first objective, the explicit form of the finance was adopted as:

$$PAT = \beta 0 + \beta 1 CIT + \mu \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ i$$
$$PAT = \beta 0 + \beta 2 EDT + \mu \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots ii$$

Where;

PAT = Companies' performance (Dependent variable) Profit after tax. CIT = Direct taxes (Independent variable) Company income tax.

EDT = Direct taxes (Independent variable) Education tax. B_0, β_1 = Estimated coefficients of the explanatory variables. μ_1 = Error term.

DATA PRESENTATION AND ANALYSIS

The mean of the data at profit after tax (23415154), company income tax (3165423.), education tax (430482.3) while the standard deviation of the data was profit after tax (32994000), Company Income Tax (3363465.) Education Tax (282515.5). Jarque-Bera test accept the normality of profit after tax, company income tax and education tax at 5% and 10%. The test was as depicted by skewness and kurtosis of the data.

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Descriptive Statistic

	PAT	CIT	ET
Mean	23415154	3165423.	430482.3
Median	15755020	2115808.	344845.0
Maximum	1.84E+08	13741050	1259600.
Minimum	1373400.	146405.0	5986.000
Std. Dev.	32994000	3363465.	282515.5
Skewness	4.010985	1.517450	1.224232
Kurtosis	20.04520	4.703746	4.047760
Jarque-Bera	443.6137	15.14171	8.865976
Probability	0.000000	0.000515	0.011879
Sum	7.02E+08	94962690	12914469
Sum Sq. Dev.	3.16E+16	3.28E+14	2.31E+12
Observations	**30**	**30**	**30**

Testing of the Hypotheses Test of Hypothesis I
H0₁: Company income taxes has no effect on profit after tax
Dependent Variable: PAT
Method: Least Squares
Date: 08/06/21   Time: 19:51
Sample: 1 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23855369	8485481.	2.811316	0.0089
CIT	-0.139070		-0.075025	0.9407
1.853640				

Included observations: 30			
F-statistic	0.005629	Durbin-Watson stat	1.677936
Prob(F-statistic)	0.940728		

Source: Researcher's Co mputation through E   -views (2021)

Test of Hypothesis II

R-squared   0.000201   Mean dependent var   23415154 **H₀₁:** There is
no significant   relationship   between

education tax and profit after
Adjusted R-squared   -0.035506   S.D.   dependent   var

329
940 00 tax.
S.E. of regression   33574635   Akaike info criterion 37.56078
Dependent Variable: PAT
Sum squared resid   3.16E+16   Schwarz criterion   37.65419

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Log likelihood -561.4117   Hannan-Quinn criter. 37.59066 Method: Least Squares

Date: 08/06/21 Time: 07:44
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error Statistic	t-	Prob.
C	19920404	11279796 1.766025		0.0883
ET	8.118219	22.01719	0.368722	0.7151

R-squared	0.004832	Mean dependent var	23415154
Adjusted R-squared	-0.030710	S.D. dependent var	32994000
S.E. of regression	33496785	Akaike info criterion	37.55614
Sum squared resid	3.14E+16	Schwarz criterion	37.64955
Log likelihood	-561.3421	Hannan-Quinn criter.	37.58602
F-statistic	0.135956	Durbin-Watson stat	1.671110
Prob(F-statistic)	0.715108		

Source: Researcher's Computation through E   -views (2021)

DISCUSSION OF FINDINGS
The result from the regression equations shown in hypothesis I table. The equation Profit after tax was dependent variable, while company income tax was the independent variable. For the model, the F-value which was insignificant at 5% level, which indicates that the model suffers from specification bias. However, from the first model, the coefficient of determination (R^2) indicates that about 0.0% of change in company income tax was accounted for by the explanatory variable

while the adjusted R-squared of -0.04% further justifies this effect. Thus, the explanatory power of the model was low and appears to suggest that the included variable was not a predictor of profit after tax. Adjusted R-squared being very close to the R-squared implies that there was higher penalty for irrelevant variable in the model. F-statistic being insignificant implies that the overall goodness of fit of the model was not satisfactory.

The hypothesis II table above shows the relationship between education tax and profit after tax of companies. The equation profit after tax was dependent variable, while education tax was the independent variable. For the model, the F-value which was not significant at 5% level indicates that the models suffer from specification bias. However, from hypotheses two, the coefficient of determination (R^2) indicates that about 0.4% of change in education tax was accounted for by the explanatory variable which was profit after tax, while the adjusted R-squared of -0.3% further justifies the effect of education tax on profit after tax. Thus, the explanatory power of the model was low and appears to suggest that the included variable was not a predictor of profit after tax. Adjusted R-squared being very close to the R-squared implies that there was higher penalty for irrelevant variable in the model. F-statistic being insignificant implies that the overall goodness of fit of the model was not satisfactory.

Given that the Prob. values of the two models are greater than 0.05, the null hypothesis was accepted, while the alternative hypotheses were rejected.

CONCLUSION

The study has examined the effect of direct taxes on the performance of export companies in Nigeria. Based on the above findings, it was concluded that there was no significant relationship between direct taxes and the performance of quoted companies in Nigeria.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are hereby presented:

i. There should be stringent penalty imposed on any corporate body who indulge in any form of tax malpractices irrespective of states. So also the companies should be encouraged to carry out more social responsibilities other than paying taxes, since direct taxes paid by these organizations do not have any significant effect on their profitability.

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ii. Government should also be able to use taxpayers' monies in the provision of infrastructural facilities and an enabling business environment, this will in no doubt boost the morale of the organizations to pay more. Staff that work with the Tax Authorities should be adequately motivated in order to enhance revenue generation and improve the percentage of tax revenue to GDP which will encourage more investors to invest in the economy. iii. Tax administrators should carry out their duties more efficiently with the most care and integrity as this will help combat issues such as multiple taxes levied on export companies in Nigeria.

iii. Tax administrators should improve their support services towards export companies and they should be educated on issues such as taxes they are expected to pay and the incentives and exemptions they are eligible for.

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