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in cooperation with
GOVCOPP - University of Aveiro, Portugal
Faculty of Management University of Warsaw
Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat
ENCGT - Ecole Nationale de Commerce et de Gestion de Tanger - Abdelmalek Essaadi University

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109th International Scientific Conference on Economic and Social Development –
„Green Economy & Sustainable Development“

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Editors:
Brian O'Hara, Mustapha Machrafi, Abdelhamid Nechad

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CONTENTS

CONTEXTUAL FACTORS SUPPORTING KNOWLEDGE SHARING IN ENTERPRISES: CONCEPTUALIZATION OF A RESEARCH MODEL

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ABSTRACT

The new millennium brought many challenges for enterprises. Physical resources have become increasingly scarce, while human (intellectual) capital is once again becoming a crucial corporate asset. Efficient management of corporate knowledge requires that additional efforts are invested in knowledge sharing activities, which require planning, organizing and implementing an organizational environment that supports knowledge sharing. After a thorough review of the relevant research on knowledge sharing and its antecedents, this paper proposes a synergistic combination of three contextual factors that support knowledge sharing: Organizational culture, ICT and Top management support. Organisational culture that promotes knowledge sharing includes: a corporate mission statement that emphasizes the importance of knowledge sharing, employee empowerment and continuous learning. Implementing ICT that facilitates knowledge sharing requires investing in ICT for knowledge sharing, using ICT tools to scan and discover new business opportunities in the market, and using ICT to improve communication between employees. Top management support for knowledge sharing requires managers to be open to employees' ideas and suggestions, to develop mutual trust and to mentor employees. The main contribution of this paper is that it provides a new tool for monitoring and evaluating contextual factors relevant to knowledge sharing. Although previous research offers a plethora of antecedents for knowledge sharing, a clear systematization of these factors seems to be lacking. Conceptualizing a research model that describes the contextual factors of knowledge sharing could help both managers and researchers to assess, improve, and further explore the organizational context that supports knowledge sharing.

Keywords: *ICT, knowledge sharing, organizational culture, research model, top management support*

1. INTRODUCTION

At the beginning of the new millennium, the business environment has changed considerably. Enterprises are confronted with a critical shortage of resources, brain drain, negative demographic trends, brain drain, accelerated digitalization and globalization, among others. As human knowledge is the only resource whose value does not decrease but, on the contrary, increases due to spending, it has attracted the attention of the academic community, especially in the field of intellectual capital and knowledge management. Globalization and accelerated digitalization undoubtedly make it necessary to change the modalities for collecting, sharing and using knowledge. In other words, the way enterprises manage their knowledge must change (Ladeg, Chalal, 2022). Accordingly, for enterprises to remain competitive in the knowledge economy, they need to rationally manage and continuously improve their knowledge to maintain and enhance their competitive advantage (Afshar-Jalili, Cooper-Thomas, Fatholahian, 2021). Due to the complexity of the concept of knowledge management (KM), there is no consensus among researchers on the phases of its implementation.

Dalkir (2011), for example, mentions the following KM activities: 1) knowledge generation and/or creation, 2) knowledge sharing and 3) knowledge utilisation. However, most researchers consider knowledge sharing as a central phase of the KM process (Dysvik, Buch, Kuvaas, 2015; Sorakraikitikul, Siengthai, 2014). Knowledge sharing is a two-way process consisting of giving and receiving knowledge. Giving knowledge means voluntarily sharing knowledge and intellectual capital with other employees. Receiving knowledge means voluntarily consulting with other employees, learning from them and encouraging them to share knowledge and intellectual capital (Sorakraikitikul, Siengthai, 2014). Since the concept of knowledge sharing is not the focus of interest in this thesis, but the contextual factors of efficient knowledge sharing, the theoretical analysis will mainly focus on the latter concepts. Nevertheless, it is necessary to understand the complexity of the process of knowledge sharing in order to better perceive the complexity of contextual factors, as these can be detrimental in the implementation of knowledge sharing activities. Knowledge sharing has been studied at the individual, group and organizational levels (Ahmad, Karim, 2019; Perotti, Ferraris, Candelo, Busso, 2021). In this paper, knowledge sharing was examined at the organizational level, based on the principles of the resource-based view of the firm. According to this theory, firms generate value through the synergistic effect of capital, knowledge and organizational capabilities or contextual factors. Although previous research has analyzed the influence of contextual factors that are important for knowledge sharing (Gold, Malhotra, Segars, 2001; Lin, 2007; Donate, Guadamillas, 2011; Suppiah, Sandhu, 2017), there seems to be a lack of consensus on the most influential organizational factors that contribute to successful knowledge sharing. After carefully reviewing the extensive literature on knowledge sharing, this paper proposes a synergistic effect of three contextual factors: organizational culture, ICT, and top management support, which comprise organizational variables that systematically represent the above factors. A measurement scale to assess these factors was developed by combining the existing empirically proven contextual factors for knowledge sharing and variables that indirectly belong to these factors, although the researchers who used them did not explicitly categorize them in this way. The rest of the paper is organized as follows: the second section contains a brief literature review of works dealing with the contextual factors of knowledge sharing. The third section comprises three subsections analyzing organizational culture, ICT and top management support for knowledge sharing. Each of these subsections provides an analytical overview of the factors and the associated measures. The final section contains conclusion.

2. CONTEXTUAL FACTORS ENABLING KNOWLEDGE SHARING: A LITERATURE REVIEW

The authors who studied the KM process defined the following contextual factors that support KM: technology, organisational structure and culture (Gold, Malhotra, Segars, 2001); organisational culture, structure, people, IT and KM processes (Lee, Choi, 2003); organisational support (managerial attitude, training), employee collegiality (teamwork and trust) according to Lu, Lung and Koch (2006); leadership and policy, information system infrastructure and training (Chong, 2006); individual factors (enjoyment of helping others) and organisational factors such as top management support (Lin, 2007); human resource management and ICT (Andreeva, Kianto, 2011), etc. In the research dealing exclusively with knowledge sharing, the following contextual factors have been defined as important for knowledge sharing: top management support, quality of social interactions and availability of information (Tan, Zhao, 2003); organisational culture, structure, people and IT (Lee, Choi, 2003); top management support, organizational rewards and ICT use (Lin, 2007); cultural values, leadership and HRM practises (Donate, Guadamillas, 2011); organisational climate, leadership and trust (Al-Kurdi, El-Haddadeh, Eldabi, 2019).

The abundance of research analysing contextual factors contributing to knowledge sharing has increased the need for systematisation of their internal content and a more transparent description of the variables belonging to each factor. The continuation of this paper provides an in-depth analysis of the missing links in each factor and suggestions for their theoretical improvement.

3. CONCEPTUALIZATION OF ORGANIZATIONAL FACTORS CONTRIBUTING TO EFFICIENT KNOWLEDGE SHARING

Before a theoretical analysis of contextual factors, it is advisable to look at a graphical representation of possible correlations between contextual factors and knowledge sharing. According to Figure 1, organisational culture and ICT are antecedents for knowledge sharing, while top management support is a moderator between antecedents and knowledge sharing. The next section explains the emergence of each factor and its associated variables.

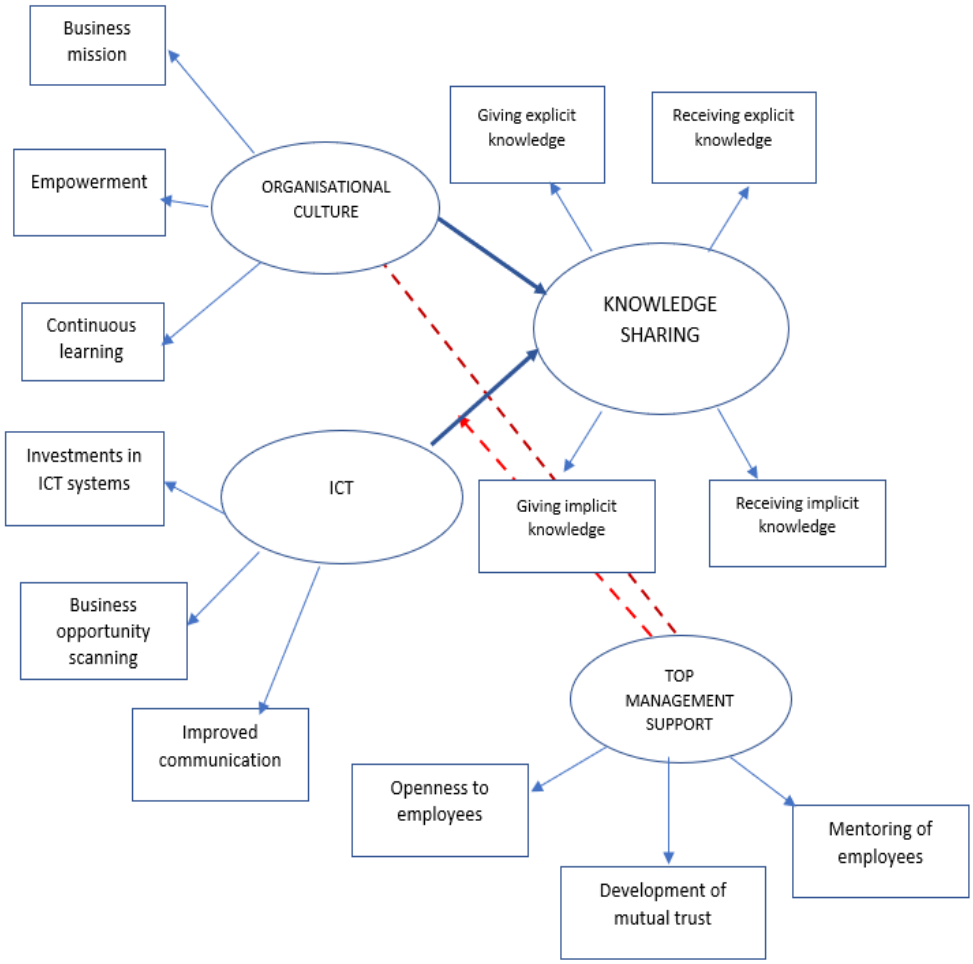

Figure 1: Conceptual model of contextual factors contributing to knowledge sharing (Source: Prepared by the authors)

3.1. Organisational culture

Organisational culture is undoubtedly one of the most important organisational factors contributing to successful knowledge sharing. This is supported by several facts, such as the promotion of community and mutual support, the promotion of fundamental values and principles, the explicit formulation of organisational goals, etc.

Although many researchers explicitly define organisational culture as a relevant factor for knowledge sharing, they combine different variables that measure culture without a clear definition of its categorization. For example, Gold, Malhotra and Segars (2003) mention culture variables related to employee interaction in sharing different perspectives, clear organisational vision, top management support and monitoring of mistakes; Lee and Choi (2003) describe collaboration, trust and learning as the most relevant factors; Vidović (2008) considers open communication, trust, sharing of ideas and innovative suggestions, informal contacts, etc. On the other hand, some authors describe variables that are important for measuring organizational culture, but without explicitly defining them: Bock and Kim (2002) described the intention to share knowledge and the expected contribution to it, with several culture-specific elements; Lu, Lung and Koch (2006) referred to knowledge sharing behaviour and training, also containing several culture-specific elements; Chong (2006) defined the contribution of top management in developing a team spirit among employees in promoting knowledge sharing and empowering employees. It cannot be overlooked that there are many similarities between authors who explicitly name organizational culture and those who define its segments, even if they do not make an explicit correlation between these variables. For example, Bock and Kim (2002) examined employee attitudes toward knowledge sharing and concluded that positive employee attitudes toward knowledge sharing are not sufficient without the support of a strong organisational culture. Since organizational culture is not a one-dimensional concept and considering the classification of organisational cultures described by Oh and Han (2020), namely clan, adhocracy, hierarchy and market cultures, this paper focuses on clan (mutual action, trust and affiliation) and adhocracy (proactive action, creativity, adaptation to the environment) cultures as cultures that support knowledge sharing. In line with the core values of these cultures, this paper particularly highlights corporate mission, empowerment and continuous learning as guiding principles that are directly related to the impact of organisational culture on knowledge sharing. In more recent research on knowledge sharing, the above variables are further investigated. Gooderham et al. (2022) looked at the importance of the corporate mission, that reflects the general corporate values but also includes possible differences in the subcultures of the companies. A mission statement explained in this way ensures acceptance by all employees. Azeem, Ahmed, Haider and Sajjad (2021) concluded that the mission statement must combine values, considerations and work practises that create the environment critical to achieving competitive advantage. Employee empowerment can be defined as a change in the power relationship between employees and their supervisors. This process helps employees to intensify their independence and self-confidence. Van den Berg, Alblas, Blanc and Romme (2022) investigated the effects of structural empowerment at the organisational level. The authors concluded that structural empowerment implies the involvement of employees in the tactical and strategic decision-making level. Consequently, empowering employees helps the organisation to easily adapt to changes in the business environment. Van Baarle, Dolmans, Bobelyn and Romme (2021) suggested in their research that managers need to find a balance between employees who support empowerment and those who resist it in order to achieve the full potential of empowerment. The organisation learns when one of its components learns. Continuous learning requires clearly defined organisational goals, a culture of knowledge sharing and the development of structures that enable continuous learning. By introducing a learning culture and continuous learning, organisations improve their competitive position in the market (Arefin, Hoque, Rasul, 2021). The goal of learning is always to improve, grow and change. After an in-depth analysis of the variables that make up an organisational culture that promotes knowledge sharing, the following points were defined (Table 1).

Business mission	A clearly defined mission supports the development of a sense of community.
	Employees understand the company's purpose and are committed to the company's mission.
	In our enterprise, knowledge sharing is an important part of the company's mission.
	A clearly defined mission supports the development of a sense of community.
Continuous learning	Our enterprise encourages employees to take initiatives.
	Employees are encouraged to participate in decision-making.
	Enterprise expects its employees to participate intensively in knowledge sharing.
	Employees appreciate the opportunity to perform challenging tasks.
Empowerment of employees	Enterprise invests considerable resources in training and development programmes to improve the specific knowledge and skills of its employees.
	Flexibility and the desire for change are basic motives for continuous learning.
	Our enterprise supports entrepreneurial action and therefore tolerates occasional mistakes and experiments by employees.
	Learning from mistakes is possible through teamwork and consensus.

Table 1: Organisational culture that supports knowledge sharing
(Source: Prepared by authors)

3.2. Information and Communication Technologies

In times of Industry 4.0, enterprises and economies are increasingly investing in digital tools to develop competitive advantages and business efficiency, thus enabling their sustainable development (Tran, Herdon, Phan, Nguyen, 2023). Technology can streamline knowledge sharing in terms of accelerated knowledge giving and receiving. Despite the numerous benefits of ICT tools, there is a certain mistrust of ICT among researchers, as they fear that ICT will be equated with the organization's knowledge. Although enterprises invest large sums in knowledge sharing software, the results are not always positive. Lin (2007) investigated a link between ICT and knowledge sharing and was unable to prove it, while Andreeva and Kianto (2012) similarly proved that ICT does not contribute to financial outcomes. In contrast, Lee and Choi (2003) confirmed the contribution of ICT to all KM processes, particularly emphasizing the importance of ICT for tacit knowledge sharing. The contradictory findings of previous research definitely call for a more in-depth consideration of this topic. Edwards and Lönnqvist (2023), who are among the leading authors in the field of ICT, have explicitly defined the need for future research on the correlation between knowledge sharing processes and ICT. Previous works dealing with ICT use several different approaches in this field: Gold, Malhotra and Segars (2003) describe ICT tools for monitoring competition, improving communication inside and outside the enterprise, creating new knowledge, etc.; Lee and Choi (2003) emphasise the importance of ICT for collaboration, improved communication and anticipation of future events; Vidović (2008) examined companies using knowledge management software, while Handžić (2010) analysed socio-technological aspects of ICT. After careful review of previous ICT and KM related work, the conceptual model proposed in this paper suggests that ICT should include the following variables: Investment in ICT tools as a highly important segment not explicitly mentioned in previous work, ICT tools to scan business opportunities, and ICT tools to improve communication. ICT tools have also been the subject of much recent research. Fernández-Portillo, Almodóvar-González, Coca-Perez and Jiménez-Naranjo (2019) based their study on the United Nations' recommendations for promoting sustainable development through greater use of ICTs. After comparing ICT use in European countries in the period 2014 – 2017 (measured in terms of GDP/capita), the authors concluded that digital services used by the public sector significantly improve GDP. Knowledge sharing can be delayed if the hardware is not adapted to the needs of end users (Karagoz, Whiteside, Korthaus, 2020).

The main shortcomings of the software they cited included slow applications, susceptibility to errors and poor setup of the menus offered. According to Deng, Duan and Wibowo (2023), digital technologies improve decision-making and enable better coordination and communication between employees. Faster access to relevant knowledge makes it easier for managers to make decisions and therefore also has a positive impact on company performance. Ćudić and Milošević (2022) examined positive ICT practises used in developed European countries that could be transferred to Eastern European (developing) countries. The authors defined the main benefits of ICT at national level as: general business improvement, increased product quality and easier access to new markets. Communication technologies (CmT) facilitate the connection of employees in different locations and time zones, while data storage technologies (CaT) connect knowledge scattered throughout the organisation by enabling its storage and retrieval (Jarmooka et al., 2020). ICT thus enables employees to better understand data and use software such as data crawlers that allow them to recognise invisible connections in a large amount of data. ICT can also be used to improve data by enabling model development, optimization and simulation. An in-depth analysis of ICT tools relevant to knowledge sharing helped to define variables to measure the ICT that promote knowledge sharing. A systematic overview of these variables is provided in the table below.

Investments in ICT	Business intelligence system in our enterprise effectively supports day-to-day business.
	Software for distance learning improves day-to-day business.
	The ICT tools in our enterprise are adapted to the needs of our employees.
	The ICT tools in our enterprise are regularly updated.
Scanning of business opportunities	The ICT tools in our enterprise are used to scan and find business opportunities.
	Our enterprise uses ICT to monitor the competition.
	Our enterprise uses ICT to monitor the activities of business partners.
	ICT in our enterprise helps employees to use social contacts to gather relevant information about new market opportunities.
Improved communication	In our enterprise, employees communicate regularly via e-mail and similar digital tools to help them perform their work better.
	ICT in our enterprise helps employees at different workplaces and/or locations to learn at the same time.
	ICT in our enterprise helps employees to quickly find the source of knowledge they need, e.g. a specific database.
	In our enterprise, employees communicate regularly via e-mail or groupware to work in groups on specific tasks.

Table 2: ICT that supports knowledge sharing
(Source: Prepared by authors)

3.3. Top Management Support

Top management support is essential for all business activities, especially those related to knowledge sharing. Studies dealing with top management support for knowledge sharing often come to contradictory conclusions. Lee and Choi (2003) examined top management support through the prism of centralization and formalization and concluded that centralization has a negative effect on knowledge sharing, while formalization has no effect on knowledge creation. The authors chose these variables when studying Korean enterprises that traditionally practice these structural forms. Lu, Lung and Koch (2006) describe organizational support for knowledge sharing as a combination of three factors: managerial attitude, training and sanctions. They concluded that organizational support does not significantly influence knowledge sharing.

Chong (2006) examined the importance of leadership and policy, which include three separate variables: Employee Involvement, Top Management Leadership and Organizational Constraints. According to this author, employees perceive managers as supportive of knowledge sharing. Lin (2007) also establishes a link between top management support and knowledge sharing and finds a positive correlation, but also emphasizes that rewards only motivate employees for a short period of time. The same conclusion was reached by Oh and Han (2020), who claimed that top management support increases the quality of knowledge sharing, while the possibility of receiving a reward for the services rendered correlates negatively with employees' attention to knowledge sharing. Handžić (2010) also demonstrates a positive correlation between top management support and knowledge sharing. Carmelli, Atwater and Levi (2011) claim that their study is the first to investigate a positive influence of top management support on knowledge sharing. These authors examined a contribution of transformational leadership, leader-member exhnage, relational and organizational identification to employee knowledge sharing. The authors proved a positive influence of transformational leadership, but have also concluded there is a wide range of factors having a positive impact on knowledge sharing and these should be explored in more details. The analysis of past researches confirms a significance of top management support, but it also urges a need of furthure analysis considering the large number of contradictory conclusions. There also seems to be missing a concensus among authors about what kind of managers/leaders are most supportive of knowledge sharing processes. This paper suggests that transformational managers are most appropriate supporters of knowledge sharing through their openness to the ideas and suggestions made by employees, creating a high level of trust and mentoring employees. The more recent researchers looking at top management support and knowledge sharing additionally confirm the above variables as characteristics of transformational managers. Coun, Peters and Blomme (2019) investigated the ways in which transformational leadership improves employee motivation to share knowledge. The authors came to the conclusion that transformational leaders have a strong charisma, through which they achieve a positive effect on employees that also stimulates their intellect. Accordingly, employees generate new ideas, while managers show their openness and acceptance of these suggestions. Ehrnrooth, Koveshnikov, Balabanova and Wechtler (2023) come to the same conclusion. Through empowerment, leaders not only encourage and support all forms of communication with employees, but also give them the freedom to contribute ideas and suggestions that often lead to innovation in business operations (Muhammed, Zaim, 2020). Transformational leadership fosters high levels of trust in knowledge sharing, especially when the team as a collective can develop trust that is different in strength than the trust that develops between individual team members (Gabel Shemueli, Tzafrir, Rodriguez Perez, Bahamonde, Enosh 2022). According to Zia (2020), among the many management categories associated with knowledge sharing, transformational management is predominantly positive. Mutual trust is an important social resource that facilitates collaboration and coordinates social interactions. The level of trust between employees and supervisors is crucial for knowledge sharing. By promoting diversity and mutual acceptance between employees, transformational leaders can minimise the resistance of older employees to the ideas of their younger colleagues (Chen, Cooper-Thomas, Cheung, 2023). According to Iman and Hatani (2021), transformational leadership offers many benefits for enterprises: It promotes teamwork, citizenship behaviour, stronger motivation and a positive work environment, which leads to more efficient knowledge sharing. The following table provides an analytical synthesis of the variables that describe top management support: Top managers' openness to employees, trust between employees and managers, and employee mentoring.

Opennes of top managers to employees	Managers promote a system that values the opinion of every employee.
	Employees are free to express their ideas/suggestions in meetings with supervisors.
	Managers motivate employees to participate in formal and informal communication with other employees.
	Managers motivate employees to form groups to learn and develop new ideas.
Trust between employees and managers	Employees perceive the company's success as their own.
	Employees care about their company's reputation with customers.
	Supervisors act as advisors and only monitor employee performance.
	Managers motivate employees to take on challenging tasks, even if there is a risk of failure.
Mentoring of employees	Managers regularly act as mentors to employees, demonstrating how important knowledge is to the success of business results.
	New employees are given an orientation phase in which they get to know the organizational structure and the systematization of tasks.
	Supervisors mentor employees who take on new tasks, regardless of their length of service.
	Employees participate in job rotations to improve their knowledge and skills with the support of managers from different departments

Table 3: Top management support to knowledge sharing
(Source: Prepared by authors)

4. DISCUSSION AND CONCLUSION

Today's business environment requires companies to be flexible and agile in their response to change. The scarcity of tangible and intangible resources requires enterprises to focus on intangible resources – primarily organisational knowledge, which is critical to gaining competitive advantage. Knowledge sharing has proven to be a central phase of the knowledge management process, which is why academic research is increasingly focusing on this phenomenon. The complexity of knowledge sharing requires equal attention to the giving and receiving of explicit and tacit knowledge, but also to the contextual factors without which the implementation of knowledge sharing in the organisation is compromised. One of the main contributions of this study is that it provides a systematic overview of the contextual factors that support knowledge sharing, with a clearly defined internal structure for each of these factors. The lack of systematization has often been cited as one of the main problems in knowledge sharing research (Lee and Choi, 2003; Handžić, 2010; Carmeli Atwater, Levi, 2011). The formulation of measurement scales for predictive variables with clearly defined internal structure and labelling of individual sub-variables can alleviate the problem of self-report data. Another important advantage of the proposed measurement scale is its broad application, which allows the variables to be assessed by both managers and non-managers. The proposed factors and associated variables also provide a differentiation from previous measurement scales: for example, this model proposes the implementation of clan and adhocracy culture in conjunction with the organisational mission (a variable rarely used in similar research) and the implementation of transformational leadership characteristics among managers. Top management support is extracted as an individual variable that is independent of organisational culture, but is important from the perspective that it reinforces the impact of organisational culture on knowledge sharing. The variables measuring top management support also take into account the characteristics of transformational managers due to their importance for knowledge sharing. Finally, previous work often has a negative attitude towards ICT, while the general opinion is that employees should be replaced by ICT tools.

However, Edwards and Lönnquist (2023) have demonstrated the importance of ICT for knowledge sharing and invited researchers to further analyse this factor. The variable used to measure ICT, which is often neglected in similar work, relates to the level of investment in ICT. In summary, the main contribution of this paper is the in-depth analysis and systematisation of contextual factors that promote knowledge sharing in development of a transparent measurement scale that enables a more accurate assessment of contextual factors. Another contribution of the proposed measurement scale is that it enables a comparison of enterprises in terms of their affiliation to a specific KM generation. When measuring KM generation, researchers can use scales that include organisational culture, structure and ICT (Milanović, 2010). The problem is that different authors use different variables to measure these factors, so their results cannot be compared. Standardising the measurement scale could help to solve this problem. In addition, the standardised scale could help managers to evaluate their enterprise's position within the KM generations and to propose and develop concrete guidelines for improving the contextual factors that promote knowledge sharing.

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ECONOMIC AND LEGAL ANALYSIS OF THE POSITION OF MINORS IN CONSUMER BANKRUPTCY PROCEEDINGS: HOW TO REGULATE THE UNREGULATED?

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ABSTRACT

The purpose of this paper is to analyse the position of minors in consumer bankruptcy proceedings. In this sense, this paper intends to point out the indeterminacy of the existing solutions and try to direct the reflection on this problem towards certain de lege ferenda solutions. The complexity of the research and the tasks set determined the choice of methods, so that the normative-legal, comparative-legal and statistical approaches were primarily used in this paper. Since the provisions of the Consumer Bankruptcy Act do not explicitly regulate the protection of minors, but the positive obligation to protect all rights is regulated, it is obvious that minors have no special procedural status in the proceedings. This analysis has theoretical-methodological and practical significance. Theoretically, the position of minors in consumer insolvency proceedings has a particular structure that needs to be identified and scientifically investigated and explained. The practical goal is to identify (scientifically and objectively) the measures and procedures that should be taken to avoid a conflict situation between the minor population and their position in consumer insolvency proceedings. Ultimately, the aim is to provide a systematic overview of the most important issues and to formulate recommendations for the upcoming reform of the Consumer Bankruptcy Act.
Keywords: *consumer bankruptcy, minors, potential problems*

1. INTRODUCTION

The aim of consumer insolvency proceedings as a *sui generis* out-of-court procedure is to relieve the *bona fide* consumer of the obligations that remain after the liquidation of his assets and the distribution of the collected funds to the creditors (the so-called discharge of residual debt). Thus, consumer insolvency proceedings involve a substantive and legal objective that applies only to the consumer and represents a *differentia specifica* compared to corporate insolvency proceedings. On the other hand, minors are natural persons who have not yet reached the stage of development at which they are considered mentally and physically mature and capable of looking after themselves, their rights and interests independently. Doctrinal analyzes state that minors, due to lack of life experience and insufficient maturity, are under the immediate care and concern of their family (primarily parents as legal representatives) and society to protect their rights and interests. These issues are combined into a whole within this paper by analyzing the issue of the position of minors in consumer bankruptcy proceedings.

In this sense, this paper intends to point out the indeterminacy of the existing solutions and, at the same time, try to direct the reflection on this problem towards certain *de lege ferenda* solutions. In order to provide the most comprehensive answer to the topic, while respecting the used normative-legal, comparative-legal and statistical approaches, the structure and conception of this paper had to be adapted to the above-mentioned conditions. After the presentation of the methodological and analytical framework of this paper (sections 1 and 2), the relevant legal acts concerning the protection of minors are briefly analyzed (sections 3 and 4). The aim of this part of the analysis is to find an answer to the question whether the existing legal framework meets the need for effective legal protection of minors in consumer insolvency proceedings from the perspective of the relevant norms of the EU law. A limiting factor in the context of this analysis is the lack of established court practice, as the consumer bankruptcy regulation is relatively new and has a rather modest practice. For this reason, the analysis does not rely on practical problems, but rather uses an economic and legal analysis to identify potential problems that could pose difficulties in the practical implementation of the legal protection process for minors. In order to obtain opinions and up-to-date information from key domestic stakeholders, interviews were conducted with some representatives of the judiciary. The interviewed experts, as well as the analyzed reports on the implementation of already adopted strategies for the protection of minors, allowed the formation of certain conclusions regarding the monitoring mechanisms and the impact of previous strategies, which served, among others, as a basis for suggested recommendations in the last section of the paper. Moreover, the position of minors in Croatia and in the EU is defined based on statistical-economic analysis (section 5). When we discuss the position of a social group, in our case minors, it is necessary to include the economic context in the analysis, in addition to the institutional framework. Based on the economic context, it is possible to explain in a more complex way how the roles of the group in question are understood and how they function in a particular socio-cultural habitus. The section on legal protection analyzes the procedural rules, and the conclusion summarizes the results of the analysis. It is about the need to change the approach to this undesirable social phenomenon, from *post festum* measures to a proactive approach aimed at prevention. Also analyzed is the logic of *de lege lata* intervention and the structure of legal acts in this area, i.e., whether and under what conditions they really add new value to the existing system of protection of minors, as well as the question of their role and relationship with other strategic documents. The penultimate section provides an overview of the practices and experiences of other countries based on a comparative analysis of the solutions applied in this area of the judiciary. This paper ends with concluding remarks and recommendations suggesting possible solutions to the problems previously identified.

2. OVERVIEW OF PREVIOUS RESEARCH

The implementation as well as the objectives of consumer bankruptcy proceedings are regulated in detail in the Consumer Bankruptcy Act (Official Gazette (OG) 100/15, 67/18 and 36/22 – further refered to as CBA), and the provisions of the Bankruptcy Act (OG 71/15, 104/17 and 36/22) are be applied accordingly. In the economic and legal literature there are about a hundred scientific texts dealing with the extensive and complex subject of bankruptcy regulation, especially with the subject of corporate bankruptcy. Thus, the number of monographs in the field of bankruptcy is modest, in contrast to the capital works and scientific papers that exist in countries with a longer tradition of bankruptcy proceedings. In recent years, however, an increasing number of studies have examined the economic and legal implications of liquidation and (re)organizational bankruptcy proceedings. More important for this paper, however, are the texts dealing with the institution of consumer bankruptcy, the number of which is much more modest (Bodul & Tomas Žiković, 2014; Bodul, 2011).

Therefore, considering the topicality of the problem of minors' protection in Croatia, this paper is largely based on papers and reports already published in this field. The empirical and literary analysis of the legal status of minors is conceptualized in the works of a number of practitioners and theorists. From the research point of view, the literature reports more or less unanimously on the positive effects, but also on the functional problems of the existing system regarding the protection of minors. Rittossa and Božičević Grbić (2012) point out that the policy of treatment of minors is a complex problem, so the statement about the existence of a crisis in the sense of the need to make changes to the existing practice is always topical. At the same time, Rittossa and Božičević Grbić (2012) indicate that we are in a period of the strongest social changes, so that old societal and other everyday problems are catching up with new problems and together form extremely complex challenges for the protective functions towards minors. However, how consumer insolvency proceedings affect the situation of minors remains unresolved in the existing literature. From what has been said, it is clear that the existing literature does not provide answers, useful explanations, or adequate approaches regarding the position of minors in the context of consumer bankruptcy proceedings. Therefore, this study will be the first systematic and scientifically sound analysis of a possible reform of the existing consumer bankruptcy procedure.

3. DEFINING THE TERMS

Considering the complexity of the problem we are dealing with in this paper, and for the sake of precision and clarity, we consider it important to explain *ab initio* the terms minor and consumer bankruptcy. According to the provisions of Article 117 of the Family Act (OG 103/15, 98/19, 47/20 and 49/23), a natural person becomes an adult upon reaching the age of 18. Thus, a minor is a natural person who is younger than 18 years of age. According to the provisions of Council Directive 94/33/ EC of 22 June 1994 on the protection of young people at work (OJ EU, L 216/12), any person under the age of 18 is considered a juvenile. The term child is used for a person under 15 years of age, while the term juvenile is used for young people between 15 and 18 years of age who are no longer subject to compulsory education. Therefore, the legal status of minors in modern legislation is completely different from the legal status or legal position of adults. There are a number of reasons for this, but this is due to the fact that minors are a special category of persons whose personality is characterized by special psychophysical, emotional and social features that require a completely different form of socio-legal response to their behavior. Therefore, in today's legislation a special approach is taken towards minors in comparison with adults. This approach is complemented by a protective philosophy and practice based on a restorative approach. This practice has proven successful in numerous countries and has led to concrete results in the protection of minors. On the other hand, according to the rules of consumer bankruptcy, the objective of this special out-of-court procedure is to relieve a *bona fide* consumer from the obligations that remain after the liquidation of his assets and the distribution of the collected funds to the creditors (the so-called relief from the remaining obligations). Thus, in consumer bankruptcy, a distinction is made between a substantive and a legal objective, which applies only to the consumer and is precisely the *differntia specifica* in comparison with corporate bankruptcy. The procedure itself is urgent, so the court can decide without an oral hearing, decide *ex officio* on facts relevant to the proceedings and submit all necessary evidence for this purpose. Special insolvency provisions give consumers the right to debt relief in several stages. The first stage consists in the consumer's attempt to reach an out-of-court agreement with his creditors on the fulfillment of his obligations. Attempting, rather than reaching, an out-of-court agreement on debt settlement is a prerequisite for opening judicial insolvency proceedings. With the CBA amendments in 2018, the consumer may initiate out-of-court proceedings, but is not required to do so.

Therefore, the rules on the necessity of conducting a preliminary procedure before the counseling center to conclude an out-of-court agreement between the consumer and the creditor are revised. This is followed by another attempt to reach an agreement on debt settlement within the framework of the judicial bankruptcy proceedings, with the possibility of forcing a decision by the court through the so-called non-obstruction rules. If the creditors do not accept the debt settlement plan of the debtor in the previous stage of the procedure, opening of the consumer bankruptcy procedure follows together with the realization of the debtor's attached assets within the framework of the judicial procedure, for which simplified rules apply, and, depending on the debtor's proposal, the release from the remaining debts for a period of up to five years (the so-called period of good governance). However, in Croatia, over-indebtedness of natural persons subject to foreclosure has long been a major problem. Due to the blocking of accounts, normal life is difficult for citizens, as they can only receive their income through the so-called protected accounts. Therefore, in 2018, the legislature introduced a new institute, the so-called "simple consumer insolvency procedure", which enables the unblocking of accounts for part of the insolvent citizens who are in the so-called "long-term block" due to relatively small amounts. In addition to the above measures, the problem of blocked accounts of citizens was solved in parallel by the new Act on Settlement of Debts of Natural Persons (OG 62/18) and the implementation of the new Act on Execution of Enforcement over Monetary Assets (OG 68/18, 02/20, 46/20 and 47/20). The application of both old and the new Bankruptcy Act with respect to individual debtors has not yet determined the appropriate standards for certain problems, and most of the provisions have remained completely "untested" in practice. Ultimately, only the application of the CBA will have to crystallize certain interpretations. One of them is the problem of pensionable insured persons as debtors in consumer bankruptcy proceedings. The changes made to CBA in 2022 were cosmetic in nature and served to align with the EU *acquis*.[1]

4. GENERAL INFORMATION ON THE LEGAL PROTECTION OF MINORS IN CROATIA (WITH SPECIAL REFERENCE TO THE MINORS' ABILITY TO WORK)

One of the basic principles of the Constitution of the Republic of Croatia (OG 56/90, 135/97, 08/98, 113/00, 124/00, 28/01, 41/01, 55/01, 76/10, 85/10 and 05/14) is the principle of protection of minors, according to which they may not be admitted to work before reaching the age established by law. They may not be forced to work in a way that is detrimental to their health or morals, nor may they be required to do so. If they do work, they have the right to special protection in the workplace. The national standards for the protection of minors in the EU Member States, as well as in the candidate countries and those preparing for accession, are based on European law and are the result of the adaptation of legislation to the requirements of European law and occupy an important place in any legal system. Therefore, the Labor Act (OG 93/14, 127/17, 98/19 and 151/22– further refered to as LA), as the basic labor law provision regulating labor relations in Croatia, pays great attention to the employment relations and working conditions of minors. The LA is based on the constitutional principle of the protection of minors and international standards for the protection of children and young people. It also determines the prohibition of employment of children and the minimum age for establishing an employment relationship. The provisions of the LA regulate the conclusion of employment contracts for minors and their protection under labor law.

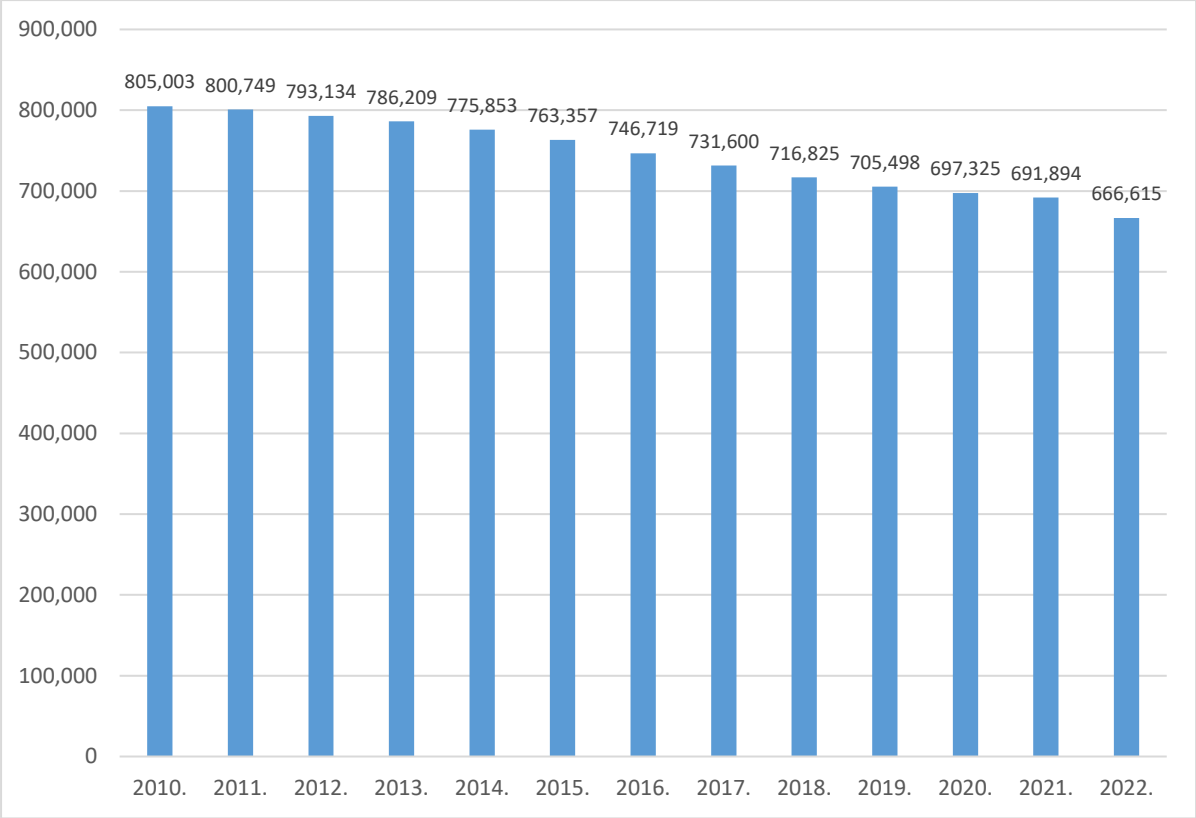
[1] The amendments were made to comply with Directive (EU) 2019/1023 of the European Parliament and of the Council of 20 June 2019 on preventive restructuring frameworks, on discharge of debt and disqualifications, and on measures to increase the efficiency of procedures concerning restructuring, insolvency and discharge of debt, and amending Directive (EU) 2017/1132 (OJ EU L 172/18).

According to the Article 19, the LA determines the minimum age for concluding an employment contract and -establishing an employment relationship in such a way that the employer may not employ: 1) a person younger than 15 years of age; 2) a person older than 15 and younger than 18 years of age while attending compulsory primary education. In other words, the minimum age for entering into an employment contract and establishing an employment relationship is 15 years of age. The protection of underage workers prescribed in the LA is harmonized with the provisions of Council Directive 94/33/ EC of 22 June 1994 on the protection of young people at work (OJ EU, L 216/12). The main objective of the Directive is to prohibit child labor (with certain exceptions) and to ensure that youth labor is strictly regulated by national legislation and that young people are guaranteed age-appropriate working conditions. Young people must be protected from economic exploitation and from any work that might jeopardise their safety, health, or physical, mental, moral, or social development, or interfere with their education. In any case, the employment of minors under 15 years of age and of minors over 15 years of age attending compulsory elementary school (notwithstanding the fact that they may be authorized to do so by their legal representatives) is, as a rule, absolutely prohibited. The Regulation on professions and activities in which minors may participate (OG 62/10, 93/14 and 151/22) provides an exception for certain activities in which minors may participate. They require prior approval of the labor inspection. The approval is granted upon the request of the minor's legal representative (parent), and a copy of the approval is sent to the competent social welfare centre. It follows from the provisions of Article 19 of the LA on the minimum age for concluding an employment contract and establishing an employment relationship that minors over 15 years of age who are not attending compulsory elementary school may conclude an employment contract and establish an employment relationship. The expression of will and the conclusion of an employment contract presuppose the legal capacity of both contracting parties, the employer and the employee. Legal capacity is defined by the provisions of Article 18 of the Obligations Act (OG 35/05, 41/08, 125/11, 78/15, 29/18, 126/21, 114/22 and 156/22) as a person's capacity to produce legal effects, i.e., to assume rights and obligations through his or her own declarations of intent. After concluding an employment contract, a minor employee has all the rights and obligations arising from the employment relationship, just like adult employees. However, the provisions of the LA also provide for additional measures to protect minor employees during the term of the employment relationship. In addition, under the provisions of the LA, minors may not be employed in activities that may endanger their safety, health, morals or development, as specified in the Regulation on professions and activities in which minors may not participate (OG 89/15, 94/16 and 109/1).

5. ECONOMIC ANALYSIS OF MINORS IN CROATIA

In this part of the paper, we analyze the position of minors in Croatia and the EU, based on secondary data from the Eurostat statistical database. The analysis covers the period from 2010 to 2022 taking into account data availability. As for the age structure, the analysis is based on a combination of indicators, where minors are defined as the population under 18 years of age or the population aged 15-19. The unavailability of consistently structured data by unique age groups is one of the main limitations of the research conducted. The following key indicators were analyzed: 1) trends in the number of minors (under 18 years of age), 2) educational structure of the population aged 15-19, 3) proportion of the population under 18 years of age living in overcrowded households, 4) employment of the population aged 15-19, and 5) proportion of the population aged 15-19 at risk of poverty and social exclusion. According to the data in Graph 1, the share of population under 18 years of age has been steadily decreasing over the observation period. The latest available data show that there are 666,615 persons under the age of 18 in Croatia, which is about 16% of the total population (Eurostat (2), 2023).

Graph 1: Trends in the number of minors (under 18 years of age) in Croatia in 2010-2022

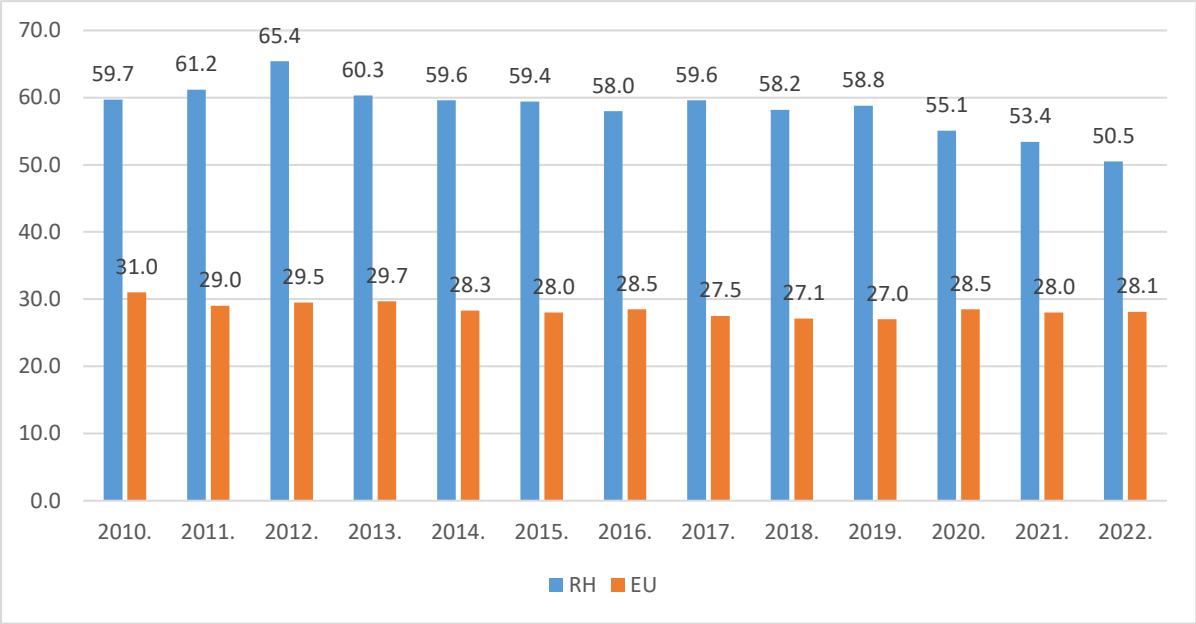


Source: Author's compilation based on Eurostat (1), 2023

Despite the noted tendency that the share of minors in the total population is decreasing, they still make up a significant part of the demographic picture in Croatia. At the same time, it is important to keep in mind how sensitive minors are to economic and social developments and the negative effects of crises and shocks. In fact, the data from Eurostat (3) (2023) also point to an unfavorable educational structure of the population aged 15-19 where 75.4 % of them have completed some elementary education or have not participated in educational processes at all. This makes them very sensitive to the trends and current challenges on the labor market. In addition, a significant part of the underage population faces inadequate living conditions, i.e., they live in overcrowded households. The data from Graph 2 show that the value of this indicator has decreased during the observed period. However, the high value of 50.5 % is still present, which means that Croatia reaches a level almost twice as high as the EU average.

Graph following on the next page

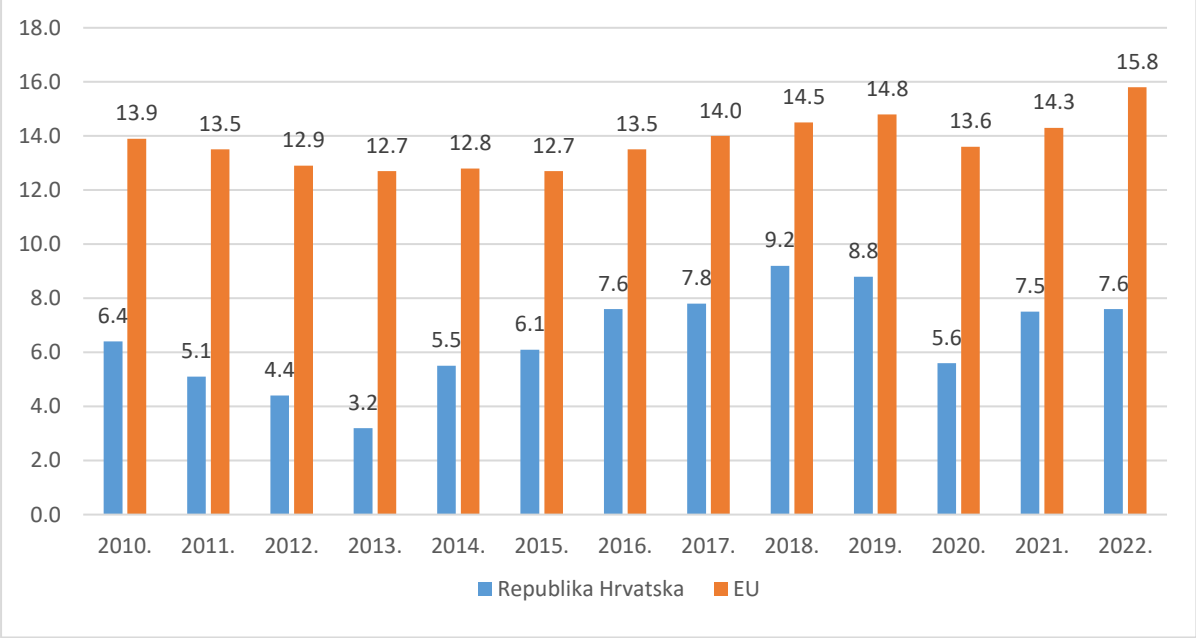
Graph 2: Proportion of population under 18 years of age living in overcrowded households in Croatia and the EU in 2010-2022



Source: Author's compilation based on Eurostat (4), 2023.

The following graph (Graph 3) shows that employment of the population aged 15-19 was in decline until 2013, after which growth began and continued until 2018. The latest available data show that 7.6% of the population aged 15-19 is employed in Croatia. Similar trends of increasing employment of the population aged 15-19 are also observed at the EU level, where 15.8% of the observed group is employed.

Graph 3: Employment of population aged 15-19 in Croatia and the EU in 2010-2022 (in %)

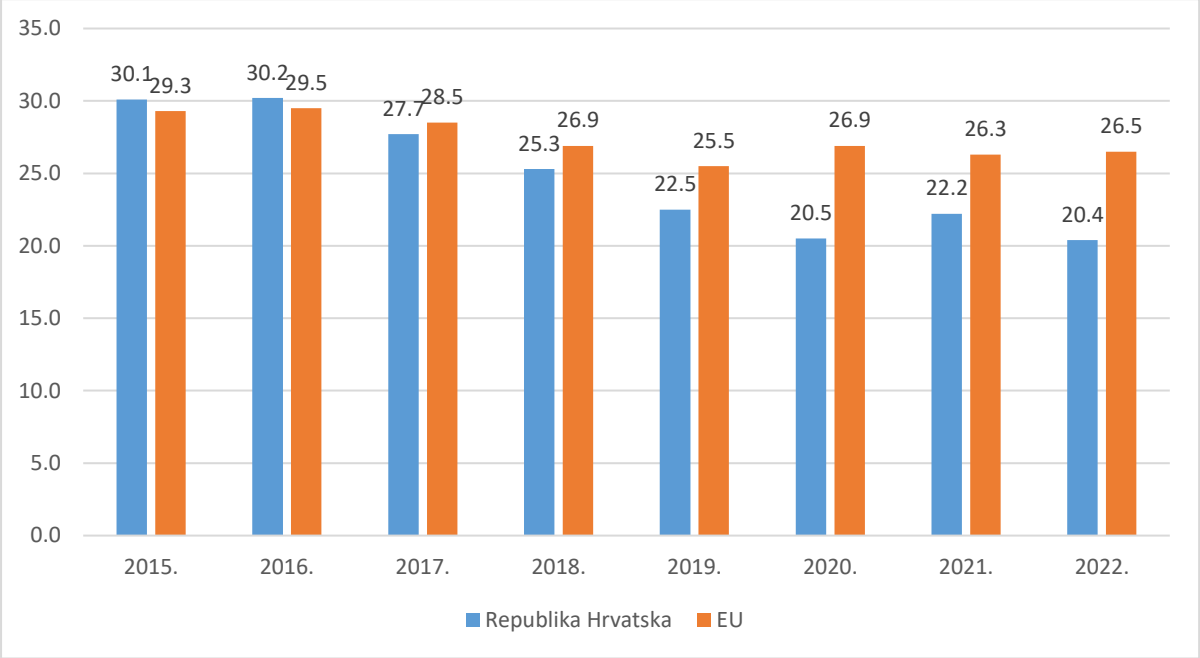


Source: Author's compilation based on Eurostat (5), 2023.

According to the data in Graph 4, 20.4% of the population aged 15-19 in 2022 was at risk of poverty and social exclusion in Croatia. In general, and throughout the observation period, Croatia managed to significantly reduce this indicator, with the highest value recorded in 2015

when 30.1% of the population aged 15-19 was at risk of poverty and social exclusion. The reasons for the improvement of the situation should also be sought in the affirmation of Croatia's full membership in the EU and the use of instruments to improve the situation of the population under 19 years of age. With the current values, Croatia is below the EU average (26.5 %).

Graph 4: Proportion of population at risk of poverty and social exclusion aged 15-19 in Croatia and the EU in 2015-2022



Source: Author's compilation based on Eurostat (6), 2023

6. SETTING THE PROBLEM STRAIGHT: CAN MINOR'S ASSETS BE SUBJECT TO CONSUMER INSOLVENCY PROCEEDINGS?

Although the implementation of the CBA has significantly changed the bankruptcy procedure in Croatia, during the many years of its practical application, a number of problems have been observed in the interpretation and impact of some provisions and institutes, which the implementation of the amendments to the CBA in 2018 has attempted to eliminate. However, the implementation has not yet established the appropriate legal standards for certain problems. Therefore, certain interpretations will have to emerge in the future. In this way, case law will greatly contribute to the formation of opinion on this legal instrument of collective legal protection of consumers and thus answer the question of the status of minors as subjects of consumer insolvency proceedings.

6.1. Who is considered a consumer within the provisions of the CBA?

Any natural person who enters into a legal transaction or acts in the market outside his or her trade, business, craft or profession is considered a consumer. A natural person liable for income tax from self-employment under the provisions of the Income Tax Act (OG 115/16, 106/18, 121/19, 32/20, 138/20 and 151/22) and a natural person liable for profit tax under the provisions of the Profit Tax Act (OG 177/04, 90/05, 57/06, 146/08, 80/10, 22/12, 148/13, 143/14, 50/16, 115/16, 106/18, 121/19, 32/20, 138/20 and 114/22) is considered a consumer if the conditions provided for in the provisions of the CBA are met. Article 4 (3) of the CBA specifies the conditions under which a natural person liable to income tax or profit tax is considered a

consumer. The following conditions must be met: 1) there must be no more than 20 creditors; 2) the obligations arising from the performance of the activity must not exceed the amount of 13,272.28 € (100,000.00 HRK); 3) there must be no obligations arising from employment relationships resulting from the performance of the activity; 4) no pre-bankruptcy or bankruptcy proceedings must have been opened against the said person. In reference to Article 4 (5) of the CBA, a natural person who has obligations arising from the activity he/she performs as a self-employed income tax payer or as a profit tax payer shall be deemed to be a consumer if he/she is no longer subject to self-employment income tax or profit tax. It should be noted that the provisions on simple consumer bankruptcy proceedings do not apply to consumers engaged in a declared activity, i.e., consumers liable for income tax from self-employment under the provisions of the Income Tax Act or liable for profit tax under the provisions of the Profit Tax Act. Therefore, simple consumer bankruptcy proceedings can be carried out exclusively on the consumer's assets according to Article 4 (2) and (5) of the CBA, if in the register of payment bases kept by the Finance Agency on the day of the opening of the simple bankruptcy proceedings, the consumer has one or more registered unexecuted payment bases (account blocking) for the purpose of compulsory liquidation of claims in the amount of up to 2,654.46 € (20,000.00 HRK) and if the blocking period has lasted continuously for more than three years. Regulation (EU) 2015/848 of the European Parliament and of the Council of 20 May 2015 (OJ EU L 141/19) on insolvency proceedings shall apply if the prescribed conditions are met, regardless of whether the debtor is a natural person, a legal entity, a trader or an individual. Annex A of Regulation 2015/848 specifies the proceedings to which the Regulation applies. Introductory provision 10 of Regulation 2015/848 recommends that the Regulation also applies to proceedings securing debt relief or debt settlement in relation to consumers and self-employed persons.

6.2. Can a minor be a consumer?

From the above definition of the term "consumer", it is clear that there is no obstacle to the opening of consumer insolvency proceedings against the assets of a minor. However, the legally relevant fact that a natural person, a consumer, is a minor can only affect his limited legal capacity, which consequently does not affect the purpose of the private bankruptcy proceedings. Indeed, a natural person acquires full legal capacity upon reaching the age of majority (from the age of 18) or, exceptionally, by entering into marriage before reaching the age of majority. Minors, with the exception of minors who marry before reaching the age of majority, do not have legal capacity to enter into an employment contract and establish an employment relationship. After the legal representative has authorized the minor to conclude a certain employment contract, the minor may independently conclude and terminate the employment contract, dispose of the income obtained on the basis of the independent work (i.e., wages and other income paid or granted by the employer to the employee in cash or in kind on the basis of the employment relationship, in accordance with the provisions applicable to the employment relationship) and perform other legal acts related to the concluded employment contract. Also, the provision of Article 85 of the Family Act (OG 103/15, 98/19, 47/20 and 49/23 - further refered to as FA) stipulates that a child who has reached the age of fifteen and earns (on the basis of self-employment) may independently perform legal acts, conclude legal transactions and enter into obligations and dispose of his/her income to the extent of the amount earned by him/her, provided that his/her maintenance is not jeopardized thereby. The legal representatives of the minor are his/her parents. Parents exercising parental care have, in accordance with the provisions of Article 99 of the FA, the duty and the right to contractually represent their child vis-à-vis third parties (including a potential employer), both in personal and property matters.

One parent is considered to have given consent to the other parent to represent the child even without the latter's express consent, unless the express written consent of the other parent is required by law (i.e., change of child's personal name, residence, religious affiliation, or in connection with the child's more valuable property). If the minor has no parents or the parents are deprived of parental care, the consent is given by the guardian. Guardianship of minors is a special form of protection for minors without parental care, which takes the place of parental care. Unlike parents who give permission to establish employment themselves, the guardian requires the prior consent of the social welfare agency (i.e., Center for Social Welfare) to give permission. The permission must be given in writing and refer to a specific employment contract. Therefore, in order to achieve the objective of the aforementioned procedure, it is crucial that the person in question has assets and is insolvent. The opening of bankruptcy proceedings against a minor naturally affects, on the one hand, the scope of the minor's legal representatives' authority to conclude legal transactions and, on the other hand, the management of the minor's assets.

7. REVIEW OF COMPARATIVE EXPERIENCES

Croatia has a long tradition of opening bankruptcies over the assets of natural persons. Thus, from a historical perspective, such an institution is not *terra incognita* in Croatian legislation. The first bankruptcy act (i.e., Preliminary Bankruptcy Code), was adopted on July 18th, 1853 and regulated bankruptcy over the assets of all natural persons. However, consumer bankruptcy is a relatively new topic in comparative research. Indeed, national particularism in the field of consumer bankruptcy has begun to give way to the idea of harmonization in the European context and beyond, as countries face the same problems in functionalizing legal protection in the field of consumer bankruptcy as well as similar legal and political requirements. The analysis of a large number of legislations shows how quickly they have introduced or reformed the institution of consumer bankruptcy in the last decades (Ramsay, 2007; Ziegel, 2006). However, regardless of the development of neoliberal economic thinking, we can note that the need to introduce bankruptcy over the assets of all natural persons was recognized relatively late. Especially if we consider that consumer bankruptcy in the European legal sphere was first introduced in Denmark (dansk. *Gældssaneringslov*) on May 9th, 1984 (entered into force on July 1st, 1984), when the Bankruptcy Act (dansk. *Konkurslov*) added Part 4 (Kilborn, 2009). After Greece, Croatia is the last country in the European legal sphere that introduced consumer bankruptcy. Although all these countries have the common goal of modernizing their law, they have their own traditions, problems and conditions and therefore face individual challenges. The clear orientation of Croatian legislation to the already existing German consumer insolvency model makes sense, as it allows foreign case law and literature to be used as an aid in solving problems that will arise when applying the “new” law (Berkowitz et al., 2003). However, neither the German consumer insolvency procedure nor the other European legislation analyzed recognizes minors as a particularly vulnerable group in society in need of special care and protection, and therefore obliges to provide minors with special protection and care through appropriate legislative and administrative measures, which is necessary for their welfare in consumer insolvency proceedings.

8. CONCLUDING REMARKS

The problem of consumer bankruptcy and the phenomenon of personal over-indebtedness in general is a dynamic area, especially in countries with a long market tradition, where new solutions are constantly sought following the trend of changes in the economy. Therefore, the question of the appropriateness and necessity of implementing amendments to the CBA (and other new regulations in the context of modernizing *de lege lata* solutions) is extremely relevant.

Moreover, previous empirical studies point to the weaknesses of the procedural provisions of the CBA and the subsidiary application of the Code of Civil Procedure. The purpose of this analysis, however, is not to describe the process of legal protection in its entirety under the statutory provisions of consumer insolvency proceedings. The aim is to analyze the policy in dealing with minor participants in consumer insolvency proceedings, which is a complex problem. Current activities in contemporary legislation do not affirm the position of minors *vis-à-vis* adults. Moreover, the consumer bankruptcy system does not take into account the different circumstances in which the various "categories" of debtors find themselves. Thus, it does not recognize that there are debtors who are unable to pay their due debts, but who have an additional and constant income with which they could regularly pay the debts due to creditors under a debt repayment plan, while maintaining a minimum standard of living. It fails to recognize that there are debtors whose assets and income are below the minimum standard, such that they are unable to make regular payments to creditors through a debt repayment plan. It also fails to recognize that there are "occasional debtors with no assets or income" who have been placed in the group of persons with assets below the average standard by the current loss of employment or income. The fact that such occasional debtors show the possibility that in the near future they will be able to make partial and regular payments to creditors under a debt repayment plan is also not recognized. It is not recognized that there are also debtors who have assets with which they could pay off their creditors but do not wish to do so, and that such a category of debtors should be denied access to consumer insolvency proceedings, since enforcement proceedings may be brought against them. Since the provisions of the CBA do not explicitly regulate the protection of minors, but the positive obligation to protect all rights is regulated, it is obvious that minors do not have a special procedural status in the proceedings. Therefore, the authors believe that the aforementioned approach is not desirable. In addition, this type of practice will ultimately prove unsuccessful, as it does not produce concrete results in assisting minors whose assets are the subject of consumer bankruptcy proceedings. Therefore, the reform of the institutional treatment of minors in consumer bankruptcy proceedings, the application of a new conceptual framework, the possibility of affirming new forms and designs and, above all, the possibility of implementing new efforts in practice, are rightly the object of interest of the scientific and professional public.

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THE RELATIONSHIP AND CONCEPTUAL LINKS AMONG JOB ROTATION, SENSEMAKING AND TERMINUS TECHNICUS

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ABSTRACT

This paper provides a thorough analysis of job rotation definitions, objectives, advantages and disadvantages, furthermore a deep dive into the terminus technicuses and sense-making. Job rotation, defined by the systematic reassignment of employees to varied roles across departments, is posited as a pivotal strategy for enhancing workforce adaptability, skill diversity, and overall employee satisfaction. The research underscores the integration of job rotation with key concepts such as terminus technicus (technical terminology), sensemaking, and organizational behavior, elucidating its role in broadening employees' professional lexicon, fostering a comprehensive understanding of organizational operations, and promoting a culture of continuous learning and innovation. The study methodically explores the tangible benefits and inherent challenges of job rotation through empirical examples from Toyo Kogyo (Mazda) and Intel Corporation, showcasing the efficacy of job rotation in creating an efficient, versatile workforce. Additionally, the paper articulates the objectives of job rotation, its benefits and drawbacks, and its implications for fostering a dynamic, skilled, and adaptable workforce, thereby contributing to organizational success and sustainability.

Keywords: *Job rotation, sensemaking, terminus technicus, management, organizational behavior*

1. INTRODUCTION

In the dynamic realm of organizational management, job rotation has emerged as a seminal strategy aimed at bolstering employee adaptability, enriching skill sets, and enhancing overall job satisfaction across various industries. This innovative practice, characterized by the deliberate rotation of employees among diverse roles within an organization, serves dual objectives: it not only amplifies the workforce's professional versatility but also significantly contributes to sustaining employee engagement and allegiance to the organization. The essence of job rotation transcends conventional operational logistics, addressing employee well-being by offering a remedial strategy against the stress linked with physically demanding tasks, thus nurturing a more vibrant and resilient workplace culture. The amalgamation of job rotation with fundamental concepts like terminus technicus, sensemaking, and organizational behavior presents a comprehensive approach to employee development and organizational learning. Terminus technicus, or specialized jargon, enriches employees' professional vocabulary as they traverse different roles, enhancing their communicative efficacy and deepening their comprehension of the organization’s multifarious operations. Concurrently, sensemaking — the process of deriving meaning from experiences — is significantly amplified by job rotation, enabling employees to acquire new insights and perspectives, thereby fostering a holistic understanding of the organizational ecosystem. Moreover, the strategic deployment of job rotation cultivates a workforce that is not only adaptable and versatile but also steeped in a culture of incessant learning and innovation. Facilitating cross-functional collaboration and knowledge transfer allows organizations to adeptly navigate the complexities of the modern business environment.

The implications of job rotation span both employee and employer benefits, encompassing enhanced learning opportunities, motivation, and the formation of a flexible workforce ready for managerial progression and operational superiority. This paper endeavors to dissect the complexities of job rotation, exploring its theoretical foundations, practical applications, and the intricate interplay among technical terminology, sensemaking, and organizational behavior. Through examining the myriad benefits and potential challenges of job rotation, the study aims to elucidate its pivotal role as a cornerstone of strategic management and employee development in contemporary organizational contexts. Job rotation is a technique utilized by some employers to systematically rotate their employees' assigned roles throughout their tenure. This practice is adopted for various reasons, primarily to enhance the flexibility of employees and to sustain their interest in remaining with the company or organization. Additionally, research indicates that job rotation can alleviate the stress experienced by employees engaged in physically demanding tasks (Smith et al., 2020).

The concepts of terminus technicus, sensemaking, and job rotation, while distinct, intersect in meaningful ways within the realms of organizational behavior, management, and learning.

1) **Terminus Technicus (Technical Terminology)**: Terminus technicus refers to the specialized terminology or jargon unique to a specific field or discipline (Johnson-Mardones, 2018). In the context of job rotation, as employees transition across various departments or roles, they encounter different technical terminologies, enhancing their understanding of the organization's diverse functions.
2) **Sensemaking**: Sensemaking involves the process of creating meaning from the information and experiences encountered (Weick, 1995). Job rotation contributes to sensemaking by exposing individuals to diverse work environments, challenges, and perspectives. As employees navigate through different roles, they synthesize their experiences, developing a comprehensive understanding of the organization.
3) **Job Rotation**: Job rotation entails moving employees through various roles or departments within an organization (Gupta & Sharma, 2017). This exposure to new technical terms and concepts, as part of terminus technicus, enhances their overall understanding of the organization.

2. CONNECTIONS

Job rotation stands out as a strategic approach that significantly enhances learning and adaptability among employees. By systematically exposing individuals to various terminologies and work contexts, job rotation not only broadens their understanding but also facilitates the integration of new technical terms into their comprehensive view of the organization. This constant engagement with diverse aspects of the organization aids employees in making sense of complex information and adapting to new roles seamlessly (Clark, 2016).

Moreover, the process of job rotation plays a crucial role in the transfer of knowledge within an organization. Employees, through their rotation across different roles, encounter and acquire a broad set of skills and knowledge. The technical terminology (terminus technicus) learned in one role often proves applicable and relevant in another, thereby fostering a more interconnected understanding of technical concepts across various areas within the organization. This cross-pollination of knowledge enhances the overall competence of the workforce (Cramer & Tichenor, 2023). Additionally, job rotation significantly contributes to innovation and problem-solving capabilities. Exposure to a diverse range of technical terminologies and experiences equips employees with the ability to approach problems from various angles and devise creative solutions. Through sensemaking, employees learn to creatively connect disparate pieces of information, which can lead to innovative thinking and novel approaches to challenges (Rogers et al., 2017). Job rotation also promotes cross-functional collaboration, encouraging individuals from different departments to work together.

In this collaborative environment, technical terminology becomes a shared language that facilitates effective communication among employees with varied backgrounds. This shared understanding not only improves collaboration but also strengthens the organization's ability to tackle complex problems through a multi-disciplinary approach (Burt, 1992). Job rotation emerges as a powerful tool for organizational development, enhancing learning, adaptability, knowledge transfer, innovation, and cross-functional collaboration. By fostering a culture that values continuous learning and collaborative problem-solving, organizations can leverage job rotation to build a more skilled, innovative, and cohesive workforce. While terminus technicus, sensemaking, and job rotation are distinct concepts, they are interconnected in the context of organizational learning, adaptability, and the development of a holistic understanding of an organization's technical landscape. The strategic implementation of job rotation not only enhances the adaptability and versatility of employees but also promotes a culture of continuous learning and innovation. By fostering cross-functional collaboration and knowledge transfer, organizations can create a dynamic and resilient workforce capable of navigating the complexities of the modern business environment.

3. WHAT IS JOB ROTATION?

Job rotation is a strategic management practice where employees are systematically moved across different departments or roles within an organization. This approach is designed to enhance employees' skills, knowledge, and experience across various operational areas, contributing to a more versatile and well-rounded workforce. Job rotation serves multiple purposes, including facilitating new employee orientation, providing comprehensive training across departments, enhancing skill sets, and preventing employee burnout.

3.1. Objectives of Job Rotation

This section outlines the objectives of job rotation, emphasizing its significance for both employee and employer learning, as well as employee motivation. Job rotation is a strategic approach that enhances workforce versatility, broadens employees' understanding of the business, and prepares them for potential management roles (Eriksson & Ortega, 2006). From an employer's perspective, job rotation facilitates the identification of individual workers' strengths and cultivates a flexible and knowledgeable workforce, capable of contributing across various departments (Arya & Mittendorf, 2006). Job rotation stands as a strategic approach that significantly benefits both employees and employers by diversifying roles within an organization. It enhances employee versatility, equipping individuals with a comprehensive understanding of organizational operations, which is crucial for those preparing to advance into management positions. This broad perspective fosters a well-rounded skill set and deepens understanding of the company’s multifaceted functions, as highlighted by Eriksson and Ortega (2006). From an employer’s standpoint, job rotation offers valuable insights into the unique strengths and capabilities of the workforce. Arya and Mittendorf (2006) emphasize how this strategy results in a versatile and well-informed workforce, thereby enhancing organizational flexibility. It allows for more informed decisions regarding task assignments and team compositions, ultimately cultivating a workforce that is both adaptable and knowledgeable. Furthermore, job rotation mitigates the monotony often associated with certain job roles, addressing employee boredom and increasing job satisfaction. McGuire (1981) points out that this reduction in job monotony not only motivates employees by providing new challenges and opportunities for learning but also deepens their organizational knowledge, potentially leading to increased opportunities for promotion and career advancement. The methodology is instrumental in succession planning, preparing a pool of employees to step into senior roles as needed. This ensures the organization's resilience and continuity by having a ready supply of experienced and capable individuals to fill leadership positions.

Additionally, job rotation facilitates the right-employee job fit by offering a mechanism to evaluate employee abilities in various contexts and finding the optimal role for each individual's skill set, thus maximizing both organizational productivity and employee satisfaction. Exposing workers to all verticals of the organization, job rotation enhances their overall operational awareness and adaptability. This exposure makes them more valuable to the organization by broadening their understanding of its operations across different departments or functions. Moreover, rotating employees through different roles enables organizations to assess and utilize the talents of their workforce more effectively. This process not only helps identify where employees excel but also where further development may be needed, leading to improved job performance and productivity. Encouraging employees to step out of their comfort zones, job rotation fosters personal and professional growth by exposing them to a variety of operational challenges and learning opportunities. This enriches the employee's career path and contributes to the organization's dynamic capabilities, demonstrating job rotation as a multifaceted tool that benefits both the organization and its employees. It enhances learning opportunities, motivation, flexibility, and the strategic alignment of employee skills with organizational needs, contributing significantly to the professional development of employees and bolstering the organization's adaptability and preparedness for future challenges. Job rotation benefits both employees and employers. Employees gain a wider skill set, making them more adaptable and increasing their chances for upward mobility within the company or even in other firms. For employers, job rotation means a more versatile workforce, potentially reducing the need to hire additional staff for different roles, thereby saving costs and possibly allowing for higher salaries for current employees (Jonsson, 1988). A study on job rotation's impact on productivity and employee leave absence revealed that employees value responsibility and pride in their work over job security. Implementing job rotation in small teams showed increased job satisfaction and a decreased tendency to avoid overtime duties (McGuire, 1981). Furthermore, job rotation has been linked to higher employee compensation, as it demonstrates the employees' ability to perform multiple job functions, thereby increasing their value to the organization (Black, Lynch, & Krivelyova, 2004). Electromyographic studies have shown that job rotation can benefit workers' health by varying tasks and muscle movements, reducing workplace stress and physical strain (Jonsson, 1988).

Job Rotation in Practice:

- **Toyo Kogyo Company**: This Japanese firm, now known as Mazda, has implemented job rotation for over two decades, initially in response to the oil embargo of the 1960s. Job rotation has enabled Toyo Kogyo to maintain an efficient and knowledgeable workforce, outperforming more specialized competitors (Lohr, 1982).
- **Intel Corporation**: Intel has utilized job rotation to fill temporary positions internally, successfully assigning about 1300 roles in various departments over 11 months. This strategy has proven effective in fields such as HR, Marketing, Finance, and Product Development (Weber & Kwoh, 2012).

3.2. Benefits and Drawbacks

Job rotation can alleviate physical and mental stress, reduce monotony, and enhance job security by diversifying employees' skill sets. However, it may not be suitable for all positions, especially those requiring specialized skills or in companies with unionized workers resistant to rotation (Hsieh, Chao, 2004; Jaturanonda et al., 2006). In the private sector, job rotation allows for a comprehensive evaluation of employees, benefiting companies through skill flexibility and lower training costs for new hires (Craig & Nierenberg, 2014). Yet, the cost of job rotation can offset gains from specialization, posing challenges in balancing productivity and employee development (Coşgel & Miceli, 1999).

In the public sector, job rotation fosters interagency communication and collaboration, though challenges in cooperation and talent exchange can arise, potentially impacting program success and employee career progression (Craig & Nierenberg, 2014).

4. ADVANTAGES AND DISADVANTAGES OF JOB ROTATION

4.1. Advantages

Job rotation plays a pivotal role in enhancing job satisfaction and reducing boredom among employees by introducing variety into their work activities. This strategic approach not only diversifies the daily tasks of the workforce but also significantly contributes to comprehensive employee development. By doing so, it enhances both the skills and mental well-being of individuals, fostering a more dynamic and capable workforce. Job rotation further mitigates the risk of job burnout, a critical concern in today's fast-paced work environments, by providing employees with periodic changes in their job roles. This variation in responsibilities not only refreshes their engagement with work but also supports their mental health by preventing the monotony that often leads to burnout. Moreover, job rotation facilitates personal growth by enabling employees to assess and understand their strengths and weaknesses in various contexts. This self-awareness is invaluable, as it empowers individuals to identify areas for improvement and to seek opportunities that align with their skills and career aspirations. Additionally, from an organizational perspective, job rotation improves turnover rates by creating a versatile talent pool. This pool is ready to fill various roles as needed, ensuring that the organization remains resilient and adaptable in the face of changing demands and challenges. By fostering a culture of continuous learning and adaptability, job rotation not only benefits individual employees but also enhances the overall strength and flexibility of the organization. This approach, by promoting a deeper engagement with work and facilitating a better understanding of the organizational operations, positions both employees and employers for success in a competitive and ever-evolving business landscape.

4.2. Disadvantages

Implementing job rotation, while beneficial in numerous ways, presents certain challenges that organizations must navigate. One of the primary concerns is the time and financial investment required for additional training. This process demands a significant allocation of resources to ensure employees are adequately prepared for their new roles, which can be both time-consuming and costly. Moreover, not all employees favor changes in their work environment. Some individuals prefer stability in their roles, finding comfort and satisfaction in a consistent set of responsibilities. The introduction of job rotation could, therefore, lead to dissatisfaction among these employees, potentially impacting their overall engagement and productivity. Job rotation, while addressing aspects of job satisfaction and employee development, may not be a panacea for all organizational challenges. Issues such as employee disengagement or cultural misalignment within the organization might persist despite the implementation of job rotation programs. These underlying issues require a more comprehensive approach that extends beyond job role changes. Furthermore, industries with a high degree of specialization may encounter additional hurdles in implementing job rotation effectively. The unique complexities and technical requirements of these roles make it challenging to rotate employees without compromising operational efficiency or the quality of work. Additionally, as employees transition into new roles and navigate the learning curve associated with these changes, mistakes can occur. These errors, while part of the learning process, can lead to operational inefficiencies and, in some cases, potential losses for the organization. Such outcomes highlight the importance of carefully planning and supporting job rotation initiatives to minimize disruptions and maximize the benefits of this strategy.

In conclusion, while job rotation offers a range of benefits, including enhanced job satisfaction and employee development, it is imperative for organizations to consider the potential drawbacks and challenges. Effective planning, clear communication, and adequate support systems are essential to mitigate these concerns and leverage job rotation as a tool for organizational growth and employee engagement.

5. TERMINUS TECHNICUS DEFINITIONS AND UTILIZATION IN TECHNICAL COMMUNICATION

Terminus Technicus: A terminus technicus, or technical term, is a word or phrase employed within a specific field of expertise, signifying concepts, equipment, processes, or personnel unique to that domain (Johnson-Sheehan, 2007). These terms serve as a concise form of communication among professionals, encapsulating complex information within a single word or phrase. For instance, the term "force" in physics is succinctly integrated into the formula f=maf=ma, demonstrating how technical terminology facilitates mathematical and conceptual clarity.

Principles for Using Technical Terms: Effective communication, particularly in fields laden with specialized terminology, necessitates a careful consideration of the audience's level of understanding. Johnson-Sheehan (2007) emphasizes the importance of tailoring the use of technical terms to align with the audience's expertise. Utilizing highly specialized terms without regard for the audience's familiarity can significantly hinder the effectiveness of communication, potentially leading to misunderstandings or disengagement. Consistency in the use of terminology is paramount to avoid confusion. Inconsistent use of terms can not only mislead the reader but also detract from the overall clarity and coherence of the communication. It is essential to establish a clear and consistent vocabulary throughout the document to ensure that the audience can easily follow the discussion.

Furthermore, it is beneficial to provide definitions and explanations for specialized terms that may be unfamiliar to the audience. Even individuals with a degree of expertise in the field may encounter terms they are not acquainted with. Offering clear definitions helps to bridge these gaps in understanding and fosters a more inclusive and accessible discourse. In addition, including a list of terms, either before the introduction or in an appendix, can greatly assist readers who are unfamiliar with the specialized vocabulary. This list serves as a valuable reference tool, enabling readers to quickly clarify terms as they engage with the material. By adopting these strategies, communicators can enhance the accessibility and effectiveness of their message, ensuring that it resonates with a diverse audience.

Technical Definitions: Technical definitions aim to introduce and explain the vocabulary essential for succinct and unambiguous communication within a particular field. For example, "iliac crest" is defined in medical terminology as the top ridge of the hip bone, illustrating how technical definitions facilitate precise communication (Johnson-Sheehan, 2007).

Sense-Making: Sense-making involves the process by which individuals or groups give meaning to their collective experiences. It is characterized as the retrospective development of plausible images that rationalize actions (Weick, Sutcliffe, & Obstfeld, 2005). Sense-making is not confined to a single definition but is broadly understood as a process that helps individuals navigate ambiguous, uncertain, or confusing situations by constructing a coherent understanding based on their experiences.

5.1. Properties of Sense-Making (Weick, 1995)

The process of sense-making is intricately tied to the context within which individuals perceive their identities, significantly influencing their actions and interpretations. This relationship underscores the dynamic interplay between personal identity and environmental context, highlighting how individuals' self-perception shapes, and is shaped by, their surroundings and experiences. Attention and its disruptions play a pivotal role in retrospection, affecting what individuals notice about their experiences. The timing of retrospection, therefore, becomes crucial, emphasizing the need for focused attention to fully comprehend and learn from past events. Dialogue and narrative construction are fundamental mechanisms through which individuals make sense of their thoughts and experiences. Through the enactment of dialogues and narratives, people organize and articulate their thoughts, facilitating a deeper understanding of their experiences and the world around them. Sense-making is also a social activity that involves the creation and sharing of stories. These narratives serve not only to construct individual understanding but also to foster a collective comprehension of events and situations. By sharing plausible stories, individuals contribute to a shared pool of knowledge and perspective, enhancing both personal and communal insight. This process is ongoing, with individuals continuously interacting with their environments. Through these interactions, people learn about their identities and the broader world, shaping and being shaped by the contexts in which they find themselves. This dynamic process highlights the fluid nature of identity and understanding, as both are constantly evolving in response to new experiences and information. Cue extraction is another critical aspect of sense-making, where individuals rely on contextual cues to determine relevant information and formulate acceptable explanations. This process demonstrates how people navigate complex situations, using available cues to guide their understanding and actions. In the face of complexity and ambiguity, individuals often prioritize plausibility over accuracy. When precise accuracy is difficult to ascertain, plausible explanations provide a means to navigate equivocal situations, allowing individuals to proceed with decision-making and action based on the best available understanding. Together, these elements illustrate the multifaceted nature of sense-making as a process that encompasses identity, retrospection, dialogue, social activity, ongoing interaction with the environment, cue extraction, and the prioritization of plausibility. This framework highlights the complexity of understanding and interacting with the world, emphasizing the importance of narratives, context, and the social construction of meaning.

5.2. Making Sense of Sense-Making in Pandemic Research

The concept of sense-making is crucial in understanding and responding to complex situations, such as the COVID-19 pandemic. It underscores the importance of constructing a shared understanding to facilitate effective decision-making and policy development. The challenges of information overload, access to reliable data, and the rapid evolution of scientific knowledge highlight the need for robust sense-making processes to navigate the uncertainties of the pandemic and other complex issues facing society today. In the exploration of effective job rotation programs within organizational settings, this study delineates a comprehensive framework designed to enhance employee engagement, foster skill development, and mitigate the risks associated with high turnover rates in critical job positions. Job rotation, as a strategic human resource management practice, offers a multifaceted approach to professional development, enabling employees to gain a breadth of skills and insights across various functions within the organization. This methodology not only contributes to the individual’s career progression but also bolsters the organization’s resilience in managing workforce capabilities and ensuring continuity in essential roles.

6. STEPS OF EFFECTIVE JOB ROTATION PROGRAM

The following table, Table 1, encapsulates the core steps involved in the implementation of an effective job rotation program. It begins with securing leadership commitment, which is crucial for the program's success, and extends through identifying critical job positions, analyzing job components, ensuring ideal bench strength, and evaluating employees' readiness for rotation. Development maps are then created to guide the job rotation process, followed by defining the job period, selecting candidates for rotation, and maintaining robust internal communication throughout the initiative. Furthermore, the table outlines the importance of team orientation, ongoing support, and rewards as integral components of a successful job rotation strategy.

Steps of Effective Job Rotation Program	**Description**
Leadership Commitment	Management greenlights the job rotation program.
Selection of Critical Job Positions	Identifying pivotal job roles with frequent turnover and essential skills.
Job Analysis	Determining crucial learning components through job analysis.
Ideal Bench Strength	Deciding on the optimal number of skilled individuals for critical roles. Typically, three employees are trained to handle turnover.
Assessment and Evaluation	Evaluating employees' current skills and readiness before starting rotations.
Development Maps	Creating plans, such as online learning, mentoring, or special projects, for implementing job rotations.
Job Period	Determining the duration for the job rotation program.
Selection Process	Choosing employees for rotation through assessments and performance reviews.
Internal Communication	Informing employees about the job rotation plan and its benefits.
Team Orientation	Orienting the team about job changes and new team members.
Support	Providing support and check-ins during milestones to keep employees motivated for learning.
Rewards	Communicating progress and providing appropriate rewards for productive team performance.

Table1: Steps of Effective Job Rotation Program
(Source: https://study.com/academy/lesson/job-rotation-definition-advantages-disadvantages-examples.html)

The establishment of a job rotation program, as delineated in Table 1, underscores the necessity of a structured and strategic approach to employee development. Leadership commitment emerges as a fundamental prerequisite, setting the stage for the meticulous selection of critical job positions and the analysis of job components. This preparatory phase is essential for tailoring the job rotation to meet both organizational needs and employee growth objectives.
The concept of ideal bench strength is particularly noteworthy, emphasizing the strategic foresight required to maintain operational efficiency in the face of turnover. Furthermore, the assessment and evaluation of employees' skills prior to rotation highlight the program's adaptability, ensuring that individuals are matched with roles that align with their

developmental needs and career aspirations Development maps and the subsequent selection process underscore the program's focus on individualized growth paths, integrating various learning modalities to facilitate comprehensive skill acquisition. Internal communication and team orientation are critical for fostering an inclusive culture that supports change and collaboration. Finally, the ongoing support and reward systems are indispensable for sustaining motivation and recognizing achievements throughout the job rotation process. These elements collectively contribute to a positive and productive work environment, ultimately leading to enhanced job satisfaction, reduced turnover rates, and a more versatile and agile workforce. The effective implementation of a job rotation program, as outlined in this study, holds significant promise for organizations seeking to cultivate a dynamic and skilled workforce capable of navigating the complexities of the modern business landscape. Through strategic planning, meticulous execution, and continuous support, job rotation can serve as a powerful tool for workforce development and organizational success.

7. CONCLUSION

In conclusion, job rotation stands not only as a cornerstone but as a dynamic cornerstone of innovative organizational management, offering a multifaceted and deeply transformative approach to enhancing workforce adaptability, skill diversity, and overall employee satisfaction. By systematically rotating employees through various roles and departments, organizations not only fortify the professional versatility of their workforce but also cultivate a culture of profound engagement, unwavering loyalty, and remarkable resilience. The practice of job rotation, intricately intertwined with the concepts of terminus technicus and sensemaking, serves as a catalyst for enriching employees' professional lexicon and facilitating a deeper, more comprehensive understanding of organizational operations and challenges. This strategic initiative not only nurtures a culture of continuous learning and innovation but also lays the groundwork for employees' managerial advancement, thereby augmenting organizational flexibility and operational excellence. Real-world implementations of job rotation in renowned companies such as Toyo Kogyo and Intel Corporation serve as compelling testaments to its practical benefits, illustrating its instrumental role in crafting an efficient, versatile workforce capable of adeptly navigating the dynamic demands of the contemporary business landscape. However, the effective application of job rotation necessitates meticulous consideration of organizational needs and constraints to fully harness its potential benefits. As organizations steadfastly navigate the complexities of the modern business terrain, job rotation emerges as a potent and proven strategy for fostering the development of a dynamic, skilled, and infinitely adaptable workforce, primed to make meaningful contributions to organizational success and sustainability. It is through the strategic deployment of job rotation that organizations can truly unlock the boundless potential of their human capital and chart a course towards enduring prosperity in an ever-evolving global marketplace.

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THE DEVELOPMENT OF HIGHER EDUCATION IN BULGARIA AND THE EMERGING CRISES

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ABSTRACT

The article is an overview of the monographs "Higher education system and labour market policies in Bulgaria in COVID-19 Crisis and post-crisis periods" and "COVID-19 Pandemics and its impact on Bulgarian universities in the context of the new challenges to the social system and labour market policies" by Venelin Terziev. The monographs address the changing social processes in the pandemic situation that has occurred around the world. The studies present analyses of the labour market situation in Bulgaria during the pandemic crisis and some solutions to new challenges to the higher education system. Special emphasis is put on the differentiated effect on higher education institutions, depending on the field in which universities carry out teaching and research activities, as well as on the peculiarities of the university business model in the changing environment for development of the higher education institutions. An attempt was made to analyze the emerging critical processes in the labour market, the prospects for action, and the post-crisis measures, as well as to forecast future actions.

Keywords: *Higher education, Development, Labour market, Emerging crises, Monograph, Bulgaria*

1. INTRODUCTION

For almost ten years now, Europe has been existing and focusing on three main goals — intelligent, sustainable, and inclusive growth. All resources are organized and mobilised to achieve them, but it is more than obvious that education and science have a leading role. On the one hand, these goals are a continuation of the paradigm for the creation of a "knowledge-based economy" introduced in 2000, but on the other hand, it is clear that modern technical and technological development is at such a stage that without science and innovation fast growth in development cannot take place. Without underestimating other types of growth, the intelligent is the one that performs the basic functions of achieving economic growth related to innovation, high efficiency, quality, productivity, and overall sustainable development (Terziev, 2022a; 2022b; 2022c; 2022d).

2. OVERVIEW OF THE MONOGRAPHS "HIGHER EDUCATION SYSTEM AND LABOUR MARKET POLICIES IN BULGARIA IN COVID-19 CRISIS AND POST-CRISIS PERIODS" AND "COVID-19 PANDEMICS AND ITS IMPACT ON BULGARIAN UNIVERSITIES IN THE CONTEXT OF THE NEW CHALLENGES TO SOCIAL SYSTEM AND LABOUR MARKET POLICIES"

The change in the management business model has been widely discussed in recent years — the one of the country as well as that of single structures, sectors, and organisations. This is a serious intervention for each of these levels as far as it requires a strategic transformation to be made. Universities are among the institutions, for which the business model transformation (or its establishment) becomes more and more urgent. The monographs examine the challenges facing higher education related to demographic problems and the quality of process management. Free movement and a single educational space are changing the attitudes, especially of young people, and their choice of where to pursue their education.

A change in education management is needed to find solutions to deficits and to build a model of "engaged universities" in which the quality of education is maintained at a level corresponding to the social and economic processes. Special emphasis is put on the differentiated effect on higher education institutions, depending on the field in which universities carry out teaching and research activities, as well as on the peculiarities of the university business model in the changing environment for development of the higher education institutions. The challenges of seeking answers to questions in terms of their usefulness, efficiency, and effectiveness are related to a definite and accurate knowledge of these processes and their impact on the entire social process in which they take place, or, to be more precise, are part of it. The impact of science on our development is a process that does not need to be proven because its results are obvious to all. Perceiving science as something abstract and incomprehensible would rather harm the process of its understanding and evaluation. The attempts to discuss knowledge sharing as part of the Open Science movement include the tasks to briefly analyse its historical development and the options for modern implementation of the open science idea. It discusses the process of knowledge sharing as an element of recognition of scientific works and part of social development. It seeks a solution to the established national and other restrictions for the sharing of knowledge, as well as its importance in the situation of limited sharing. In this context, the monographs also discuss the process of changes in the higher education system in Bulgaria related to the consolidation of Bulgarian universities. The monographs, on the other hand, try to address the changing social processes in the pandemic situation that has occurred in Bulgaria and around the world. Possible interpretations of operating in the current critical situation are examined and a parallel is sought with similar situations in previous periods. An attempt is made to partially analyze the emerging critical processes in the labour market. The current crisis with the spread of the COVID-19 viral infection once again puts to the test the implemented social policies in terms of unemployment and employment. Entire sectors of the economy are being stagnated and others are limited to such a degree that their functioning is minimal. This implies active processes of pressure on the existing social system. To what extent it is capable of withstanding these critical processes and the extent to which they will occur is yet to be seen, but it is clear to all that negative influence is already a fact and it will intensify. Although the Bulgarian economy has been growing in recent years, the progress is quite fragile and insignificant to compensate for what is happening now. The studies research and analyse the periods of a crisis in the labour market in Bulgaria in the newest history of our country. A parallel is made with the measures, which were taken in the period of active economic and political transformation at the end of the nineties of the past century and the transition to the market economy and the current crisis caused by the pandemic COVID-19 state of affairs. The prospects for action are analysed as well as the post-crisis measures and an attempt to forecast future action is made. The monographs analyse and explore the processes of the Bulgarian market currently taking place due to the emergency caused by the COVID-19 pandemic. These works attempt to systematically analyse the current national employment plan and its priorities, as well as to address the possibilities for change in a critical situation. It offers alternative options for action, both in the direction of the current set of measures and for the financial resource restructure to provide these measures in the crisis. The presented research is part of an extensive study that analyses and examines the processes in the Bulgarian market that unfolds in the emergency resulting from the COVID-19 pandemic. The focus is on the state of the labour market before the pandemic crisis and the subsequent changes in the current national employment plan given the challenges of the situation caused by COVID-19. It proposes measures and supports actions for restructuring the financial resource for adaptation of the plan to the new challenge to the labour market in Bulgaria. A strategy for higher education has to begin and end with the quality of the higher education process itself because this is the first and main criterion by which we may or may not be included in the world

university rankings. The strategy started with quantitative parameters and so will end in this way — with quantitative results, numerous changes in law, etc. Defining the main national priorities is perhaps the most essential action in creating a document of this nature and there is no way to organise the priorities of any system, even if it is the most important for our society. This analysis is research on the real situation as a result of the pandemic crisis caused by COVID-19 and looks for answers to the lack of appropriate training of Bulgarian students for action in times of crisis. Past periods are analysed when there was such specialised training and possible correlation is searched for in this emergency as well as the steps taken by the government and those of the whole population. This study represents an attempt to briefly analyse the labour market situation in Bulgaria during the pandemic crisis and to find a solution to new challenges our education system shall face. Through changes in the educational environment, the authors tried to formulate and define teaching methods, organisation, and management of the values-changing process, creation of a new culture of the school community, emphasis on the project-based educational process, increase in students' learning motivation through experience, development of key competencies so that learners can meet the requirements of the dynamic labour market — the ability to independently gain knowledge and planning skills. These works represent an attempt to define a group of issues existing in the Bulgarian higher education system. Summarising and specifying them is a matter of detailed analysis that would explain their low level and opportunities for change. The monographs analyse the extraordinary influence on the process of social isolation, both of the scientific works of academic Angel Balevski and his poetry. It attempts to draw a parallel between actions and events we witness in the current post-crisis isolation. The reflection of his scientific discoveries, as well as the attitude of Angel Balevski through his literary works in times of social, political, cultural, and economic transformations in Bulgaria raise particular interest (Terziev, 2020a; 2020b; 2020c; 2020d; 2020e; 2020f; 2020g; 2020h; 2020k; 2020l; Terziev, Andreeva, 2020i; Terziev, et al.; 2020j; Terziev, Georgiev, Ivanov, 2021a; Terziev, Lyubcheva, Georgiev, 2021b; Terziev, 2022e; Terziev, Lyubcheva, 2022f).

3. CONCLUSION

The country has a rich network of universities and colleges, but unfortunately, none of the inter-university networks like those in other countries work actively, efficiently, and successfully. And this is the way to create centres of excellence. I should say that whatever strategies we use, if there is no partnership and the creation of university expert teams, there can be no success. Nor will it be enough to use partnerships with universities abroad, for which Bulgarian universities usually play a secondary role. It is not about official cooperation, ensured by contracts that often do not work, but about creating expert teams that implement partnership and cooperation. In addition to building partnerships, they must be sustainable, i.e. that they have long-term business prospects. And thirdly — the interaction with business. Research will not be alive if it is not done. Technologies change so fast that if a created innovation is not implemented within a year, it irretrievably loses its value and if it is not created in partnership with the business in our country, the business will get the same or similar technology from abroad. Research shows exactly such situations — business prefers to trust an imported innovation than one created by our university or institute. Which in turn gives a chance for higher growth of the foreign economy. This is the reason why we are talking about the need to achieve integrated growth not only at the EU level but also in our country — a national expression of it. In the context of intelligence growth, the best option is to include business representatives in the expert partner teams. It is also about building trust between science and business, which is part of the value system of the current industrial age. Among the prerequisites for the realisation of intelligence growth, and with its increasing importance, is the development of start-ups and entrepreneurship.

They are again based on the leading role of human capital and the research-innovation interaction. Their future in our country is just as important as in Berlin, Lisbon, and Stockholm. Each era has its industry that symbolises it. In the 19th century, these were the railway companies. Car manufacturers, radio and television channels, and information and communication technology companies have marked the 20th century. Now, in the 21st century, is the time of digitalization and of the start-ups and entrepreneurship that use and develop it. Their advantage is not simply in the implementation of new technologies. A start-up in a key area is much more than a small or young company that applies digital technology to its work. This is something much more important. It is a combination of values and technology! What are the key values embedded in their DNA? Ambition, speed, entrepreneurship, striving for leadership. They strive to occupy a central place in their environment, in their ecosystem, to dominate it. The difference is in tradition and innovation, in routine and leadership, in human capacity and the combination of human capacity and digitality, in following well-known paths and tolerable risk. This type of entrepreneur has led technical progress through all the industrial revolutions, but of course at different levels. This is a new type of business model that breaks traditional connections and creates a huge network potential that can solve a given problem at once and lead it to a successful end. It's like a race where only the first ones win. The battle not only for profit but also for leadership, which brings many other benefits, is what motivates them. Start-ups covering key economic areas possess revolutionary innovative achievements. This is contagious and is already moving into a new trend for the development of key areas, namely the creation of artificial intelligence. This is a product of this same human capital, which is already on its way, and is very likely that the next industrial period will be connected with it. In recent years, a lot of research has been done on the processes of social adaptation, which are quite difficult and not always successful. We have a similar experience in Bulgaria, in fact not a very good one, in the process of reducing the Bulgarian Army staff and the subsequent dismissals of highly qualified specialists, tens of thousands who have failed to be successful in the primary labour market. After a process of social isolation, which may take another month, two months, or even more, a great number of people will need specialised help and an adaptive process, which may be accompanied by other critical situations and negative consequences. This is just an oblique reference to the whole complex of problems that will accompany the already qualitatively new and different social process, which requires very precise and measured actions and the expertise of a large number of professionals who must create a crisis action plan in this direction, as it is obvious that the currently developed ones are either not working or are only partially applicable. The recommendations and priorities that have been set and that are to be implemented by the National Employment Action Plan should be quickly reconsidered and the ongoing processes should be examined to orient them to users who have a special need in this particular situation. First of all, the freshly formed risk groups should be studied and defined, which up to this moment have not existed in the labour market, and also the most critical regions of the country and the relevant industries should be identified. The consequences will be multiple, and the processes are relatively long in time. This would make it necessary to go back to the approaches, that we implemented at the end of the past century which are well-adapted and will be easily approbated in the present circumstances, as well as to think about implementing a comprehensive plan, which should reflect the ongoing measures and foresee such that should be implemented consequently. This would require a change in the philosophy of the National Employment Action Plan, which would demand supplementary provision of funds and even human resources with suitable expertise in the social sphere. In other words, the preparation in certain, very important areas, should be thought of not as just a daily routine or simply to meet the current needs of teachers and disciplines, nor only when events come our way, but constantly and in the long run — priority knowledge and skills for all — for citizens, for managers, for pupils and students, who after the school or university

environment will need them in their professional realisation. Furthermore, a great part of them are future managers and they are expected to be highly efficient and high-graded, as well as to make the right and informed decisions in difficult situations. All this should not be determined by any ideologies but should be guided by genuine concern for the quality of our lives. The pandemic situation caused by COVID-19 motivated us to make this analysis, but the core reason is our observations in many areas of our lives that need a change. So when we are looking for solutions to economic, political, or other problems that happen and will continue to happen to us every day, we must think in perspective about the educational and cultural processes. Only their successful solution will lead to the much-desired efficient political and economic transformations. They are about to happen to us again in the near and distant future, and they will be of great importance to us. But we must be prepared to feel more confident to take the position we think we deserve. Otherwise, pointlessness will overwhelm us and give us unnecessary self-confidence, rivalry, and malice, but it will not help us overcome our self-sufficiency. Let us make more efforts for spiritual development and growth and not for survival so that our movement forward does not go together with decline but with the meaning of successful development! (Terziev, 2022a; 2022b; 2022c; 2022d)

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CULTURAL IDENTITY AND THE GLOBAL WORLD

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ABSTRACT

The current development tries to find good examples of realized socio-cultural identity in the conditions of the emerging rules of the global world. He tries to outline one such example in a Bulgarian school and points out the practical implementation of "cultural corridors", which are brought into real visual implementation. The possible connection between the implementation of the educational and educational process is sought. A brief analysis of the ongoing processes in the small settlements of Bulgaria was made, with the example of the municipality of Bregovo, which is located in the Don border with two other countries, given as an example.

Keywords: *Cultural identity, Cultural corridors, Global world, Bulgarian school, Bregovo*

1. INTRODUCTION

Various and many definitions of the concept of cultural identity are found in scientific and other literature. We propose to go beyond the framework of the exact scientific definition and look for the modern semantic meaning. For example, Simeon Marinov defines the concept of cultural identity as follows: "Cultural identity reflects the material and spiritual culture of any society and nation. It is often unconditionally the main factor for uniting the nation and a means for its unification in the conditions of crisis, instability, and historical fluctuations. In some countries, instead of the concept of cultural identity, "socio-cultural identity" is used accordingly.The content of the concept of cultural identity (socio-cultural identity) mainly includes components of the cultural-historical heritage such as objects, phenomena, and works having historical and cultural value. It is most often perceived that the cultural-historical heritage includes - material cultural heritage (buildings and facilities, samples of engineering and technical solutions, historical and cultural landscapes, archaeological monuments, sculptural monuments, works of fine, applied, and folk art, documents, books and other objects of the material world, preserving ideas about the peculiarities of people's lives in past eras) and intangible cultural heritage (languages and dialects, traditions, customs, beliefs, folklore and ideas about the structure of the world and society, literary heritage, musical, theater and cinematographic art). Given the type of cultural heritage, different approaches to the study of cultural heritage are also taking shape. Conceptual approaches to the study of cultural heritage form the content and structure of the normative regulatory framework for its effective and efficient regulation. Therefore, cultural identity is based on the understanding of the nature, structure, and functions of cultural heritage. Misunderstanding of conceptual approaches to cultural heritage ultimately leads to contradictions, especially in the normative framework of cultural heritage. We are talking about contradictions that affect national and international legislation in this area. In our country, cultural heritage is interpreted as a historical-cultural phenomenon. In this regard, we must point out that in the UNESCO Convention for the Protection of Cultural and Natural Heritage, to which our country is a party, cultural identity is understood as a reflection of cultural heritage following natural heritage". (Marinov, 2021).

Svetlana Kuyumdzhieva does it in the following way:
"Cultural identity can be articulated in hundreds of different ways. It is usually associated with belonging to a certain nation, group, race, religion... However, national and cultural identity nowadays are concepts that do not easily find their boundaries. Today, a person builds his cultural identity thanks to his social experience and the individual choices he makes and has to make constantly. Cultural identity is a concept with an almost unlimited capacity of defining possibilities. Perhaps this is exactly what makes it an extremely convenient occasion for many different artists to gather in one place". (Kuyumdzhieva, 2007).

2. CULTURAL CORRIDORS IN SCHOOL AS A MEANS OF FORMING NATIONAL IDENTITY

Understanding the cultural corridors that are extremely important to the cognitive nature of the information society, the knowledge society, where one navigates the world (receives, stores, selects, transmits, processes information) will bring us back to that state of mind that he spoke of Academician Likhachov, and for which today he insists on a new Revival - His Holiness Patriarch Neophyte and the Bulgarian Orthodox Church, in his address to the nation (Lihachov, Samvelyan, 1987). The clear cultural and ideological policy of the state is part of national security. The lack of ideological guidelines, the division of the elite, and the discrediting of the leaders will have sad and negative consequences. Are there modern national authorities recognized by the state, the intelligentsia, and the people at the same time? There is not, and this is a phenomenon of modern traditional society. When a municipal school in the extreme North-West of Bulgaria tries to remind about the primitive ideological orientations (from Kubrat's covenant to the idea of a united Europe); to recall how the local "elite" were formed and who were the local authorities for already 160 years of school history with recognizable, visualized images of teachers, principals, public figures who permanently inhabited the school space. Such an example is the founder of the school, Ion Cholaka, who was a close associate of Levski and close to the first Bulgarian exarch Antim Parvi. Emphasis is also placed on significant historical figures, such as Khan Kubrat, Khan Asparukh, Tervel, Tsar Boris Michael the Baptist, Saints Sedmochislenitsi, Paisius Hilendarski, the canonized school saint Deacon Ignatius, Hristo Botev. The pattern of the Bulgarian needlework and the Bulgarian bee are presented as a sign of the special connection with the cosmos and the interaction with nature. The presence of several water spaces, a mill with a wheel and running water and two fountains, a water wall, and a clock with Bulgarian embroidery, on which are written the words of Democritus "Everything flows, everything changes". The spiritual center, which also unifies the building, is the school chapel. It is dedicated to the Holy Brothers co-patrons of Europe, where all historical and contemporary messages for our future are concentrated. In such an environment, conditions are created to get an answer to the question: of how to form our national and cultural identity, especially in border and cross-border areas, such as the area of the municipality of Bregovo. The logical questions arise, is it possible for a school like St. St. Cyril and Methodius Secondary School, which is located in the border town of Bregovo, located on the border with the Republic of Serbia, with the cultural corridors created as a result of hard work over the last two decades, to have affects the identity policies of both the children who are brought up and educated in this school, as well as the local community and Bulgarian society? The school has a lot of historical morality, aesthetics, and spirituality, it carries the old Revival and is part of the new one, for which the Bulgarian Orthodox Church and the Bulgarian Patriarch Neophyte, as well as the Bulgarian communities abroad, are pleading. Such schools must become more and more visible in order to be able, at a certain moment, through the structures and the interaction with the local authorities, to influence the decision-making at the national level, related to the national identity, through the cultural corridors that they create.

Schools with such a concentration of historical and cultural messages, which create references from the past to the future, should have a special place in every society: Literally and figuratively, this is where Bulgaria begins. In fact, such schools are the alpha and the omega, the beginning and the end of Bulgaria as border schools. The two neighboring countries - the Republic of Serbia and the Republic of Romania, with which a common historical destiny and a common future are connected, can also be identified if they follow the rules of cultural corridors. These rules can be defined as follows - to share and learn about traditions, culture, customs, and the European future. Such schools are a kind of ambassadors and diplomats who are of key importance and should be invested in. The educational function of the school is gradually moving away from its meaning with the introduction and development of digital forms - distance education and online learning. The modern trends for digitization of the intellectual and cultural heritage, the use of various interactive technologies, and the development of the virtual environment for communication. Gaining knowledge in such a way has a significant impact on education and self-education, which are a part and characteristic of any level of culture. Culture is related to man and human presence, it is the universal way of interaction with nature, the way of our presence in the environment. In order to talk about culture, it is necessary to have a purposeful thought process that provokes and motivates human activity and ideas to transform the world around us. Culture is also a society, united by tradition and religion. Culture encompasses all forms of human creativity. The school is the place of every culture, it is called to educate, to add education to the contribution of the smallest, but also the most important part of society - the family. If we imagine a traditional school, as in practice this school in Bregovo, we must feel the time continuum in which it resides. The school with a history of 160 years, which defines it with its importance in the social development of the local community and the region. It was founded in 1864 by Daskal Ion Cholaka, who was a prominent public figure and champion of Bulgaria's freedom. At the same time, Vasil Ivanov Kunchev - the Deacon was a teacher in Voinyagovo, teaching reading and writing to the local children, telling them stories about the glorious past of Bulgaria, singing folk songs to them, and often giving his lessons in nature. An even more interesting fact is that these two people will meet in 1872. Levski will sing “Dostoyno est” to the right clergy of the Assumption Church in Bregovo, on the day of Saint Charalampius. In the chronicles of the time, we discover the place of Bregovo, the school, and ourselves in the history of our people and connect them with the traditions and customs in every layer of culture to this day. Through imagery, (i.e. through the images of the Thessalonica brothers who are over forty, through the images of personalities, moments of history, the embedded nature in the fountains, the water wheel, the water wall, images related to the earth and its fertility) we achieve elements of sensory cognition, and through intellectual conscious cognition (in the lesson) images are already perceived as a basis for forming concepts. Students who are less sensitive to intellectual cognition are open to concrete visual cognition, engaging not only the mind but all human senses. This principle in didactics helps us to experience and make sense of things that are difficult to understand but have great emotional value and therefore remain in our long-term memory. The school is a temple, and we know that in the temple, the images that suggest meanings are of particular importance, giving reason to work hard and understand what is hidden behind these images, and why they are there. Today we talk, and we will talk continuously, about functional literacy, orientation in space and time, our location here and now, about the fact that not only artificial reality, but also our imagination based on knowledge, can carry us forward, and back in time. If we take a virtual walk around the border school in the small northwestern town of Bregovo, it will inspire you, because: You are in a Bulgarian school, and its revival spirit clearly shows that it knows where it started from, where it is, and what its purpose is. The central entrance will welcome you with an architectural arch, under which is a built-in door.

On both sides of the entrance, the full-length images of the brothers Cyril and Methodius are painted according to the church canon (Picture 1);

Picture 1: The full-length images of the brothers St. St. Cyril and Methodius

Here you will find all the stages of the Bulgarian Revival. Already at the central entrance of the building are written the Glagolitic, the Cyrillic, the prayer of Constantine Cyril the Philosopher for an enlightened Bulgaria, the relief panels of the Golden Church from Veliki Preslav from the time of Tsar Simeon, as well as the relief of Boris placed in a special niche, with all the insignia of power Michael the Baptist, the images of The Seven Apostles of Bulgarian Orthodox Church, as well as a panel showing the defence of the Slavic script against the Trinitarian heresy before Pope Hadrian II in Rome (Picture 2-3);

Picture following on the next page

Picture 2: The relief panels of the Golden Church from Veliki Preslav from the time of Tsar Simeon

Picture 3: The central corridor of the school

The school teaches in love for the earth and all the goods of the earth. The adjacent corridor is where the offices for professional training of agro-ecologists are located. Drawings and large canvases related to the earth and its fruits are located here. Here is also the logo of the school, which is embedded in a wall. It is an image of the spiral of development and fire, in harmony with the images of Saints Cyril and Methodius. The inscription on the logo is: "School of spirit and innovation". In the same corridor is the Tree of the Vidin Holy Mountains, with all the monasteries, as well as the Tree of Life. Corridor 1300 years after the creation of Bulgaria is unique with a finger embedded in it, a finger from the grave of Khan Kubrat and a ring gift from the National History Museum. Here are placed the geographical maps of all the Bulgarian states that existed after the collapse of Old Great Bulgaria, as well as a monument that is an exact copy of the one from Malaya Pereshchepina in Ukraine, where the grave of the famous Bulgarian Khan was discovered, will surprise you and take you to another dimension. A corridor telling about the Apostle of Freedom - Vasil Levski, with his bas-relief and a reconstruction of the windmill in the Solakovi Inn, because not elsewhere, but precisely in the yard of the Inn, was the windmill in which Hristo Botev and Vasil Levski spent the frosty winter of 1869. Standing in front of our reconstruction, we recall the words of the great revolutionary and poet: "My friend Levski is an unheard-of character! Cold, wood, and stone crack, but he sings cheerfully and always sings". The windmill is made from an old Austrian bronze stove that was part of the school's offices. A beam reminiscent of the gallows is built into this corridor, and Botev's poem "The Hanging of Vasil Levski" is inscribed. The corridor space tells about the Apostle's family and brothers, as well as his mother Gina Kuncheva (Picture 4);

Picture 4: The Apostle of Freedom - Vasil Levski

The European Corridor is a story about the visit to the European Parliament in Brussels, Belgium by representatives of the students from the school. Along it, relief maps of Europe and the member states of the European Union can be seen. The characteristics of each member state are presented, as well as the emblematic building, a symbol of European democracy and the official seat of the European Parliament in Strasbourg, in front of which the flags of all European countries are displayed. The school in Bregovo is a kind of cultural corridor, which has so many meaningful dimensions that it is not easy to cover and understand them in one visit there. We are witnessing a reality dependent on the cultural horizons of not one or two generations. If the culture changes, so does the reality. Currently, some young people live in a world with elements of hyperreality, disorder of time and place, non-synchronous memory, variable identity, and mixing of different cultures and historical periods. The digital generation is looking for a universal language in which to communicate. It knows about the European space, but it does not know its place in it, it cannot locate its residence even in its own country. The temptation to use ready-made information is ready to swallow even the slightest effort to change this status quo. For some students, libraries, periodicals, and even textbooks do not exist or are so archaic in their ideas that all attempts to convince them otherwise are futile. We talk about existential culture, high culture, and pop culture, but whatever we talk about, the main problem is the irretrievably outdated archaic, and ineffective classroom lesson system that does not take into account the individual needs of students. The solutions to the problems in the cultural aspect of school are part of the solutions in education in general: access to education, regardless of other circumstances. Transition from the standard and unification to individual educational programs. The modern education system must be transformed from a set of institutions that translate knowledge into a special space for the exchange of knowledge between participants in the educational process. Apart from community events, small settlements cannot offer theater or other performing arts. They are doomed to survive in a time of incessant economic and social change, and for this reason, they quickly surrender or despondently resist without being able to develop. The culture of the small settlement defines the reality of this community. It is not a panacea, but in the small town, the creation of a specific environment in the school is so concrete and relative in timelines that we can easily identify: where we are in the distant or recent past, in the present, or we are outside of time and space. It is important for the school to specify the near and far distance in time, the temporal layers, to be filled with specific content - as understandable as it is useful. In this sense, the cultural corridors in any educational institution will be useful landmarks so that we can dwell not only in the past but give emphasis to the present and the future by presenting school life with the works of outstanding students, the school's award-winning places, dedicated spaces for changing exhibitions, places for solemn events, stage for performances of students and teachers, creative workshops. The school must show that it lives and motivates its residents through its successes. Elementary students live in an environment populated by fairy-tale characters or favorite animals. In the corridor, they use there are stories about the life of bees, beehives, a mill, a bear with bears, and a water wall. Embroidery, the perpetual calendar, and the clock with embroidery, different textures, volumes, and colors are important for children's development. Each class has a logo or something that distinguishes it from the others. There are many “cultural corridors” in the school and they have their special educational function. Each corridor is a story with a continuation. Even when they go to the school canteen, the students will meet Father Paisius, locked in his cell in the Athos monasteries, bent over the manuscript of: “History of Slavonic Bulgaria”, with Borimechka and the cherry ball. The school is that institution that sets the pulse of the small town. The old school bell, cast during the Balkan Wars, which is said to have been heard in neighboring countries, is a reminder of those 1,200 students who said the prayer: “Our Father” every morning before entering class (2024).

3. CONCLUSION

Searching for relevant and objective opportunities in this dynamically changing environment is a difficult task. The cultural survival of small settlements is an important feature for defending the traditions of the nation-state, and partially establishing a balance between globalist interests and claims for its erasure. The implementation of such ideas is only part of a plan for the restoration or defense of the traditions of Bulgarian society, but it would not be possible without a national cultural strategy. The implementation of such a strategy would be a successful endeavor if it were sufficiently well funded.

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DEVELOPMENT OF THE TRANSPORT NETWORK OF VARAŽDIN COUNTY

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ABSTRACT

Traffic serves as the bloodstream of modern society, shaping, connecting and defining space and its functions. Varaždin County, with the features of its historical, cultural and geographical position, stands out as a natural key in the regional and European transport. The aim of this work is based on the analysis of the transport network of Varaždin County, with a focus on the geo-traffic position of Varaždin County and the existing transport infrastructure. The purpose of this paper is defined by the theoretical framework, that is, the geotraffic position of the region, which includes state and local roads, the railway network, and bicycle routes that reveal the dynamics and potential of sustainable mobility. Methodologically, this paper relies on a combination of previous research and fresh empirical data, collected through a survey that covered a wide spectrum of Varaždin County's population. This integrated analytical matrix enables a deeper understanding of the traffic dynamics of the region, with special reference to cycling as a symbol of the transformation and modernization of traffic paradigms. In conclusion, this paper not only offers a visualization of the current state of the transport infrastructure of Varaždin County, but it also lays the foundations for any and all visionary planning of the future. A crucial part of this vision is the promotion of sustainability, innovation and integration, ensuring that Varaždin County remains a vital and respected point on the traffic map of Europe. The road infrastructure of Varaždin County not only reflects its key geographical position as the intersection of international traffic arteries, but also the deep-rooted multifunctionality of the region. This combination of geographic and socio-economic dynamics makes Varaždin County the epicenter of activities, interactions and exchanges in a wide range of sectors.

Keywords: *cycling routes, master plan, transport networks, railway infrastructure, Varaždin County*

1. INTRODUCTION

Transportation, in its essence, is the backbone of modern society, and its significance has transcended basic needs for connecting people and goods. In today's globalized world, transportation serves as a catalyst for economic development, cultural exchange as well as technological innovation.

It not only shapes the physical space, but also profoundly influences the socio-cultural dynamics of communities, fostering interaction, the exchange of ideas and the formation of identity. Advanced transportation systems are not just technologically sophisticated, but they are also living symbols of progress, exhibiting a society's ability to adapt, innovate, and integrate with the global community. This integration, boosted by fast and efficient transportation, opens doors to unlimited possibilities, promoting trade, tourism, education, and cultural exchange at unprecedented levels. Therefore, transportation is not merely the mere movement of people and goods; it is a dynamic force that shapes the way we live, work, and think in the 21st century. Čavrak's definition of transportation from 1999 provides a comprehensive insight into its essence as a multidisciplinary phenomenon encompassing various aspects of human interaction and exchange. In the context of the globalized and digitized world of the 21st century, transportation can be viewed not only as the physical mobility of people and goods but also as a vital mechanism that fosters economic activity, cultural diversity and technological progress (Čavrak, 1999). Beyond the material movement of goods and people, transportation now includes digital flows of information, ideas, and innovation. In a world where information is transmitted in real-time and distances are reduced to virtual boundaries, transportation becomes the focal point of contemporary society relying on connectivity and communication speed. Taking a further step into research, Cerovec (2001) delves into the essence of mobility and connectivity, recognizing its dimensionality and complexity. In the context of a globalized society, Cerovec's definition iluminates transportation as a dynamic process that extends far beyond mere movement. As Cerovec describes this phenomenon, transportation is not just the simple act of moving from point A to point B; it is an integral network that involves sophisticated logistical operations, technological innovations along with complex management systems. Additionally, transportation serves as a catalyst for social interactions, economic transactions, and cultural exchanges (Cerovec, 2001), moreover transportation is crucial, because it is part of the north-western connection of the Republic of Croatia to European transport systems. The exceptionally significant transport role is verified by the fact that two important transport corridors intersect in this area: the transversal, which is the shortest and most convenient traffic link to the central Danube region and the northern Adriatic, and the longitudinal, which follows the course of the Drava River, connecting the Republic of Croatia to its western and eastern neighbors. Varaždin County is located in the extreme northwest part of the Republic of Croatia. It borders the Republic of Slovenia to the west, and its borderline character is further emphasized by the proximity of neighboring (gravitating) countries: Austria and Hungary. The neighboring counties with which Varaždin County shares its borders are Međimurje, Koprivnica-Križevci, Zagreb, and Krapina-Zagorje (Srpak, 2022). Varaždin is the largest city in Varaždin County both in terms of area and population (Figure 1).

Figure following on the next page

Figure 1: The position of Varaždin County in the Republic of Croatia (Source: Srpak, 2022.)

According to the 2021 census („Census of Persons, Households, and Housing Units, by statistical regions of the 2nd level and counties"), Varaždin County, with an area of 1,261.29 km2 (adjusted to the data from the Croatian Bureau of Statistics - DZS, 2021), is one of the smaller counties in the Republic of Croatia. However, it stands out with a population density of 139.42 inhabitants per square kilometer, totaling in 161,820 residents, which is above the national average (71.5 inhabitants per square kilometer). It is among the most densely populated counties in Croatia, along with Međimurje (155.99 inhabitants per square kilometer) and Krapina-Zagorje (98.41 inhabitants per square kilometer). Geographically, Varaždin County consists of two parts: a larger one belonging to the Drava River basin and a smaller one belonging to the Sava River basin, encompassing the area between the Drava River to the north (Korunek et al., 2010). The county holds significant transportation importance as two major transport corridors intersect within its borders. The transversal corridor, of primary significance, represents the shortest and most convenient link to the central Danube region and the northern Adriatic (via the so-called „Croatian threshold"). Simultaneously, the longitudinal corridor of secondary significance follows the course of the Drava River. Figure 2 illustrates the position of Varaždin County in the Croatian territory, emphasizing the region's importance and advantages in terms of geo-transport significance. This undoubtedly implies fundamental starting points for future development.

Figure following on the next page

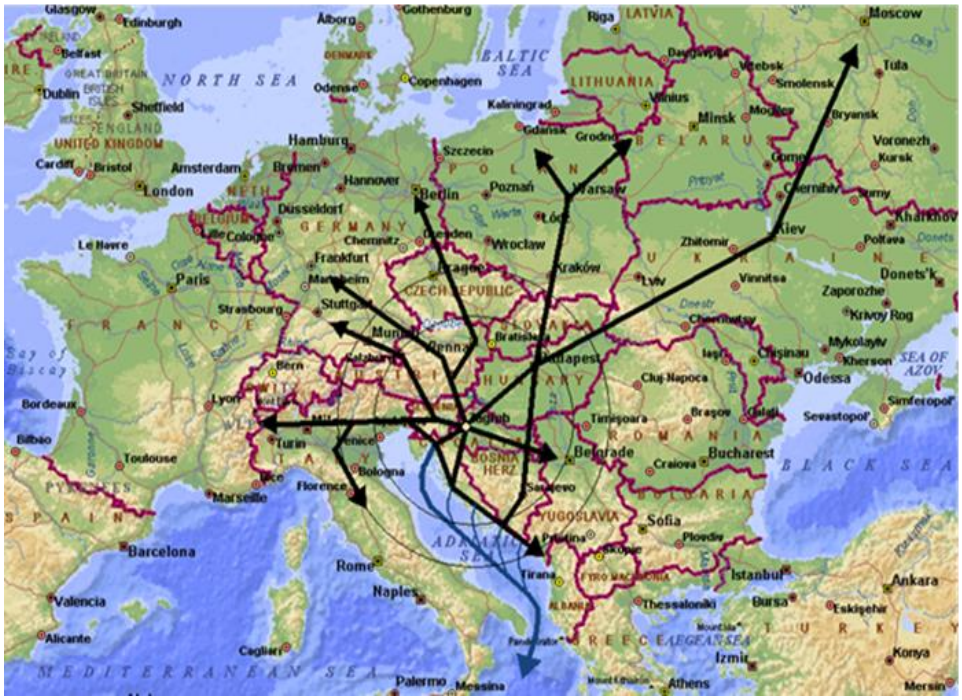


Figure 2: The main integration directions for Croatia.
(Source: Srpak, 2022.)

The Council of the European Union adopted the Regulation on the Trans-European Transport Network, or TEN-T network. In 2023, the European Parliament approved the Council of the European Union's proposal for amendments to the TEN-T Regulation (Regulation on the Trans-European Transport Network or TEN-T network). According to this amendment, the Republic of Croatia, in addition to the existing two transport corridors (Mediterranean corridor and Rhine-Danube corridor), will be additionally positioned on two more corridors - the Baltic Sea-Adriatic Sea and the Western Balkans-Eastern Mediterranean corridor (Figure 3).

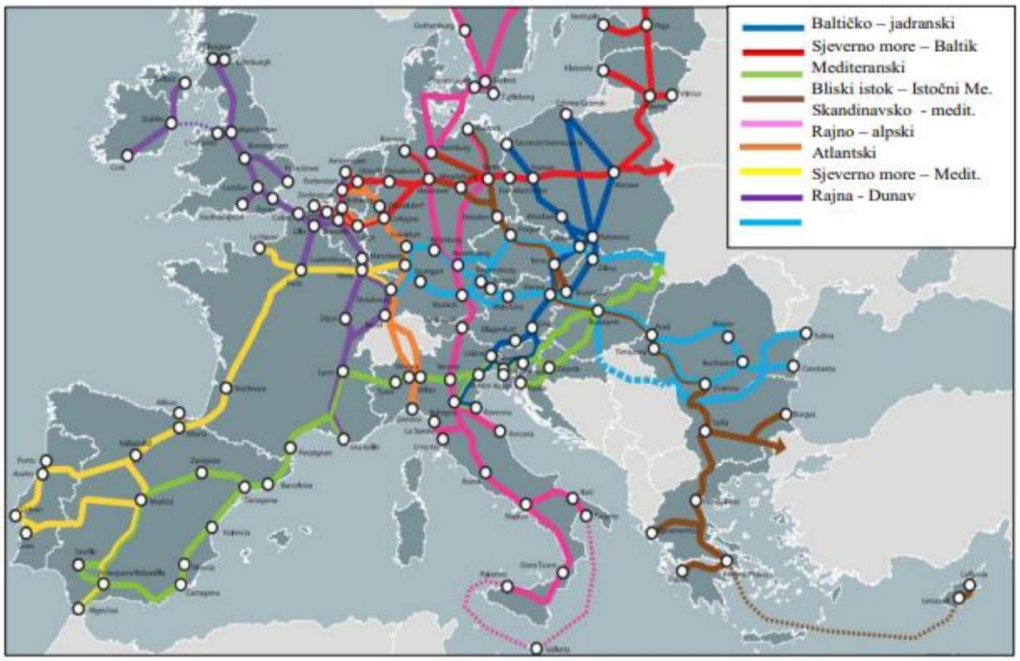


Figure 3: TEN-T corridors.
(Source: https://ec.europa.eu/transport/themes/infrastructure_en)

The TEN-T Regulation was adopted in 2013, before the Republic of Croatia became a member of the European Union. In that version, crucial parts of Croatia were not covered, hindering the EU co-financing for vital infrastructure projects in those areas. The current TEN-T Regulation now includes a section from Rijeka (which will be part of the three corridors) through Zagreb to the borders with Hungary and Slovenia (The Mediterranean corridor for railways and roads) and the Rhine- Danube River corridor (Danube, Sava, ports of Vukovar, and Slavonski Brod). Since Croatia gained independence to present day, the most significant transportation investments have been directed towards roads, while railway infrastructure and the number of passengers and freight transported by rail have been neglected. Statistics indicate that the number of railway kilometers has either stagnated or decreased, while highways have grown from 394 km (1996) to 1310 km (2018) (Croatian Bureau of Statistics, 2019). There has been a reduction in the usage of railway transportation, making roads the most dominant form of freight transport in Croatia (73.6% according to Eurostat, 2019a). The majority of passenger transport occurs by cars (85%), with railways being less utilized (2.7%) (Eurostat, 2019) (Keček et al., 2022). Harjač et al. (2018) emphasize that the transportation system is well-developed due to high population density, the number of settlements and the transportation-geographical significance of the area. In Varaždin County, settlements are connected by constructed roads, with an emphasis on dispersed lowland settlements that are well-connected to urban centers (Spevec, 2009). Varaždin County comprises of 6 cities (Ivanec, Lepoglava, Ludbreg, Novi Marof, Varaždin, and Varaždinske Toplice) and 22 municipalities (Bednja, Breznica, Breznički Hum, Beretinec, Cestica, Donja Voća, Donji Martijanec, Gornji Kneginec, Jalžabet, Klenovnik, Ljubešćica, Mali Bukovec, Maruševec, Petrijanec, Sračinec, Sveti Đurđ, Sveti Ilija, Trnovec Bartolovečki, Veliki Bukovec, Vidovec, Vinica, and Visoko), as shown in Figure 3. The city of Varaždin serves as the regional center, while Ivanec, Ludbreg, Novi Marof, Lepoglava, and Varaždinske Toplice act as subregional centers aimed at maintaining the development of polycentric settlement networks while further encouraging the creation of a properly structured network of cities in the county (Srpak, 2022).

Figure 3: Administrative-territorial division of Varaždin County (Source: Srpak, 2022.)

Varaždin, as a historical and cultural center in northwest Croatia, represents a microcosmos of challenges and opportunities in the context of urban development and transportation infrastructure. The city's development, structure and functionality are inevitably linked to the efficiency and sustainability of its transportation system. The traffic dynamics of Varaždin reflect its transitional role as a hub connecting various parts of Croatia and neighboring

countries. However, as highlighted by research from Harjač, Gašparović, and Jakovčić (2015), the existing road system of the city exhibits certain discrepancies and challenges. It is precisely the integration of traffic corridors with diverse functionalities – from vital economic nodes to essential health and educational institutions – that creates a synergistic effect fostering growth, development and integration. Varaždin County, therefore, is not merely a transit point, but also a vital focal point that shapes and directs regional and broader traffic flows. This complex interplay between the transportation network and socio-economic structures emphasizes not only the importance of Varaždin County within the national context, but also its irreplaceable role in connecting and integrating European regions.

2. EXISTING TRANSPORT NETWORK OF VARAŽDIN COUNTY

Varaždin County is characterized by high population density and a large number of settlements, along with a significant transportation and geographical importance. Ilić (1995) investigated the traffic and socio-economic characteristics of the Varaždin region and found that the road network in the region is well-developed. Franolić and colleagues (2010) emphasize the imperative of developing the transportation infrastructure of Varaždin County as an essential precondition for continuous socio-economic progress in the region. Recently, the county has become an attractive investment zone due to its favorable transportation-geographical position, marked by the intersection of important European corridors and proximity to borders (Cini and Varga, 2009). Within the scope of this revolutionary transportation perspective, the key focus is on the concept of sustainable mobility as a fundamental axis for future urban and regional development. This implies not only promoting the use of public transport, but also advocating alternative, sustainable means of transport such as cycling and walking. Therefore, sustainable cities cannot thrive without sustainable mobility (Alex et al., 2022; Cvitković et al., 2023). The concept of sustainable development is a crucial prerequisite for the overall growth and development of society, meaning that all ecological, social, and economic elements are interconnected with transportation (Chatziioannou et al., 2023). According to Silva and colleagues (2022), a sustainable mobility system is one based on smart mobility, fully interconnected via the internet and intermodal transport. Furthermore, Brlek (2022) highlights that the concept of Mobility as a Service (MaaS) aims to integrate various transportation services into a unified, On-demand accessible system through a single application with a unified payment channel. MaaS functionalities provide solutions to challenges such as traffic congestion, delays, increased fuel consumption as well as environmental pollution in large urban areas. Simultaneously, Varaždin County aims to increase the capacity and efficiency of the railway sector, which has been recognized as a key factor in reducing the load on road networks. This goal is based on strategic European, national, inter-county, and county-level documents, as well as local initiatives (at the EU level, the White Paper on Transport 2011; Croatia's Transport Development Strategy 2017-2030; Croatia's Spatial Development Strategy; Master Plan for Integrated Territorial Investment (until 2027 for the northern Croatia region); Sustainable Urban Mobility Plan for the city of Varaždin).Through the Spatial Plan of Varaždin County (Official Gazette of "Varaždin County" 8/00, 29/6, 16/9, and 96/21), the following significant roads are planned:

- Drava Expressway (PBC): Slovenia - Varaždin - Koprivnica – Osijek (with connecting roads to the existing or planned road network as outlined in the prepared documentation).
- Zagorje Expressway (ZBC): Varaždin (highway: Goričan - Varaždin - Zagreb) - Ivanec – Krapina with a variant towards Sveti Križ Začretje (highway: Zagreb - Slovenia) (including connecting roads to the existing or planned road network as specified in the prepared documentation).
- Bypass of the town of Varaždinske Toplice - connecting road from the highway interchange Varaždinske Toplice (from DC 526) towards ŽC 2250.

- County road on the route LC 25070 from D35 to ŽC 2101 (Municipality of Vidovec, Municipality of Petrijanec).

Thanks to the county's determination, which includes the requirements made by competent public authorities, new transportation solutions and structures are being planned, that are based on the previously prepared study documentation plan, namely:

- Sustainable modernization of the state road D3 by constructing a new lane and bridge west of D3 and the existing bridge towards Međimurje County, along with the improvement of traffic conditions at the intersection of D3 and Koprivnička Street (in the area of the City of Varaždin).
- Expansion of the eastern bypass in Varaždin, specifically the part of the state road D2 from the roundabout in M.P. Miškina Street to the roundabout in Gospodarska Street (with two lanes).
- Planned new road connection between Varaždin and Međimurje County (towards the bypass of Nedelišće and Pušćine) as a potential or alternative corridor for the road connection between the two counties, which still requires further research. This also includes the northwest bypass roads of the city of Varaždin (according to the request of the competent public authority and the planned Spatial Plan of Međimurje County and the Spatial Plan of Urban Development of Varaždin).
- Additional interchange traffic junction on the southwest bypass of the City of Varaždin (future Drava Expressway) is planned at Jalkovec, according to the conceptual design, which is in progress.
- Relocation of a section of the state road (D2) from Petrijanec to Hrašćica (in the areas of the municipalities of Petrijanec, Sračinec, and the City of Varaždin*).*
- Connecting road from the Zagreb Ring Road (fast roads Popovec - Marija Bistrica - Zabok) to the Zagreb – Varaždin – Goričan Motorway, at the interchange in Breznički Hum (as a connection between two motorways).
- Possible or alternative road corridor from Ivanec to Novi Marof (mostly following the existing route of LC 25157 and ŽC 2105).
- Possible or alternative corridor for a new road between ŽC 2088 and D 528 (future PBC) in the area of the Municipality of Gornji Kneginec.
- Possible or alternative corridor for a road between ŽC 2071, the planned Drava Expressway (PBC), and D 2 in the area of the Municipality of Sveti Đurđ and the City of Ludbreg.
- Modernization of the following existing roads, which are important for the county, with the possibility of their later reclassification into state roads:
- County road ŽC 2029 along the border with Slovenia (Municipality of Cestica).
- County roads ŽC 2056 and ŽC 2027 (border area) along the border with Slovenia (Municipality of Bednja, City of Lepoglava, Municipality of Donja Voća, Municipality of Vinica, Municipality of Cestica).
- County road ŽC 2258 from DC 74 towards ŽC 2056 (in the area of the Municipality of Bednja).
- County road ŽC 2076 in the eastern part of the county towards Koprivnica-Križevci County (in the area of the City of Ludbreg, Municipality of Veliki Bukovec, and Municipality of Mali Bukovec).
- County roads ŽC 2071 and ŽC 2033 from DC24 towards Međimurje County (in the area of the City of Ludbreg and the Municipality of Sveti Đurđ).

New county roads are planned in the areas of the City of Lepoglava, the City of Ivanec, and the City of Novi Marof. Additionally, local roads, which were not previously covered by the Spatial

Plan of Varaždin County (PPŽ) and, in accordance with current regulations, that need to be included, are planned in the following areas: Municipality of Cestica, Municipality of Petrijanec, City of Lepoglava, City of Ivanec, Municipality of Donja Voća, Municipality of Beretinec, City of Novi Marof, Municipality of Breznički Hum, Municipality of Visoko, Municipality of Trnovec Bartolovečki, and Municipality of Sveti Đurđ. There is also a possible alternative corridor (route) for roads in the area of the Municipality of Trnovec Bartolovečki (near the airport) (near the airport) (Figure 4).

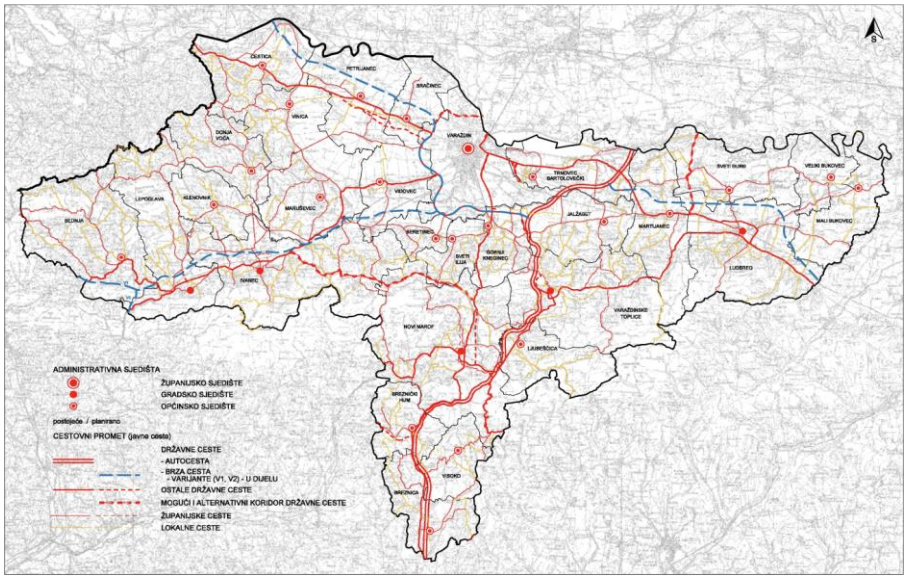
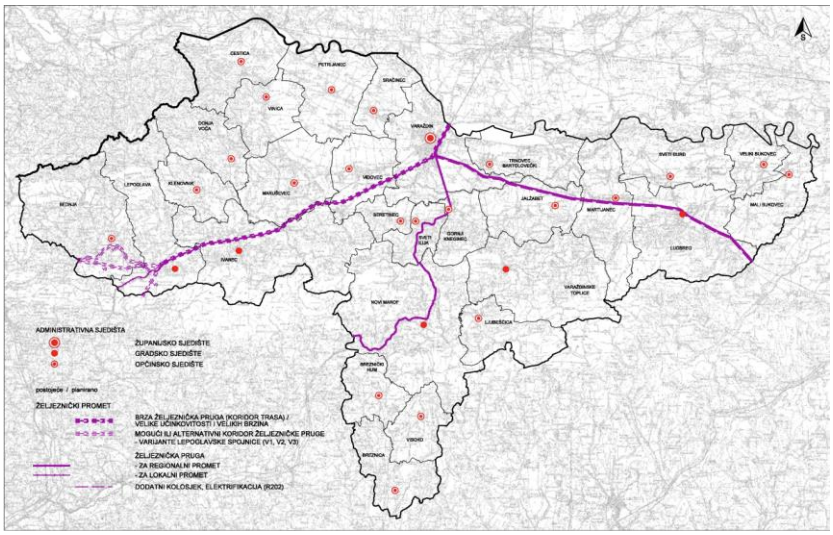


Figure 4: Road traffic and administrative centers in the area of Varaždin County (Source: Spatial Plan of Varaždin County (Official Gazette of Varaždin County, 8/00., 29/06., 16/09., 96/21.)

2.1. The railway network of Varaždin County

According to the current Spatial Plan of Varaždin County, the construction of a high-speed railway (linking Zagreb to Vienna) is planned via Lepoglava, Ivanec, and Varaždin towards Čakovec and Hungary. In this respect, the modernization of the existing local railway L 201 and a section of R201 is envisaged, along with the construction of a new connection called the „Lepoglava Link" (18 km in Varaždin and Krapina-Zagorje counties), there are three corridor variants under consideration for this link as well. The modernization involves the construction of an electrified, double-track railway with a bridge over the Drava River including specific solutions, which will be defined based on future study documentation (Figure 5).

Figure following on the next page



Slika 5: Railway traffic and administrative centers in Varaždin County
(Source: Spatial Plan of Varaždin County (Official Gazette of Varaždin County, 8/00., 29/06., 16/09., 96/21.)

According to the data from the scientific article „New Railway Lepoglava – Krapina" (Klečina et al., 2017), this railway is planned for mixed traffic - long-distance and international transport (InterCity train – international high-class train) between Murakeresztur (and other cities in Hungary) and Zagreb, as well as local passenger transport (between Varaždin and Međimurje counties) and including regional passenger transport (from Čakovec towards Zagreb). The existing railway network is outdated, so railway technology needs to be renovated and modernized as not a single kilometer of the railway track is electrified. Electrification would increase speed and significantly boost passenger numbers (Božičević and Perić, 2001; Ilić, 2000).

2.2. Bicycle routes of Varaždin County

Bicycle routes in Varaždin County are not overly demanding. However, Varaždin County only partially exploits its potential as a tourist destination for cycling. The advantages of Varaždin County for the development of cycling tourism include an attractive and diverse natural environment, rich cultural and historical heritage, a favorable climate along with a multitude of roads with low motor traffic intensity, as well as paths suitable for cycling. In Varaždin County, four road routes, one half off-road route, together with a half road cycling route have been established by the Tourist Board of Varaždin County. Above mentioned cycling routes in Varaždin County can be divided into a main cycling route as follows:

- R01 Bicycle Route in Varaždin County – Drava – Mura – Drava Bike Route,
- R02 Bicycle Route in Varaždin County – Drava – Mura – Drava Bike Route,
- R03 Bicycle Route in Varaždin County – Drava Route,
- Castle to Castle Route,
- Toplice Cycling Tourist Route,
- Other Routes (Figure 6).

The bicycle routes of Varaždin County attract visitors due to their moderate difficulty, making them more competitive compared to coastal routes. Despite the untapped potential for cycling tourism, the region boasts lush greenery, hilly landscapes, vineyards, along with cultural as well as natural heritage. With appropriate development, Varaždin County has the potential to become a key destination for cultural, eco and cycling tourism, enriched by an outstanding gastronomic offer.

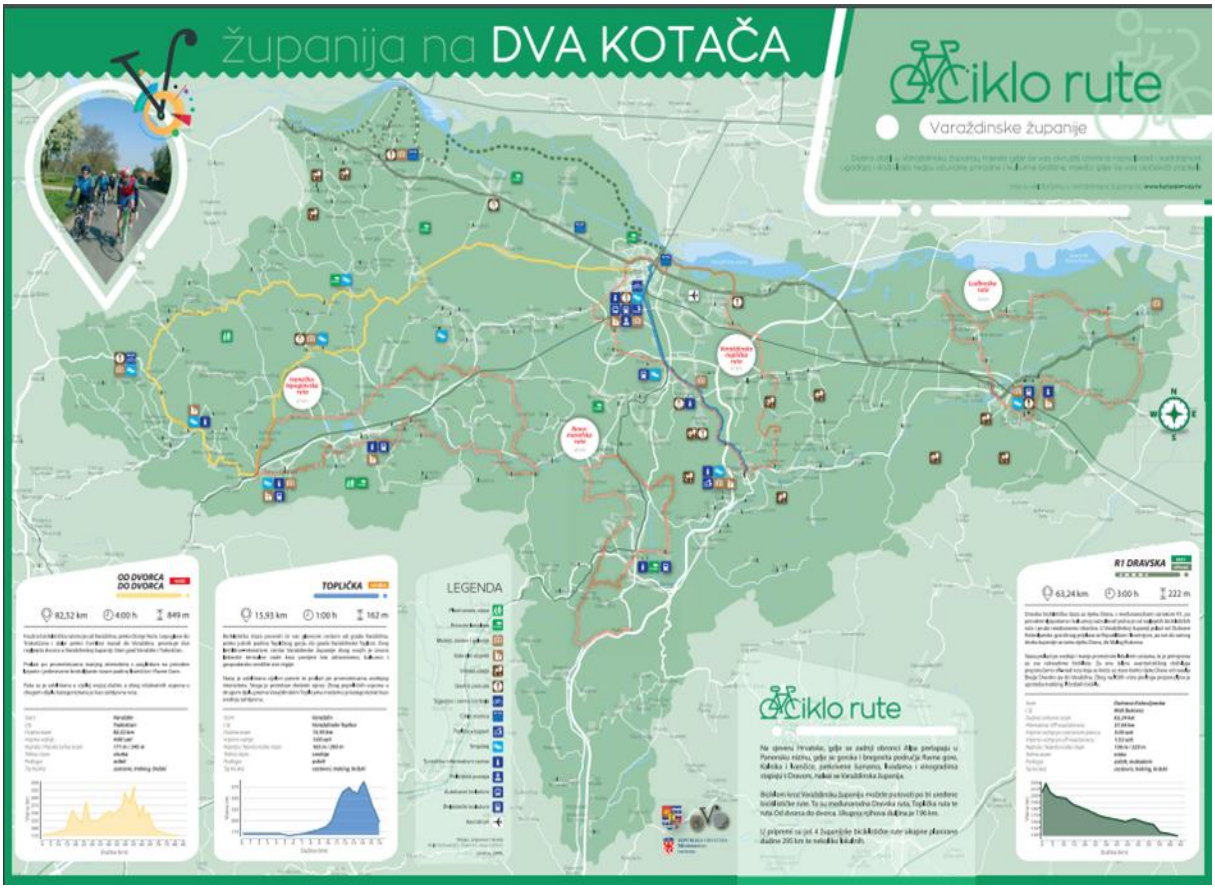


Figure 6: Cycling routes in Varaždin County
(Source: Operational Plan for the Development of Cyclotourism in the Varaždin County Area, 2017.)

3. ANALYSIS AND PROCESSING OF SURVEY DATA

In the theoretical segment of this paper, we are immersed into the conceptual framework of the geo-traffic position of Varaždin County, laying the foundations for further analytical depths. In the introductory chapter, not only are theoretical assumptions shaping the county's traffic landscape discussed, but also a holistic vision of its integrated traffic topography is provided (Mihaljević, 2010). The components of the traffic infrastructure, including road, rail, and bicycle networks, are thoroughly examined and deconstructed to give the reader a comprehensive insight into the complexity and dynamics of traffic flows within the region. The research conducted for this paper is based on the study of potential users of road and rail infrastructure, as well as users of existing cycling paths. A questionnaire with 16 closed-ended questions was used in the research, where each respondent answered questions of the above mentioned type. A total of 183 respondents completed the survey, with 102 of them being female (55.7%) and 81 male (44.3%). The majority of respondents, 69 (37.7%), belong to the age group of 31 to 40 years, while 59 (32.2%) are in the age group of 18 to 30 years. Additionally, there were 34 respondents in the age group of 41 to 50 years, 11 respondents under the age of 18, and 10 respondents over the age of 51. Analyzing the age groups of respondents, it has been observed that the largest number, 69 respondents (37.7%), belong to the age group of 31 to 40 years, while 59 (32.2%) are in the age group of 18 to 30 years. Additionally, 34 respondents were in the age group of 41 to 50 years, 11 respondents were under the age of 18, and 10 respondents were over the age of 51 (Figure 7) (Slavinec, 2019.).

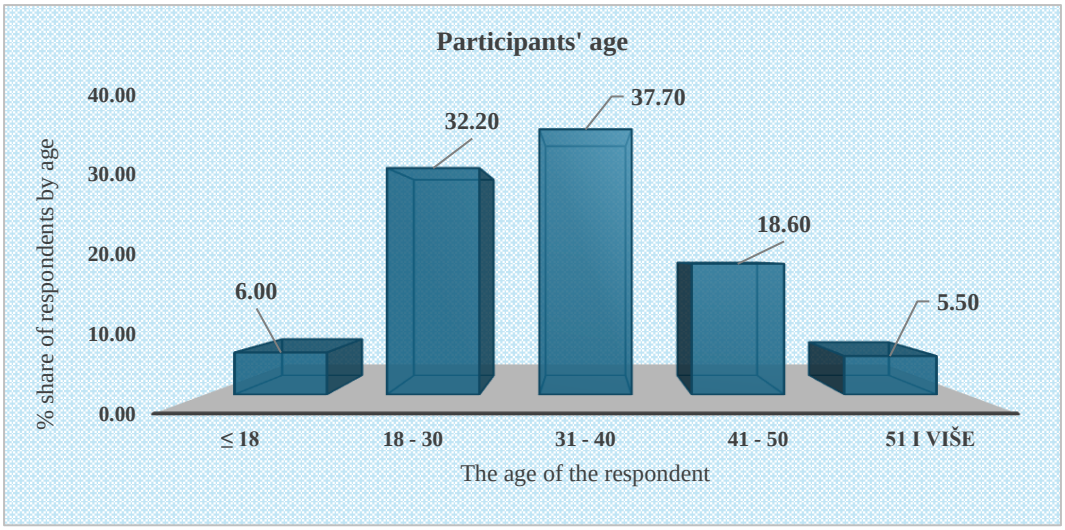


Figure 7: Participants' age.
(Source: Authors' work, 2024.)

As an answer to the third question, "Are you the owner of a personal vehicle?" out of a total of 183 respondents, 134 (73.2%) answered affirmatively, while 49 (26.8%) do not own a personal vehicle. The fourth question related to the mode of transportation to school or work. The majority of respondents, 75.4%, travel by their own car. Other respondents use various means of transportation: 13.7% use another means, 6.6% cycle, and 4.6% travel by train (Figure 8). From these answers, we can conclude that traveling by a personal car is the most widespread mode of transportation among the respondents (Slavinec, 2019.).

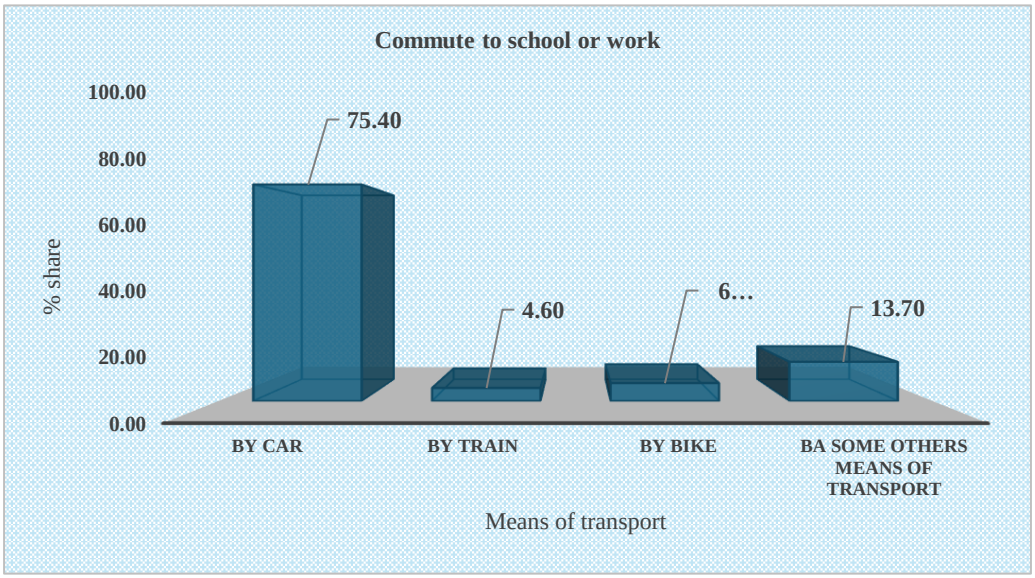


Figure 8: Commute to school or work
(Source: Authors' work, 2024.)

The fifth question was about the frequency of travel, specifically the question asked was: "How many times a day do you travel?" When it comes to the frequency of travel, the smallest number of respondents, only eight of them, travel ten or more times a day. Ten respondents travel between five to ten times a day, while 60 respondents travel three to five times a day. The largest number of respondents, 105 of them, travel once to three times a day (Figure 9) (Slavinec, 2019.).

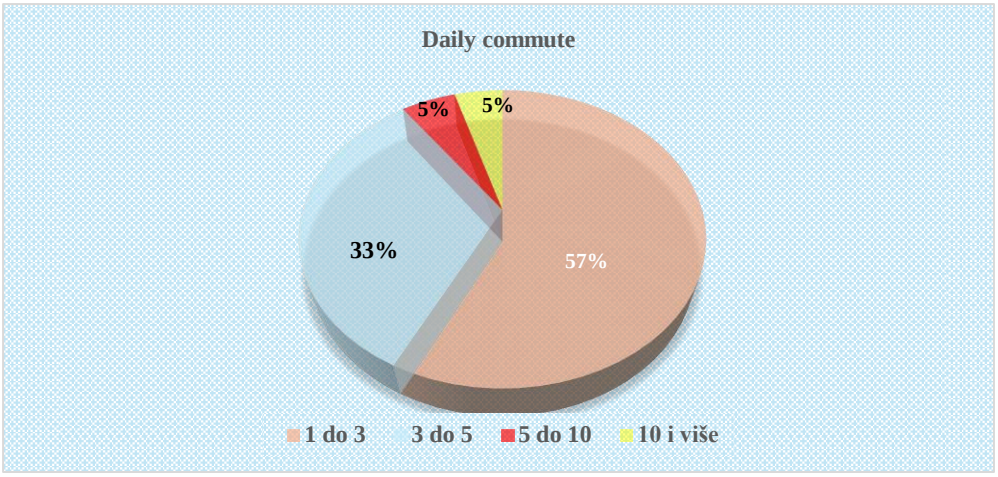


Figure 9: Daily commute.
(Source: Authors' work, 2024.)

The sixth question was about the respondents' opinions on the state of the road infrastructure in Varaždin County. The majority of respondents, 57.9%, think that the condition of the roads is good. On the other hand, 34.4% of respondents believe that the condition of the roads is poor. Only a small number of respondents, 7.6%, think that the condition of the roads is very good or excellent. The seventh question was related to the previous one and concerned the assessment of the condition and maintenance of roads in the county. The majority of respondents, 87 (47.5%), believe that the condition and maintenance of the roads are poor. On the other hand, 85 respondents (46.4%) believe that the maintenance of the roads is good. Only a small number of respondents think that the maintenance of the roads is very good or excellent (Figure 10).

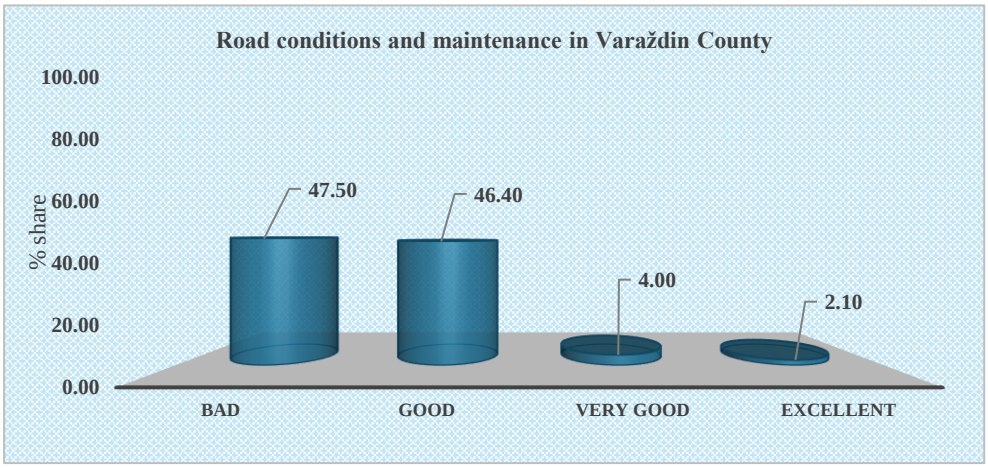


Figure 10: Road conditions and maintenance in Varaždin County
(Source: Authors' work, 2024.)

The eighth question pertainted to the frequency of train travel. The majority of respondents, 92.3% or 169 respondents, travel less than five times a month, indicating that train travel might be infrequent. The ninth question concerned the satisfaction with railway transport services. The majority of respondents, 61.2%, are not satisfied with the service, while 38.3% are satisfied. It is interesting to note that none of the respondents answered that they are very satisfied. Similarly, such dissatisfaction was confirmed in the research on the quality of services of passenger trains on the R202 Varaždin-Dalj line, or the Varaždin-Koprivnica route, which included dissatisfaction with comfort of travel not to mention timetable accuracy.

Additionally, most surveyed student passengers emphasized the need for increased investment in railway infrastructure (Brlek, 2021). The tenth question was related to the impact of the availability, condition, and parking for vehicles at the train station, on the decision making process on which on mode of travel to use. The results were divided, with 51.9% of respondents indicating that it affects their decision, while 48.1% responded that it does not affect their decision. The eleventh question was concerned the respodent's satisfaction with the cycling infrastructure in the county. The majority of respondents, 149 of them, were not satisfied, while only 34 expressed satisfaction (Figure 11) (Slavinec, 2019.).

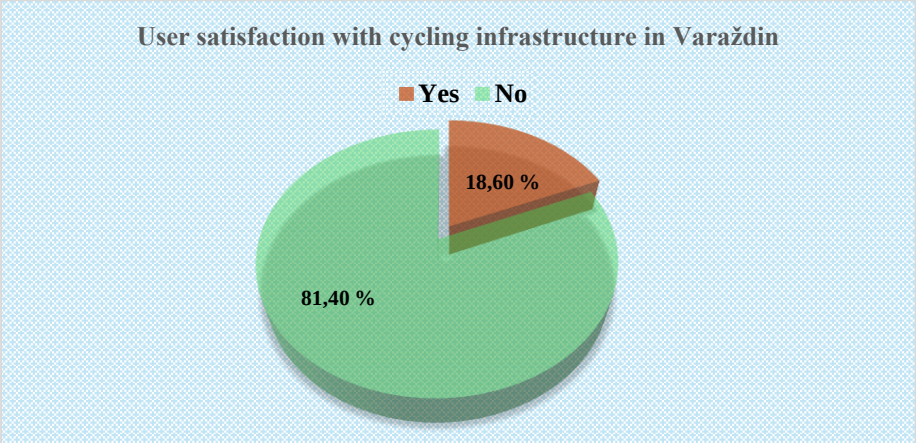


Figure 11: User satisfaction with cycling infrastructure in Varaždin (Source: Authors' work, 2024.)

The twelfth question was aimed at the respondents' level of awareness regarding the development of cycle tourism and cycling paths. The majority of respondents, 59% or 108 individuals, were not familiar with it, while 41% or 75 respondents were acquainted with it. The thirteenth question related to the feeling of safety in traffic within the county. The majority of respondents, 59.6% or 109 individuals, felt safe, while 40.4% or 74 respondents expressed that they did not feel safe. The fourteenth question was directed towards the perception of commuting costs to work or school. The majority of respondents, 58.5% or 107 individuals, considered commuting to be expensive, while 41.5% of respondents did not find their commute expensive (Figure 12).

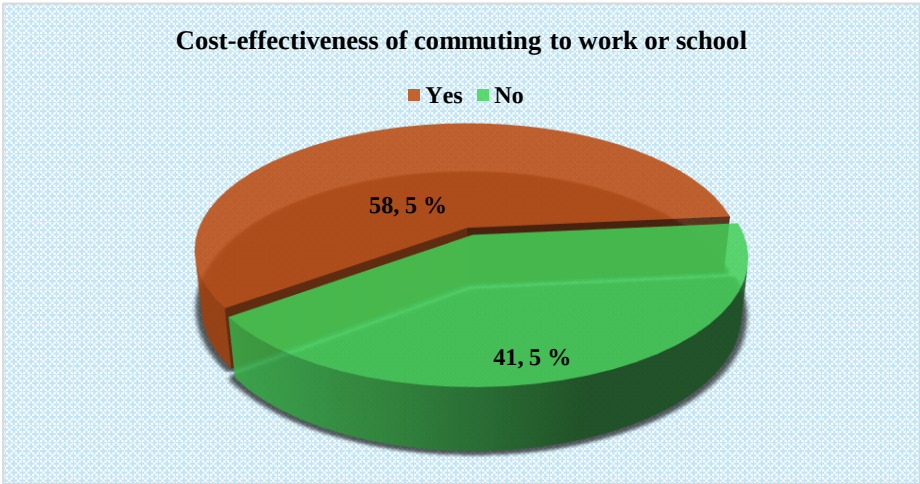


Figure 12: Cost-effectiveness of commuting to work or school (Source: Authors' work, 2024.)

The fifteenth question pertained to the respondents' awareness of the impact of their mode of transportation on environmental pollution. Respondents in the Varaždin County region demonstrated a high level of environmental pollution awareness. According to the data, the majority of respondents (174 out of 183, or 95%) are aware of the impact of their transportation choices on environmental pollution. This indicates a high level of awareness of environmental issues among the respondents. When we asked the respodents about their priorities for the development of transportation connections with other counties and the City of Zagreb, the majority of respondents (140 out of 183, or 76.5%) consider the construction of the fast road Varaždin, Ivanec, Lepoglava, Golubovec, Sveti Križ Začretje as a priority. A smaller number of respondents (43 out of 183, or 23.5%) believe that the priority is the modernization and construction of the railway between Čakovec and Lepoglava, and Krapina/Sveti Križ Začretje and Zabok (Figure 13). These results indicate that the majority of respondents believe that the construction of a fast road could be a more effective solution for improving transportation connectivity. However, it is important to note that the modernization of the railway could be a more environmentally friendly option (Slavinec, 2019.).

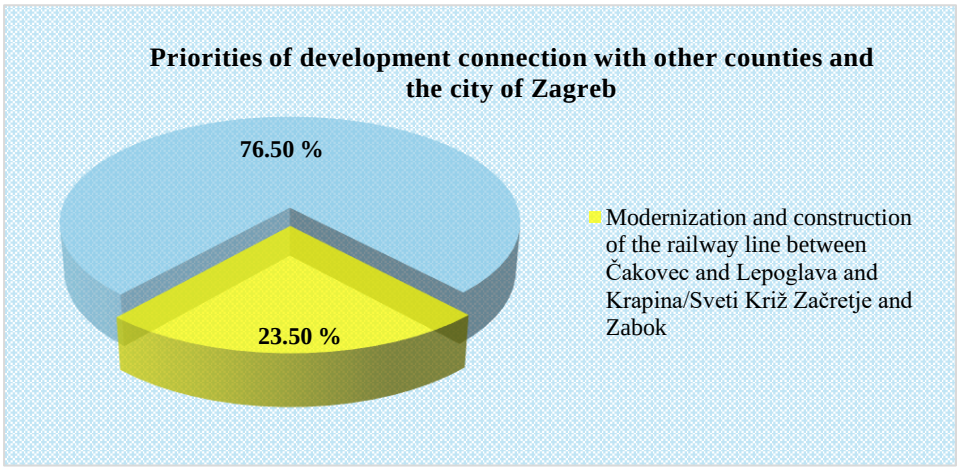


Figure 13: Priorities of development connection with other counties and the city of Zagreb (Source: Authors' work, 2024.)

This point is a possible area of further research, especially considering the high level of environmental awareness among the respondents, particularly in the context of the perception of implementing certain environmental protection practices or policies during the process of educating new employees, with an emphasis on environmental preservation in the context of traffic impact (Špirić and Pavlović, 2001.).

4. DEBATE AND DISCUSSION

In the analysis conducted among 183 respondents, demographic data indicate significant trends in the perception and practices of traffic use within the population. Regarding gender distribution, 55.7% of respondents were female, while 44.3% comprised the male population. It is interesting to note a slight dominance of the female population, which may reflect specific perceptions or practices related to traffic. When it comes to age structure, young adults between 18 and 40 years old constitute the majority of the surveyed population. Specifically, 37.7% of respondents belonged to the age group of 31 to 40 years, while 32.2% were between 18 and 30 years old. This data emphasizes the need to tailor traffic strategies to respond to the specific needs and preferences of this key demographic group. In the context of car ownership, 73% of respondents (134 out of 183) own a personal car. This information is crucial for understanding the dominant role of road traffic in the lives of the surveyed population (Figure 14).

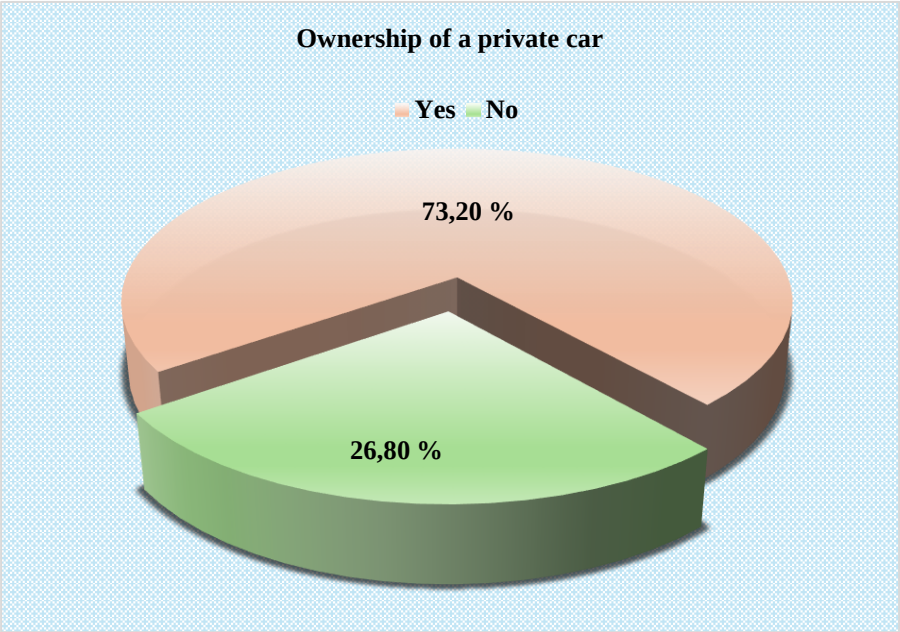


Figure 14: Ownership of a private car
(Source: Authors' work, 2024.)

Further analysis shows that the majority of these car owners prefer personal cars for their daily activities, with an emphasis on commuting to work or school. Specifically, 138 respondents use a personal car for these purposes, while a smaller number use a bicycle (12 respondents) or train (8 respondents). Considering the frequency of travel, most respondents travel once to three times a day, with a smaller segment of respondents (who are not to be overlooked) traveling more than five times a day. This data highlights the need for optimizing traffic networks and alternative modes of transportation in order to ensure efficient and sustainable mobility in urban areas. The results of the survey in the analysis of the road infrastructure provide insights into citizens' perceptions of the quality and condition of transportation networks. When it comes to the overall impression of road conditions, the majority of respondents (57.9%) believe that the current state is satisfactory or even good. However, it should be noted that a significant percentage (34.4%) rates the condition of roads as poor, indicating the need for improvements and interventions in certain parts of the road network. On the other hand, when the focus shifts to road maintenance, the results are more diverse. While 85 respondents believe that road maintenance is good, as much as 87 respondents highlight a poor level of maintenance. This data suggests a possible discrepancy between the perception of the overall state of roads and the specific condition of road surfaces, where, despite positive general beliefs, concrete infrastructure components, such as road surfaces, may require more attention and interventions. When comparing these findings, it becomes clear that respondents recognize inequalities in the quality of road infrastructure. While some aspects are evaluated positively, such as the overall condition of roads, others, such as road surface conditions, require more urgent interventions. Therefore, the results of the conducted survey provide a valuable framework for further research and planning of infrastructure projects in order to ensure the safety and satisfaction of citizens in their daily commutes. In the analysis of the perception of railway traffic within Varaždin County, key aspects relate to the frequency of train travel, satisfaction with the service as well as the importance of infrastructure elements such as accessibility and parking. Respondents pointed out to incosistent use of railway transport, as the majority of people rarely use this type of transport. A significant number of respondents (112) expressed dissatisfaction with railway transport services, indicating potential weaknesses or deficiencies in service quality, infrastructure, or transport organization (Figure 15) (Slavinec, 2019.).

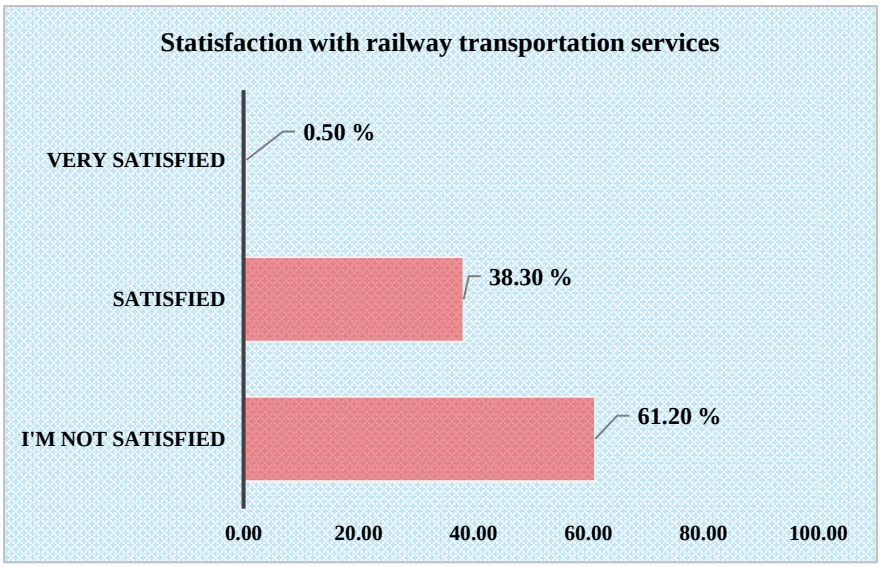


Figure 15: Satisfaction with railway transportation services (Source: Authors' work, 2024.)

Particularly concerning is the data indicating that 95 respondents emphasize how infrastructure elements, such as accessibility and parking at train stations, significantly influence their travel decisions. This data underscores the crucial role of infrastructure investments and improvements in promoting railway transport as an attractive alternative to other forms of transportation. Analysing the results, we can conclude that it is important to highlight increased investments in the development and improvement of railway infrastructure. Besides increasing user satisfaction and encouraging more frequent railway use, such investments would contribute to sustainable development, reducing traffic congestion, and promoting environmentally responsible transportation. This analysis represents an important step towards understanding the needs and preferences of citizens, and it can be utilised as a foundation for future strategic transportation policy planning. In the analysis of the perception of cycling infrastructure and safety in Varaždin County, three key aspects are highlighted: satisfaction with cycling infrastructure, awareness of cycling tourism development and the feeling of safety in traffic. A significant number of respondents (149) expressed dissatisfaction with the cycling infrastructure. This indicates the need for improvement of existing cycling paths, their expansion, or the construction of new routes that would better meet the needs of cyclists. Additionally, the fact that 108 respondents are not familiar with the development of cycling tourism and cycling paths, suggests that there is room for greater promotion and informing of citizens on the opportunities that cycling tourism offers. The most alarming data is the feeling of insecurity in traffic expressed by 74 respondents. This figure represents a significant share of almost 40% of the surveyed population. The feeling of insecurity may be related to various factors, including the lack of adequate infrastructure, non-compliance with traffic rules, or the general insecurity that cyclists face in mixed traffic environments. Based on the survey results, a comprehensive strategy will be submited, which will involve infrastructure improvement, citizen education of citizens on the benefits of cycling tourism as well as cycling paths and initiatives aimed at increasing the safety of cyclists in traffic. Such an approach would not only improve the quality of life for Varaždin County residents, but also promote sustainable mobility, advocating cycling as an environmentally friendly and healthy mode of transportation. The analysis of the perception of the traffic network in Varaždin County, conducted throughout the survey, provides a deeper insight into the citizens' perspectives and their priorities regarding the region's traffic development.

The key finding of this research is that the majority of respondents perceive the costs of commuting to work, school, or college as excessively high. This conclusion emphasizes the need for economically more sustainable and accessible forms of public transportation or alternative modes of transportation that would facilitate citizens' daily commutes. Interestingly, respondents are aware of the impact of their transportation choices on the environment. This awareness can serve as a platform for promoting more sustainable forms of transportation and initiatives to reduce carbon dioxide emissions in the transportation sector. When it comes to the priority of traffic projects, most respondents highlight the need for the modernization of the railway line, especially concerning its connection to other key railway corridors. This indicates the citizens' perception that improving railway transport could provide a sustainable and efficient solution for the regional traffic network. On the other hand, a significant number of respondents see the need for the construction of a fast road that would connect several key points within the county. This initiative could stimulate economic development, facilitate access to key resources, and potentially reduce traffic congestion. Overall, the research results indicate the need for an integrated approach to the development of the traffic infrastructure in Varaždin County, involving a combination of the modernization of existing systems, the construction of new infrastructure projects along with the promotion of sustainable forms of transportation. This comprehensive approach would not only enhance citizens' mobility, but it would also contribute to the environmental sustainability of the region.

5. CONCLUSION

Varaždin County, due to its favorable traffic-geographical position, has a well-developed transportation system, but due to its aging infrastructure, reconstruction is very much needed. Road traffic stands out as the most significant form of transportation, and in order to enhance the quality of the road networks, the establishment of new road routes is necessary. Roads such as the Zagorje Expressway, along with the supplementation and modernization of the network of state roads, including the Podravina Expressway. It is essential to emphasize the imperative of urban planning, which calls for restraint from further urban expansion along the main traffic corridors to ensure their functionality, integrity, and sustainability. Preventing further expansion of settlements along state and county roads is crucial to avoid downgrading road categories. In Varaždin, three railway lines intersect, with the most significant one connecting Varaždin to Čakovec and ultimately to Zagreb. The existing railway lines do not meet the requirements of modern railway transportation systems nor do they allow for higher travel speeds or the transportation of heavier axle loads. A favorable circumstance is the well-arranged railway facilities and devices in the area, since the routes of the existing railways are radial in relation to the centrally located Varaždin railway station.This arrangement has established the shortest and fastest traffic connections to the broader areas of the city, county, and the Republic. One of the drawbacks is the limited possibility of expanding railway tracks, considering that they are occasionally built through densely populated areas. However, urban challenges, such as population density along the routes, necessitate innovative solutions to ensure optimization and expansion of railway infrastructure in accordance with future needs and trends. Comparing railway with road transportation, railway transport exhibits significant economic advantages resulting from its higher efficiency and lower environmental impact. Hence, it is imperative to modernize and revitalize railway lines and the associated infrastructure to meet growing needs and ensure competitiveness in the transportation sector. Additionally, investment in railway infrastructure is not just a transportation investment, but also a commitment to the future of sustainable development, socio-economic integration along with the global competitive position of the region. The revitalization or „revival“ of county roads is crucial for the economic and touristic development of Varaždin County.

Since they are vital for economic prosperity, it is essential to ensure their quality, safety, and timely service for public and individual traffic. While the highway is fully developed, planned expressways are still in the early design phase, indicating the need for further infrastructure efforts to be invested.

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WOW - WAYS OF WORKING - NEW LEADERSHIP IN THE HYBRID CORPORATE REALITY

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ABSTRACT

Accelerated technological breakthroughs of the past decades have resulted in a new paradigm of work; it may now be performed at any time, in any physical location, or via technology. The virtual world and its many communication tools have established a new framework for leadership and cooperation. As the COVID-19 pandemic passed, hybrid working arrangements became widespread, and several companies tended to mix on-site and remote working, seeking to take advantage of both. A growing ratio of employees prefer to prioritize their own needs ahead of the business growth of their employer, which all together has led to a need for managers and leaders to understand the unprecedented implications of such hybrid setups. This paper serves as a critical literature review that aims to explore the way leadership can operate in this 'new normal' of a working environment. The study focuses on three aspects of the problem at hand and thus intends to: (a) identify the social and economic changes that led to having hybrid teams; (b) discuss the new ways of working that have been implied by such changes; and (c) debate the findings of the literature review about the different scenarios of leadership behaviors that managers of hybrid teams may follow to ensure the desired productivity level is met by their teams. First and foremost, as a widely accepted conclusion, managers might consider re-inventing the workplace in close discussions with their colleagues in order to integrate private preferences. Furthermore, enhanced people management skills and an increased EQ level might help leaders be more effective. It is perceived that the focus of leadership shifts from decision-making to relationship management in the post-pandemic era. That relationship is best maintained by one-on-one leader-subordinate discussions.

Keywords: *COVID-19, EQ, Hybrid working environment, Leadership, People management*

1. INTRODUCTION

The 2020 Covid-19 outbreak turned our approach to work upside down as it allowed millions of employees to experience the benefits of working from the safety of their homes as opposed to the previously ruling work-from-office paradigm. Four years later, amid the Russian-Ukrainian war, the energy crisis and an increasing inflation rate, hybrid working arrangements (a combination of an employee working part time in the company office and part time from their own homes) have become widespread and several companies tend to mix on-site and remote working and seek to take advantage of both. As we are still in the wake of this new era, the impact of the hybrid setup on business KPIs, e.g., business performance, profitability, fluctuation, and engagement are still highly unexplored. The purpose of my study is to present how the term "work" is changing, and what kind of work environment is expected to stay with us for the longer run in our hybrid corporate reality. My review of existing literature has focused on i) the economic and societal developments, ii) the grounds for having hybrid teams, iii) its implications on the working setup and employee behavior and finally to iv) find the tools leaders may use to maintain the required productivity level within their teams. As the hybrid setup will most probably re-shape the working environment in the long run, a research to be built on this literature review would be of great novelty and highly helpful for both leaders and the academia in the coming few years. For my literature review, I searched ScienceDirect to identify relevant articles.

My search criterion required that at least one key term (remote work, virtual teams, hybrid work, leadership, employee behaviour, performance management) be part of the abstract, title or keywords. Furthermore, I have performed a Google search to identify in-press research as well to make my review as current as possible. Note to the reader that existing research on hybrid setup is scarce due to the novelty of this phenomenon and a large portion of published papers are stating opinion without field research. As my research has unfold I have realized several interconnected areas that need to be considered when dealing with the matter on hand. The key findings are presented in the below conceptual map.

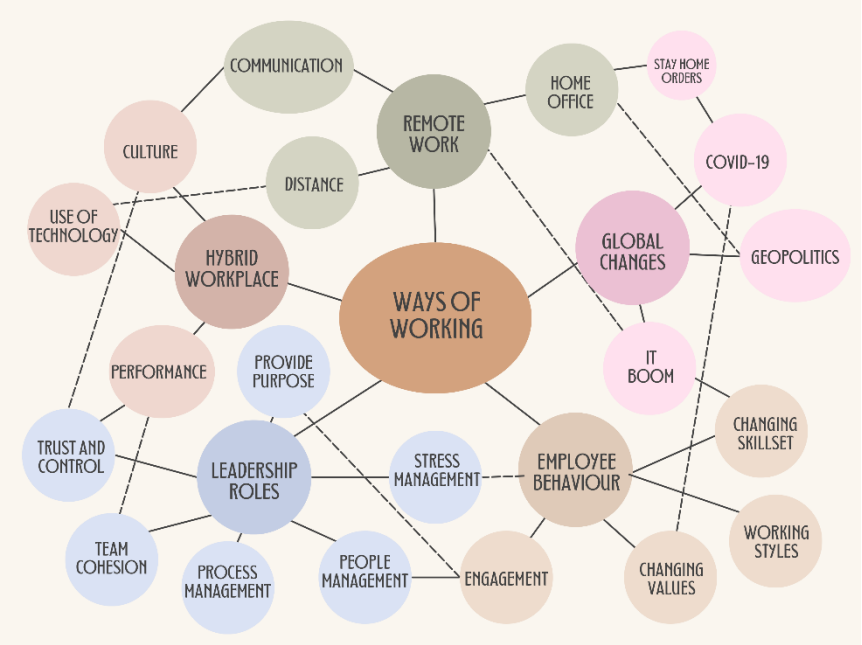

Figure 1: Conceptual map of critical literature review
(Source: Author's own elaboration)

2. GLOBAL CHANGES TO OUR LIVES

The way most of our workplaces are designed today originates from Taylorism and the functional structures are built on labor economics models. The ruling paradigm ever since the Industrial Revolution says that organizations and structures are permanent and co-located, tasks are organized into jobs with specific descriptions and chains of command and authority regulate the workforce and workflow (Leonardelli, 2022; Minbaeva, 2021). As significant environmental, sociological, and political changes of the past few decades have altered our everyday lives and our economies have most certainly moved on from the industrial age to the age of technology, it has also severely affected how people are managed within corporations. It has become inevitable to challenge our theoretical compass to show alternative ways of successfully navigating the evolving landscapes of human resource management. Three major megatrends are significant in their implications to reassess our approach towards people management. As businesses try to navigate away from free trade and free movement and into a new reality of fractured relationships, broken supply chains, and restrictive migration regulations, geopolitics rose to the top of the corporate agenda. The altered and extensive use of technology and data is an additional topic for discussion and investigation (Minbaeva, 2021). While these help us make better business decisions, it is already witnessed that our understanding of them is limited. Technology changes not simply the nature of work but also the skillset and knowledge needed by the workforce. The growth in the usage of digital technology is seen to shift the labor market away from permanent types of work, towards a per-task basis.

The abrupt outbreak of a pandemic in 2020 was a systemic shock of the 21st century that caused long-lasting global changes to processes, practices, and attitudes regarding fundamental human needs (Kniffin et al., 2021). As Béland et al. (2020) predicted, Covid-19 has also resulted in a recession in the world similar to the Spanish Flu or the Black Death. Most researchers consider that Covid-19 has played a disruptive and a catalyst role in the virtualization processes: companies had no choice but to switch to remote working arrangements (Béland et al., 2020; Chamakiotis et al., 2021; Leonardelli, 2022; Kniffin et al., 2021).

3. HYBRID TEAMS ARE BORN

3.1. Remote work

The first signs of virtual teams date back to the 1990's when technological innovation accelerated, and mobile phones became a commodity as well as a tool for business communication. New ways of working started to evolve decades ago with the introduction of concepts like e-mail consoles on mobile phones, flexible workspaces, and videoconferencing, all these bore the intention to ease people's burdens by using digitalization for automating work processes. Information technology made it first possible, later also easy to coordinate work without boundaries in time and/or space. This evolution was quicker in knowledge-intensive companies, mostly in the technology and the science-based sectors than in sectors that require a human-to-human interaction (like healthcare or hospitality). Jarvenpaa and Tanriverdi talked about a "transition from tree-like hierarchical structures into flat, web-like organizations that enable better knowledge flows among business units" as early as in 2003 (p.403.). They also envisioned the blurred organizational boundaries between customers, suppliers and partners and considered them as a wider network. As Chamakiotis et al. (2021) highlight, the benefits of remote/virtual teams are inevitable: they provide access to talent irrespective of its residence, they reduce travel and commuting costs and give opportunity for a more flexible work-life time-distribution. It is important to mention though that even though the term 'virtual team' was first used in 1992 (Gilson et al., 2021), remote work and virtual teams had not become common for decades and were considered as 'revolutionary' mainly due to control considerations. In 2021, as the COVID-19 pandemic eased up, most companies requested their workforce to return from lockdown and work from the offices, but the advancement of home office arrangements, that seemed like a short-term inconvenience at the wake of the crises had since become a permanent shift in how and where people would like to work (Leonardelli, 2022) and companies need to adapt a hybrid working structure to balance the needs of both their business and workforce.

3.2. Hybrid workplaces

Hybrid teams are the ones who "have face-to-face contact in addition to their technology-supported collaboration" (Mitchell and Brewer, 2021, p.1). The authors characterize the hybrid dissemination factors as location, organization, time zone, and culture. A rather similar definition was made by Hambley, O'Neill and Kline already back in 2007 when they state that "virtual teams are defined as interdependent groups of individuals that work across time, space and organizational boundaries with communication links that are heavily dependent upon advanced information technologies" (p.1.). We underline the 'interdependent' characteristic of such teams as several researchers postulate it as a vital factor when determining the desired team setup. In their theoretical paper about e-leadership and virtual teams, Cascio and Shurygailo (2003) states three major distinguishing factors that can determine if a group of people are working as a team or not: members should interact, they must work towards a common goal that they agreed upon and they should continuously adapt to any changes in circumstances to come to their goals. These are applicable for both in-person and virtual teams. It can be argued though if the setup has a determining role of the team performance, or it can be influenced by teammates.

The manager of a hybrid team, according to Mitchell and Brewer (2021), may actively engage in changing the workplace in ways that fully harness the benefits of both (in-office and remote) worlds. As Tzabbar and Baburaj (2019) found, moderate regional dispersion enables businesses to get fresh data from various information networks and use it to produce creative results. Even though each member offers something different, too much dispersion might result in information overload. As practice underlines the authors finding, hybrid arrangements achieve more successful team buy-in when a leaders offer partnership to their teams in identifying the tasks that require face-to-face work versus the ones that can preferably be done remotely.

4. SHIFTED EMPLOYEE BEHAVIOUR

The goal of today's new ways of working is to maintain performance while improving employee satisfaction and retention by bringing in changes to time spent at work (employees don't need to put in 9 to 5 hours, but the emphasis is on the result), to the workplace itself (employees don't need to be physically present at a given location), and to the contracts (people no longer need to be bound by full-time contracts). The main characteristics of organizational setup, such as employees are organized into teams that are led by managers and leaders are not yet changing though. The purpose of a team is to effectively integrate the contributions and the performance of the individuals that it is built of (Zaccaro et al., 2011). In order to reach the desired performance, team members should coordinate and synchronize their actions, whether they are conducted in a virtual or in a face-to-face setup. In the following paragraph some important aspects of the new working setup and the related employee behavior are collected and challenged.

4.1. Working styles

In their empirical research Eisenberg and DiTomaso (2019) found that members of remote teams experience distance in a variety of ways therefore collaboration is a major challenge for most teams that can be overcome with the extensive use of technology. This is supported by Chamakiotis et al. (2021) when stating that leaders of the pandemic-induced virtual teams had to focus mainly on adapting to the technology-mediated processes: online meetings, performance management and employee-wellbeing responsibilities. Based on the findings of Mitchell and Brewer (2021), the typical hybrid meeting starts with a social chat and introductions to warm up distanced parties, then turns on to discussing the main topic, documenting meeting minute, and assigning actions and owners to agreed tasks. All this seems to put a higher burden on the leaders that they were used to in the traditional in-office setups. The advantages of having more creative sources available due to geographic dispersion are likely to be offset if team members have any type of fears. Teams that are widely scattered find it more difficult to collaborate and learn because members are more inclined to consider the environment hazardous (Tzabbar and Baburaj, 2019). Since a team member's perceptions of psychological distance from other team members have a greater impact on the quality of their cooperation than their actual physical distance (Eisenberg and DiTomaso, 2021), it is essential to investigate the elements that may influence the establishment of such psychological perceptions. Tzabbar and Baburaj (2019) talk about the need to develop a creative culture that provides psychological safety for the employees. Managerial choices on how to build a team, how to assign workloads across many teams, and where to put members may create diverse microclimates that impact how team members interact with each other, which affects how they assess team processes and emergent states likes trust. Eisenberg and DiTomaso (2021) score a very important point by stating that team arrangements affect perceived psychological distance of their members, and this may not always rise linearly as physical distance does.

4.2. Changing values

Working remotely, workers may sense less trust and support from their boss and the firm than it is experienced in the face-to-face environment. Beno (2021) maintains that an optimal workplace culture emphasizes activities that generate and demonstrate trust. In their study of Austrian companies with either an in-office setup or a hybrid working model, they discovered that hybrid workers are frequently more supportive, caring, rewarding, forgiving, and inspiring than cubicle workers, whereas there is no significant difference in terms of respecting one another, demonstrating integrity, fostering dignity, and expressing appreciation. Beno (2021) states that "hybrid is characterized by flexibility and choices" (Beno, 2021, p. 333). COVID-19 made it possible for employees to seek out their personal life preferences, so a large proportion of subordinates no longer want to be instructed on what to do and when to do it. Rather, they prefer to choose their own preferred method of completing the job and are advocating for new work arrangements. Golden (2021) amongst other researchers underlines that the most often noted challenge with teleworking is balancing the demands between work and family. Employees working from their homes on given days are also immersed in their typical family domain packed with reminders of their non-work demands and interests. In their empirical research in 2020 in the US, George et al. (2022) found that 44% of respondents claimed their job demands have raised since working from home as compared to the previously common in-office work (Fig.1., p.3.). In their paper about the challenges of working from home in times of crises, Toniolo-Barrios and Pitt (2021) claim that practicing mindfulness may help employees in several ways. First, it helps oneself to disconnect from work, second it improves attention span thus performance, and third it allows for a better recovery from screen fatigue. To conclude, the stress and anxiety resulting from the increased workload and the blurred lines between work and personal life more and more seem as factors that leaders will need to consider and tackle in hybrid working setups.

5. NEW LEADERSHIP

The desire for flexibility, autonomy, and a redefined work-life balance has necessitated a recalibration of leadership roles and expectations. This has implications for leadership roles, particularly in communication, team cohesion, building trust and people management.

5.1. Communication

It might be found difficult to communicate within virtual teams. Multiple methods, including instant messaging, a corporate social media platform and videoconferencing, are used by virtual teams to connect with one another. Larson and DeChurch claims that in all these, the fundamental problem is the absence of nonverbal communication, such as physical proximity and body language, to express interpersonal intimacy while participants are at a distance. It is argued if virtual gatherings are sufficient at all, or leaders should try to bring team members together face-to-face regularly to facilitate chances for cooperation. The mere act of sitting next to someone in a conference room may provide comfort and confidence during a heated meeting, but this is not achievable in a virtual environment (Dinh et al., 2021). If synchronous collaboration time is organized in a hybrid setup, it can be the heartbeat of a team as it provides a prioritized block of time with high responsiveness. Such occasions emulate the spontaneous brainstorming and rapid problem-solving practices of the old-school in-office work. Mitchell and Brewer (2021) claim that a high level of collaboration allows for increased resources, better creativity and innovation, improved decision quality and in turn, increased return on investment. Kulshreshtha and Sharma (2021) also warn that information communication tools cannot replace face-to-face interactions among a leader and his colleagues due to the negative effects of ICT on organizational culture. It reduces the potential for personal connection and fosters misunderstandings that lead to conflicts.

When both parties attend the same location, basic human resource management functions, such as performance evaluations, feedback, and coaching sessions, are performed more effectively. Some researchers distinguish leader-employee interactions based on the number of attendants and claim that "One-on-one meetings are an opportunity for the leader to lead, inspire, influence, motivate, coach, listen, solve problems, make decisions, and create an environment where employees feel energized" (Olariu and Aldea, 2014, p.382.). Not to forget that leadership is a relationship based on voluntary obedience, Joullié et al. (2020) remind us that the way a leader communicates determines whether their social interactions are authoritative or authoritarian. Considering a hybrid setup with all its complexity, a leader must not let themselves slip into authoritarian means of expressing power.

5.2. Team cohesion

A significant factor in handling power related difficulties lies within the social connections gained from belonging to a team. Leaders of geographically dispersed and hybrid teams should make extra effort to establish a stronger feeling of connectedness and shared purpose (Eisenberg and DiTomaso, 2021). They may do it by promoting, supporting, and rewarding increased levels of team member interactions using whatever channels are available. During their empirical research of transformational leadership (when a leader uses its charisma to influence team members, motivates via inspiration, provides intellectual stimulation and considers individual behaviors), Purvanova and Bono (2009) found that leaders are more effective if they increase their transformational leadership behavior in a virtual setup and that its effect on team performance is stronger in virtual teams than in face-to-face ones. The limitation of this conclusion might be the difficulty for a leader to perform the exact same behavior within different team contexts.

5.3. Building trust

Most leaders recognize the necessity for teams to build robust emotional emergent states such as trust and cohesion. Maynard and Gilson (2021) concluded that strong personal relationships are a key predictor of trust within the work teams. Cognitive states such as shared mental models and transactive memory systems are just as important as a behavioral integration process. According to studies by Jarvenpaa and Tanriverdi (2003) and Larson and DeChurch (2020), shared styles of leadership promote team performance more than hierarchical types. With shared leadership, everyone contributes to the team goals in a dynamic and interactive process of influencing each other. The conventional conception of a successful leader is someone who is more informed and capable than others. Higher social standing is attributed to the perception of a leader's ability to use their influence and authority. However, research indicates that corporate managers should also participate in modest questioning (Cojuharenco and Karelaia, 2020). Whenever leaders pose questions to which they have no answers they presumably demonstrate a realistic confession of their own limits, a desire to learn from others, and a regard for the other's viewpoints and expertise; these are the defining features of humility.

5.4. People management

A performance and engagement premium is registered with leaders who engage in regular one-to-one discussions with their team members to openly ask them questions of any kind. Leader-subordinate relationships are considered to have a crucial effect also on employee wellbeing (Glaso and Einarsen, 2006). Successful leadership combines a team needs assessment and considers aspects that increase job happiness, such as employee emotions of autonomy. Sinclair et al. (2021) found that leaders must assess employees' perspectives and seek insight into their happiness and sense of connection in a way that allows for open and honest communication.

Beno (2020) reaches an unambiguous conclusion when he asserts that managers of previous eras are not inherently prepared for handling their teams in the modern workplace. Even though their research indicates that hybrid working reduces noxious workplace customs, they conclude that face-to-face interaction between executives is preferable for preserving social signals within the team.

6. DISCUSSION

As we delve into the intricacies of the hybrid corporate environment, the examination of literature offers valuable insights, yet a nuanced discussion reveals disparities between the findings of academic studies and the unfolding realities in today's workplaces. This discussion seeks to illuminate the contradictions that persist between conventional narratives and the evolving practices of remote and hybrid work, shedding light on the areas that have witnessed substantial change and emphasizing the reconfigured values within organizations. Global catalysts such as the IT boom, geopolitical shifts, and the transformative effects of the COVID-19 pandemic have been acknowledged, but the extent to which they shape the day-to-day experiences of employees and leaders in hybrid setups is often underestimated. Real-world practices show the dynamic nature of this environment, needing an adaptable organizational culture capable of responding to ongoing changes. Remote work, a prominent aspect of the hybrid model, has been a recurrent theme in literature, emphasizing its influence on communication, distance, and the use of technology. However, the lived experiences of employees reveal a more complex reality with the challenges of maintaining effective communication, establishing a cohesive corporate culture, handling stress and ensuring equitable performance evaluation. In real-world scenarios, the integration of technology is accompanied by challenges related to accessibility, cybersecurity, and the digital divide among employees. Cultural nuances in a hybrid setting demand continuous attention and empathy towards one another. Employee behavior, encompassing changing values, skillsets, and working styles, forms a critical aspect of the hybrid work environment. While literature recognizes this transformation, the lived experiences of employees showcase a more profound shift. Leaders are grappling with the challenge of aligning organizational goals with the changing values of a diverse and remote workforce. The evolving nature of the hybrid workplace requires leaders to adapt rapidly. The practical challenges of maintaining team cohesion in a virtual environment, building trust without physical proximity, and managing stress in a dispersed workforce underscore the shifting role of leaders. The literature reveals a notable transformation in the importance of one-to-one discussions between leaders and subordinates. This shift is driven by the need for personalized approaches in addressing individual concerns, fostering a sense of purpose, and building trust. As the hybrid model blurs the lines between professional and personal spheres, leaders choose to invest in meaningful conversations that transcend traditional hierarchical boundaries. In conclusion, the hybrid corporate environment demands a reevaluation of leadership approaches to navigate the contradictions between old narratives and current practices. The evolving values, skillsets, and working styles of employees necessitate a more personalized and adaptive leadership style. The increasing importance of one-to-one discussions emerges as a key theme, underlining the critical role these interactions play in enhancing engagement and maintaining organizational cohesion in the evolving world of work.

7. CONCLUSION

During my literature review my intention was to collect available sources on several aspects of the development of the post-pandemic hybrid working setup with the goal to check whether research has already identified the desirable leadership behavior or not. The topic is widely complex and after reading and analyzing a wide number of sources we may say that we have

some knowledge about the important characteristics of employee behavior and its leadership implications within the new paradigm. In a modern organization, firm-centric leadership, in which activity is directed to one stakeholder group without respect for other stakeholders, does not fit. On the contrary, contemporary leaders must align organizational goals with the evolving values of a diverse and remote workforce, which leaves them facing practical challenges in maintaining team cohesion, building trust without physical proximity, and managing stress in a dispersed workforce. In essence, the hybrid corporate environment calls for a reevaluation of leadership approaches to reconcile theoretical narratives with practical realities. The evolving values of employees require a personalized and adaptive leadership style. There is a significant need for leaders to involve team members in decisions that affect the team cohesion, their cooperation, and the communication. The focus of leadership shifts from decision-making to relationship management. The importance for leaders to spend one-on-one time with their teammates to coordinate and ensure belonging has thus increased compared to the previously existing working-in-office setup. As it is only four years since we are experimenting with hybrid structures worldwide, the implication of my literature review is that we need to vest more efforts into studies to understand how these leadership behaviors, especially one-on-one discussions affect performance and engagement once the hybrid setup settles as a new norm.

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ADVANCING AND STRATEGIZING MARITIME ENVIRONMENTAL PROTECTION: A PATH TOWARDS A MORE SUSTAINABLE FUTURE

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ABSTRACT

The maritime sector, which handles more than 90% of global transactions, plays a key role in international trade, but contributes only about 3% of global greenhouse gas emissions. Although economically significant, its relatively smaller share in total emissions puts it in the context of an important, but not the main, source of air and water pollution. This report presents a detailed examination of the marine sector's journey towards sustainability and environmental stewardship. This analysis underscores the significant influence of maritime operations on ecosystems, specifically drawing attention to the emission of detrimental substances and the ecological ramifications of shipping activities. To address these difficulties, the industry has launched green shipping initiatives with the goal of improving maritime safety and fostering the integration of environmental, economic, and social factors. The study examines the function of international and regulatory organizations, such as the International Maritime Organization (IMO), in enforcing environmental regulations and promoting the industry's shift towards sustainable practices. This entails a transition in emphasis towards the control of atmospheric contaminants, human influences, and technology progress to alleviate maritime mishaps. Moreover, the article investigates the industry's endeavors to embrace alternative fuels such as hydrogen, ammonia, biofuels, and methanol in order to attain maximum carbon efficiency. The text delves into the technological, economic, and regulatory obstacles associated with the adoption of alternative fuels. It emphasizes the significance of engaging stakeholders and the policy implications in advancing sustainable practices. The study explores the important role of ports as vital economic and logistical centers, their impact on coastal pollution, and the adoption of sustainable practices at container terminals. The document showcases case studies that illustrate successful waste management and recycling initiatives, highlighting the industry's dedication to reducing its impact on the environment. The article underlines the maritime industry's essential role in combining economic expansion with ecological sustainability. To secure the industry's role in a resilient and ecologically sensitive future, it necessitates ongoing innovation, international collaboration, and an unwavering dedication to sustainable practices.

Keywords: *maritime industry, environmental sustainability, green shipping, alternative fuels, waste management*

1. INTRODUCTION

The marine industry is a crucial component of global trade, serving as a fundamental facilitator of international commerce and responsible for managing over 90% of worldwide transactions. Despite its significant economic significance, the industry encounters environmental obstacles as a result of its operations. Nevertheless, it is crucial to acknowledge that its impact on global greenhouse gas emissions amounts to around 3% of the overall emissions, which is comparatively lower in comparison to other sectors. This places the marine industry in context as a significant, if secondary, contributor to air and water pollution (Wang et al., 2020). Ships that travel on the sea release exhaust gases and particles into the layer of air that surrounds the ocean, which has a substantial impact on human-made emissions (Eyring et al., 2005).

The emissions mentioned consist of nitrogen and sulfur, both of which have a significant influence on the ecosystem (Endresen et al., 2003). In many maritime nations, the environmental issues are further exacerbated by the combined effects of seasonal tourism and development in coastal regions along key shipping routes (Alves et al., 2021). Green shipping projects have been developed in response to the environmental effect of the maritime sector. The objective of these projects is to enhance the safety of marine occupations and to correspond with worldwide concerns about environmental preservation, economic advancement, and social integration (Reinhold et al., 2019). Additionally, there has been an increase in patents linked to emissions in the marine industry, suggesting a connection between environmental restrictions and the promotion of eco-innovation (Makkonen & Inkinen, 2018). The International marine Organization (IMO) and other regulatory agencies are essential for ensuring compliance with environmental standards in the marine industry (Akyurek & Bolat, 2021). The sector has been transitioning towards a sustainable future, prioritizing the regulation of air pollutants to mitigate environmental issues (Fan et al., 2021). In addition, the maritime sector has been prioritizing human factors, enhancing rules, training prerequisites, and technology advancements to mitigate marine accidents (Atik & Arslan, 2019). Ports, which serve as vital economic, industrial, and logistical hubs, have a substantial role in the pollution of coastal metropolitan areas, thereby adding to the environmental effect of the marine sector (Calcerano & Hilsdorf, 2021). The implementation of sustainability measures in container terminals is a response to environmental concerns and aligns with the larger trend of implementing sustainable business models in the marine sector (Calcerano & Hilsdorf, 2021). The marine industry, a crucial component of worldwide commerce, holds an indispensable and essential position in global trade. This sector, which accounts for over 90% of all worldwide transactions, plays a crucial role in enabling and facilitating the movement of commodities and services between continents. As a result, it promotes global economic growth and fosters international collaboration. The marine industry, while undeniably economically significant and a major contributor to the global economy, has several environmental issues, particularly in relation to air and water pollution, resulting from its diverse range of operations. Nevertheless, it is crucial to acknowledge that although the marine sector is widely present in global commerce, its impact on global greenhouse gas emissions is only 3% of the total worldwide emissions. The marine sector's contribution to global pollution is very little compared to other sectors, categorizing it as substantial but not as the primary contributor. Hence, while it is essential to always strive towards minimizing the environmental effect of the marine industry, it is equally crucial to acknowledge its comparatively lesser contribution to overall pollution as compared to other industries. This data provides a distinct viewpoint on the marine industry, emphasizing the importance of adopting a well-rounded approach to tackle its environmental issues, while also safeguarding its crucial role in global trade. Measures to tackle this impact including implementing eco-friendly shipping efforts, ensuring strict compliance with environmental standards by regulatory authorities, and embracing sustainable practices at ports. These endeavors demonstrate an increasing acknowledgment of the necessity to harmonize economic progress with ecological sustainability in the marine sector. The marine sector has been recognized as the fundamental pillar of international trade, enabling the transportation of products and playing a crucial role in the global economy. The industry's importance is emphasized by its contribution to the advancement of economic growth and the prosperity of several nations. Nevertheless, its activities have had environmental consequences. The marine industry significantly contributes to environmental pollution, since its operations produce pollutants that negatively impact the air and water quality. The industry's environmental impact is evident in the generation of sludge, bilge water, waste, sewage, and the detrimental effects on the ecology caused by ballast water exchange activities.

The industry has been motivated by these environmental issues to search for sustainable and competitive solutions (Allal et al., 2018). The growing relevance of sustainable practices in marine operations is an increasingly important subject within the maritime sector. Stakeholders are urging bulk shipping and tanker businesses to adopt sustainable shipping practices because of the heightened safety risks and environmental consequences associated with their operations. The study conducted by Yuen et al. in 2017. Research has shown that adopting green supply chain management strategies may enhance the operational and relational efficiency of supplier organizations, hence positively influencing organizational performance (Lee et al., 2012). Moreover, the primary objective of sustainable practices in seaport operations is to incorporate sustainability concepts into all seaport activities (Tijan et al., 2019). The implementation of stricter environmental legislation and the growing public concern for sustainability have prompted shipping corporations to prioritize sustainable shipping management. This involves tackling societal and environmental challenges in their operations (Tran et al., 2020). Maritime ports are increasingly prioritizing environmental sustainability in response to the impacts of climate change and the increasing needs of the logistics and transportation industries (Mansoursamaei et al., 2023). The marine sector, encompassing shipping, seaports, and maritime logistics, has a crucial impact on the attainment of sustainable development objectives, namely in the areas of clean energy and climate change (Razmjooei et al., 2023). The significance of sustainability practices in improving overall port performance is widely acknowledged as a mediator in the linkages between competitiveness and performance in port operations (Kim & Chiang, 2017). The rising significance of sustainable operations has resulted in heightened focus on green marine ship technology, propelled by the necessity for sustainable and energy-efficient maritime operations (Stevens et al., 2015). The laws imposed by the International Maritime Organization regarding the interaction between ships and ports/cities have progressively prompted players in the business to prioritize sustainability concerns in many sectors, such as aviation, land transport, and supply chain (Lee et al., 2019). The study by Justavino-Castillo et al. (2023) has demonstrated that sustainable practices have a substantial effect on the value of logistics, especially for importers. This highlights the crucial role of sustainability in improving the total value within the marine business. The use of local operational and technical energy efficiency measures in maritime transport has been shown to provide a substantial contribution to sustainability. This aligns with global and regional initiatives aimed at promoting sustainability (Christodoulou & Cullinane, 2020). The marine sector is actively investigating several zero-emission alternatives, including battery-electric designs, ammonia, hydrogen, biofuel, and autonomous ships, in order to assess advancements in sustainable development (Koilo, 2020). Dinwoodie et al. (2011) have put out a comprehensive framework to facilitate the design of marine operations that are more sustainable. The objective of this framework is to reduce possible risks and promote proactive management of development ideas in order to fit with sustainability agendas. Scholars have highlighted the need of focusing on standardized issues and clear algorithms to enhance sustainable marine operations through optimization techniques (Du et al., 2023). The last two decades have witnessed a tremendous growth in stakeholder involvement and research studies aimed at supporting sustainable development in the marine industry. This trend reflects the rising emphasis on sustainability (Osobajo et al., 2021). Although there is a substantial body of literature on sustainable port practices, the policy implications of these activities have not been thoroughly investigated. This suggests that there is a need for more research to study the policy implications of sustainable port practices (Shankar et al., 2021). Since the Earth Summit in 1992, there has been an increasing interest among all parties involved in sustainability for the development and functioning of marine transport networks, emphasizing the industry's enduring commitment to sustainability (Hasanspahić et al., 2021).

The proposal suggests using knowledge capture to provide guidance to Harbour Masters of smaller ports in order to plan and implement more sustainable marine operations (Kuznetsov et al., 2017). The maritime sector has shown growing interest in the notion of remotely controlled, unmanned, and autonomous ships. This concept offers the potential for enhanced safety, improved efficiency, and sustainability. It reflects the industry's pursuit of innovative and sustainable technology (Dybvik et al., 2020). The study of sustainability in maritime logistics is increasing, but it lacks coherence in terms of conceptual development, empirical testing and validation, and theory building. This suggests the need for additional research to consolidate and enhance our understanding of sustainability in maritime logistics (Shin et al., 2018). The International marine Organization has pledged to create a sustainable marine transportation system by implementing sustainability measures within a broader framework of corporate social responsibility (Fasoulis & Kurt, 2018). The industry is actively working on creating a sustainability management system for smaller ports, as part of their dedication to incorporating sustainability into port operations of all sizes (Kuznetsov et al., 2015). The United Nations Environment Program Regional Seas Programme has encouraged neighboring countries to establish sustainable coastal and marine management in a comprehensive manner, promoting collaborative and integrated sustainability initiatives within the maritime industry (Sereda et al., 2021). marine tourism has emerged as a significant contributor to the tourist industry and a crucial determinant for choosing travel destinations worldwide. This emphasizes the importance of implementing sustainable measures in the marine tourism sector (GAVCAR, 2019). An assessment is being conducted to evaluate the economic, sociological, and environmental aspects of marine transport. This evaluation aims to support a wider European effort to promote the Blue Economy, with a focus on the many effects of sustainable practices on maritime operations (Grdinić & Škurić, 2021). In the following sections, we will explore in greater detail the precise tactics and innovations that the marine sector is implementing to reduce its environmental effect and strengthen its dedication to sustainable growth. The primary emphasis will be on achieving zero carbon efficiency, utilizing inventive fuels and energy sources, and implementing efficient recycling and waste management practices on ships. These efforts will support the industry's transition towards a more environmentally friendly future.

2. THE INTERSECTION OF THE GREEN ECONOMY AND SUSTAINABLE DEVELOPMENT WITHIN THE MARITIME INDUSTRY

2.1. Overview of sustainable development objectives pertaining to the marine sector

The marine industry's commitment to sustainable development goals is seen in its contributions to economic expansion, ingenuity, conscientious consumption and production, and environmental preservation. The sector plays a crucial role in attaining these objectives, particularly in clean energy and climate change activities. The study by Olteanu and Stinga (2019) has emphasized the industry's role in contributing to Sustainable Development Goals (SDGs) 8, 9, and 11, highlighting its responsibilities towards promoting sustainable development. In addition, the International marine Organization (IMO) has implemented a protocol aimed at attaining sustainable marine development, in line with the wider concept of sustainable development (Wang, Yuen, Wong, & Li, 2020). The industry's significant involvement in achieving the 2030 Sustainable Development Agenda and the Paris Agreement highlights its capacity to contribute to global sustainability initiatives (Stead, 2018). The marine industry's ability to contribute to sustainable growth depends on doing research, acquiring information, and developing technology in order to maximize value generation and assure long-term sustainable growth (Koilo, 2021). Nevertheless, the lack of comprehensive research on marine supply chain sustainability suggests a possible knowledge gap regarding its complete influence on sustainable development goals (Essel, Jin, Bowers, & Abdul-Salam, 2022).

Furthermore, the industry's capacity to fulfill the IMO-led policy on sustainable development as part of the 2030 Agenda highlights the necessity for collaborative endeavors to tackle sustainability concerns (Popek, 2016). The maritime industry's growing focus on sustainability concerns, prompted by legislation and stakeholder consciousness, signifies a transition towards more environmentally friendly and sustainable practices, such as green supply chains and sustainable development (Fasoulis & Kurt, 2019). The industry's contribution to the preservation and responsible utilization of oceans and marine resources is in line with SDG 14, emphasizing the growing obligation of maritime spatial planning as a process of balancing competing interests (Essel, Jin, Bowers, & Abdul-Salam, 2022). Ultimately, the marine sector's commitment to sustainable development objectives is clearly demonstrated by its contributions to economic expansion, ingenuity, conscientious consumption and production, and ecological preservation. Nevertheless, further investigation and focus on the sustainability of marine supply chains are required in order to effectively tackle the industry's influence on sustainable development (Koilo, 2021).

2.2. Existing methods that support the development of an environmentally friendly economy in marine activities

In order to promote the growth of an ecologically conscious economy in maritime industries, it is essential to take into account the possible hazards and difficulties related to discussions on sustainability and the environmentally friendly economy (Blythe et al., 2018). Illuminate the hidden dangers in current discussions on sustainability, with a focus on the possibility of environmental progress resulting in the seizure of land, oceans, and resources. This might undercut the goal of establishing an eco-friendly economy. This viewpoint emphasizes the significance of carefully assessing the possible adverse outcomes of sustainability attempts in maritime operations. Moreover, the endorsement of ecotourism in Marine Protected Areas (MPAs) is recognized as a significant strategy for assessing the worth of natural resources and improving effective management of marine environments (Casimiro et al., 2023). Highlight the importance of promoting the growth of ecotourism and involving local communities in order to attain sustainable development in Marine Protected Areas (MPAs). This is in line with the objective of promoting an ecologically sustainable economy in marine activities through the utilization of ecotourism to encourage the preservation and responsible utilization of marine resources. Furthermore, the need of employing comprehensive data gathering and analysis endeavors is emphasized as crucial for overseeing the environment and guaranteeing the sustainable use of marine resources (Malde et al., 2019). Highlight the crucial significance of data-driven methodologies in marine science, which are essential for influencing policies and practices aimed at fostering an ecologically sustainable economy in marine operations. In addition, the need of doing transdisciplinary research and utilizing real-world labs to tackle the many viewpoints and obstacles in promoting transformational paths towards marine sustainability is emphasized (Franke et al., 2022). Highlight the significance of comprehending and incorporating ecological, sociological, political, and economic viewpoints to advance oceanic solutions, in line with the objective of fostering a sustainable economy in marine endeavors.

2.3. The economic consequences of incorporating sustainable practices into marine operations

The economic implications of integrating sustainable practices into maritime activities are diverse and have been extensively studied. There is data indicating that using sustainable practices in maritime operations can result in improved financial performance for enterprises (Ameer & Othman, 2011). This is evidenced by the notion that adhering to obligations within the framework of "superior sustainable practices" might lead to enhanced financial performance

in comparison to those who do not partake in such activities. Nevertheless, it is crucial to acknowledge that the economic success of marine activities is inextricably connected to the ecological viability of marine ecosystems. Studies have demonstrated that the initial generation of organic matter in an ecosystem sets a constraint on the amount of resources that can be harvested sustainably, as well as the economic benefits gained from marine resources (Marshak & Link, 2021). In addition, the effects of fishing low-trophic level species on marine ecosystems have been emphasized. Evidence suggests that reducing exploitation rates by half might significantly decrease the consequences on marine ecosystems, while still reaching 80% of the maximum sustainable yield (Smith et al., 2011). Within the realm of fisheries management, there has been a strong emphasis on the crucial role of good management in enhancing the state of fish stocks (Hilborn et al., 2020). Regions without abundance evaluations often have inadequate fisheries management, resulting in unfavorable stock conditions. Overfishing poses a substantial risk to the well-established worth of marine fisheries (Link & Watson, 2019). Furthermore, the enlargement of oxygen minimum zones and excessive fishing activities may jeopardize the long-term viability of valuable pelagic fisheries and marine ecosystems (Stramma et al., 2011). These findings emphasize the crucial significance of using sustainable practices in marine operations to reduce the negative impacts of overfishing and ecosystem degradation. Furthermore, the sustainable growth of the maritime sector is a multifaceted matter that is impacted by a multitude of elements. The exponential expansion of the maritime sector, together with the establishment of port wharfs, power plants, and land reclamation, has resulted in heightened strain on marine resources and frequent occurrences of marine disasters, posing a threat to sustainable development (Yang et al., 2016). Li et al. (2023) propose that enhancing marine scientific and technical competence may effectively increase the efficiency of exploiting and utilizing marine resources, hence promoting the sustainable development of the marine economy. Moreover, the significance of resource optimization in promoting the economic growth of marine sectors has been emphasized, underscoring the necessity for holistic resource management to attain sustainable development (Wang & Yang, 2022).

3. ACHIEVING ZERO CARBON EFFICIENCY IN CONTEMPORARY VESSELS

3.1. The notion of zero carbon efficiency and its significance in the maritime sector

The imperative to attain carbon neutrality in the marine sector has garnered considerable focus owing to the urgent requirement to reduce carbon emissions in the industry heavily reliant on fossil fuels (Mukherjee et al., 2020). The International Maritime Organization (IMO) has established ambitious objectives to achieve a 40% reduction in carbon emissions from ships by the year 2030 (Risso, 2023). In order to do this, researchers are investigating many inventive methods, which involve the utilization of alternative low or zero carbon fuels, such as biofuels, ammonia, and hydrogen, in marine transportation (Carvalho et al., 2021; Dhanabal, 2023; Makepeace & Ravi, 2022). Moreover, the adoption of fuel cell power systems and seaport microgrids is considered a potential approach to attain a completely carbon-neutral state in future seaports. This development is part of the broader effort to electrify the marine sector (Xing et al., 2021; Bakar et al., 2021). The use of ammonia and hydrogen in maritime transport is becoming increasingly interesting due to their potential as alternative fuels. Ammonia is considered a solution to the decarbonization challenge for the maritime industry due to its storage and distribution advantages compared to hydrogen (Valera-Medina et al., 2021). Furthermore, ammonia is considered a promising hydrogen carrier that eliminates problematic hydrogen storage and transport (Deng et al., 2022). Furthermore, ammonia is widely used and intensively produced on a global scale, making it a potential next-generation hydrogen carrier (Matsumura et al., 2021). On the other hand, hydrogen is also seen as a key player in providing a long-term low-carbon storage vector, with decarbonisation of hard-to-reduce sectors and

applications (Bauer et al., 2022). It is considered one of the main energy carriers with several advantages and applications in industry and everyday life (Tavakoli & Karimi, 2022). However, there are concerns about the use of hydrogen as a fuel, especially when it is transported in the form of ammonia. Recent research has revealed the harmful consequences of hydrogen fuel as a greenhouse gas emission when it is not burned but released into the atmosphere (Zheng et al., 2023). Furthermore, the use of hydrogen must be thoroughly evaluated for the current aircraft platform due to the uncertainty regarding the potential increase in radiation impact (Hasan et al., 2021). Although ammonia and hydrogen hold promise as alternative fuels for shipping, there are uncertainties and potential adverse effects associated with their use. Ammonia is considered a potential solution due to its storage and distribution advantages, while hydrogen is recognized as an important long-term low-carbon storage vector. However, there are concerns about the harmful effects of hydrogen fuel and the uncertainty surrounding its use, especially when transported in the form of ammonia. Moreover, the adoption of low-and zero-carbon technology is highlighted as an imperative in order to comply with the progressively stringent emission and efficiency standards established by the International Maritime Organization (IMO) (Park et al., 2021). The necessity of this transition is emphasized by the forecast that greenhouse gas (GHG) emissions from the marine sector are anticipated to rise by 50%–250% by 2050 under a "business as usual" situation (Mukherjee et al., 2020). The statement emphasizes the urgent requirement for the marine industry to make substantial reductions in greenhouse gas (GHG) emissions and actively participate in efforts to achieve decarbonization (Nisiforou et al., 2022). Figure 1 presents a striking representation of the projected increase in CO2 emissions in the maritime transport industry over a period of forty years, starting from 2010 and lasting until 2050. The projection is systematically divided into three main groups that collectively describe the emission profile of the industry. The solid red fundamental layer represents the newly projected emissions that are expected to occur after the deployment of mitigation initiatives. Additionally, there are two layers of measures aimed at reducing the impact: one layer is depicted by a striped orange pattern, which represents the reductions attributed to the Ship Energy Efficiency Management Plan (SEEMP), and the other layer is represented by a dotted yellow pattern, which indicates the reductions achieved through the Energy Efficiency Operational Indicator (EEOI). An examination of the temporal pattern reveals a noticeable increase in total CO2 emissions from the sector, even when taking into account the efforts to reduce them. Significantly, the infographic indicates a gradual increase in the influence of these methods as time progresses. The picture suggests that a significant portion of prospective emissions will be offset by the specified measures by the year 2050. The depiction of a ship decorated with tree-related motifs symbolizes the industry's transition towards more environmentally friendly operational methods. This graphic juxtaposes industrial and ecological images, perhaps serving as a call to action for the business. It signifies the necessity for a stronger dedication to environmental stewardship in response to rising emissions.

Figure following on the next page

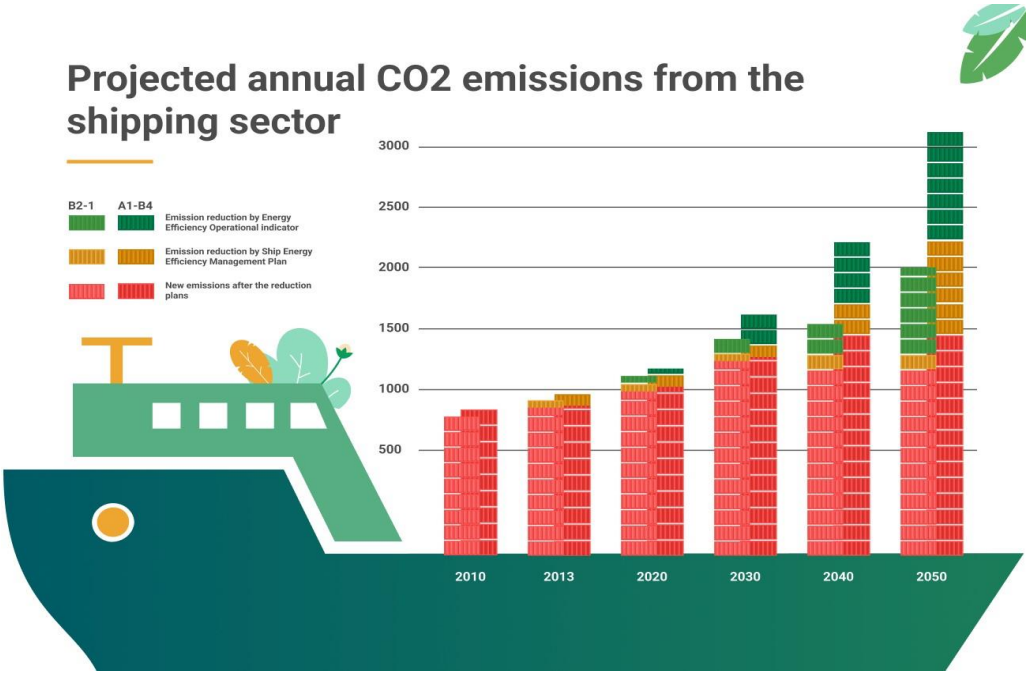

Figure 1: Projected annual CO2 emissions from the shipping sector
(Source: *https://www.container-xchange.com/wp-content/uploads/2019/07/Projected-annual-CO2-emissions-from-the-shipping-sector.png*)

The marine sector is now investigating the use of carbon capture and storage methods to reduce CO2 emissions from commercial ships (Bortuzzo et al., 2023; Negri et al., 2022). Furthermore, it is considered crucial to implement a comprehensive and integrated strategy that considers the whole life cycle of the marine sector in order to effectively decrease its carbon footprint (Vakili et al., 2022). The creation of mechanisms by international organizations like the IMO and the European Union to restrict the release of greenhouse gases from shipping highlights the importance of attaining complete carbon efficiency in the marine industry (Schwartz et al., 2022). To summarize, attaining complete carbon efficiency in the marine industry is an intricate and diverse undertaking that necessitates the embrace of several cutting-edge technologies and fuels, together with the enforcement of rigorous regulatory procedures. The necessity of this shift is emphasized by the anticipated rise in greenhouse gas (GHG) emissions from the marine industry, highlighting the crucial importance of decarbonization endeavors (Mukherjee et al., 2020).

3.2. Illustrations or instances of ships that have achieved carbon neutrality in their operations

Various programs and instances of ships adopting carbon-free or low-carbon technologies have arisen in the pursuit of carbon-neutral marine operations. These examples not only show that it is possible to achieve zero carbon efficiency, but they also provide a standard for the industry's shift towards sustainable practices. Presented below are a few noteworthy visual representations. A research emphasized the substantial decrease in greenhouse gas emissions by substituting heavy fuel oils with hydrogen and ammonia in transoceanic marine vehicles, as these fuels are carbon-neutral. According to a study by Biçer and Dincer (2017), the evaluation of the environmental impact of transoceanic tankers and freight ships revealed that these fuels had a far smaller effect on global warming when in operation, in comparison to traditional vessels powered by heavy fuel oil. The marine industry is increasingly embracing carbon-free fuels, leading to a significant shift in the shipbuilding and shipping sectors. The integration of batteries, fuel cells, and electric propulsion systems in ships is pivotal to this shift. Marine

demonstrations that use environmentally acceptable alternative fuels and components for electric propulsion systems are essential for the industry to be ready for achieving carbon neutrality and developing future ship designs (Shim et al., 2023). Ammonia, due to its carbon-neutral chemical composition and high energy density, is seen as a viable power option for the marine sector, making it a feasible choice for the future generation of shipping. Ammonia's utilization as a fuel offers a promising approach to reducing carbon emissions in the shipping industry, considering its existing infrastructure for production, transportation, and storage (Ayvalı, Tsang, & van Vrijaldenhoven, 2020). Exploring alternate marine fuels, including hydrogen, ammonia, and methanol, is crucial for attaining low carbon shipping by 2050. These fuels, in conjunction with technological and operational strategies, have the potential for a substantial decrease in emissions of sulfur oxides, nitrogen oxides, and carbon dioxide, hence contributing to the sustainability of the sector (Xing, Stuart, Spence, & Chen, 2021). Within the framework of the comparative analysis of marine fuel properties table, a detailed investigation reveals considerable variations in the energy characteristics and storage needs of various marine fuels. Marine gas oil (MGO) has a lower heating value (LHV) of 42.7 MJ/kg, which is considered high, and it also has the greatest volumetric energy density of 36.6 GJ/m³ compared to the other mentioned fuels. Significantly, it sustains these energy values even when stored under normal environmental conditions, highlighting its widespread utilization in maritime applications. On the contrary, liquefied natural gas (LNG) has a larger energy content per unit mass, as indicated by its LHV of 50 MJ/kg. Nevertheless, its volumetric energy density is considerably reduced to 23.4 GJ/m³, which requires bigger storage capacities. The storage temperature for LNG is extremely low at -162°C, which needs cryogenic storage equipment, adding complexity and significant expenses to its management. Methanol and liquid ammonia have lower lower heating values (LHVs) of 19.9 MJ/kg and 18.6 MJ/kg respectively. Methanol may be stored at a temperature of 20°C, whereas ammonia can be stored in a temperature range of -34/20°C. Although they are less energy-dense than LNG, they may be easier to handle. Liquid and compressed hydrogen fuels have a same high Lower Heating Value (LHV) of 120 MJ/kg, which is considerably higher than that of traditional fuels. Nevertheless, their volumetric energy densities are the lowest, measuring at 8.5 and 7.5 GJ/m³ respectively. In addition, the storage and transportation of liquid hydrogen present significant hurdles due to its requirement to be kept at a temperature of -253°C, which is the lowest among all fuels. Compressed hydrogen requires a storage pressure of 700 bar, which is substantially greater than the atmospheric pressure storage of the other fuels, highlighting the requirement for robust containment mechanisms (Table 1).

Fuel Type	LHV [MJ/kg]	Volumetric Energy Density [GJ/m³]	Storage Pressure [bar]	Storage Temperature [°C]
MGO (Marine gas oil)	42.7	36.6	1	20
LNG (Liquefied natural gas)	50	23.4	1	-162
Methanol	19.9	15.8	1	20
Liquid ammonia	18.6	12.7	1.okt	-1.7
Liquid hydrogen	120	8.5	1	-253
Compressed hydrogen	120	7.5	700	20

MGO - Marine gas oil and; LNG - Liquefied natural gas; LHV - Lower heating value

Table 1: Comparative Evaluation of Characteristics of Marine Fuel
(Source: https://energypost.eu/shipping-commercially-viable-zero-emission-deep-sea-vessels-by-2030/)

Battery energy storage systems are utilized in the hybrid/electric propulsion systems of ships. The growing use of battery/hybrid propulsion boats, particularly in the short-range vessel sector, indicates a significant shift towards decarbonization. By integrating battery energy storage systems (BESS) with local renewable sources and shore connection systems, ships may effectively utilize sustainable electrical energy, hence supporting the industry's decarbonization goals (Kolodziejski & Michalska-Pożoga, 2023). These occurrences highlight the marine sector's proactive measures in achieving carbon neutrality. The industry is using advanced fuels, propulsion technologies, and collaborative research to provide a sustainable path for the future. This aligns its operations with the wider objectives of preserving the environment and taking action on climate change.

3.3. Obstacles and future outlook in attaining complete carbon efficiency in marine operations

Attaining full carbon efficiency in marine operations is a complex and demanding task, but it is crucial for the maritime sector due to its substantial contribution to global commerce and environmental consequences. The journey towards achieving carbon neutrality is complex, characterized by several challenges in technology, economics, regulations, and operations. However, the future appears hopeful as continuous innovation, favorable laws, market mechanisms, and international cooperation offer potential solutions. Technological innovation is leading this transition. The industry is now engaged in the exploration and investment of novel fuels and propulsion technologies, including hydrogen, ammonia, and sophisticated battery storage systems. Nevertheless, these technologies are currently in their early phases and want extensive investigation and advancement to guarantee their practicality, security, and dependability for marine operations on a massive scale. The industry's dedication to technical progress is crucial, but it requires substantial expenditures and a readiness to adopt new technologies (Shim et al., 2023; Xing, Stuart, Spence, & Chen, 2021). The influence of economic factors is crucial in the shift towards carbon efficiency. The exorbitant expenses linked to the development and execution of novel technologies provide a substantial obstacle. Moreover, the marine sector functions with narrow profit margins, and players frequently exhibit reluctance to make significant expenditures in the absence of evident economic advantages. Hence, it is important to consider the economic feasibility of sustainable practices. Financial incentives, subsidies, and carbon pricing schemes can incentivize the sector to invest in cleaner and more efficient operations (Kolodziejski & Michalska-Pożoga, 2023; Allal, Mansouri, Youssfi, & Qbadou, 2018). Regulatory obstacles introduce an additional level of intricacy. Uniform laws are necessary in the marine business due to its worldwide character in order to maintain fairness and equality among all participants. Nevertheless, harmonizing global, continental, and domestic legislation poses a substantial obstacle. The International Maritime Organization (IMO) has a crucial function in establishing worldwide benchmarks, although the process of reaching agreement among member nations and implementing laws is intricate. It is crucial to enforce stringent standards and ensure compliance in order to promote sustainability within the sector (Popek, 2016; Akyurek & Bolat, 2021). Incorporating new technology and processes into old systems will unavoidably result in operational interruptions. The marine business is known for its conventional and cautious approach, which necessitates time and adaptation to modify operating processes, educate workers, and guarantee the dependability and safety of new technology. In order to achieve a seamless transition, the sector must demonstrate a willingness to accept and adopt changes, as well as allocate resources towards developing and enhancing the skills and knowledge of its workforce (Dinwoodie, Tuck, Knowles, Benhin, & Sansom, 2011). Notwithstanding these challenges, the prospects for attaining full carbon efficiency in maritime activities are encouraging.

The industry's growing emphasis on innovation, bolstered by governmental frameworks and market processes, is a positive move. Global cooperation and the exchange of exemplary methods and technology will be essential in surmounting the forthcoming obstacles. The marine industry's pursuit of carbon neutrality encompasses more than just adherence to regulations or financial advantages; it entails a commitment to sustainable development and the preservation of the environment for future generations (Essel, Jin, Bowers, & Abdul-Salam, 2022). To summarize, achieving carbon efficiency in the maritime sector is a challenging but attainable objective. A comprehensive strategy is necessary, which encompasses technical advancement, financial motivations, regulatory harmonization, and operational flexibility. By implementing effective methods and fostering collaboration, the marine sector may successfully overcome these problems and establish itself as a frontrunner in sustainable and ecologically conscious operations.

4. CUTTING-EDGE FUELS AND ENERGY SOURCES

4.1. Introduction to the novel fuels being implemented in the marine sector

The marine industry is currently at a critical point in its efforts to achieve sustainability, and the use of innovative fuels is essential in driving this change. The sector, which has traditionally relied on fossil fuels, is currently investigating and embracing new, environmentally friendly fuel choices in order to comply with strict environmental rules and fulfill the aspirations of society for cleaner operations. This overview of emerging fuels in the maritime industry emphasizes the progress and potential of various energy sources in influencing the future of marine transportation. Hydrogen is a very promising candidate in the pursuit of environmentally friendly naval fuel. With its substantial energy content and absence of carbon emissions when burned, it is a perfect substitute for conventional fossil fuels. Nevertheless, the sector is facing considerable obstacles in terms of hydrogen storage and delivery, mostly due to its low density and the requirement for high-pressure or cryogenic confinement. Extensive investigation and advancement in storage technologies and the creation of hydrogen fuel cells are imperative for fully exploiting their capabilities (Shim et al., 2023; Xing, Stuart, Spence, & Chen, 2021). Ammonia is an emerging fuel that is attracting interest because of its carbon-neutral characteristics and greater energy density in comparison to hydrogen. It may be immediately utilized as a fuel in internal combustion engines or fuel cells, providing a diverse energy option for the marine sector. The current infrastructure for ammonia production, transportation, and storage, which was mainly designed for the agriculture industry, serves as a basis for its utilization as a maritime fuel. Nevertheless, the toxicity and corrosive properties of ammonia need meticulous handling and implementation of sophisticated safety protocols (Ayvalı, Tsang, & van Vrijaldenhoven, 2020). Biofuels, obtained from organic sources, offer a renewable and environmentally-friendly fuel alternative. Compared to traditional marine fuels, they possess the capacity to substantially decrease greenhouse gas emissions. Biofuels possess a high degree of adaptability, enabling their integration with conventional fuels or independent usage, hence offering flexibility in their implementation. However, the long-term viability of biofuel production, namely regarding land utilization and its impact on the rivalry with food crops, remains a topic of continuous discussion and investigation (Xing, Stuart, Spence, & Chen, 2021). Methanol, a liquid fuel, is renowned for its environmentally friendly combustion characteristics and convenient manageability. It may be generated from many sources such as natural gas, coal, and renewable biomass, providing a means to decrease emissions in maritime activities. Methanol's compatibility with current engine technology and its ability to remain in a liquid form under normal conditions make it a highly appealing choice for the marine industry. Nonetheless, the total environmental impact of methanol is contingent upon the manufacturing techniques employed and the origin of the methanol itself (Xing, Stuart, Spence, & Chen, 2021).

Ultimately, the marine industry is actively investigating and adopting innovative fuels as a means of fulfilling its dedication to sustainability and environmental accountability. Hydrogen, ammonia, biofuels, and methanol possess distinct benefits and difficulties, exemplifying the intricacy of adopting renewable energy in marine operations. To achieve the effective incorporation of these innovative fuels, it is necessary to persist in conducting research, advancing technology, providing regulatory assistance, and fostering collaboration across the marine industry. These efforts are crucial in overcoming obstacles and fully realizing the promise of these fuels for a sustainable future in maritime operations.

4.2. Advantages and difficulties linked to each fuel type

As the marine industry progresses towards a more environmentally friendly future, the implementation of innovative fuels is essential in minimizing the sector's impact on the environment. Every alternative fuel choice offers distinct benefits and difficulties, influencing the industry's strategy in attaining cleaner and more efficient operations. In order to get a deeper comprehension of the characteristics of these innovative fuels, the subsequent table presents a comparative synopsis of their advantages and corresponding challenges. This understanding is crucial for stakeholders to make educated decisions and develop strategies for integrating alternative fuels into the marine industry (Table 1).

Fuel Type	Advantages	Difficulties
Hydrogen	- Zero emissions - High energy content	- Storage and distribution challenges - Infrastructure requirements
Ammonia	- Carbon-neutral - Existing infrastructure	- Toxicity and corrosion - Lower energy content
Biofuels	- Renewable source - Compatibility with existing engines	- Sustainability concerns - Variable quality
Methanol	- Reduced emissions - Ease of handling	- Production footprint - Lower energy density

Table 2: Pros and Cons of Novel Fuels in the Maritime Industry
(Source: Adapted from Shim et al., 2023; Xing, Stuart, Spence, & Chen, 2021; Ayvalı, Tsang, & van Vrijaldenhoven, 2020.)

The table 1. summarizes the essential characteristics and factors related to hydrogen, ammonia, biofuels, and methanol. It offers a concise overview of the opportunities and obstacles that each fuel type presents in the marine industry's shift towards sustainability.

4.3. The significance of these fuels in mitigating the ecological consequences of marine activities

The use of alternative fuels such as hydrogen, ammonia, biofuels, and methanol in the maritime industry is a crucial step in reducing the environmental impact often associated with marine activities. This transition is not only a reaction to legislative requirements, but rather a proactive strategy to tackle the urgent environmental issues that result from marine activity. The significance of hydrogen in this ecological transformation is especially remarkable. Hydrogen, when burned, creates just water vapor as a byproduct, making it a clean fuel that does not emit CO2, NOx, or SOx. The substantial decrease in greenhouse gas emissions and air pollutants is vital for safeguarding coastal and port populations and adhering to international climate objectives.

Hydrogen has environmental advantages that go beyond only reducing emissions. It eliminates the possibility of oil spills and water pollution, so safeguarding marine habitats and biodiversity (Shim et al., 2023). Ammonia, known for its carbon neutrality when derived from renewable energy sources, presents an additional means to decrease the carbon emissions of the maritime sector. Using ammonia as a marine fuel can substantially reduce greenhouse gas emissions, so aiding worldwide endeavors to address climate change and alleviate ocean acidification. Nevertheless, it is crucial to prioritize the control of ammonia's toxicity in order to prevent any unintended negative effects on marine life or human health when using it as a marine fuel (Ayvalı, Tsang, & van Vrijaldenhoven, 2020). The ecological importance of these new fuels highlights the marine industry's dedication to sustainable and accountable practices. The industry may greatly reduce its ecological impact by decreasing its dependence on fossil fuels, lowering emissions, and eliminating marine contamination. Nevertheless, the effective utilization of these fuels necessitates not only technological progress and the establishment of necessary facilities, but also a thorough comprehension of their ecological consequences and sustainable acquisition methods. Incorporating these innovative fuels into the energy composition of the marine industry represents a significant shift towards a more environmentally conscious and sustainable future. The collaboration between policymakers, academics, and maritime stakeholders will play a vital role in addressing the problems and maximizing the benefits of these fuels for a more environmentally friendly marine business.

5. SHIPBOARD RECYCLING AND WASTE MANAGEMENT

5.1. Existing protocols and rules for the management and recycling of garbage on board ships

The management and recycling of waste on ships are crucial components of marine operations, regulated by a complex framework of procedures and regulations aimed at reducing environmental effect and encouraging sustainable practices. The International Maritime Organization (IMO) has implemented rigorous requirements, through conventions and regulations, to guarantee the appropriate handling, management, and disposal of trash created by ships. An essential legislation in this field is the International Convention for the control of Pollution from Ships (MARPOL), particularly Annex V, which addresses the control of pollution caused by waste disposal from ships. MARPOL Annex V establishes restrictions on the disposal of the majority of rubbish kinds in maritime environments, enforces appropriate waste management protocols, and necessitates ships to uphold a rubbish Record Book. The convention highlights the need of minimizing trash produced by ships, recycling whenever feasible, and environmentally-friendly disposal of garbage on land (Allal, Mansouri, Youssfi, & Qbadou, 2018). The guidelines encompass more than just disposal, encompassing waste reduction, recycling, and reutilization. Vessels are advised to reduce the production of trash on board by using efficient practices and selecting items that use less resources. Promoting the recycling and reuse of materials is highly recommended as a means to minimize the quantity of garbage transferred to onshore facilities. This approach is consistent with the overall environmental objectives and sustainable practices in the maritime sector. It promotes a circular economy, which aims to use resources more efficiently and minimize waste (Dinwoodie, Tuck, Knowles, Benhin, & Sansom, 2011; Essel, Jin, Bowers, & Abdul-Salam, 2022). Furthermore, port facilities are essential in this environment as they offer sufficient garbage receipt and processing amenities. It is crucial to ensure that ports are adequately prepared to handle the garbage that is unloaded from ships in order to effectively execute waste management regulations. Effective cooperation between maritime operators and port authorities is vital to guarantee the ecologically conscientious management of trash, including its inception aboard vessels and its ultimate disposal or recycling onshore.

To summarize, the current norms and regulations for handling and reusing waste aboard ships demonstrate the maritime sector's dedication to environmental responsibility and sustainable practices. By strictly following these standards and implementing proactive waste reduction and recycling initiatives, the marine industry may effectively reduce its impact on the environment and help achieve global sustainability objectives.

5.2. Novel approaches and advanced technology for the recycling and waste reduction aboard ships

The maritime sector is actively adopting innovative methods and modern technology to promote sustainability and environmental conservation by recycling and reducing trash on ships. These measures not only fulfill the statutory criteria but also showcase the industry's dedication to reducing its ecological impact. Waste Segregation and Enhanced Recycling Systems: Contemporary vessels are outfitted with advanced waste management systems that enable the separation of trash at its origin. State-of-the-art compactors, baling machines, and shredders are used to process recyclable materials such as paper, glass, and certain plastics. This guarantees that these materials are compressed and kept effectively until they can be unloaded at appropriate recycling facilities. Utilizing such technology diminishes trash volume, optimizes recycling possibilities, and decreases the ecological repercussions of garbage disposal (Allal, Mansouri, Youssfi, & Qbadou, 2018). Food waste treatment and biodegradable solutions are gaining popularity for efficient management of food waste. These solutions include the use of vacuum food waste systems and biodegradable packaging. Vacuum systems efficiently convey food waste straight to a centralized processing plant for compact storage or subsequent processing. Certain vessels are including bioprocessors capable of transforming food waste into biogas or other valuable byproducts. This helps to decrease waste volume and fulfill the ship's energy requirements (Dinwoodie, Tuck, Knowles, Benhin, & Sansom, 2011).
Advanced wastewater treatment technologies are being used aboard contemporary ships to reduce the environmental consequences of sewage discharge. These systems purify black and gray water to a level that meets or beyond international standards, ensuring safe disposal. The use of membrane bioreactors, sophisticated oxidation processes, and UV sterilization guarantees the elimination of detrimental contaminants and pathogens from the discharged water (Essel, Jin, Bowers, & Abdul-Salam, 2022). Energy recovery and waste-to-energy technologies are becoming increasingly popular on ships. These systems transform waste materials into electrical energy or heat, so supplementing the ship's energy provision and diminishing reliance on fossil fuels. Through the utilization of advanced techniques like pyrolysis, gasification, or incineration with energy recovery, ships have the ability to diminish the amount of garbage produced and simultaneously produce energy, so transforming waste management into a productive process. Digital waste management solutions are significantly improving waste management procedures on ships by leveraging digitalization. Integrated software solutions provide precise tracking, recording, and monitoring of waste creation and handling operations. These solutions guarantee adherence to environmental rules, enhance waste treatment operations, and empower ships to effectively and transparently manage their trash. Ultimately, the marine sector's embrace of innovative strategies and cutting-edge technology to recycle and minimize waste serves as evidence of its commitment to environmental preservation and sustainable methodologies. By always introducing new ideas and dedicating themselves to the principles of sustainability, the sector is not only meeting strict environmental standards but also leading the path towards a more sustainable and environmentally conscious future.

5.3. Case studies demonstrating effective waste management and recycling programs in the marine sector

The sustainability strategy of the marine sector relies heavily on the implementation of efficient waste management and recycling initiatives. Multiple case studies exemplify how inventive techniques and unwavering endeavors might result in triumphant achievements in diminishing environmental footprint. Presented here are a few noteworthy illustrations:

1) The 'Green Ship' Initiative: A prominent shipping firm implemented the 'Green Ship' initiative, which integrates state-of-the-art waste management and recycling technologies aboard their vessels. The initiative encompasses the installation of vacuum food waste systems, compactors, and balers to facilitate efficient waste sorting and processing. The vessel also utilizes a sophisticated wastewater treatment technology, guaranteeing that the released water complies with international environmental regulations. The ship's adoption of this comprehensive waste management strategy has resulted in a substantial decrease in its ecological impact, establishing a standard for the industry (Essel, Jin, Bowers, & Abdul-Salam, 2022).
2) Zero-Waste Cruise Liners: A cruise firm has developed a zero-waste project with the goal of reducing landfill trash and maximizing recycling and reuse. The effort encompasses thorough trash segregation at its origin, significant personnel education, and cooperation with port authorities to guarantee appropriate unloading and recycling of waste products. The organization has achieved a commendable recycling rate, with a substantial amount of its garbage being reused or recycled. This demonstrates the practicality and advantages of comprehensive waste management programs in the marine industry (Dinwoodie, Tuck, Knowles, Benhin, & Sansom, 2011).
3) Port-Side Recycling Collaboration: A port authority, in partnership with shipping corporations and trash processing enterprises, established a recycling program at the port. The program offers ships advanced garbage receiving facilities, guaranteeing the effective unloading and processing of trash generated by the ships. The port authority provides incentives to ships that demonstrate exceptional waste management and recycling practices, promoting the adoption of optimal methods and enhancing the overall sustainability of marine operations (Allal, Mansouri, Youssfi, & Qbadou, 2018).
4) Waste-to-Energy Solutions: A shipping firm used innovative waste-to-energy solutions by putting a small-scale waste-to-energy plant aboard one of its ships. The facility transforms organic waste into biogas, which is subsequently utilized to provide power for internal operations. This project not only lowers the quantity of garbage but also aids in fulfilling the ship's energy requirements, demonstrating a pioneering method of converting waste into a useful asset.

These case studies illustrate that by demonstrating dedication, ingenuity, and cooperation, efficient waste management and recycling initiatives may result in significant ecological advantages within the maritime industry. Through the implementation and improvement of these methods, the marine sector has the potential to make a substantial impact on worldwide sustainability initiatives and serve as a commendable model for other industries.

6. INCORPORATION INTO WIDER CONFERENCE TOPICS

The incorporation of marine environmental preservation and sustainable methodologies into the wider subjects of the conference emphasizes the interdependence of the maritime industry with worldwide economic, social, and environmental systems. The maritime industry's dedication to sustainability aligns with the core topics of the conference, underscoring the sector's crucial influence in crafting a sustainable future.

This part examines the correlation and contribution of marine environmental protection and sustainability measures to the wider conference themes. The marine industry's endeavors to attain carbon neutrality and minimize waste are crucial for promoting an environmentally sustainable economy. The implementation of measures such as the adoption of alternative fuels and improved waste management systems makes a substantial contribution to sustainable development. These initiatives are in line with worldwide endeavors to establish a resilient and sustainable economy (Allal, Mansouri, Youssfi, & Qbadou, 2018). The marine industry plays a crucial role in the worldwide economy, enabling commerce and fostering connection. Consequently, it encounters the task of harmonizing operational effectiveness with ecological sustainability. The sector's dedication to mitigating emissions and effectively handling trash is essential in tackling the environmental difficulties brought about by globalization (Dinwoodie, Tuck, Knowles, Benhin, & Sansom, 2011). The incorporation of sustainable practices in the marine sector is fundamentally transforming the current economy. The marine industry is effectively reducing its environmental footprint and promoting economic development and adaptability by using green technology and fuels. This allows the sector to comply with changing regulations and meet customer demands (Essel, Jin, Bowers, & Abdul-Salam, 2022). The marine industry's dedication to sustainability and environmental care enhances societal progress and is in line with democratic principles. The industry's dedication to public welfare and inclusive governance is demonstrated via efforts to enhance air and water quality, protect marine habitats, and include stakeholders in decision-making processes (Allal, Mansouri, Youssfi, & Qbadou, 2018). Education and information exchange are crucial for promoting sustainable marine practices. Promoting the spread of effective methods, educating staff, and encouraging exploration and advancement are essential for cultivating a sustainable mindset within the sector. Facilitating the sharing of information is crucial for promoting ongoing enhancement and guaranteeing that the marine industry complies with sustainable principles (Dinwoodie, Tuck, Knowles, Benhin, & Sansom, 2011). The marine industry's emphasis on environmental preservation enhances contemporary welfare economics by guaranteeing that economic endeavors take into account the well-being of the environment and society. The marine sector is prioritizing the well-being of present and future generations by actively lowering emissions, sustainably managing trash, and embracing clean technology (Essel, Jin, Bowers, & Abdul-Salam, 2022). The marine industry's proactive stance on environmental preservation and sustainability aligns well with the overarching topics of the conference. By integrating these concepts into its operations, the sector is not only mitigating its ecological footprint but also playing a pivotal part in crafting a sustainable future.

7. CONCLUSION

The maritime sector plays a leading role in global commerce, serving as a crucial conduit for international trade and economic growth. Nevertheless, this position has a substantial environmental obligation, given that the industry's activities exert a profound influence on marine ecosystems and air quality. Recognizing these difficulties, the sector has undertaken a profound process of change towards sustainability. The shipping industry demonstrates its dedication to reducing its environmental impact and preserving its economic importance through initiatives such as green shipping projects, strict regulatory compliance, the adoption of novel eco-friendly technology, and the implementation of sustainable practices at ports. The industry is being propelled towards reaching zero carbon efficiency via innovative research, global collaboration, and the use of state-of-the-art technology. The industry's proactive attitude to environmental stewardship is seen via the development and use of alternative fuels such as hydrogen, ammonia, biofuels, and methanol, as well as improvements in waste management and recycling. These projects not only tackle the pressing environmental issues at hand, but also provide the groundwork for a long-lasting and environmentally-friendly marine future.

Nevertheless, this expedition is not without of its obstacles. The industry has several obstacles, including technological, economic, legal, and operational challenges, in achieving full carbon efficiency and implementing sustainable practices. To overcome these obstacles, it is necessary to consistently develop new ideas, make significant financial contributions, foster cooperation across different industries, and globally commit to achieving sustainable objectives. The maritime industry's commitment to sustainability is not a separate effort, but rather a closely interconnected part of the wider global economic, social, and environmental systems. By adhering to sustainable standards, the sector not only helps preserve the environment but also plays a crucial part in developing a robust and sustainable global economy. The maritime industry's crucial position in the worldwide pursuit of a sustainable and environmentally sensitive future is underscored by its unwavering dedication to sustainability and environmental care. This commitment is essential for safeguarding the well-being of both present and future generations.

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MEDIA CONSUMPTION AND MEDIA USING HABITS OF STUDENTS IN THE 2ND YEAR OF COMPUTER SCIENCES AT THE MEĐIMURJE UNIVERSITY

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ABSTRACT

The media, in their diversity, play a key role in modern society, shaping our understanding of the world and events. Traditional forms such as newspapers and television have now been overtaken by digital transformation, where the Internet, forums and social networks are becoming key sources of information. This rapid development opens the door to new challenges, including fake news and the need for media literacy. Digital transformation also brings changes in the way news are consumed, providing us with the possibility of accessing information in real time, but at the same time raises the question of authenticity and reliability. Students spend a significant part of their time on social networks. The paper analyzes what kind of content second-year computer science students follow and how much time they spend on the Internet. Furthermore, the work brings into relation the time spent on the Internet and the quality of sleep, the reduction of physical activity. Monitoring of video content, of influencers, partly affect the shopping habits of students. The paper also questions whether students form opinions under the influence of the media and how many students have the habit of watching documentary programs.

Keywords: *digital transformation, social networks, communication, media, students*

1. INTRODUCTION

The media are an important part of modern society. Traditional forms such as newspapers and television have now been overtaken by digital transformation, where the Internet, forums and social networks are becoming key sources of information. Media have the responsibility to inform, educate, entertain. The media has a profound influence on public opinion, shaping our attitudes through selective reporting and questioning. In the political context, the media is inextricably linked to campaigns and politicians, using social media to interact directly with the public. Digital transformation also brings changes in the way news is consumed, providing us with the possibility of accessing information in real time, but at the same time raises the question of authenticity and reliability. Therefore, the future of media brings with it challenges and opportunities, laying the foundation for a dynamic coexistence between technology, politics and society. With all these changes, the media has become an indispensable factor in shaping identity and culture.

Globalization enables the rapid exchange of information and ideas around the world, leading to the creation of a global media landscape. However, at the same time, local media play a key role in preserving and promoting cultural diversity. On the other hand, the monetization of the media, especially through advertising on social networks, raises questions about the independence of journalism and the influence of marketing interests on the information we consume. With the growth of technology such as virtual reality and artificial intelligence, the media is facing new opportunities and challenges, such as the personalization of content and the increase of false information generated by algorithms. In this context, the development of media literacy becomes a key factor in order to critically understand and evaluate information coming from different sources. Thus, the media, while continuing to evolve, remain an indispensable factor in modern society, shaping our thinking, values and way of life. In today's digital age, the media have the power to shape attitudes, mobilize society and promote democratic values, but also have a responsibility towards accuracy, diversity and respect for journalistic principles. (Ostrički, 2015. 10) One of the earliest forms of communication was oral transmission of information between people. The development of writing, starting with hieroglyphs in ancient Egypt and Chinese letters, made it possible to store information on permanent materials. With the invention of the printing press in the 15th century, the media underwent a revolution. During the 19th century, with the development of the telegraph and the telephone, long-distance communication became possible, speeding up the transmission of news. At the same time, the first newspapers began to develop, bringing regular information to a wider audience. The arrival of radio at the end of the 19th century and television in the middle of the 20th century marked a new era in the mass transmission of information. Media has become ubiquitous in homes, providing a visual and audio dimension of information. (Briggs, Burke, 2011. 212-276). The advantages of the media are enabling access to information on a global level, providing a visual and sound dimension of information, transforming society and promoting democratic values, and providing a wide range of opportunities for information, entertainment and social interaction (Jurčić, 2017. 1-10). Also, the media bring some disadvantages such as the challenge in distinguishing between accurate information and misinformation, especially with the rise of social media, a large amount of information can lead to information overload or information pollution. Fake news, misinformation and propaganda content are a challenge for preservation of credibility of information. (Grmuša, Prelog, 2020. 65-66). As the shortcomings represent a challenge for all members of society, especially children and minors, it is necessary to develop media literacy in order to recognize reliable sources and critically evaluate information. (Roje Miličević, 2019. 1-7)

2. MODERN TYPES OF MEDIA AND THEIR USE

In the modern digital age, media have become an indispensable part of everyday life, providing diverse opportunities for information, entertainment and social interaction (Grbavac, Grbavac, 2014. 2). Internet portals and news allow quick and constantly updated access to information about events in various fields. Social networks have become platforms for dialogue, sharing personal experiences and promoting cultural and social trends (Šošić, 2019 20-31). Podcasts offer a flexible way to consume information through a variety of audio content. Streaming services like Netflix and Spotify have transformed the way we consume video and audio content, eliminating the need for traditional television schedules.

2.1. Internet portals, social networks and influencers

Social networks allow people to share information, photos and personal experiences. They have also become platforms for dialogue, promotion of ideas and expression of cultural and social trends. (Kušić, 2010. 104). Instagram is a social network based on sharing photos and short videos.

Users can post their own pictures, use different filters, and follow other users. This platform often serves as a space for personal expression, product advertising and brand promotion. (Dujmić, 2023. 10). X (twitter) is a microblogging platform that allows users to send short messages called "tweets". This information and social network allows users to follow news, share thoughts, participate in conversations and connect with people who share similar interests. (Lozić, 2021. 1-2). Youtube is the largest platform for sharing video content in the world. Users can post, view and comment on videos related to a variety of topics, including news, education, entertainment and gaming. (Stipić, Beneazić, Ružić, 2021. 103). Facebook is the largest social network in the world that allows users to create profiles, share photos, connect with friends and participate in groups (Guavac, 2019. 31). Facebook is also used for advertising and event promotion purposes. Influencers have become key players in the marketing world, as brands recognize their power to influence and ability to reach specific demographics. In addition, influencers often have a greater degree of authenticity compared to traditional marketing campaigns, because they engage the audience through a personal approach and their own experience with products or services. (Martinković, Vuković, Hunjet, 2020. 20).

3. MEDIA USE HABITS

For the purpose of research, a survey was conducted in which the respondents were second-year students majoring in computer science at the Međimurje polytechnic in Čakovec. The survey was conducted online via google forms, and 11 respondents have participated. The following hypotheses were put forward: general hypothesis - students spend a significant part of their time on social networks, and accompanying - regular monitoring of news on the internet is associated with greater student awareness of global events, computer science students spend more time watching video content, long-term consumption of video games in of students is associated with a decrease in the quality of sleep, students who often watch television have less time for physical activity, students who use social media to inform about news may be more susceptible to forming opinions under the influence of the media, students who follow certain "influencers" on social networks may show a greater tendency to buy the products they promote, the consumption of high-quality content (documentary films, etc.) Through the media can stimulate the development of intellectual interests among students, the increase in media consumption during the period of the covid-19 pandemic can have a long-term effect on the habits of media use and the interaction of students with others.

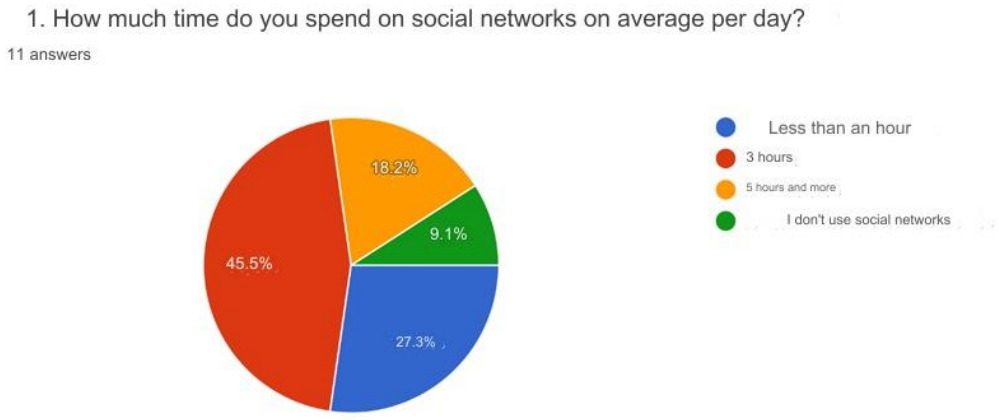

Figure 1: Time spent on social networks
(Source: author's own creation)

The hypothesis was confirmed because almost half of the respondents spend three hours a day on social networks. Also, 18.2% of students spend more than five hours on social networks, which points to the exceptional importance of social networks for respondents. Such data are not surprising because we live in a society mediated by technology, especially social networks.

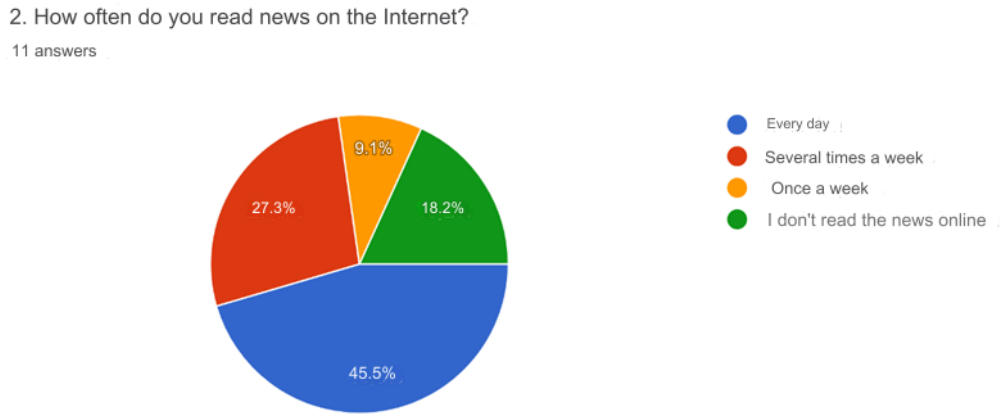

Figure 2: News reading habits
(Source: author's own creation)

The above data prove the hypothesis that regular monitoring of news on the Internet is associated with greater awareness of global events among students. Almost half of the students read the news every day, from which it can be concluded that they are informed about daily socio-political events at the national and global level. Regarding the objectivity of the media, 36.4% of students believe that the media do not report objectively, 27.3% of respondents believe that they report objectively. The problem of media ethics and the principles that journalists should adhere to reporting are prescribed by different ethical codes. Croatian journalists should act according to the code of ethics of the Croatian Journalists' Association, which clearly stipulates that journalists must be honest and fair in collecting, reporting and interpreting information. Likewise, journalists must verify the accuracy of information from all sources and make an effort to avoid unintentional errors. Deliberate distortion is absolutely not allowed.

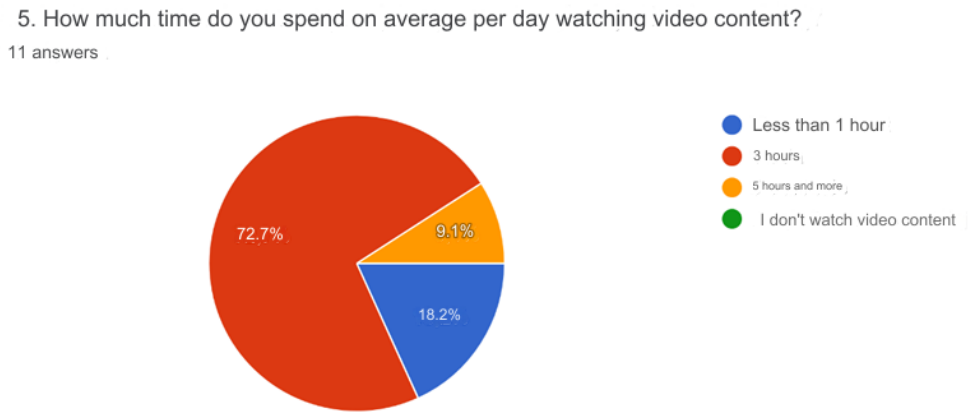

Figure 3: Time spent watching video content
(Source: author's own creation)

The hypothesis was proven by a very high percentage of students who spend more than three hours a day viewing video content. A large amount of video material related to almost every aspect of human life is available on various online sites and it has become common in society to first consult various platforms in case of questions about how to perform a task.

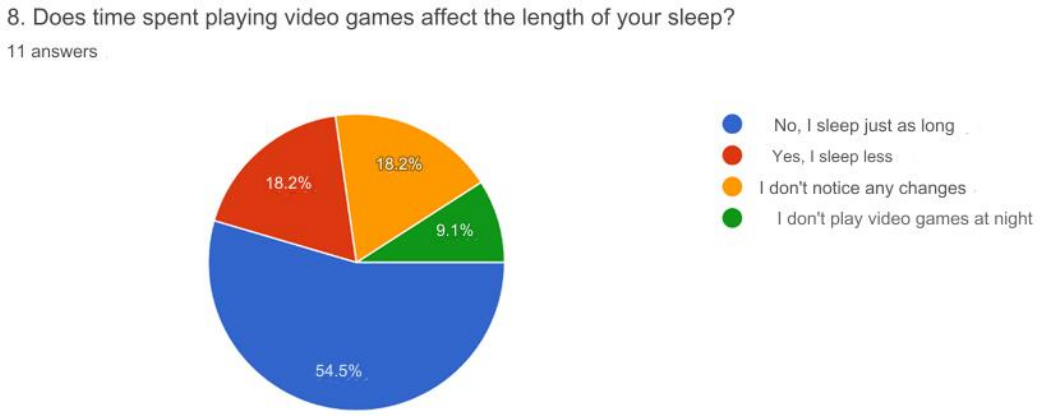

Figure 4: Assessment of the impact of video games on sleep quality
(Source: author's own creation)

According to students' assessment, the time spent playing video games does not affect the quality and length of sleep, only 18.2% of students notice that they spend less time sleeping because of video games. Although the hypothesis was not confirmed, the percentage of students is not negligible. Very often, students spend their time in the evening playing video games on different services.

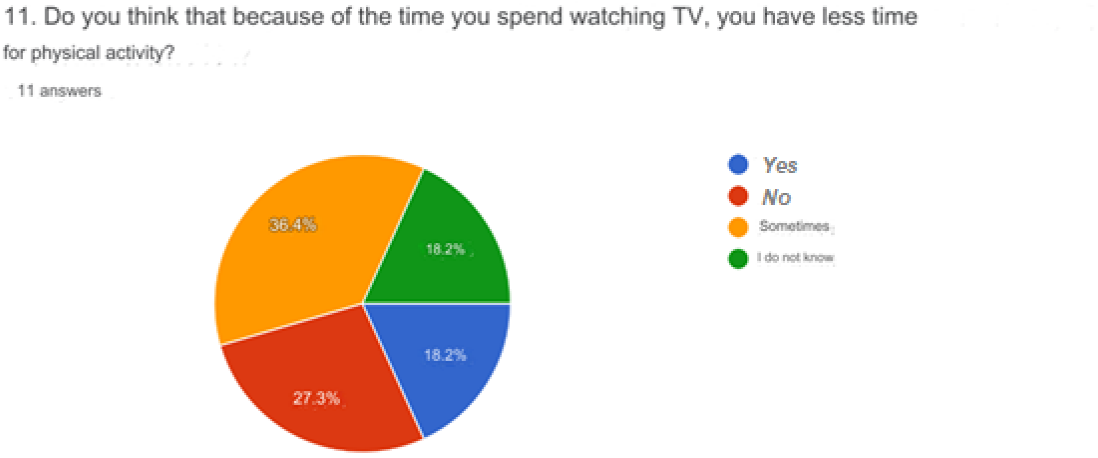

Figure 5: Assessment of the impact of watching TV programs on activity
(Source: author's own creation)

According to the survey results, 63.6% of respondents do not spend time watching TV. This information should not be surprising considering the habits of students and young people who are more focused on online services. The hypothesis was not confirmed because students do not spend much time watching TV programs.

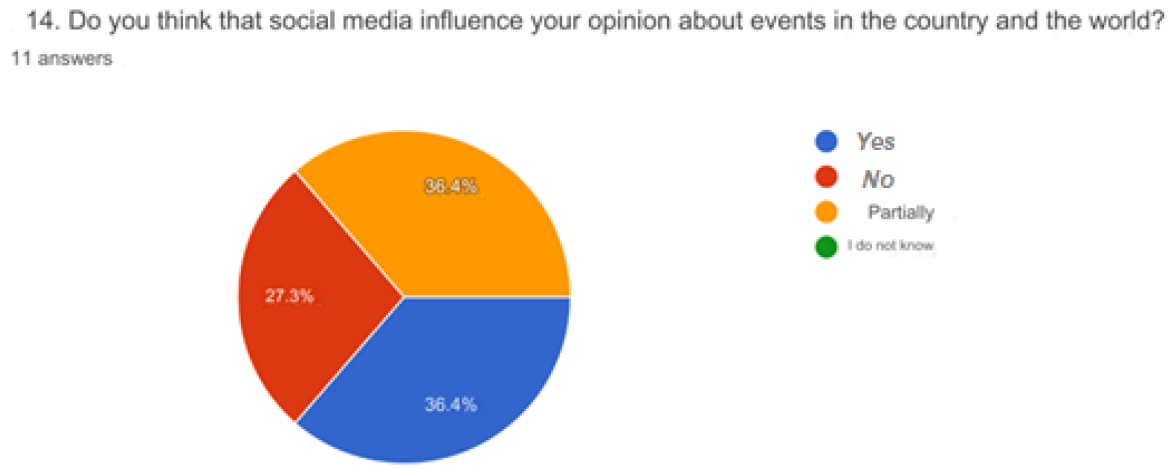

Figure 6: Assessment of media influence on opinion formation
(Source: author's own creation)

An identical number of students believe that the media influence the formation of their attitude about events in the country and the world (36.4%), while the same percentage of students believe that they have a partial influence. If we look at these answers together, we get a percentage that says that students are quite influenced by the media. To develop critical thinking and media literacy, young people should be systematically educated from school age so that they know how to deal with the shortcomings of the media.

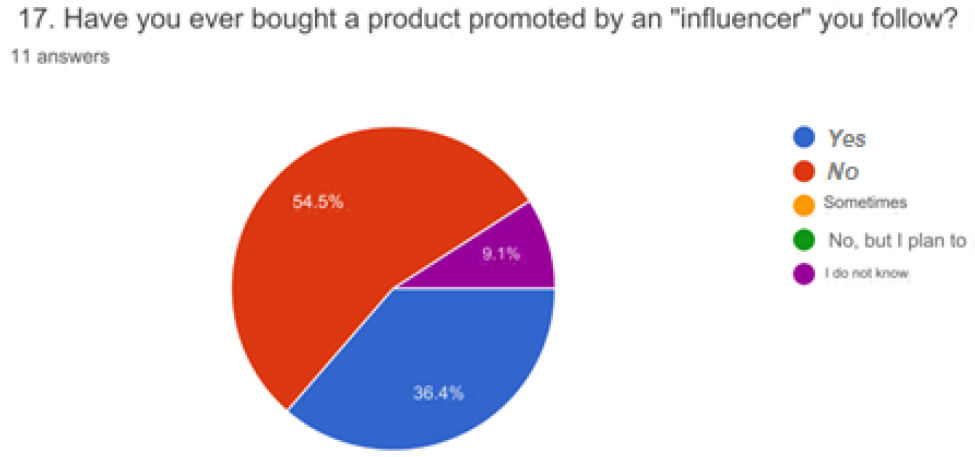

Figure 7: Influence of influencers on shopping habits
(Source: author's own creation)

The hypothesis that students buy products under the influence of influencer recommendations was not confirmed because more than half of them do not have this habit. The percentage of students who have this habit is 36.4%, which is a relatively significant number. The market of products and services in today's society relies a lot on new ways of promotion, of which influencers occupy a significant part.

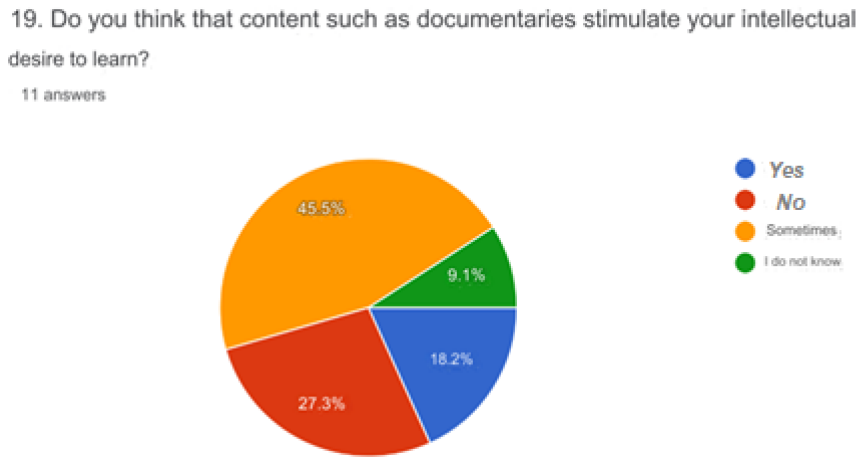

Figure 8: The impact of documentary content on the desire to learn
(Source: author's own creation)

The hypothesis that students watching documentaries and high-quality content will be encouraged to study and research has not been proven, as only 18.2% of students believe that this is the case, while 27.3% of them believe that this is not the case. 45.5% of students chose the answer sometimes, which points to the conclusion that students are sometimes encouraged to study and research due to monitoring higher quality content.

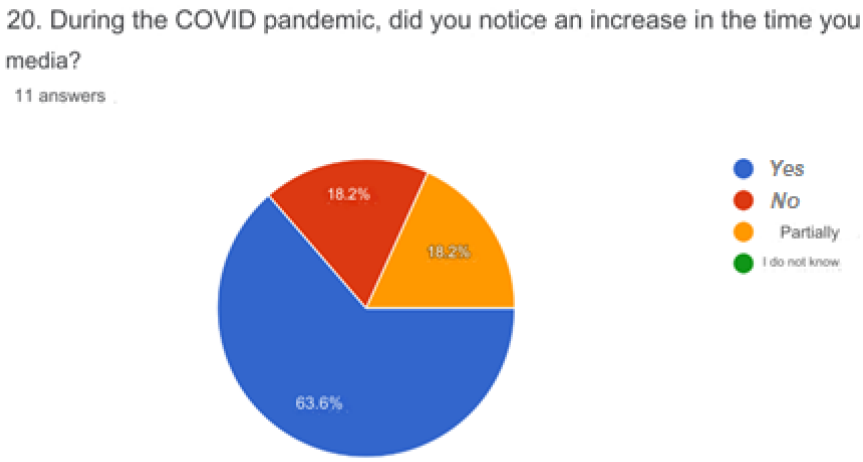

Figure 9: The impact of the covid-19 virus pandemic on the consumption of media content
(Source: author's own creation)

The hypothesis that the increase in media consumption during the period of the covid-19 pandemic can have a long-term effect on the media usage habits and interactions of students with others was confirmed because students themselves (63.6%) notice an increase in the time spent with the media. That percentage is a logical sequence of living conditions and classes that took place during the mentioned pandemic through various online platforms. The graphs showing the amount of time students spend on social networks show that even after the pandemic, the habit of spending time on social networks has not been abandoned.

4. CONCLUSION

The reflection on the insights gleaned from the research conducted among second-year computer science students at Međimurje University, Čakovec, it is intriguing to see the intricate relationship between media and our daily lives. The study has provided a window into the ways in which media, particularly in its digital forms, shapes our understanding of the world and influences our behaviors. It is striking to observe the significant amount of time students dedicate to social networks, highlighting the profound impact of digital platforms on our social interactions and information consumption patterns. Moreover, the study's findings underscore the enduring influence of media, even amidst global crises like the COVID-19 pandemic, which has led to increased media consumption among students. The research journey has reaffirmed belief in the transformative power of media and the importance of fostering thoughtful engagement with it. The conducted research emphasizes the importance of media literacy among students in the digital age, which proved to be crucial in the context of media consumption. The research confirmed that regular monitoring of news on the Internet increases students' awareness of global events and that those who use social media for information may be more susceptible to forming opinions under the influence of the media. Although some hypotheses remain unconfirmed, the research emphasizes the need to develop critical thinking in the consumption of media content, especially considering the increase in media consumption during the COVID-19 pandemic. Promoting media literacy becomes essential for responsible media use and distinguishing reliable sources of information from misinformation, providing students with the tools to successfully navigate the digital information landscape. In essence, this research has tried to deepen the understanding of media's role in shaping our perceptions and behaviors. Moving forward, the society should be committed to advocating for media literacy as a cornerstone of responsible media consumption, contributing to a more informed and empowered community.

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THE INFLUENCE OF VIDEO GAMES ON THE STUDENT LIFE OF MEV STUDENTS

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ABSTRACT

In today's digital world, video games have become an indispensable part of the daily life of many people, and as such represent a significant consumption of time, especially among young people, including students who live in the fast-paced environment of higher education. While some see video games as an unwarranted distraction, others find them a way to relax, challenge and socialize. By analyzing the data obtained by surveying students in all three years of computer science, the paper examines the impact of video games on various aspects of life, including academic success, emotional state, social interactions and the balance between the virtual and real world. The goal of the work is a deeper understanding of the impact of video games on the lives of students themselves, taking into account their attitudes, experiences and habits. The paper analyzes the amount of time that students spend playing video games and investigates the connection between playing video games and communication, distinguishing singleplayer and multiplayer games because the latter are played with other participants and this can strengthen communication between students. Also, video game playing habits are monitored during the week when students have responsibilities at the Polytechnic and during the weekend when they have more free time.

Keywords: *digital world, communication, multiplayer, singleplayer, video games*

1. INTRODUCTION

In today's digital world, video games have become an indispensable part of the daily life of many people, and as such represent a significant consumption of time, especially among young people, including students who live in the fast-paced environment of higher education. While some see video games as an unwarranted distraction, others find them a way to relax, challenge and socialize. Therefore, research such as this aims to gain a deeper understanding of the impact of video games on the lives of students themselves, taking into account their attitudes, experiences and habits. By analyzing this data, the opportunity will be given to see how video games affect different aspects of life, including academic success, emotional state, social interactions and the balance between the virtual and real world. Questions related to digital literacy, cooperative gaming, and student-perceived challenges related to video games could further enrich the analysis.

In this way, contribution to understanding the complexity of the relationship between video games and student life, including the positive and negative aspects of this interaction can be given. Different genres of video games affect the perception of students' everyday life. There is a lot of controversy in society related to video games and the problems they bring, and it is undeniable that they have become an industry. "A video game development technician develops and programs video games, works in various development environments for creating video games, designs various graphic elements necessary for creating video games, implements various visual effects in video games, animates 3d objects, produces audio and video content, manages project phases of video game development , works in teams, tests the quality of video games with the aspect of player experience and participates in the process of placing the product on the market". (https://www.ss-novska.hr/Upisi/Tehni%C4%8Dar-za-razvoj-videoigara.) The mentioned program is carried out at Novska Secondary School. The opening of the program is a reaction to the state and interest of society.

2. VIDEO GAMES

Video games, also known as "computer games" are electronic games that the user can manage and control using input devices such as: mouse, keyboard, controller, etc. Video games can be a great balance of fun and relaxation if quality time is spent playing them. They can be used for competitive purposes as well as software and computer learning. There are several video games designed to help improve motor skills and hand-eye coordination in humans. The first video games were optimized during the 1950s and 1960s, and by the 1970s an entire industry had sprung up around video games. In fact, there were so many video games being produced that by 1983 the industry was in crisis due to too many bad games. (https://www.enciklopedija.hr/clanak/racunalne-igre). Playing video games and creating them becomes profitable. Video games significantly influenced the development of the media industry as a whole and directly contributed to the sharp increase in income within the media industry (Lozić, 2018, 152). Today, video games are an important factor in the digital entertainment industry and attract many players, regardless of gender, age, social, political or economic status. This popularity and the rapid development of video games lead to an increasing need for companies to make their video games available to as many people as possible in order to achieve a high return on financial investment. (Tot, Dunđer, 2021, 93). The first video games were created back in the 1950s, many computer scientists came up with the idea of creating electronic video games to test the computer itself. They created very simple games such as tic-tac-toe that could be programmed into early computer systems, and were used as a demonstration of the general power of computers themselves at the time. One of the lesser known facts about video games is that many early developers never believed that video games could become popular, but only used them as a test of the capabilities and power of computers. (https://www.twinkl.hr/teaching-wiki/video-games).

2.1. Beginnings of games

The first steps in the creation of video games date back to the 1950s, when computer scientists experimented with simple electronic games. An example is "OXO" or "Noughts and Crosses", a digital version of the Noughts and Crosses game created in 1952 on the EDSAC computer. (https://www.conceptventures.vc/news/the-history-evolution-of-video-games). "Spacewar!" is considered one of the first true video games. Developed at MIT in 1962, it allowed two players to simulate combat in space. In 1971, Nolan Bushnell and Ted Dabney created the first arcade game, "Computer Space". But the real success came with the game "Pong" (1972), also created by Bushnell, which started the era of arcade games. (https://www.twinkl.hr/teaching-wiki/video-games).

Magnavox Odyssey (1972) represents the first home game console. (https://americanhistory.si.edu/collections/nmah_1302004). Shortly after that, in 1977, the Atari 2600 appeared, which became the first successful home console. (https://racunalneigre.weebly.com/povijest.html).

2.2. Further development

The development of personal computers enabled the flourishing of computer games. Games like "Pac-Man" (1980), "Donkey Kong" (1981) and "Super Mario Bros." (1985) became iconic. The year 1983 marked a crisis in the video game industry with the market falling due to too many bad games. With the appearance of smartphones, mobile games are becoming extremely popular. "Angry Birds" (2009) becomes one of the most famous titles in this period. (https://www.conceptventures.vc/news/the-history-evolution-of-video-games). Sony PlayStation 4, Microsoft Xbox One and Nintendo Switch represent the latest generation of game consoles. Virtual reality (VR) and augmented reality (AR) are also emerging. Electronic sports (Esports) are becoming a global phenomenon in 2010, with professional players, tournaments and huge spectator bases. The development of the Internet allowed small independent development teams (indie games) to create original, innovative titles. The history of video games encompasses various technological innovations, cultural shifts, and the evolution of games as an artistic and entertainment medium. Over time, the industry has become huge, shaping the way people have fun and connect around the world. The improved visual quality of games, although important, is probably not the only reason for the increased time that children and young people spend playing video games, but the increasing popularity of online video games. (Malek, Ninčević, Jurić Vukelić, 2018).

3. ADVANTAGES AND DISADVANTAGES OF VIDEO GAMES

Video games bring with them some advantages, they help against distraction, especially if we choose the so-called "action games". Our focus on the different stages of the game can be useful in other circumstances in life, when our focus will be needed in order to use our mental abilities. It is important to be concentrated and focused when solving homework, math problems, reading material or performing other school duties. Playing games online often opens the door to new acquaintances, enables the creation of new friendships, and even with people who live far away from us. This experience is usually a completely new, but at the same time pleasant experience for each of us. (https://www.medijskapismenost.hr/7-prednosti-igranja-videoigara-i-4-nedostatka/). Virtual games with animal subjects have the potential to teach us about correct behavior, adopting new ways and rules of interaction and about coexistence with domestic animals or pets, providing us with useful skills of caring for and relating to them. Puzzles, adventure games and word games have the potential to improve our ability to solve problems quickly, which we often call "problem solving" in everyday conversation with friends. Also, these games contribute to the development of logical reasoning, an example of which is the well-known Sudoku game, which significantly improves such skills. Studies have found that children who use some of their free time to play educational video games improve their cognitive abilities - and do so faster than their peers. They perceive this process as a kind of "trick" designed by the creators of these intelligent games: while you are having fun, you unconsciously gain new knowledge. Playing on the Nintendo wii quickly reveals that it is not only fun, but also an opportunity to improve physical fitness. Research has shown that children who play wii use significantly more physical activity compared to those who sit and play playstation 4, xbox 360 or pc. This change has led to wii consoles being used a lot, especially in winter, when bad weather limits outdoor activities. (https://www.medijskapismenost.hr/7-prednosti-igranja-videoigara-i-4-nedostatka/). In video games, fast frame changes, editing changes, camera angle changes, zooms, and sudden sounds are forced.

All this stimulates the secretion of adrenaline, which triggers fight or flight reactions in the body, and activates the amygdala, part of the limbic system, which is responsible for recognizing danger and the body's reactions. There is an acceleration of the heart, expansion of the blood vessels that send blood to the brain (the brain needs a lot of oxygen and energy to make quick assessments of the situation), narrowing of the blood vessels that send blood to the muscles, and there is a temporary blocking of alpha waves that are responsible for relaxation and sleep. After the body has experienced pleasure or excitement, mirror neurons are activated that imitate those actions that will contribute to the same feeling again. (Brčić, 2020, 2673). In a video game, the player wants to achieve success, which he achieves by controlling the game, and with control is connected the feeling of power and control over the elements that represent the world in the video game. (Valković, 2008, 488). Among the negative sides of video games, an important disadvantage is their addiction. Players often neglect key life activities, such as studying, acquiring new knowledge, and spending time with friends, which should be a priority. Experts warn that some adults have become so addicted that they stop going to work, and children miss school. Some neglect regular meals in order not to stop playing, eat fast and unhealthy, while others forget about physical activity and exercise. (https://www.medijskapismenost.hr/7-prednosti-igranja-videoigara-i-4-nedostatka/). Experts have confirmed that video games, including those on the wii console, do not provide the body with everything it needs and are not a substitute for real exercise outdoors or in the gym. The danger of becoming desensitized to violence exists for people who often or completely devote their time to video games with strong violent elements. The video game industry often creates cruel stories to attract attention and increase sales, which can have a long-term negative impact on mental health and desensitisation to violence. The virtual world is fictional, non-existent, and only exists within video games while we play. (https://www.medijskapismenost.hr/7-prednosti-igranja-videoigara-i-4-nedostatka/). The most popular video games, within which the Esports industry has developed as the fastest growing branch of the entertainment industry, involve communication with other players with whom they form teams. Players in teams communicate strategy, analyze the virtual environment, define goals and delegate tasks. (Prevarek, Grmuša, 2022, 25). From a communication point of view, video games can promote the development of communication in players. In a large number of cases in front of the screen we are only passive consumers of media content, in video games our activity is required. That's why video games develop certain mental and motor skills, according to research. (Haramija, Njavro, Vranešić, 2020, 96).

4. VIDEO GAME PLAYING HABITS OF MEV STUDENTS

For the purposes of the research, a survey was conducted to which 40 respondents, MEV students have participated. The following hypotheses were established. The majority of respondents regularly play video games (more than 70% of them), more than 80% of respondents spend more than 3 hours a day on the computer (for educational or entertainment purposes), more than 50% of respondents spend more than 3 hours a day exclusively playing video games, students who spend more from 5 hours a day on the computer they have problems with and communicate less with other people and this affects their social life, more than 70% of students play online video games, 40% of students play video games on the weekend less than during the week, students who play online and multiplayer have stronger social ties and a stronger sense of belonging to the community, more than 80% of students play video games to relax and avoid reality, because of playing games, students have a desire to explore the real world, less than 50% of students have a desire to play professionally in competitions.

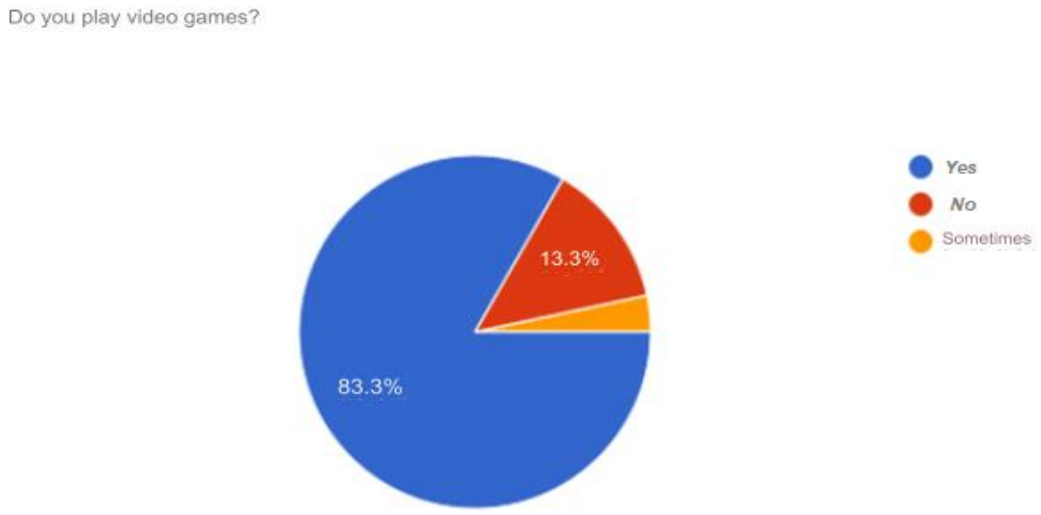

Figure 1: Video game playing habits
(Source: author's own creation)

The results showed that 83.3% of students, regularly play video games, which supports our hypothesis in which we expected more than 70% positive answers. In accordance with general trends in society and habits of using social networks, this result is not surprising. By acquiring a personal computer at a very early age, a trend is already being noticed among children that the first use of a computer is for video games. Only when children enter the world of education, personal computers acquire other dimensions of use.

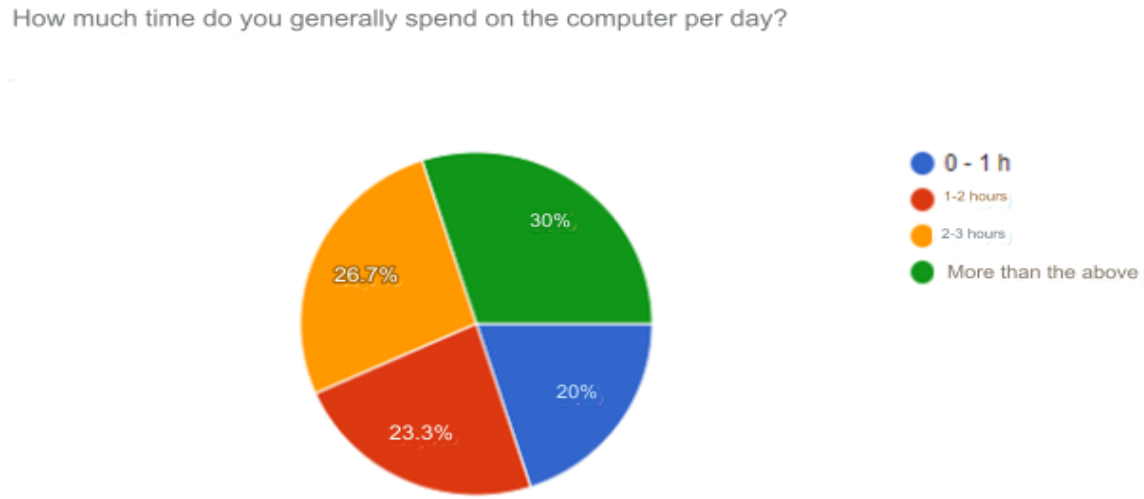

Figure 2: Time spent at the computer
(Source: author's own creation)

Regarding the hypothesis that most students spend more than 3 hours a day at the computer, the survey showed that only 30% of them spend more than 3 hours a day on the computer. It is likely that this percentage would be higher if mobile devices were included.

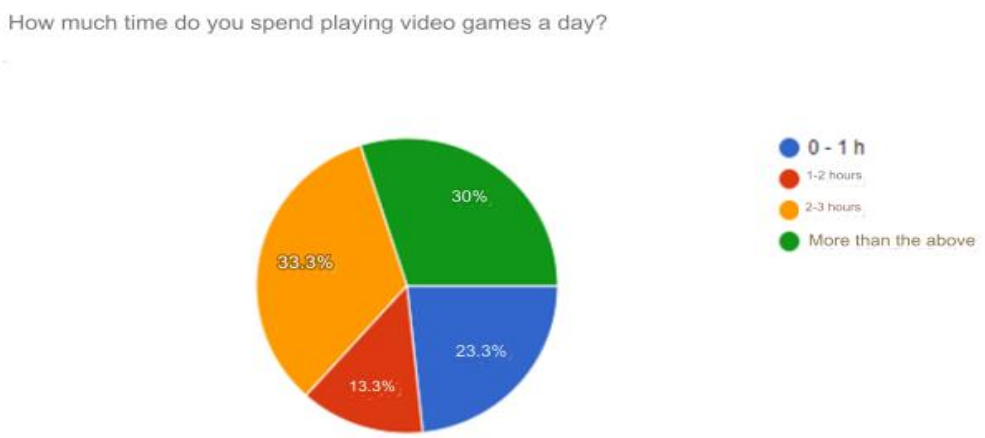

Figure 3: Daily amount of time spent playing video games
(Source: author's own creation)

Only 30% of students spend more than 3 hours a day exclusively on video games. The percentage of students who spend 2-3 hours a day playing video games is 33.3%, which is not a negligible number and indicates deep-rooted habits among students.

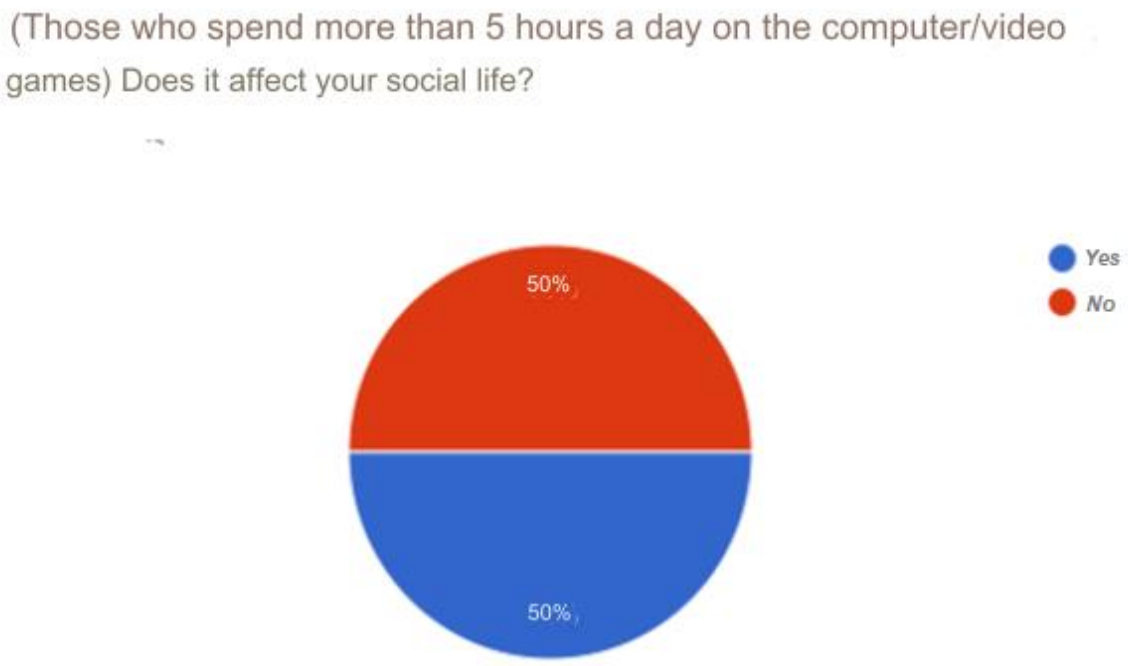

Figure 4: Impact of video games on social life
(Source: author's own creation)

The survey found that 50% of people believe that video games have a negative and bad effect on their life and general communication, while the other 50% believe that video games have no reflection on their social life. Given that half of the respondents agree and half disagree, the hypothesis is confirmed if we put it in the general context of video game issues and trends in society.

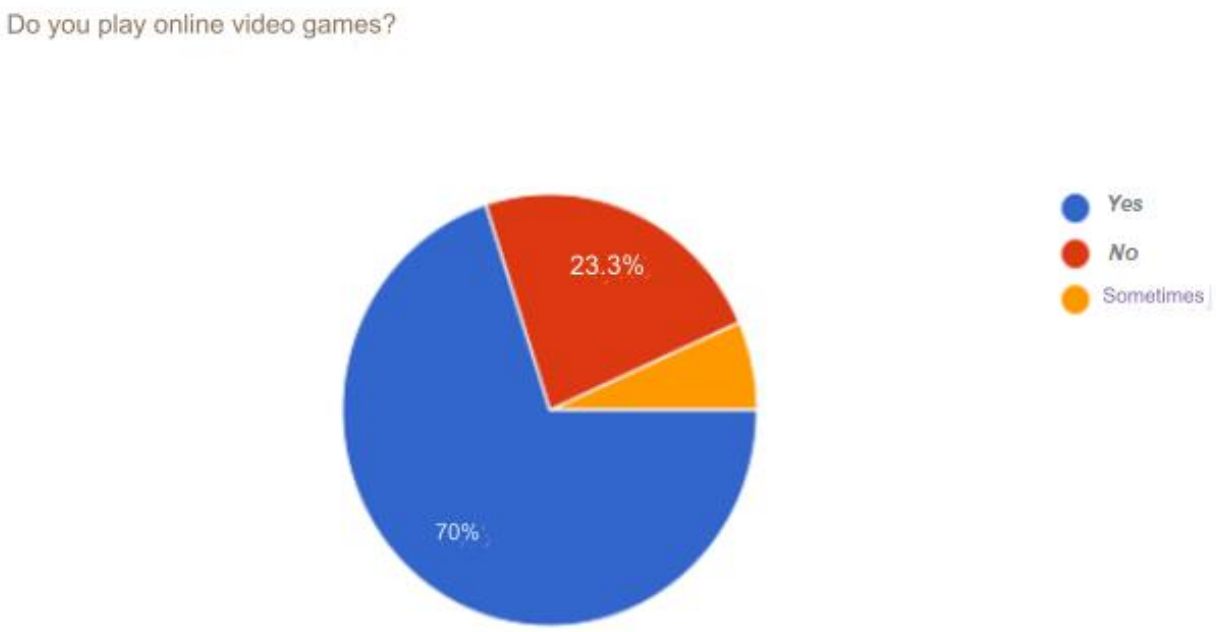

Figure 5: Playing video games online
(Source: author's own creation)

It has been confirmed that 70% of students play online video games where they have the opportunity to interact and play with real people instead of playing against the computer itself. A small percentage say they play them only sometimes.

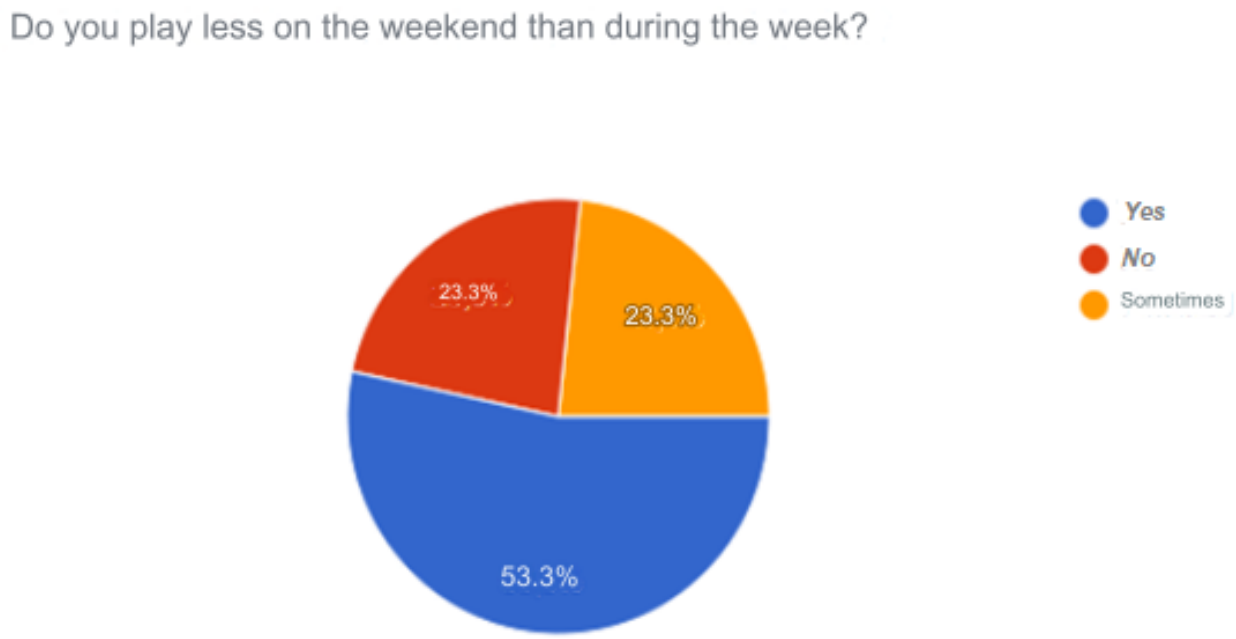

Figure 6: Playing video games during the weekend
(Source: author's own creation)

The percentage of respondents who play games less during the weekend than during the week is 53.3%, which exceeds the expected 40%, surprising percentages considering that students have more free time during the weekend than during the week due to academic education.

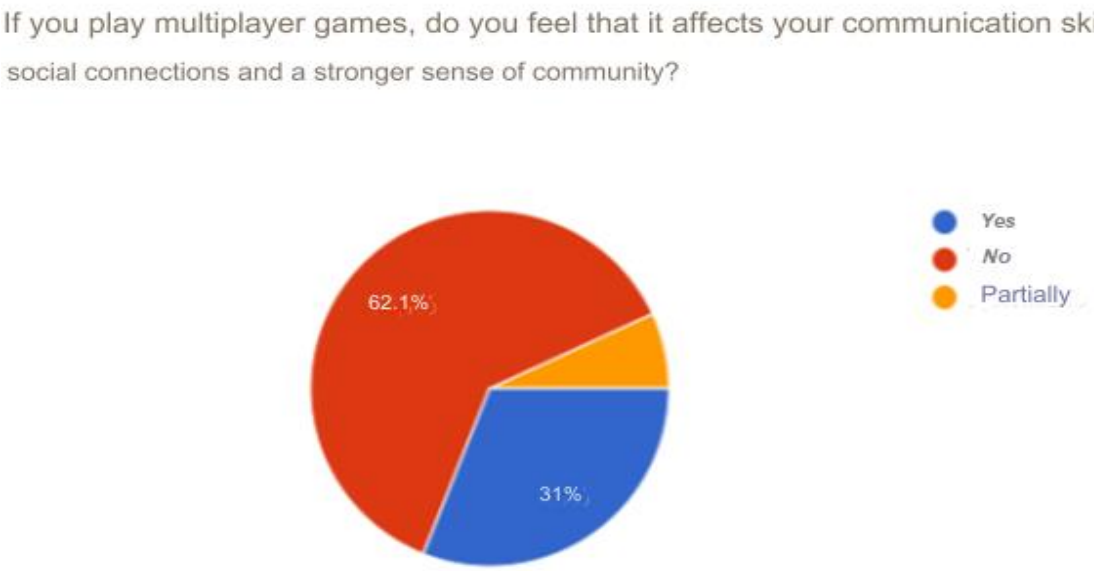

Figure 7: Impact of video games on social life
(Source: author's own creation)

As many as 62.1% of students believe that games do not affect their strengthening of social ties and a stronger sense of belonging. While 31% of students believe that games have helped them strengthen personal communication with other people. During the game, players agree on strategies and tactics that lead to communication, expression of opinions, openness to others' suggestions, cooperation and tolerance of other opinions.

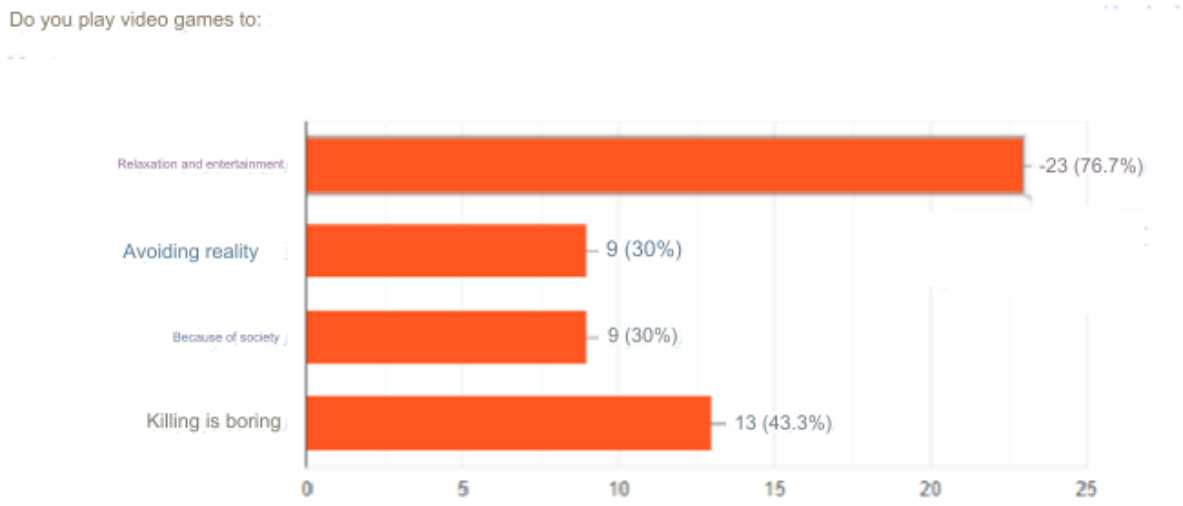

Figure 8: Reasons for playing video games
(Source: author's own creation)

A percentage of 76.7% of students confirm that they play video games to relax, and 30% of them confirm that they play them to avoid reality. Given that the hypothesis was set at 80%, it was not confirmed, although the deviation is not large considering that there was a possibility of more selection and it is assumed that there are respondents who marked both things.

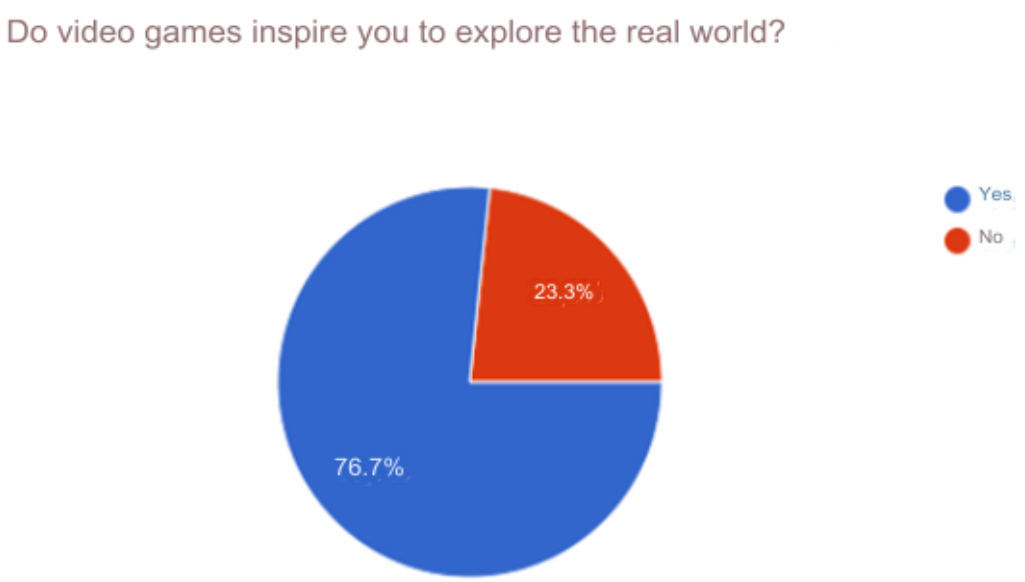

Figure 9: Real world exploration due to video games
(Source: author's own creation)

According to the survey, 76.7% of students confirm the assumption that most students have a desire to explore the real world thanks to video games, many of which are based on the principle of open world and exploration. Video games present different scenarios that can serve as ideas for exploring the world around us.

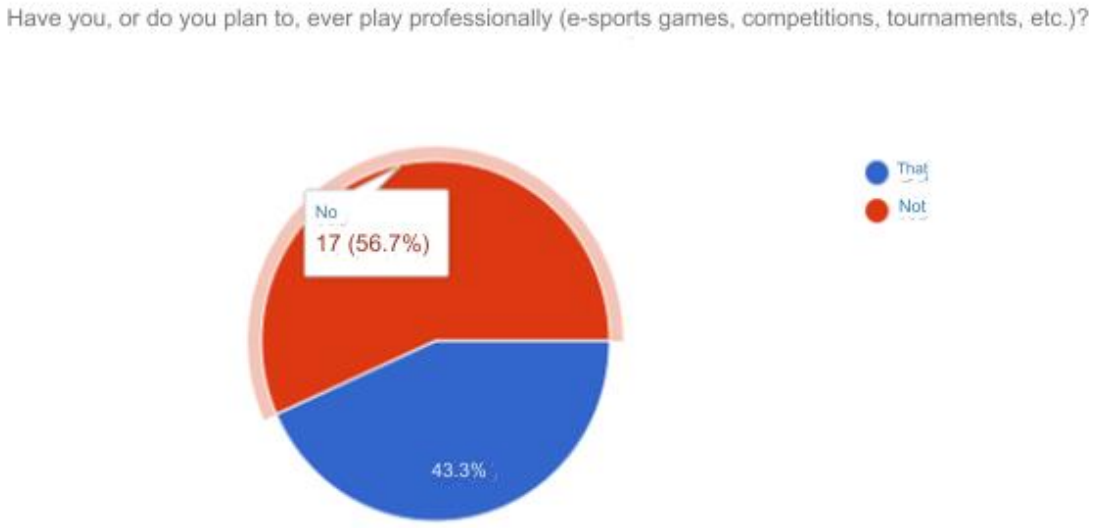

Figure 10: Students' attitude about playing video games professionally
(Source: author's own creation)

According to the survey, the number of respondents who would like to play professionally is 43.4%, which confirms the hypothesis in which it was assumed that less than 50% of students would even have a desire for competitions, e-sports, etc. As playing video games is a habit of many students and students, it remains the question of why they should not try their hand at competitions, especially since it has become a mass industry and a source of income.

5. CONCLUSION

The conducted survey revealed a number of important aspects related to games among the student population. Although video games have become a powerful element of everyday life, the research points to several key challenges that require attention and further study. One of the key problems is the impact of long-term computer use on the social interaction of students. Half of the respondents express concern about the negative consequences on their social life. This is an indication that playing video games for long periods of time can have a serious impact on the emotional and social well-being of students. Nevertheless, it is important to recognize that video games also offer the potential to foster a spirit of inquiry and curiosity among students. More than three-quarters of respondents express a desire to explore the real world inspired by the experience of playing video games. This suggests that video games can be used as a tool to encourage learning and the development of specific skills. Considering all the above, future research on this topic should emphasize how to properly direct the use of video games in order to maximize the benefits and minimize the negative consequences. Studying strategies for balancing play time with social activities is critical to supporting students in maintaining a healthy lifestyle. In addition, it is important to examine how education about the safe and responsible use of video games can contribute to a better understanding of potential risks. The development of support programs that integrate elements of education and the promotion of healthy video game use habits could have a positive impact on the student community. Ultimately, it is important not only to recognize the negative aspects, but also the potential for positive effects of video games on the development and education of students. With the right approach, video games can become a tool for fostering creativity, collaboration, and a spirit of inquiry among students. Overall, further research on this topic will contribute to a better understanding of the complexity of the relationship between students and video games and will help shape tailored interventions and policies in the future. In the future, further growth and integration of video games into the lives of students is expected. It is important to focus on the balance between using video games and maintaining social connections, with a special emphasis on education about safe use. The development of support programs and policies that encourage positive use of video games will be crucial as the number of players is expected to continue to grow and in 2025 there could be more than 3.5 billion people playing video games.

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RELATIONSHIP OF INDIVIDUALS TO SUPERIOR AND SUBORDINATE

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ABSTRACT

The paper deals with the topic of the individual's relationship with his superiors and subordinates. The attitude of an individual towards himself, superiors and subordinates is an important topic that affects the quality of life and work. The starting point is the question how people behave in different situations at the workplace and whether age affects the way they relate to work and people with different authority if is it higher or lower than theirs, and whether this has an impact on motivation and efficiency. The paper compares whether an individual has a more negative attitude towards subordinates and a more positive attitude towards superiors, and whether young workers have less willingness to work and understanding towards older colleagues. The comparison will be made using the scientific method of observation. The sample is made up of 15 people who work at three different workplaces – coffee shop, hotel and shop. Each person had one or more superiors and subordinates. Their verbal and non-verbal communication signals were observed in two different situations: when they were talking to a superior and when they were talking to a subordinate.

Keywords: *communication, motivation, superiors, subordinates, workplace*

1. INTRODUCTION

An important role in a person's life is the role of an employee. We often spend more than eight hours a day at work. Due to the complexity of work tasks, we communicate with a larger or smaller number of people who are arranged hierarchically within the organization. The importance of interpersonal relationships at the workplace and the so-called "work climate" is an important element on the basis of which people decide whether to stay in the organization or change their workplace. We distinguish three types of relationships in the workplace: vertical, horizontal and diagonal. A vertical relationship is one between a superior and a subordinate, based on hierarchy and authority. A horizontal relationship is one between colleagues at the same level, based on cooperation and solidarity. A diagonal relationship is one between persons belonging to different levels or departments, based on coordination and communication. The paper deals with the observation of people's behavior in a vertical relationship, because this is an important relationship in the workplace.

Officials in lower positions in the hierarchy are often as skilled or even more skilled than individuals in higher positions. Namely, the direct performance of work that accomplishes an external task often requires greater expertise, knowledge, experience and ability than connection and coordination tasks performed by higher managers in the hierarchy. (Brčić, Vuković, 2008, 56-57). This can be the reason for the appearance of tension and problems in the organization. By joining an organization, every individual accepts its values and principles of behavior. Also, the individual undergoes professional socialization as a prerequisite for remaining in the organization. How much is professionally socialized depends on a number of factors, from one's own awareness of the need for socialization to the values fostered within the organization. An organization without values and hierarchy will not be effective. Organizational climate is defined by typical behaviors, attitudes and feelings in the organization. Within this theoretical perspective, climate is an organizational attribute that exists independently of the perceptions of its members. (Peruško, 2015, 12). Typical attitudes, behaviors and feelings within the organization exist in a way that employees transfer them to each other and they are measurable by the level of satisfaction of the employees themselves. Differences in size, complexity, vision and mission among organizations are also caused by differences in the components that make up their organizational climate. (Čuljat, 2020, 97). Employees are a factor that changes it if they want to, and they do not take over the established patterns of behavior that have become the practice of the organization.

2. SUBORDINATE AND SUPERIOR

Communication has a purpose. (Verderber, Verderber, Sellnow, 2010, 10). The purpose of communication within business entities is to transmit information. That function is the most important. In the workplace, the emotional component should not be expressed. However, it becomes pronounced because it is sometimes difficult to separate the roles of employee and human. We experience and express emotions in interaction with others. (Lewicki, Saunders, Barry, 2009, 132). The core of communication is the message. Elaboration of the message is where arguments and support are presented. (Benoit, Benoit, 2013, 77). Messages are transmitted neutrally and equally to everyone. Communication in all directions (vertical, horizontal and diagonal) should be transmitted evenly, regardless of the relationships of superiority and subordination. People do not treat all people equally and equally, but they treat different people differently considering their differences from themselves. The same situation can be seen in business relationships, where people will behave differently towards a person, considering what position that person is in relation to them, and adapt to that and try to get the most favorable outcome if that person is ranked higher than them. But when they have to communicate with people of a lower status than themselves, then they do not have to adapt in order to achieve some profit, but they often know how to behave worse towards these people. In every organization, communication is the key. Effective communication leads to better business results. This is important in everyday life, and especially in crisis situations. When an organization faces a crisis, the behavior of employees at all levels of the hierarchy changes. (Novak, 2001. 105). In crisis situations, communication between subordinates and subordinates will come to the fore, and the crisis will be the element that will manage communication in such a way that the crisis is overcome, so that any divisions and personal reasons become an undesirable weight on communication in resolving the crisis. Communication in the organization cannot be approached intuitively and reactively. (Tafra Vlahović, 2013. 221). Business communication must be formal, efficient, optimized, established and clear and accessible to everyone. The means of communication within the organization must have their own proven channels and forms so that all information reaches every employee. A new social standard is introduced in working environments where relations and good behavior between workers are consciously built. (Osredečki, 1992. 25).

It is a dimension of business etiquette that encompasses all dimensions of the organization, from the appearance of the premises, the clothing of employees to the manner of dealing with internal and external publics.

3. RESEARCH OF SUPERIOR AND SUBORDINATE RELATIONS

For the purposes of the research, the following hypotheses were set. The individual has a worse relationship with subordinates and a better relationship with superiors, young employees are less motivated to carry out business tasks, young employees have a harder time accepting the authority and orders of their elders, younger employees often come into conflict with older employees regarding the way of performing business tasks, older employees have more understanding for the mistakes of young employees. The examination of these hypotheses was carried out in 3 locations, in a restaurant, a shop and a hotel, using the method of observation of 15 people, who were divided according to their age into two groups, the first from 18 to 35, and the second from 36 to 60. age. The data were obtained by the observation method. The results of the traffic were recorded on an analytical matrix created according to the hypotheses and research needs.

Hypothesis 1

	18- 35 years	36- 60 years
Good relationship with superiors, bad with subordinates	28,57%	0
Good relationship with superiors, good with subordinates	42,85%	100%
Bad attitude towards superiors, bad towards subordinates	28,57%	0

Table 1: Presentation of employees' relations with superiors and subordinates (Source: author's own work)

The hypothesis that an individual has a worse relationship with subordinates and a better relationship with superiors was not confirmed. Observational research in selected workplaces showed that young individuals have a worse attitude towards their subordinates because they consider them competition, and better towards their own superiors due to possible benefits and a reduction in the amount of work. Older employees have a much better relationship with their subordinates and superiors, due to their desire to pass on as much knowledge as possible to their subordinates and their desire to help and make their work easier.

Hypothesis 2

	18- 35 years	36- 60 years
Motivated	57,14%	87,5%
Unmotivated	42,85	12,5%

Table 2: Presentation of employee motivation (Source: author's own work)

The hypothesis that young employees are less motivated to perform business tasks has been confirmed. Due to the impetuous nature of young employees, they have less motivation to work and want to finish their work as soon as possible so that they can devote themselves to things

they consider more interesting. And because of this, they have a harder time accepting orders that could make their job more difficult when they believe that there is an easier or faster way to do the same job with the same result.

Hypothesis 3
Young employees have a harder time accepting the authority and orders of their elders. The hypothesis was proven, and the research showed that from the age group of 36-60 years only one respondent does not accept orders from superiors, while in the group of 18-35 years there are four. In general, the majority of employees (66.6%) accept orders from superiors.

Hypothesis 4

	18- 35 years
Performs tasks in a prescribed manner	14,28%
Does not perform tasks in the prescribed manner	85,71%

Table 3: Presentation of the execution of tasks in the prescribed manner (Source: author's own creation)

Younger employees do not perform tasks according to the agreed method of execution. The hypothesis is not proven because a high percentage of young employees have their own vision of how to perform a task and enter into discussions with other employees and superiors about it. This often leads to a situation where tasks are not completed as they should be.

Hypothesis 5

	18- 35 years	36- 60 years
There is understanding for mistakes	57,14%	87,5%
There is no understanding of mistakes	42,85%	12,5%

Table 4: Presentation of employees' understanding of mistakes (Source: author's own creation)

The hypothesis that older employees are more understanding of young employees' mistakes was confirmed. These employees have more understanding for the mistakes of young and newer employees and want to help them understand how to solve this problem. Such situations lead to a better organizational climate and improvement of the foundation. Older employees understand that younger employees need to be helped and that they themselves were beginners. Because of this behavior, older employees believe that younger employees are more frivolous in approaching work and that they lack the concentration to perform slightly more complex tasks.

4. CONCLUSION

The work tries to provide answers to the set hypotheses. The answers were obtained using observations in such a way that the respondents were divided into two groups: people aged 18 to 35 and people aged 36 to 60. Those groups of respondents showed quite different results. The assumption that older people have very little understanding of the mistakes and innovations of young people is not founded. Young employees have less tolerance for the mistakes of their subordinates and much less motivation to work than older ones. Older employees are much more open to the innovations of young people than expected.

The reason for expectations is based on the fact that the elderly like to do things in only one correct way, and that older workers have lower expectations than young people because they do not consider them serious. Based on these results, it can be concluded that older people are much better equipped with years of experience and the desire to work to better accept subordinate employees because they also went through that phase of youth. In any case, the organizational climate is an important criterion when choosing whether employees will stay at a workplace. On the example of the conducted research, a partial picture of the relationship between children can be obtained. The relationships are the same in all three types of activities. The private sector differs from the public sector primarily because of the security it brings, and there the organizational climate is mostly inherited and the standard patterns of employee behavior are transferred to new employees. In the private sector, which is more susceptible to economic rewards, the competitive relationship is more pronounced and the organizational climate is not as stable as in the public sector. Employees bring emotions to work and it is doubtful how much they are prone to authoritarianism. When young employees up to the age of 24 were observed, the problem of improper behavior towards subordinates appeared, which is significant given the fact that they themselves do not have much work experience with which to impose themselves as an authority on even younger people. There is also the phenomenon of young employees who do not cultivate correct relationships with their superiors or subordinates, which is a problem that the management of an organization should pay attention to. Older employees perform tasks in a prescribed manner, while the vast majority of younger employees do not and try to perform tasks in an easier and faster way, which does not always lead to accuracy. The organizational climate of any organization is a very complex set of factors and should be given due attention in order to improve business and communication.

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INSHURTECH: BIBLIOMETRIC ANALYSIS USING VOSVIEWER

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ABSTRACT

This study aims to identify current trends in the scholarly literature on the topic of InshurTech. It was carried out by applying a bibliometric review of documents published in the Web of ScienceTM Core Collection database. The focus of this study is mainly on co-authorship analysis and co-occurrence analysis of terms based on textual data. In this regard, 83 publications were identified on the InshurTech topic based on keywords and the "Title field" option was selected to create a map. The study was done by data visualization using the VOSviewer software application. In the process of data processing, standard bibliometric indicators were applied: year of publication, document type, source type, source title, language, research area, keyword analysis and authorship. The dating of publications on InshurTech from the Web of Science database started in 2017, and after this year there has been a significant increase in the number of publications on the topic. Also presented are the top ten most frequent terms in InsurTech publications and co-occurrences in the Web of Science database. In addition, the countries/regions whose authors have contributed to the development of the InshurTech topic are analysed, using Microsoft Excel. In the process of the research, it was found that the leading countries, which are a kind of engine of research dedicated to the mentioned topic, are headed by Spain, followed by the People's Republic of China and the USA.

Keywords: *Bibliometric Analysis, Insurance, Insurance Technology, InsurTech, FinTech, VOSviewer, Web of Science*

1. INTRODUCTION

The digital change and digitalization of various aspects of the economy are a prerequisite for the entry and application of modern, consumer-responsive technologies, including insurance ones. The revolutionary transformation of traditional insurance is overturning the insurance business, turning it into a more attractive and reliable tool for providing insurance services to compensate for risks that occur accidentally to individual objects/entities (1). The dynamically changing reality triggered by several key events of multifactorial genesis for humanity, including the COVID-19 pandemic (2), has catalyzed both established and emerging players in the insurance market to unleash their potential in terms of leveraging information technology (IT) through innovation in the traditional insurance industry (3). Issues related to "Insurance Technology" (InsurTech) innovations are proving to be key not only for practice but are becoming an attractive topic for insurance science. This, in turn, results in the implementation of a large number of scientific studies, respectively leading to their subsequent publication in world databases (including primary databases Scopus and Web of Science). The sustained trend towards growing interest (especially after 2010), as well as the identification of unexplored "white fields" on the topic of "InshurTech" - empirically and bibliometrically, appear to be the prerequisites and provoke the realization of the present bibliometric analysis, based on extracted information from the primary database of the Web of ScienceTM Core Collection (WoSCC).

The present bibliometric analysis has been carried out based on key specifications on the subject under consideration. The structure of the research paper is composed as follows: Literature review; Methodology; Results; and Conclusions.

2. LITERATURE REVIEW

Considering the topic of the present study, the review of the scientific literature allows it to be tentatively classified into two categories. The first category comprises scientific publications whose main focus is on the mechanisms for performing bibliometric analysis, and within the scope of the second category, publications whose focus is specifically on InshurTech topics are included. Regarding bibliometric analysis in scientific publications, specific guidelines are proposed to serve the rigorous performance of the same (4). Some scholarly work has found that bibliometric methods/analyses are firmly established as scientific specialties (5), and that they are increasingly used as a tool by the scientific community (6). In the world of scientific literature, there are also publications devoted to certain trends in bibliometric analysis (7,8,9).
Bibliometric analysis is carried out using a range of different tools. In this study, the software application VOSviewer was used. In the world databases (Scopus, Web of Science, Google Scholar, etc.) scientific publications are found, in different research fields, based on the use of the mentioned software (10,11,12,13,14). Regarding the second category - the publications on InshurTech issues, we can state that it is equally attractive and relevant for both science and practice. This makes it an increasingly frequent object of research, whose authors put a different discourse in their works. One part of the scientific publications on this topic focuses on InsurTech business models (15,16,17). Another part discusses issues related to InsurTech startups (18,19,20). Several publications on the relationship between InsurTech and Blockchain are also present in global databases (21,22,23).

3. METHODOLOGY

Bibliometric analysis serves as a means to evaluate scientific publications on a given topic or scientific field, and the evaluation is objective and unbiased. Through its application, a quantitative evaluation of scientific research is carried out according to given qualitative categories. In this way, the dynamics and trends in the development of publications - in this case on the topic of InshurTech - are determined. The present study was carried out based on the Web of ScienceTM Core Collection database available as of 28 February 2024. To find relevant articles, the keyword “InshurTech” was used. In response to the search performed, 83 documents were fixed. The results were visualized using extracted images from the WoSCC database and the use of VOSviewer (Nees Jan van Eck and Ludo Waltman; Version 1.6.20) (24). The application of this tool is to create bibliographic maps and co-authorship networks based on bibliographic data and the co-occurrence of terms resulting from the available textual data. When using the tool, the lines of the network map demonstrate objectively the existing links between important items. The distances between items represent the strength of their associations, and the colouring of the circles suggests correspondence in the clusters to which the items belong. The following table presents the specifications we apply to carry out these analyses.

Table following on the next page

Table 1: Web of Science query: InsurTech: Bibliometric Review

Specifications	Conditions	No. of documents
Descriptions	Inshurtech (Topic)	83
	All Open Access	42
	Gold	21
	Gold-Hybrid	12
Access	Free to Read	6
	Green Published	15
	Green Accepted	1
	Green Submitted	9
Query search date	February 28, 2024	-
Year	1985 – 2024	83
	Business Economics	57
	Computer Science	10
	Engineering	9
	Science Technology Other Topics	6
	Environmental Sciences Ecology	5
	Social Sciences Other Topics	5
	Government Law	3
	Operations Research Management Science	
Research area	Public Administration	3
	Social Issues	3
	Arts Humanities Other Topics	2
	History Philosophy Of Science	2
	Mathematical Methods In Social Sciences	1
	Mathematics	1
	Physics	1
	Sociology	1
	Telecommunications	1
	Article	69
	Early Access	33
	Proceeding Paper	8
Document Type	Book Chapters	4
	Editorial Material	4
	Book	1
	Review Article	1
	English	81
Language	Russian	1
	Spanish	1
Final Result	The final number of documents	83

Source: Authors' Design Based on Web of ScienceTM Core Collection database (25), using a framework proposed by (26)

4. RESULTS

Within this study, the number of publications written about "InshurTech" and the number of citations for the years 2017-2024 (through 02/28/2024) are presented. The information is extracted from the Web of ScienceTM Core Collection database. The presented results are visualized in Figure 1.

Figure following on the next page

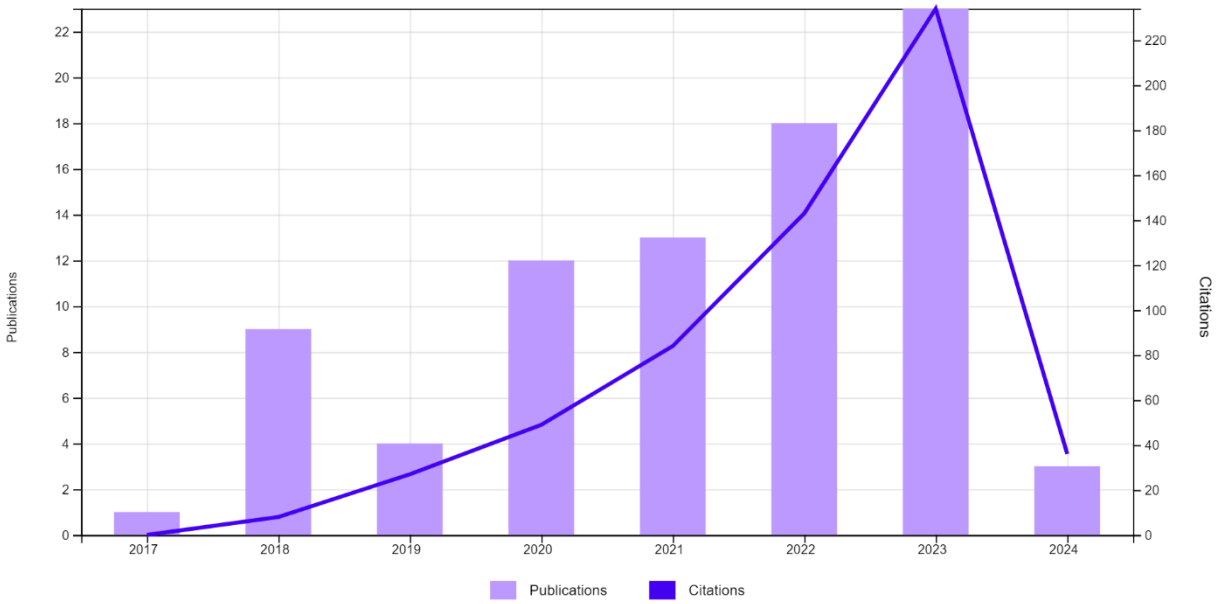
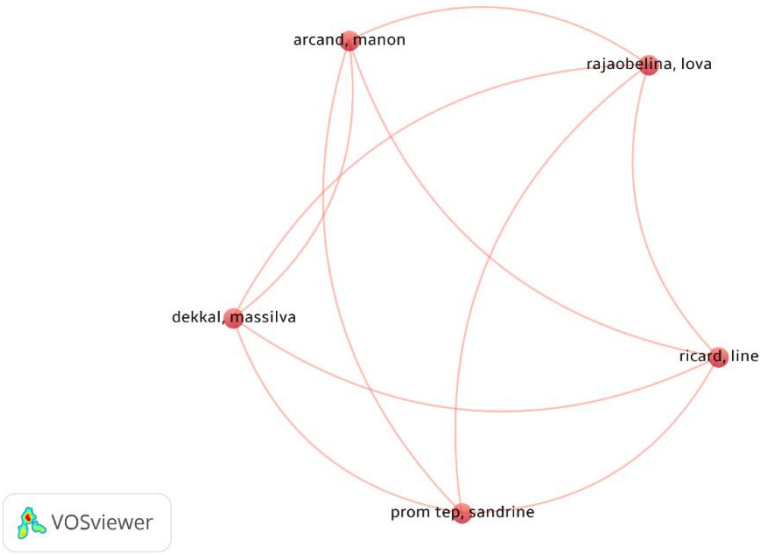


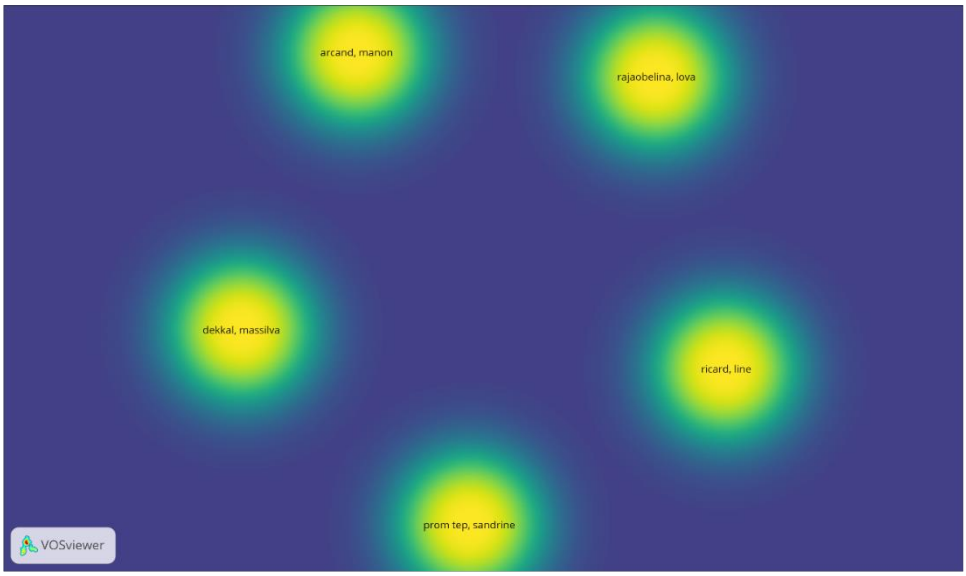
Figure 1: Citation Report: InsurTech (Topic)
Source: Authors' design based on Web of ScienceTM Core Collection (27)

A clear upward trend in both the number of scientific publications on the subject and the citation rate of the same is evident from the preliminary results. In spite of the originally set period (1985 - 2024), publications on the subject under consideration in the Web of Science database are originally dated 2017, with a total of 83 publications and 585 citations, or an average of 83.57 citations per year in total for publications on the subject of InshurTech. The highest peak of scientific publications and citations is fixed in 2023, with the number of publications and citations being 23 and 238 respectively. A visualisation of the co-authorship analysis and the intellectual structure of InsurTech's impact is presented in Figure 2. The cluster illustrates the extent to which authors are co-authors, and the width of the lines demonstrates the intensity of co-authorship interactions. 5 items were identified, and grouped into 1 cluster. The links attribute has a value of 10, and the weight is document-based. For each of the five authors, we find the presence of four links that are with the other authors.

Figure following on the next page



a)

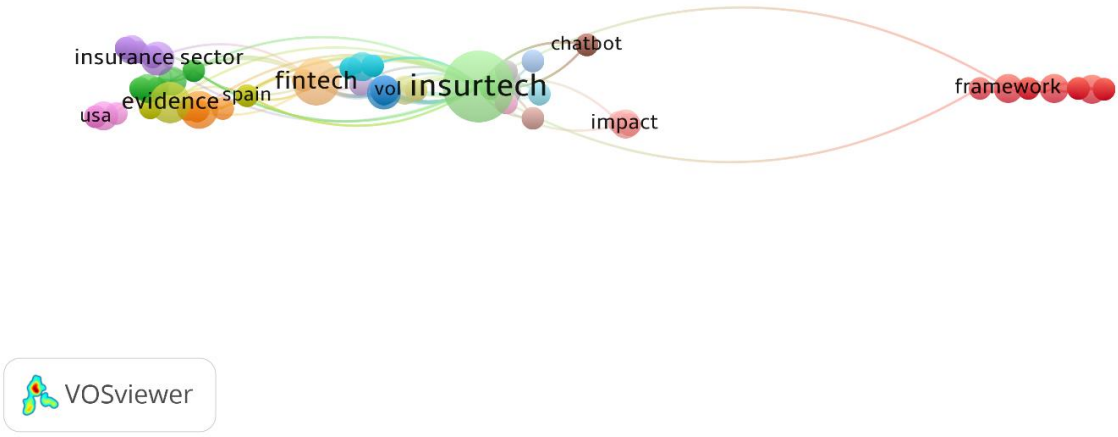


b)

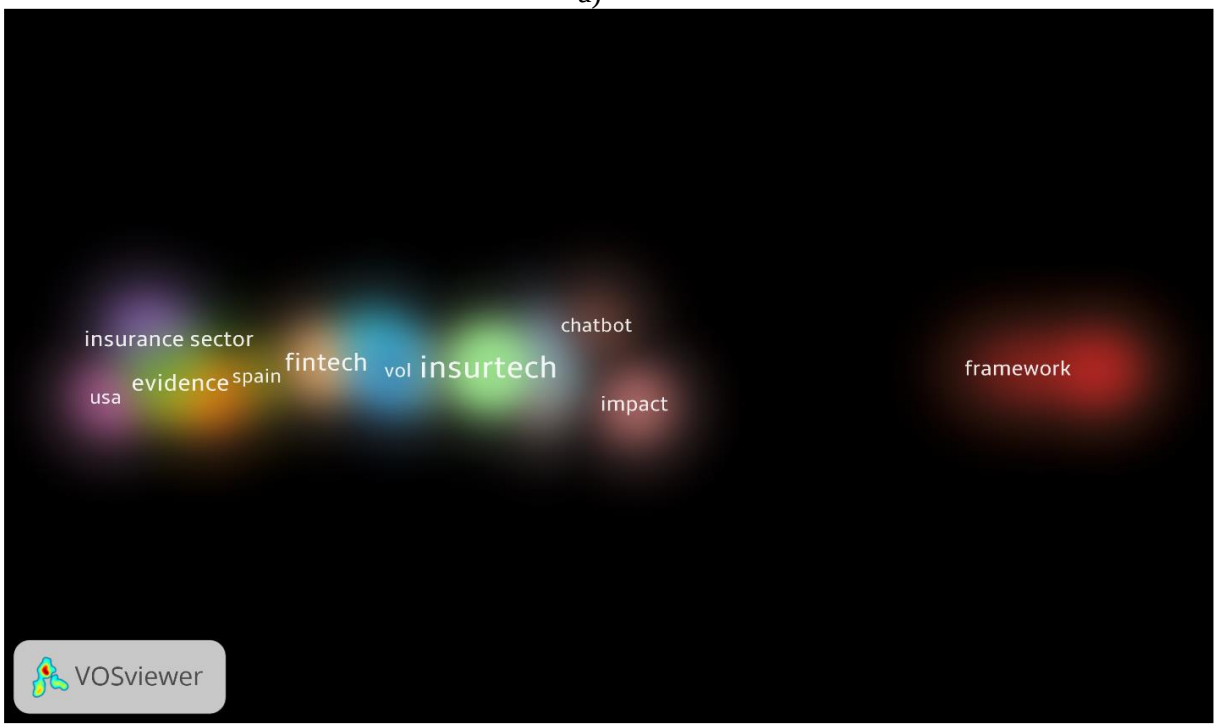
Figure 2: Bibliographic data map: Co-authorship analysis
Source: Visualization map from VOSviewer based on the Web of ScienceTM Core Collection database

In order to perform the co-occurrence analysis of the terms used by the author or authors, VOSviewer is used in this study. The mentioned software application serves as a tool to realize and visualize the bibliometric network of terms on the topic of "InshurTech" used by the authors.

Figure following on the next page



a)



b)

Figure 3: Map Text Data: Title Field (A term co-occurrence map)
Source: Visualization map from VOSviewer based on the Web of ScienceTM Core Collection database

Visualization maps are used to analyze the co-occurrence of terms based on textual data in a large number of documents. Thus, the strength of the relationship between their co-occurrence is determined (28).

The colour, size of the circles, font size and thickness of the connecting lines represent the strength of the associations between the terms (29), an occurrence e weight. Grouping terms into clusters is a kind of grouping by a common theme or subject (30). In the analysis, terms that stretch (at least once) are represented, resulting in 125 items classified into 21 clusters, with 338 links, and the attribute total link strength has a value of 363. Based on the application of the software application VOSviewer and the identification of 125 author terms grouped into clusters according to a predefined parameter (Title), 10 items are highlighted for which the corresponding cluster they belong, the identified links and the corresponding occurrences are presented. Table 2 presents a detailed description of these ten core terms and their characteristics on the InshurTech topic (see Table 2).

Table 2: The Top Ten Most Frequent Terms In InsurTech Publications And Co-Occurrences In the Web of Science database

Keyword	Cluster	Links	Occurrences
InshurTech	11	71	21
FinTech	16	30	7
Evidence	4	20	5
Blockchain	3	12	3
Insurance sector	5	10	3
Opportunity	6	9	2
Insurance industry	7	8	4
Adverse selection	2	8	2
Case	5	6	2
Insurance development	9	6	2

Source: Author‘s design-based result from research with VOSviewer

In terms of the terms “InshurTech”, “FinTech”, “Evidence”, “Blockchain”, and “Insurance sector”, the most links and occurrences are found. The same can be defined as a kind of “driver” on the topic of “InshurTech”. The next positions are occupied by the key terms: “Opportunity”, “Insurance industry”, and “Adverse selection”, having a direct link to the considered topic. Ninth and tenth positions are for the terms “Case” and “Insurance development”. Figure 4 visualizes the countries' contributions to the InsurTech theme. An important clarification that needs to be highlighted is the fact that when publications are co-authored by two or more authors from different countries/regions - in this case, the publication counts towards each of the countries/regions indicated.

Table following on the next page

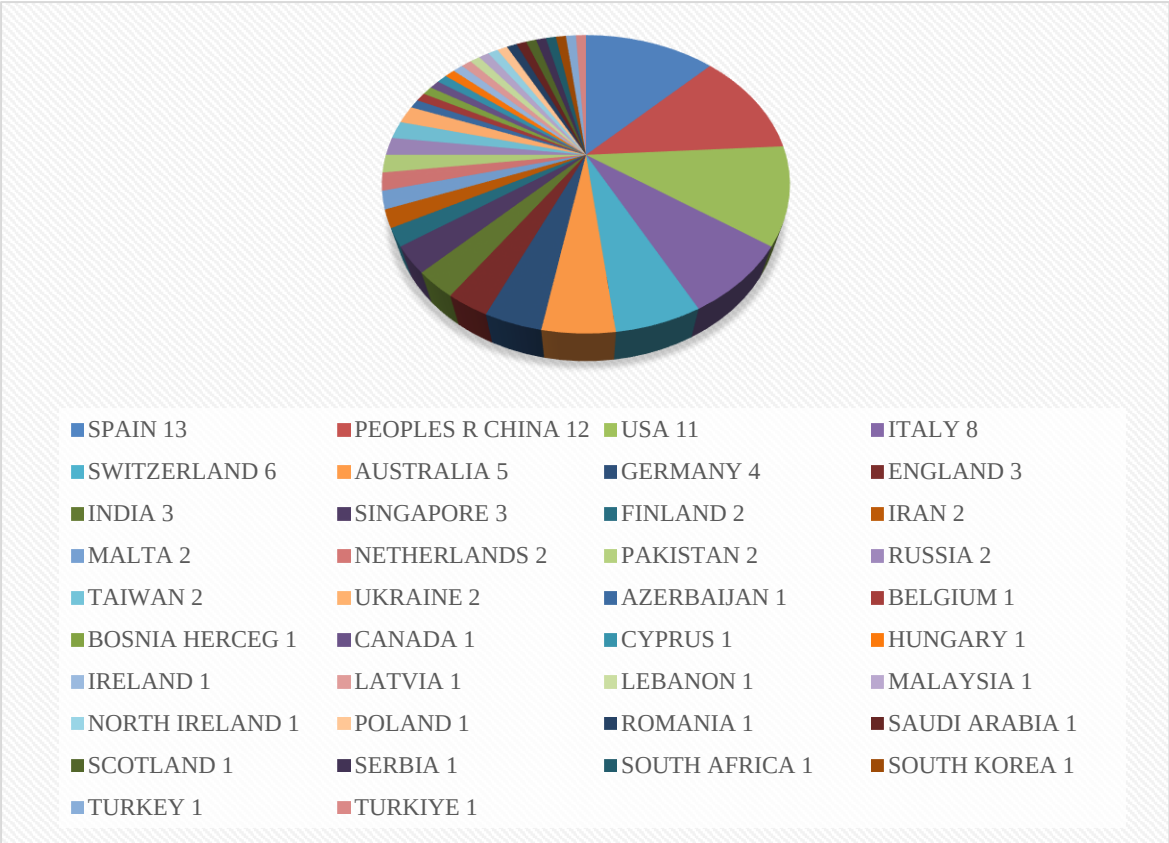


Figure 4: Countries/Regions Contributing Authorship Of Articles on InsurTech
Source: Author's design

The total number of results obtained is 104, based on which it is reported that the countries with the lowest contribution to the country/region criterion are Spain, People's Republic of China and USA, with 13, 12 and 11 matches respectively, followed by Italy (8), Switzerland (6) and Australia (5).

5. CONCLUSIONS

The scope of this study includes research papers on the topic of InshurTech from the Web of ScienceTM Core Collection database, present in it as of 28 February 2024. The purpose for which said database is used is to serve the purpose of performing bibliometric analysis using the VOSviwever software application. As a result of the initial search, 83 scientific publications on the subject were found. We find that, despite the original period (1985-2024), it was found that publications on the subject in the Web of Science database originally date back to 2017, with a total of 83 publications and 585 citations, or an average of 83.57 citations per year. Against the country/region criterion, Spain emerged as the most significant contributor with 13 matches, followed by the People's Republic of China and the USA. Scientific publications on the topic of InshurTech are most numerous in the research areas of Business Economics; Computer Science; and Engineering. Publications on the topic also fall under other research areas - Science Technology Other Topics; Environmental Sciences Ecology; Social Sciences Other Topics; Government Law; Operations Research Management Science; Public Administration, etc. The co-authorship analysis, based on bibliographic data, demonstrates the presence of 1 clusters and 10 links. The analysis of the co-occurrence of terms based on textual data, which in turn aims to represent the relationship between the co-occurrence of terms in a large number of documents, resulted in classifying the same into 21 clusters and identified 338 links.

A sub-objective of this analysis is to use the same as a starting point for exploring ongoing global processes and outlining the genesis and factors influencing the rapid development of InsurTech. In this line of thought, a potential focus of future research could be directed towards a bibliometric analysis of specific aspects of "Insurance Technology" (InsurTech) innovations in the global scientific literature, referring to indexed scientific publications from Scopus/Web of Science.

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BALANCED SCORECARD AS A MANAGEMENT IMPROVEMENT TOOL

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ABSTRACT

The article is an overview of the monograph "Balanced Scorecard as a management improvement tool" by Marin Georgiev. The aim of this study is to gather sufficient evidence and arguments in order to prove to society that during the process of change in thinking and especially of effective practical implementation of management models such as the balanced scorecard model, high levels of efficiency can be achieved on all hierarchical levels in systems key for the society and the state. The author explore opportunities for the effective implementation of the model and trialling it in different systems and levels of management.
Keywords: *Balanced Scorecard (BSC), Management, Education, Monograph, Review*

1. INTRODUCTION

The development "Balanced scorecard as a management improvement tool" by Associate Professor PhD Marin Georgiev is a rational summary of the accumulations in the field of measuring activity indicators, which is made in an appropriate form and shows in practice how it can achieve real value in a consequence of the management based on the intangible assets, reconciling them with the organizational strategy. The introduction of new content of the measurement methodology with the use of its three roles - for compliance with standards, for verification, and improvement are significantly different and are much more comprehensive than the "traditional understanding of measurement as a tool for strategic management and relevant control. They are not based on the understanding that behavior can be controlled by measurement" (Georgiev, 2019a). They are built based on the view that Balanced Scorecards are a tool used to improve the course of institutional development and that the course in question has other characteristics that should be measured and managed in a new and different way. On this basis, the advanced measurement methodology goes beyond the nature of confirmation of compliance with standards and is established as a methodology for measuring strategic stability, thereby more fully meeting public interests. The focus in research development is centered on the importance of strategic management and control in front of "current and short-term goals and their corrective role on the strategic success factors of the organization in the process of using the resources of the external environment" (Georgiev, 2019a), ignoring challenges such as priorities in the activity are the maximum satisfaction of public expectations, the minimum consumption of resources, the use of own priorities, the skilful overcoming of uncertainty and risk, the introduction of adequacy in management decisions against the background of reasonable and measured risk. In the research, alternatives suggested by observations and practice have been realized for changing and improving the architecture of the Balanced Map as a management and control tool, in the conditions of high variability and uncertainty of the social environment.

2. OVERVIEW OF THE MONOGRAPH "BALANCED SCORECARD AS A MANAGEMENT IMPROVEMENT TOOL"

The implementation of a balanced method of management and control of the strategic process allows to analyze the achieved results and to use the most favorable opportunities for realization and prosperity in dynamic conditions. The proposals made also rely on the opportunities provided by the defense and security system to make appropriate use of personnel knowledge

and experience in the development and evaluation of multiple hypotheses about the measurements, factors and indicators of military success and the formation of a rational strategy, a process burdened in some sense of the international situation and the socio-economic environment. On the other hand, the process of developing map proposals creates essential prerequisites for their improvement. The broad discussion aims at reaching a consensus on the final parameters of the indicators in the maps and realizing a reverse influence, including on the individual, intellectual models. Based on this, the maps can be established and perceived with conviction as a guide to action, as a challenge for analysis, as an alternative for improvement, as a method above all for effective management in difficult conditions and mandatory control. In the proposed monographic work, applied scientific results can be defined, representing scientific contributions in a theoretical and, above all, in a practical-applied aspect. In the context of the basic principles of management theory, developed by Bulgarian and foreign researchers, a systematization and analysis of known developments in the field of balanced scorecards and the technology of their implementation has been carried out. Known models for the development and implementation of a balanced scorecard have been applied and, on this basis, proposals for the introduction of cards in various key units of the structure of a large Bulgarian institution have been structured. As a result, analyses were carried out to adapt the implementation technology in the following aspects:

- Accordingly, the absence of the organization's strategy, implies the inclusion in the technology of the development of the maps and the inclusion of elements for the development of basic aspects of the strategy;
- According to the possibility, the potential of the balanced card model should be revealed and it should be proposed for application according to the different nature of management needs;
- Taking into account the need to improve information and analytical systems from the point of view of the needs of the process of development and implementation of the balanced maps.
- For the further development of the map as a tool for strategic management, requiring an assessment of the expected state and priorities in the control of the indicators included in the map.

The above-mentioned proposals, qualified as scientific achievements, form the opinion that the considered theoretical statements, methodology, and enriched methodology are proposed for solving specific management cases, and conclusions and recommendations are formulated in its practical implementation in the construction of BC aimed at the needs of key units of defense and security system. As a priority area of the monographic work, a heuristic methodology is presented with the registration of indicators for monitoring areas with special attention, indicating not only the state of organizational effectiveness but at the same time marking strategic alternatives in organizational development. In addition, part of future research efforts should improve and enrich the list of indicators and refine the measurement methodology. After all that has been written up to this point, one of the main tasks of the present study can be specified - through the improvement of the methodology for management and control of the strategy in a substantive and functional plan, the growing role of modern management for the stable development of modern social systems in the conditions of the changing environment. The proposed methodology applying the concept of the map is a basis for expanding research in several areas:

- Monitoring of the strategic process in key structures for society with the application of management adequate to the new thinking;
- Designing a system for early indication of failures at the level of strategic indicators;
- Introduction of a risk measurement and management system;

- Modeling and improvement of the Balanced Scorecard; mass introduction in the sphere of organizations with an intangible (ideal) goal, in the public sector, both for performance evaluation and for strategies;
- Improvement of the strategic processes taking place in the state-administrative apparatus and their realization in the public and political sector, through the approval of Balanced Maps.

3. CONCLUSION

The author, Associate professor PhD Marin Georgiev, is a graduate of the University of National and World Economy in Sofia and a doctor of administration and management at Vasil Levski National Military University in Veliko Tarnovo. He is an associate professor at the Georgi Stoikov Rakovski Military Academy in Sofia. He successfully uncovers and demonstrates the interdependencies, illustrating how "measurement can be used to increase the effectiveness of strategic processes and the efficiency of all socially significant activities towards which everyone strives and the way for laggards to catch up and leaders to go forward even faster, turning public expectations into reality, including in areas such as defense and security. The present development is useful and interesting both for researchers in this scientific field and would be applicable in the training of students and doctoral students in the fields of economics administration and management. On this topic, the author has dozens of scientific reports, articles, and scientific communications that have been published in various scientific publications or scientific conferences (Georgiev, 2019a; Terziev, Stoyanov, Georgiev, 2017a; Dimitrovski, Pushova, Georgiev, 2017b; 2017c; Terziev, Stoyanov, Georgiev, 2017d; 2017e; 2017f; 2017g; Terziev, Georgiev, 2017h; 2017i; Terziev, Banabakova, Latyshev, Georgiev, 2017j; 2017k; Terziev, Nichev, Stoyanov, Georgiev, 2017l; 2017m; Georgiev, 2017n; Banabakova, Georgiev, 2018a; 2018b; Terziev, Bogdanova, Georigev, 2019b; Terziev, Georgiev, 2020a; 2020b; Terziev, Georgiev, Nichev, Solovev, Bogdanov, 2020c; 2020d; Terziev, Georgiev, Andreeva, 2020e; 2020f; 2020g; 2020h; Terziev, Georgiev, Klimuk, 2020i; 2020j; Terziev, Georgiev, Ivanov, 2021a; 2021b; Terziev, 2022a; 2022b; Terziev, Georgiev, 2023).

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TOWARDS SUSTAINABLE ENERGY: AZERBAIJAN IN A QLOBAL CONTEXT

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ABSTRACT

Energy as the most important sphere of human life support is interconnected with world politics, climate, economic, environmental and technological development. It responds to all external challenges, often exerting a decisive influence on them. Azerbaijan is an important oil and gas producing country and plays an important role as an exporter of energy resources. Now there is a lot of talk about the energy transition, that in connection with this, Azerbaijan needs a new energy strategy. In the modern world, the production of environmentally friendly energy has become relevant. Azerbaijan has the potential for renewable energy production as well as CO2 capture and storage (CCS), which can be used to export low-carbon hydrogen. The geographical position of Azerbaijan and its growing transport and logistics role open up wide opportunities for the exchange of experience and cooperation in the field of decarbonization and the creation of export routes for low-carbohydrate energy carriers with European countries. The development of alternative energy sources against the backdrop of more frequent worldwide natural disasters is a vital and irrefutable demand of the times. The energy policy of Azerbaijan fully meets these trends. is influenced by a huge number of very different, often multidirectional factors. Azerbaijan also has great potential for the production of green energy and Azerbaijan plays an important role in ensuring the energy security of Europe. Natural gas exported from Azerbaijan fully meets the needs of a number of European countries. Today, a secure and sustainable energy supply is shaping a new global energy landscape based on the diversification of sources and routes, including the development of green energy. Azerbaijan is entering a new stage with initiatives that will strengthen its strategic position in ensuring energy security at the regional and European levels. Azerbaijan has already started producing alternative energy using new technologies. Along with the extraction and export of oil and gas, Azerbaijan will pay great attention to the production and export of "green" energy, which will increase its role in ensuring the energy security of Europe.
Keywords: *sustainable energy, energy policy of Azerbaijan, energy security of Europe, alternative energy, energy sector of Azerbaijan*

1. INTRODUCTION

The energy sector is under the influence of a huge number of different, often multidirectional factors. This includes globalization, which until recently was the most important of them, and geopolitics, and the explosive development of science and technology, including the discovery of new sources of energy resources, and demographic processes, and a sharp increase in social inequality, and social revolutions and wars. . But a special place among these factors belongs to global warming, the reaction to which was the concept of transition to “Sustainable Energy”, which changes the very idea of energy in the mid-21st century.

Energy is critical to ensuring a high quality of life for people. Affordable and sustainable energy is a key element of sustainable development. However, "at the Vienna Energy Forum, held at the initiative of the UN in June 2011, depressing figures were announced: three quarters of the world's poor use only 10% of global energy, for 1.5 billion people electricity is still not economically available, about 3- x out of 7 billion people do not have access to modern energy services and use traditional bioresources and coal as the main source of energy, energy "hunger" annually claims up to 2 million human lives" (Yuri Bychkov, 2014). In September 2015, countries agreed on the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs). Achieving these goals depends both directly and indirectly on ensuring a sustainable energy supply. "The world energy system is currently experiencing a fourth energy transition, which is based on a fundamental transformation - the introduction of widespread use of renewable energy sources (RES) and the displacement of hydrocarbon energy sources" (Мамедов З.Ф., 2023, p. 201). Azerbaijan, like the whole world, faces new challenges. This determines the need for economic modernization and innovative development. One of Azerbaijan's main goals is to ensure a sustainable energy future. Azerbaijan's energy policy is aimed at ensuring long-term energy security, taking into account the fact that the demand for oil and gas will gradually decline in favor of sustainable energy. It is possible and necessary to improve the country's energy base, taking into account the use of alternative energy sources. The national policy in the field of renewable energy sources is set out in the State Strategy for the Use of Alternative and Renewable Sources.

2. SUSTAINABLE ENERGY FOR EVERYONE

"The SEFA (Sustainable Energy for All) program, adopted by the UN in 2011, is an extremely timely program aimed at achieving three strategically interrelated goals by 2030: ensuring universal access to modern and affordable energy services; doubling the level of energy efficiency of the economy; doubling the share of renewable energy sources in the global energy balance" (https://www.un.org/ru/issue/510). We note that "in accordance with the Paris Climate Agreement, in addition to the introduction of renewable energy sources, an important task remains the sustainable and effective reduction of carbon dioxide emissions from traditional energy sources, known as "decarbonization." Decarbonization is the need to reduce carbon dioxide emissions caused by the production and use of energy resources. "This trend has led to the introduction of very strict environmental policies and standards for CO2 (Carbon Dioxide) emissions, and also launched major technological innovations in various sectors of the economy" (Borodin, A.; Zaitsev, V.; Mamedov, Z.F.; 2022, 15, 7111.). Energy policy over the past 30 years has strived to decarbonize the energy sector. And although it did not lead to the desired results in reducing carbon dioxide emissions, it nevertheless contributed to the growth in the use of renewable energy sources." This gives rise to optimistic forecasts regarding the future development of the Earth and its citizens.

3. ENERGY OF AZERBAIJAN IN THE CONTEXT OF THE DEMANDS OF THE TIME

The implementation of the "Contract of the Century" made it possible to begin transporting oil and gas resources of the Caspian Sea to international markets through the Black and Mediterranean seas. "Having received international support in the development and production of "black gold" and taking into account its national interests, Azerbaijan chose the principle of multi-vector routes for transporting energy resources, believing that such a policy meets the interests of not only Azerbaijan itself, but also consumers of oil and gas resources." The new oil strategy ensured the attraction of foreign investors to the development of Azerbaijan's oil fields, the diversification of crude oil transportation routes, the effective management of oil revenues and the entry of Azerbaijan into a new stage of development.

In order to develop the country's energy strategy, the main export pipelines were launched: Baku-Tbilisi-Ceyhan for oil export from the large Azeri-Chirag-Guneshli field and the Baku-Tbilisi-Erzurum gas pipeline from the Shah Deniz field, and the Baku-Tbilisi-Kars railway was built. “In just the 14 years that have passed since the signing of the Contract of the Century, more than $40 billion of investments have been made into the Azerbaijani economy as a whole. 27 oil contracts were concluded with 43 companies belonging to 21 countries of the world, through which a capital investment of $60 billion was provided for the development of the oil industry of Azerbaijan.” As a result of the income received from the implementation of oil and gas contracts, without exaggeration, grandiose projects began to be implemented in the country - in the economic, social, and cultural fields. Today, Azerbaijan widely exports extracted energy resources to neighboring countries. As Professor Mamedov believes: “The Azerbaijani project is not in words, but in practice embedded in the Grand Chinese initiative “one belt, one road”, designed to unite the continents through a belt of economic cooperation. The initiative “one belt, one road”, while opening up new opportunities in the transport sector, at the same time encourages trade, tourism, contacts between peoples and serves to promote stability, security and peace in the Eurasianspace.” (Mamedov Z. F., 2020., p. 409). “The expenditures of the European Union (EU) countries on the purchase of gas from Azerbaijan via the Trans Adriatic Pipeline (TAP) in the first quarter of 2022 are estimated to amount to 2.1 billion euros. Such data are presented in the quarterly report of the European Commission (EC) on the situation in the European gas market. The report notes that in total in the first months of 2022, the EU spent about 78 billion euros on gas imports, of which 26.5 billion euros came from gas from Russia, 19.2 billion euros from Norway, 5.4 billion euros from Northern Europe. Africa (Algeria and Libya), 2.1 billion euros - according to TAP. The EC noted an increase in supplies from Azerbaijan over the year: approximately 24 TWh in the first quarter of 2022 versus 10 TWh for the same period last year. “TAP provides access to Azerbaijani gas resources through the Southern Gas Corridor (SGC), which is an important result of the EU gas supply security policy,” the EC emphasized” (http://interfax.az/view/878890). All of the above testifies to the growing status of Azerbaijan in the world and is the result of the successes achieved in both the domestic and foreign policies of the country. It can be said with good reason that today Azerbaijan is at the highest level of development, meeting the challenges of the century.

4. AZERBAIJAN ON THE PATH TO “SUSTAINABLE” ENERGY

At the same time, there is theoretical and practical evidence according to which oil, gas and coal belong to the category of non-renewable natural resources, which, moreover, with their increasingly intensive and widespread use, causes irreparable damage to the environment. “Currently, the global energy community is faced with two important tasks, which at first glance seem mutually exclusive. On the one hand, it is necessary to provide the growing population and global economy with an adequate amount of energy resources. On the other hand, it is necessary to fulfill the obligations assumed by the world community to reduce greenhouse gas emissions"(https://energypolicy.ru/prirodnyj-gaz-i-novye-istochniki-energii-put-ot-konkurenc zii-k-sinergii/gaz /2022/12/19/). Thus, on the agenda is the issue of alternative energy sources, which, by the way, our country is also immeasurably rich in. These are, in particular, the sun, wind, energy of sea waves, geothermal waters, etc. Thus, “On December 17, 2022, in Bucharest, an “Agreement on a strategic partnership in the field of development and transfer of green energy” was signed between the governments of the Republic of Azerbaijan, Georgia, Romania and Hungary. A cable will be laid along the bottom of the Black Sea, through which " green energy” from Azerbaijan to Europe. The minimum potential of solar and wind energy in Karabakh and East Zangezur, declared a “green energy” zone, is 9,200 megawatts, and the hydropower potential is at least 600 MW.” (https://news.day.az/politics/1534377.html).

In 2016, Azerbaijan signed the Paris climate agreement, and by 2030 the state pledged to reduce emissions by 35%. The diversified development of all sectors of the Azerbaijani economy makes it possible to ensure the country's development for the long term and avoid dependence on the oil and gas factor. "At the present stage in Azerbaijan there is an energy transition from a resource-raw material to a resource-innovative model of development and minimization of energy risks, which is necessary to ensure a high level of energy security of Azerbaijan" (Aliyev A. State policy of the Republic of Azerbaijan to ensure energy security in modern conditions: political science aspects. Abstract of the dissertation for the degree of Doctor of Philosophy. Baku-2022)

5. ALTERNATIVE ENERGY SOURCES IN AZERBAIJAN

Today, in parallel with the development of energy technologies, it is also necessary to increasingly develop methods for the practical use of such non-traditional energy sources as wind, sun, geothermal water, hydrogen, etc. "Alternative energy sources in general are economical and environmentally friendly, these are, as they say, natural types of energy provided to humanity by nature itself" (Mamedov, Z.F.; Qurbanov, S.H.; 2022, 2, 15–27). For Azerbaijan, especially Absheron, they are extremely relevant: windy and sunny days in Baku almost all year round. In the capital of our country - the city of wind, sun and sea - in the future they can become not only alternative, but essentially no alternative. From an environmental point of view, the most ideal fuel is hydrogen. The name "hydrogen" itself speaks for itself: "giving birth to water." In a free state, hydrogen is extremely rare, but in space it is the most common element. Hydrogen has the highest calorific value, and the only product of its combustion is water. "The Caspian Sea occupies a special place in the renewable energy potential of Azerbaijan. This is due to the fact that the Caspian Sea ranks second in the world in terms of wind energy potential after the North Sea." In offshore oil production, the use of wind turbines is more than justified. Indeed, according to statistics, "the wind energy potential of the Caspian Sea alone is 157 gigawatts." (Global impact of the new energy paradigm of President Ilham Aliyev // https://www.trend.az/business/3709893.html). In Azerbaijan, taking into account the high transparency of the atmosphere, using solar rays it would be possible to obtain not only electricity, but also heat for heating livestock farms and greenhouses, drying agricultural products, desalinating sea water, and air conditioning in the premises, in a word, to implement a lot of processes that ensure significant savings in fuel and energy resources and environmental protection. It should be especially emphasized that alternative energy sources can not only ensure savings in national natural resources, but also, which is very important, guarantee the preservation of the unique nature of our country. Azerbaijan, which joined the Kyoto Protocol, using alternative energy sources, thereby significantly reduced emissions of harmful substances into the atmosphere. Of course, this brings comprehensive and invaluable benefits to Azerbaijan. All planned measures to modernize the energy sector management system and increase energy efficiency in Azerbaijan will allow in the future to save energy resources, increase exports, increase domestic production, create new jobs, reduce energy costs for enterprises and citizens, and guarantee energy security for future generations. "Within the framework of the concept "Azerbaijan 2030: national priorities for socio-economic development", the implementation of reconstruction and development projects is envisaged, and the transformation of the Karabakh region of the country into a green energy zone has been identified as a priority direction. In May 2021, the Ministry of Energy of Azerbaijan signed an agreement with the Japanese company TEPSCO on the creation of a "green energy" zone in the territories of Azerbaijan. The goal is to transform the region into a completely green energy zone by 2050, and reduce carbon dioxide emissions by 40%." The collision of the world with a new energy crisis // https://report.az/ru/energetika/stolknovenie-mira-s-novym-energeticheskim-krizisom/

6. CONCLUSION

So, to achieve the goals of the 2030 Agenda for Sustainable Development, it is necessary to ensure the sustainable use of natural resources, develop sustainable production and consumption patterns, create sustainable infrastructure and ensure coherent development of the entire system. A fundamental requirement for sustainable development is access to affordable, reliable and sustainable energy. Energy is the basis for ensuring social and economic well-being, eradicating poverty, ensuring healthy lifestyles and improving living standards. The global energy system is currently experiencing a fourth energy transition, which is based on a fundamental transformation - the introduction of widespread use of renewable energy sources (RES) and the displacement of hydrocarbon energy sources. Thus, positive processes in the economy and social life of our country have become possible thanks to a verified state strategy of development and reform, which is confirmed by the continuous growth of macroeconomic indicators in all sectors of production. “The development of this strategy was carried out within the framework of the document “Azerbaijan 2030: National priorities for socio-economic development. The goal of the program is to double Azerbaijan's GDP within 10 years. National priorities include 5 main areas: ensuring sustainable growth and competitiveness of the economy; creating a vibrant, inclusive society based on social justice; competitive human capital and modern innovations; the great return to the liberated territories; clean environment and a country of "green growth"" (http://interfax.az/view/852209). Azerbaijan's energy policy has insured it against possible economic losses. The creation of appropriate infrastructure makes it possible for sustainable development and the implementation of new projects that contribute to strengthening relations between states, as well as the spread of cooperation to other areas of activity. At the present stage, the Republic of Azerbaijan is undergoing an energy transition from a resource-raw material model to a resource-innovative model of development and minimization of energy risks. Azerbaijan's energy policy is based on a kind of triangle - “reliability of energy supplies”, “sustainability of the energy sector” and “economic efficiency of the process”. The development of alternative energy sources against the backdrop of increasingly frequent global natural disasters is a vital and irrefutable requirement of the time. Azerbaijan's energy policy fully responds to these trends.

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ECONOMIC GROWTH, ENVIRONMENT AND GREEN ECONOMY

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ABSTRACT

Permanent efforts to maximize production, economic growth, have had a positive impact on population growth, raising the standard of living, and reducing poverty. In the global environment, maintaining a balance between economic development and the use of the world's resources is an important fact. Just as the gross domestic product and the income situation developed positively, the consumption of natural resources also grew over the years, which was reflected in the growth of the global material footprint, domestic material consumption and material footprint. In the paper, we will focus on investigating the relationship between economic growth, well-being and the material footprint. Based on data from the World Bank, since 1960 the global GDP has increased from 10.94 billion dollars, to 87.95 billion dollars in 2022. Over the past nearly fifty years, the growth of world population and global GDP has necessitated an escalation in demand for natural resources. The use of natural resources in the form of material extraction has tripled since 1970, far beyond what industrial ecologists consider a sustainable limit. The concept of separating economic growth and resource use, or separating economic growth and environmental impacts, is gaining momentum globally. An essential prerequisite for maintaining sustainability is the efficient use of natural resources. This means supporting the efficient use of energy and resources, investing in renewable energy sources, supporting waste reduction and increasing recycling efforts, or encouraging technological innovation. The solution is sustainable production and consumption and the transition from a linear economy to a circular economy as much as possible.

Keywords: *Economic growth, Ecological transformation, Environment, Green economy*

1. INTRODUCTION

Natural resources are an essential prerequisite for the functioning of the European and global economy and the basis of the quality of our life. The permanent effort to maximize production, economic growth, was positively reflected in the increase in the standard of living. Millions of households around the world were lifted out of poverty, which also had a negative effect on natural resources and environmental degradation. Sustainable economic growth that meets the needs of the present with the ability to provide for the needs of future generations is therefore key to the long-term development of humanity and the protection of the environment (Abbas, et. al., 2023; Jiakui, et. al., 2023; Long and Ji, 2019; Vidová, 2019). For the long-term development of humanity and the protection of the environment, sustainable economic growth that fulfills the needs of the present with the ability to ensure the needs of future generations is therefore key. As the impacts of consumption are far beyond the limits of sustainability, it is essential to transform key systems and sectors to a circular economy. Our success will also depend on our ability to finance sustainability. Despite contributing significantly to our standard of living, our current production systems are not sustainable. Many regions and countries are trying to increase the material efficiency of their economies and reduce the total volume of materials used. The European Union, Japan and China have policy frameworks and laws that promote efficient use of resources and guide investment in the ecology and sectors of the economy to promote sustainable consumption and production practices.

2. ECONOMIC GROWTH AND SUSTAINABILITY OF NATURAL RESOURCES

Based on data from the World Bank, since 1960 the global GDP has increased from 10.94 billion dollars, to 87.95 billion dollars in 2022. Income analysis shows that in 1987, 30% of countries were classified as low-income, while in 2022, only 12% fell into this category. The extent of this decline varies between world regions, with sub-Saharan Africa's share of low-income countries falling from 74% to 46% in 2022, East Asia and the Pacific from 26% to 3%, and South Asia from 100% to 13%. as economies moved into higher categories during this period. During the years 2000 - 2021, GDP growth is reflected in a decrease in the number of low-income countries, while the number of upper-middle-income and high-income countries increased (Figure 1 and Figure 2).

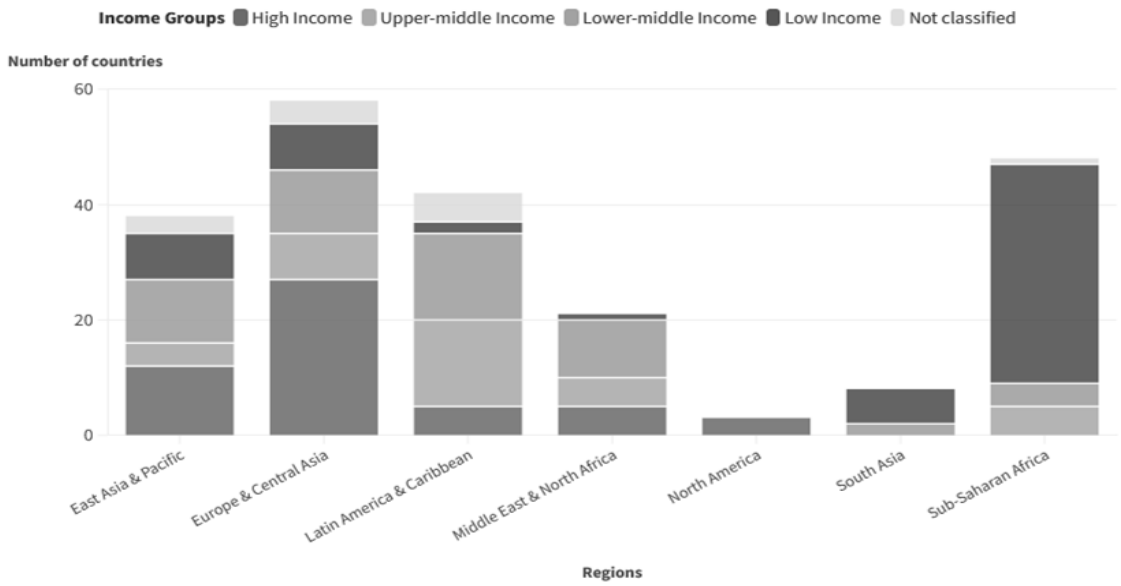

Figure 1: Development of income level by region 2000 (Source: https://blogs.worldbank.org/opendata/new-world-bank-group-country-classifications-income-level-fy24)

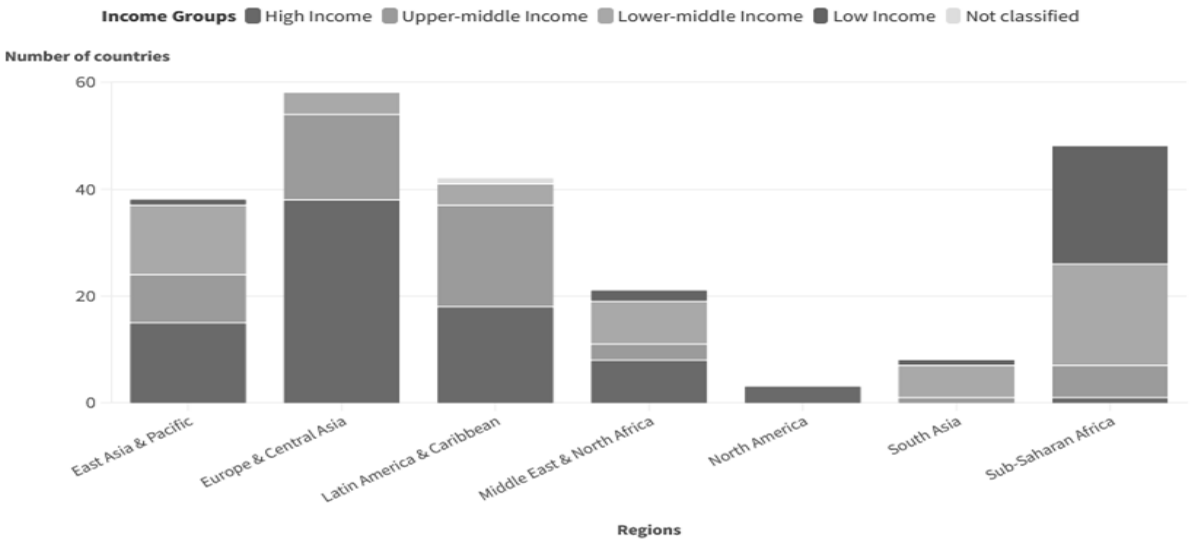

Figure 2: Development of income level by region 2022 (Source: https://blogs.worldbank.org/opendata/new-world-bank-group-country-classifications-income-level-fy24)

As the gross domestic product developed positively, the income situation, over the years, the consumption of natural resources also grew, which was reflected in the growth of the global material footprint, domestic material consumption (DMC) and material footprint (MF). Schandl and Eisenmenger, (2006; Behrens, et. al., 2007) pointed out the huge range of materials use. During the first decade of this century, the material footprint, which measures the amount of raw material extracted to meet consumer demand, increased globally, as did the amount of material used in manufacturing processes. The share of the material footprint represented by imports has increased from 48% in 2010 to 51% in 2020. This indicates the EU's growing dependence on other countries to meet its material needs. From 2010 to 2020, the EU's material footprint remained relatively stable: it decreased by 7% from 2010 to 2016 and increased by 5% from 2016 to 2019. In 2020, the material footprint decreased by 5% to 6.1 billion tons, but the 2020 figures are significantly affected by the economic slowdown due to the COVID-19 pandemic, which is considered temporary. Among the various material groups, the highest consumption is non-metallic minerals, which in 2020 represent 50% of traces; changes in consumption in this group were largely responsible for the overall trend. The second majority was biomass (23%), followed by fossil fuels (19%) and metals (9%). Although non-metallic minerals make up a large part of the total material footprint, they have a smaller impact on the environment and climate than metals and fossil fuels relative to their share of the material footprint. The EU's overall material footprint is above the global average and much higher than in low- and middle-income countries. 6.1 billion tons of material for manufactured goods and provided services for EU residents. extracted from nature in the EU and outside it. This level of resource consumption exceeds the planet's "safe operating space" for resource extraction, meaning that if the world consumed EU-level resources, the planet's capacity to provide those resources would be exceeded. Achieving Agenda 2023's Goal 12, Ensure sustainable consumption and production patterns, requires strong national frameworks for sustainable consumption and production that are integrated into national and sectoral plans alongside sustainable business practices and consumer behaviour. Ultimately, this requires compliance with international standards related to hazardous chemicals and waste." The EU Action Plan for the Circular Economy explicitly requires methods of measuring the material footprint. This is because the EU has a larger share of world consumption and investment than of world production, as much of the goods consumed in Europe are produced in Asia. Material footprints make visible the EU's responsibility for the environmental pressures that arise as a result of products imported into the EU. In the following text, we will focus on domestic material consumption (DMC), which tracks the total amount of materials directly used within the national economy. It is calculated as direct material input minus exports. According to the Global Resources Outlook, the share of global DMC attributed to high-income countries has been declining rapidly, from 52% in 1970 to 22% in 2017. This was driven by rapidly growing DMC in upper-middle-income countries, which increased its share of global DMC from 33% in 1970 to 56% in 2017, mainly thanks to the Asia-Pacific region. The share of DMC belonging to lower-middle-income countries also increased from 12% to 19%, but the share of the low-income group, despite by far the fastest population growth, remained unchanged at below 3%
In 2021, DMC in the Slovak Republic was 65,585 thousand. tons, which represents 12.0 tons per inhabitant (the average value within the EU states was 14.4 tons per inhabitant). In the period from 2005 to 2021, a decrease in DMC/population was recorded. by approximately 14%. In 2021, domestic extraction for the Slovak Republic was 10.5 tons per inhabitant, while the average value within the EU was 12.4 tons per inhabitant. The import of goods was 8.6 tons per inhabitant. Direct material input (DMI) was 19.1 tons per inhabitant (the average value within the EU states was 16.1 tons per inhabitant). Domestic material consumption (DMC) was 12.0 tons per inhabitant (the average value within the EU states was 14.4 tons per inhabitant).

DMC in the Slovak Republic in 2021 consisted of non-metallic mineral raw materials for the most part, up to 49.8%, followed by biomass with 26.6%, energy raw materials (17.4%) and metallic minerals (6.2%). The size of the share of imports in DMC also has an important explanatory power. The larger the ratio of this share, the more sensitive the economy of a given state is to random fluctuations in foreign trade (a shortage of certain commodities, an unexpected increase in their prices, etc.). The share of imports in DMC increased from 50.3% in 2005 to 71.8% in 2021, which means an increasing degree of dependence of the Slovak economy on the import of raw materials.

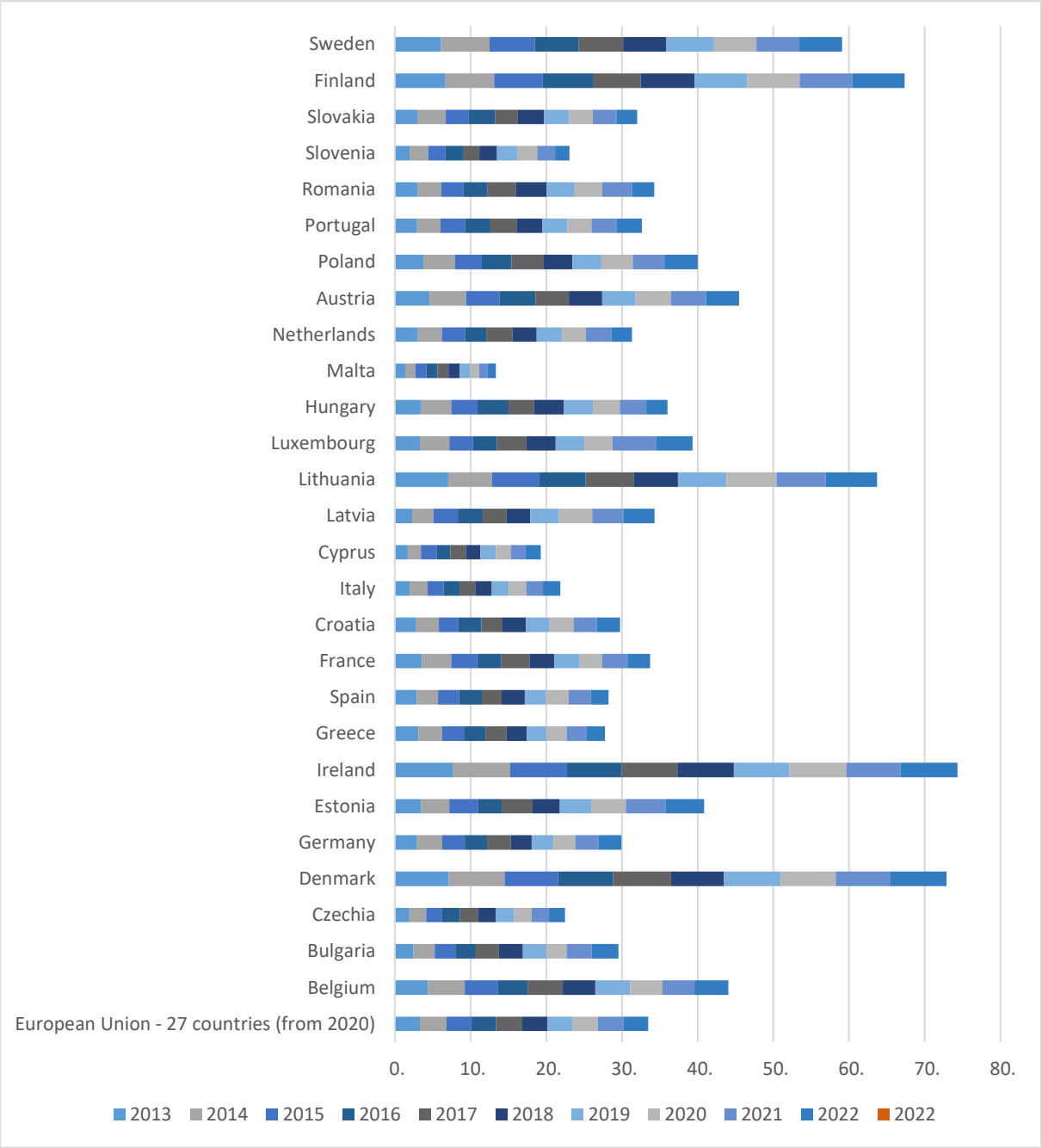

Figure 3: Material flows - countries of the European Union
(Source: own processing based on data https://ec.europa.eu/eurostat/databrowser/view/env_ac_mfa__custom_8652789/default/table?lang=en)

3. (NOT) SEPARATING ECONOMIC GROWTH FROM THE USE OF NATURAL RESOURCES

Achieving sustainable economic growth requires decoupling economic growth from the use of natural resources and decoupling economic growth from environmental impact. This fact requires reducing the global extraction of resources and the material productivity of resources. The use of natural resources in the form of material extraction more than tripled from 1970 to 2019, from 30.9 billion tons to 96.1 billion tons. According to industrial ecologists, the sustainable limit is around 50 billion tons per year. Global material consumption grew by acquiring all materials. Mining of non-renewable materials (non-metallic minerals, especially industrial and construction minerals) recorded high growth rates. The reason was the constant need to improve infrastructure in energy, transport and construction works around the world. In order to satisfy the demand for energy, the consumption of fossil fuels and the extraction of biomass also increased. Based on the Global material flows nas resource productivity (2016) data, in all material groups biomass production increased year-on-year by 2%, fossil fuels by 1.9%, metal ores by 2.8% and non-metallic minerals by 4%. average. Different growth rates of different materials have changed the contribution of these materials to the total global use of materials. The share of biomass fell from 37% in 1970 to 27% in 2010, and the share of fossil fuels from 26% to 19%. Metallic ores remained constant at around 10%, and non-metallic minerals rose from 27% to 44%. Global demand for raw materials has increased due to the industrialization of developing countries. According to Xie et al. (2020), developing countries also suffered from increasing environmental pollution.

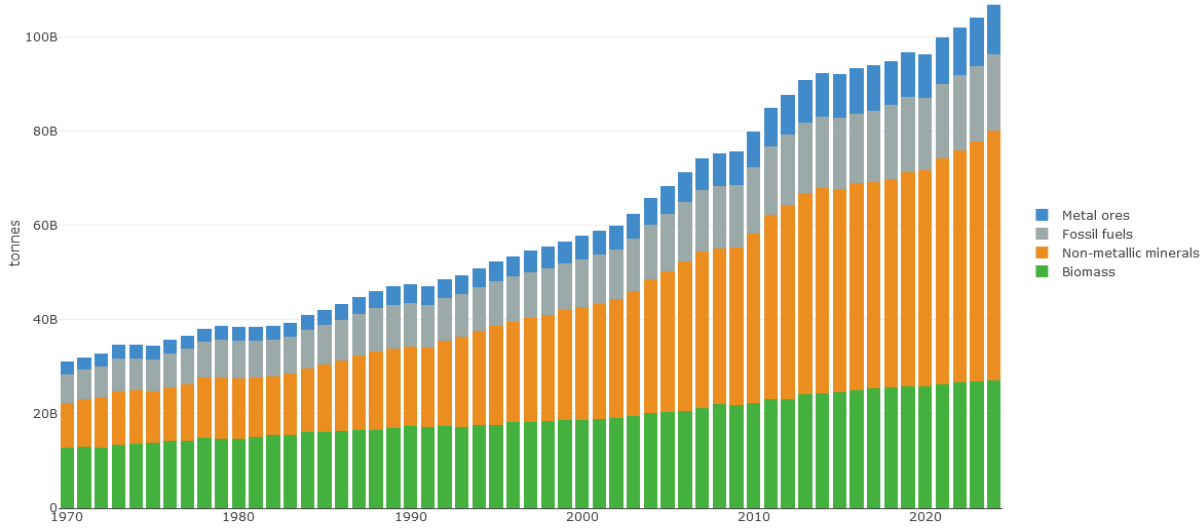

Figure 4: Development of global material extraction (t) 1970-2024 (Source: https://www.materialflows.net/visualisation-centre/country-profiles/)

Material productivity grew sharply from 1970 to 1980. Until 1997, its growth was more moderate and it increased sharply until 1990 and then decreased until 1996. The reason is the increase in income, domestic consumption, which influenced the growth of globalization flows. The increasing pace of domestic material consumption had an impact on the environment. Material productivity stagnated after 2002 and even decreased from 2009, while this was caused by the economic and financial crisis, which also caused a decrease in global GDP in 2008 and 2009. On the other hand, the total extraction of the material maintained a trajectory of rapid growth, as developing economies such as China, India or Indonesia, which were not significantly affected by the crisis, entered the market and at the same time entered a period of large growth rates, which led to an escalation of the intensification of resource consumption.

Thus, during the period of stagnation and decline in material productivity between 2009 and 2014, there was no separation for most of the years, as the rate of growth of resource extraction largely exceeded the rate of GDP growth. Global material productivity only started to increase again in 2014, and with it the trend of relative decoupling continued. Between 1990 and 2002, the rate of GDP growth globally exceeded the rate of material extraction, representing a trend of relative resource separation. Since 2002, this trend of increasing material productivity has stagnated, and since 2009 it has reversed. The economic and financial crisis caused a downward trend in global GDP between 2008 and 2009. On the other hand, the total extraction of the material continued to grow rapidly, as developing economies such as China, India or Indonesia entered the market, were less affected by the crisis and entered a period of enormous growth rates, leading to an intensification of material consumption. In 2014, global material productivity began to increase again, with a slight decline in 2020. During this year, the impact of the COVID-19 pandemic on global GDP growth was more pronounced than on material extraction growth.

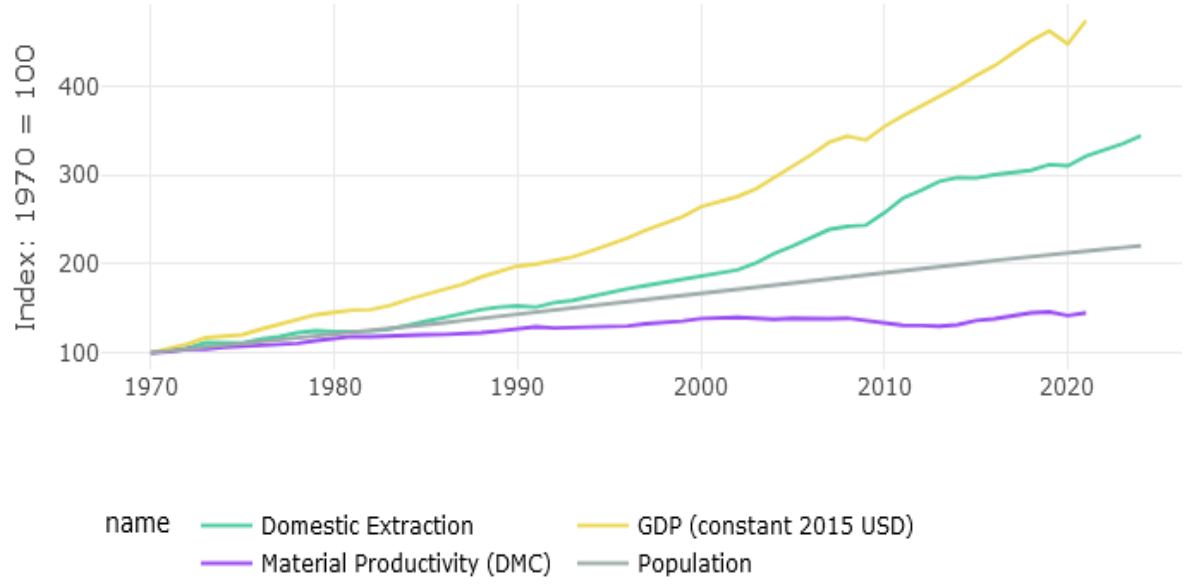

Figure 5: Global trends in material productivity, GDP, world population and domestic resource extraction 1970-2024
(Source: https://www.materialflows.net/decoupling-material-use-and-economic-performance/)

Regions and countries differ in terms of their raw material options. Countries with smaller reserves of raw materials have a demand for materials. To meet their needs, they have to increase imports. In addition, rich countries have production in developing countries because of the low cost of labor, which increases emissions and negatively affects the environment. According to The Material Flow Analysis Portal in the period 1993 to 2021, domestic extraction in Slovakia increased by 22.9%, from 53,233,969 tonnes in 1993 to 65,412,738 tonnes in 2021. Non-metallic minerals had the largest share in overall material extraction in 2021 (67.4%), followed by Biomass (30.7%), Fossil fuels (1.6%), and Metal ores (0.3%). Comparing the amount extracted in Slovakia with other countries, the per-capita level is more meaningful. On a global level, with 8.9 tonnes per capita Slovakia ranked 129 out of 237 countries in 2021. This amount was 21.9% below the world average of 11.4 tonnes per capita.[1]

[1] https://www.materialflows.net/visualisation-centre/country-profiles/

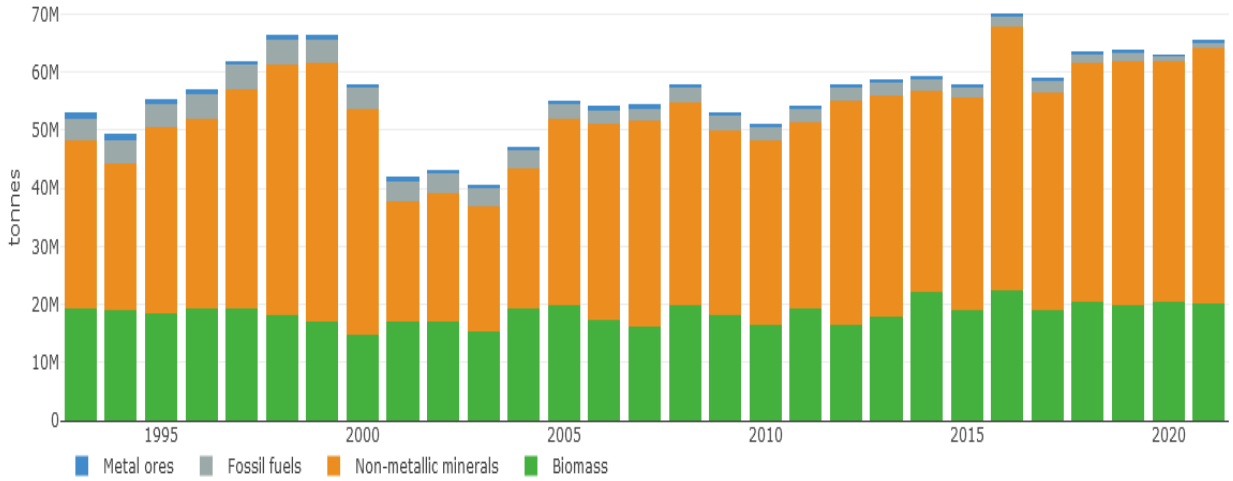

Figure 6: Domestic extraction of Slovakia in 1970 – 2021, by material.
(Source: https://www.materialflows.net/visualisation-centre/country-profiles/)

Material Productivity is a measure for how efficiently an economy is using its raw materials. It is calculated as the ratio of GDP and DMC or MF. An increase in productivity is synonymous with decoupling material use and economic performance. In the period 1993 to 2021, the GDP in Slovakia increased by 175%. At the same time, its DMC changed by 4%. This resulted in an increase of the country's Material Productivity (DMC) of 165%. In a similar period (1993-2021), the MF rose by 16%. Consequently, Material Productivity (MF) increased by 137%**.** With a Material Productivity (MF) of 1.2 USD per kilogramme, Slovakia ranks 126 – 60.6% above the global average of 0.8 USD per kilogramme (Figure 7).

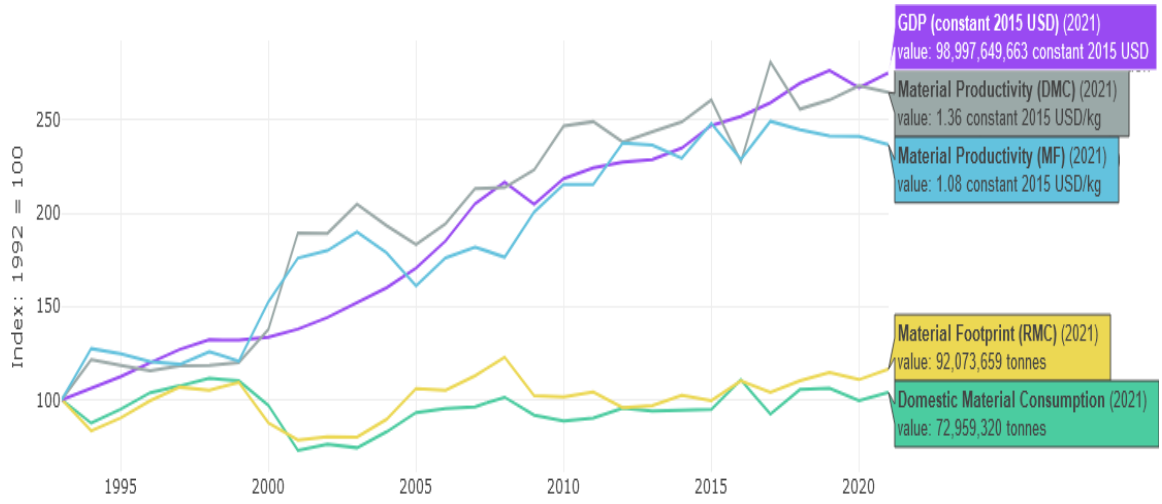

Figure 7: Productivity trends in Slovakia in 1992 – 2021
(Source: https://www.materialflows.net/visualisation-centre/country-profiles/)

Several authors (Celik, et. al., 2024; Chen, et. al. 2023; Mushafiq and Prusak, 2023) found in their studies that improving material efficiency reduces environmental degradation. We can increase material efficiency by switching to a green economy. Within the framework of the green economy, resources are used efficiently with an emphasis on reuse and recycling (Bartošek – Jurová, 2023).

Europeans currently produce an average of around 600 kg of municipal waste per person, of which 49% is reused or recycled. About 23% is deposited in landfills, which is the worst option for waste treatment. Countries are therefore trying to introduce measures for the reuse of waste in the production of products or for the production of energy. In this way, reduce carbon emissions, overall air and water pollution.

4. CONCLUSION

Our highly globalized economy provides us with all kinds of products and services, from local produce and tropical fruits to cheap clothing, from high-tech equipment to vacation packages across the planet. Economies are active in many sectors. Industry, agriculture, energy, transport, construction, tourism create millions of jobs and offer many goods and services. These economic activities and industries that keep our economies going also have an impact on nature as it needs resources which has an impact on nature. To solve this situation, it is necessary to make substantial changes in economic systems. The transition from focusing on economic growth and consumption to a more sustainable one is the most ideal way of development. Achieving this transition requires changes in behavior and values not only at the national level but also at the household level. Households play an important role in promoting sustainable development by adopting environmentally responsible behavior, supporting environmentally friendly businesses or promoting policies that prioritize sustainability.

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SDG8 - ANALYSIS OF SELECTED EU COUNTRIES

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ABSTRACT

Economic transformation and the leading strategies of contemporary global society are founded on sustainable development, i.e. on encouraging continuous economic and social progress, without endangering natural resources and environment crucial for human activity in the future. The eighth goal of the UN Sustainable Development Program (SDG 8) states the promotion of inclusive and sustainable economic growth, full employment and decent work for all. Sustainable development and the labour market are closely intertwined concepts that focus on creating a better future for society while ensuring economic stability and employment opportunities for all people. The aim of the paper is to reveal the state of individual CEECs in their attempt to align with the SDG8. For this purpose, we analyse the indicators that are important for achieving the conditions for decent work and calculate the mutual relationship of the countries, using the average values for the European Union (EU27) as a reference. The analysis was made for the ten-year period from 2012 to2022. The results of the analysis suggest that these countries have created the preconditions for achieving the eighth UN goal of sustainable development, while their mutual relationship is relatively stable.

Keywords: *decent work, CEEC, labour market trends, SDG 8*

1. INTRODUCTION

Sustainable development (SD) has become a fundamental strategy for guiding global social community and economic transformation (Shi et al. 2019). The fundamental goal of sustainable development is to ensure the sustainable usage of natural resources at the national and international level. The goals of sustainable development stated in the 2030 Agenda for Sustainable Development, adopted at the United Nations conference held in New York in 2015, are anticipated as a global response to the problems posed by threatening environmental crises and poverty. Sustainable development can be defined as a framework for defining strategies and policies for continuous economic and social progress, without endangering the natural resources and environment crucial for human activities in the future. The entire concept of sustainable development is based on the assumption that growth and development should support the future of new generations through the reasonable use of non-renewable resources and the reduction of environmental pollution. The sustainability model supports development policy with the application of new technologies and scientific achievements. The goal of sustainable development is threefold. At the same time, it strives for economic social responsibility, efficiency (economic growth), and environmental protection. Previously mentioned three items are called the pillars of sustainable development (Frajman-Jakšić et al., 2010). In order to survive, society uses economic models to increase the quality of life, and it is completely dependent on the Earth's resources. Since economies are managed by humans, the pillars of sustainable development are interconnected. The eighth goal of the UN Sustainable Development Program (SDG 8) refers to the promotion of inclusive and sustainable economic growth, full employment and decent work for all. Therefore, sustainable development and the labour market are closely related concepts that focus on creating a better future for society while ensuring economic stability and employment opportunities for all people. By encouraging industries and sectors that highlight sustainability, such as renewable energy sources, environmentally friendly agriculture and green technologies, countries can create new

employment opportunities while reducing their environmental impact. Sustainable development often includes investments in green infrastructure and clean energy projects. These initiatives create jobs in various sectors, including construction, manufacturing, research and development. Sustainable practices can also promote employment in areas such as organic farming, waste management and eco-tourism. Because sustainable development emphasises social equality and well-being, by investing in education, health care and social services, countries can improve the human capital of their workforce, making them more productive and adaptable to changing labour markets. In addition, sustainable development encourages innovation in various fields. The development and implementation of sustainable solutions often requires research and development, which can lead to the growth of knowledge-intensive industries and employment opportunities for highly skilled people. In short, sustainable development and employment are interconnected because sustainable practices can lead to job creation, promote social equality, encourage innovation and ensure long-term economic stability. By integrating sustainability principles into economic and social policies, countries can work towards a more prosperous and fairer future. Decent work is based on the existence of an equal and inclusive work environment based on the principles of the right to work and freedom, gender equality, work without pressure and discrimination (Petričević and Medarić, 2014). Sustainable economic growth and decent work are important for the development and success of European countries. The aim of this paper is to analyse the indicators that are important for achieving the conditions for decent work in order to investigate the situation regarding SDG8 in some of the newer member states of the European Union. The analysis is conducted to investigate trends in the areas of sustainable economic growth and labour market and to estimate mutual relationships among the selected countries of Eastern and Central Europe using average values for the European Union (EU27) as a reference to reveal the state of individual countries in their attempt to align with the SDG8. The analysis was made for the ten-year period from 2012 to 2022 for the following countries of Eastern and Central Europe: Bulgaria, the Czech Republic, Croatia, Hungary, Poland, Romania, Slovenia and Slovakia. The paper is structured as follows. In the next part, the concept of decent work is clearly explained and the existing policies aimed at achieving the prerequisites for decent work for all at EU level are presented. In the third part of the paper, a systematic review of the literature related to the eighth UN goal of sustainable development is presented. In the fourth part, the situation in the labour markets of the selected countries is analysed. Next part of the paper presents the average mutual ranking of analysed countries. The paper ends with a conclusion.

2. EXISTING POLICIES FOR ACHIEVING THE PRECONDITIONS FOR DECENT WORK

Decent work, according to the definition of the International Labour Organization (ILO), is defined as "the possibility for women and men to obtain dignified and productive work, in conditions of freedom, equality, security and human dignity". This working definition includes six dimensions (Anker et al., 2003).

- Opportunities for work refer to the need for all individuals (men and women) who want work to be able to find work.
- Working in conditions of freedom emphasises that work should be a free choice.
- Productive work is necessary for workers to have an acceptable income for living.
- Equality in work implies treatment and opportunities with the absence of discrimination at work and access to work and the possibility of harmonising work with family life.
- Protection at work refers to protection at work in case of health and other unforeseen circumstances and the need of workers to limit the uncertainty associated with possible loss of job and livelihood.

- Dignity at work requires that workers are treated with respect and that they can participate in making decisions about working conditions, where it is important that workers can collectively represent their interests.

Sustainable economic growth and decent work are important for the development and success of European countries. At the level of the European Union, there is a whole series of plans, directives, recommendations and documents aimed at achieving the eighth goal of the UN Sustainable Development Program. "The European Pillar of Social Rights Action Plan" aims to increase the employment rate of persons aged 20 to 64 to at least 78% and to reduce the proportion of young people aged 15 to 29 who are not employed, not in education or training (NEET) to less than 9% by 2030. The guidelines for the employment policies of the member states emphasise the post-COVID-19 environment, a socially just green transition, and recommend various measures in response to Russian aggression against Ukraine. "Council Recommendation on Access to Social Protection" for workers and the self-employed has been included in the social protection system throughout the EU since 2019. "EU Work-life Balance Directive" (European Parliament, 2019) aims to improve access to family leave and flexibility of work arrangements to facilitate women's participation in the labour market. The Council recommendation on the integration of long-term unemployed persons into the market aims to help long-term unemployed persons to re-enter the workforce and integrate into the labour market. The European Social Fund (ESF) and the Youth Employment Initiative (YEI) support quality employment, further education, internships and training (Sustainable Development in the European Union, 2022). "Communication from the Commission to the European Parliament, The Council, and The European Economic and Social Committee: On decent work worldwide for a global just transition and a sustainable recovery (2022)" recaps the EU's commitment to advocating decent work in the European and global labour market. The European Parliament and the Council Directives (2022) on adequate minimum wages in the European Union and on transparent and predictable working conditions in the European Union (2019) aim to ensure that EU workers earn minimum wages that enable a decent life and set new minimum standards for working conditions. EU strategic framework on health and safety at work for the period 2021-2027 defines priorities for improving worker health and safety in a rapidly changing world of work.

3. LITERATURE REVIEW - THE EIGHTH GOAL OF SUSTAINABLE DEVELOPMENT

To analyse the eighth goal of the UN sustainable development program, it is necessary to start from its targets. The first target refers to economic growth per capita, which depends on national circumstances. The annual rate of economic growth of the least developed countries should be at least 7%. The results of research conducted by Gumus and Celikay (2015) indicate that research and development expenditures have a long run positive and significant effect on the economic growth of all countries, which is in line with the relevant literature. For developing countries, the effect is weak in the short run, but strong in the long run. Therefore, higher expenditure on research and development can contribute to the achievement of this target. The second target is aimed at achieving a higher level of economic productivity through diversification, technological progress and innovation. Among other things, it focuses on labour-intensive and highly profitable sectors. This target is very similar to the first one and it is measured by the annual growth rate of real GDP per employed person. As previously stated, this goal can be achieved by increasing expenditures for research and development, but also by investing in human capital. According to Awad (2021), health has a positive and significant role in the growth process in the short run, while in the long run education has a positive and significant effect on economic growth.

The following target refers to the promotion of development-oriented policies that support productive activities, entrepreneurship, dignified job creation, innovation and creativity, and the encouragement of the formal establishment and growth of micro-, small- and medium-sized enterprises, among other things, through access to financial services. Micro-, small- and medium-sized enterprises play a key role in creating a large number of jobs at a low cost of capital compared to large industries, help establish industries in economically less developed regions and reduce regional inequalities (Gade, 2018). Gherghina et al. (2020) argue that SMEs are key to local economic development, playing an important role in job creation, poverty reduction and economic growth. According to the fourth target, it is necessary to improve the global efficiency of resources in consumption and production by the end of 2030 and strive to separate economic growth from the degradation of nature and the environment in accordance with the ten-year framework related to sustainable consumption and production, with developed countries playing a leading role (Rahman, 2020; Ali et al., 2020). The next, fifth, target emphasises the need to achieve full and productive employment and decent work for all women and men by the end of 2030, which includes young people and people with disabilities, as well as equal incomes for work of the same value. This goal is measured by average wages and unemployment. Next target aims to significantly reduce the share of youth not in education, employment, or training (NEET). Namely, the results of the research conducted by Göçer and Erdal (2015) indicate that even exclusive economic growth will not be sufficient to reduce the youth unemployment rate in the country, if this rate is very high. Crises also have a negative impact on youth employment. Lambovska et al. (2021) point out that youth unemployment is a problem in every EU member state. The EU tries to alleviate this problem by implementing various programs to support young people in finding and keeping a job, thereby contributing to economic growth. However, due to the COVID-19 pandemic EU member states introduced many strict measures to prevent its spread. Unfortunately, these measures caused a significant increase in unemployment, including youth unemployment, and thus harmed economic growth. The results of the research conducted by Catilo et al. (2020) point out that although new generations of young people are more educated, education is not a sufficient guarantee for quality entry into the labour market. This fact can be explained by the lack of work experience and the segmentation of the labour market. Taking urgent measures to eliminate forced labour, ending modern slavery and human trafficking, eliminating the worst forms of child labour, including the employment and use of child soldiers (stopping child labour in all its forms by 2025) are the guidelines of the seventh target. Uduji et al. (2019) suggest that economic growth can greatly contribute to the achievement of this target. The eighth target refers to the protection of labour rights and ensuring a safe working environment for all workers, including migrant workers, especially female migrants and those who do hazardous work. According to Skvarciany and Vidžiūnaitė (2022), governments have enormous opportunities to create preconditions for achieving these targets by amending laws and legal acts. The ninth target refers to sustainable tourism. The intention is to design and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products by the end of 2030. Specifically, evidence from a study conducted by León-Gómez et al (2021) suggests that sustainable tourism development is necessary for economic growth. According to the tenth target, it is necessary to weaken the capacities of domestic financial institutions in order to increase the availability of financial services, banking, and insurance for all. Svilokos et al. (2019) highlighted the importance of development of the financial sector on economic growth.

4. STYLIZED FACTS

In order to investigate the situation in the newer member states of the European Union related to the eighth goal of sustainable development, and based on the previous literature review the following indicators are analysed: employment rate; real GDP per capita; the rate of youth not

in education, employment, or training; employment rates, and long-term unemployment rates. For this purpose, the research was carried out on selected countries of Central and Eastern Europe (Bulgaria, the Czech Republic, Croatia, Hungary, Poland, Romania, Slovenia and Slovakia) for the ten-year period from 2012 to 2022. All indicators were compared with the EU 27 average. The data were taken from the official website of the Statistical Office of the European Union (EUROSTAT).

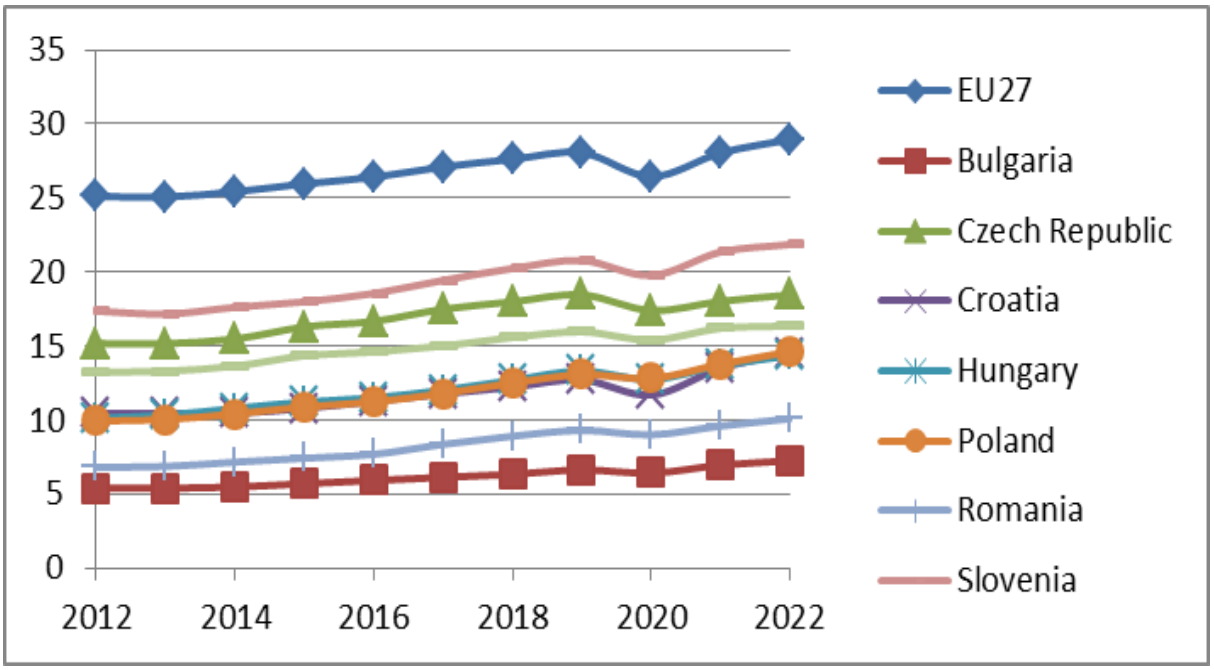

Figure 1: Real GDP per capita
(Source: EUROSTAT)

In the observed period, all analysed countries recorded growth in real GDP per capita (Figure 1). The exception is 2020, when as a result of the COVID-19 crisis; a slight decline in this indicator is recorded in all countries. All countries had a lower real GDP per capita compared to the EU27 average. This is not surprising, since the countries in the analysis are former transition countries and need more time to catch up with European countries that have been practising market economy for decades. Throughout the observed period, Slovenia and the Czech Republic had the highest real GDP per capita compared to other analysed countries. Romania and Bulgaria had the lowest real GDP per capita, while Croatia, Hungary and Poland have very similar indicators. Table 1 shows the share of the population aged 15 to 29 who are not employed and not in education or training (NEET). Improvement is evident in all analysed countries. At the EU27 level NEET rate fell from 16% in 2012 to 11.7% in 2022. Compared to the EU27 average, the Czech Republic, Hungary, Poland and Slovenia had a lower rate of young people who are not employed and not in education or training in 2022. Slovenia is the country with the lowest rate and has already achieved the goal stated in the “The European Pillar of Social Rights Action Plan", which aims to reduce the proportion of young people aged 15 to 29 who are not in employment, education or training (NEET) to less than 9% by 2030. Furthermore, it can be observed that in all countries, the share of the population aged 15 to 29 who are not employed and not in education or training is deteriorating (increased rate) in 2020, the year characterised by the Covid pandemic (the only exception is Romania, which had the highest NEET rate among all observed countries). This is in line with the findings of Erdal (2015) and Lambovska (2021) that the crises have a negative influence on youth employment.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
EU27	16,0	16,4	16,0	15,5	14,8	14,0	13,3	12,8	13,9	13,1	11,7
Bulgaria	24,7	25,8	24,0	22,2	22,4	18,9	18,2	16,7	18,2	17,6	15,1
Czech Republic	12,9	12,8	12,1	11,8	11,1	10,0	9,5	9,8	11,0	10,9	11,4
Croatia	19,7	22,3	21,8	19,9	19,5	17,9	15,6	14,2	14,6	14,9	13,3
Hungary	16,9	16,7	14,7	13,1	12,0	11,2	10,6	11,0	12,3	11,7	10,8
Poland	15,9	16,4	15,7	14,9	14,0	13,0	12,2	12,0	13,1	13,4	10,9
Romania	24,3	24,5	24,8	25,8	24,3	22,1	21,3	20,9	20,6	20,3	19,8
Slovenia	10,1	11,0	11,0	10,5	9,3	7,9	7,5	7,5	7,9	7,3	8,4
Slovakia	18,0	18,3	17,5	16,4	15,1	15,1	13,8	13,7	14,4	14,2	12,3

Table 1: Youth not in education, employment, or training (NEET)
(Source: EUROSTAT)

Figure 2 shows employment rates in all selected countries in the analysed period. The indicator measures the share of the employed population aged 20 to 64. Employed persons are defined as all persons who during the reference week worked at least one hour for salary or profit or were temporarily absent from that job.

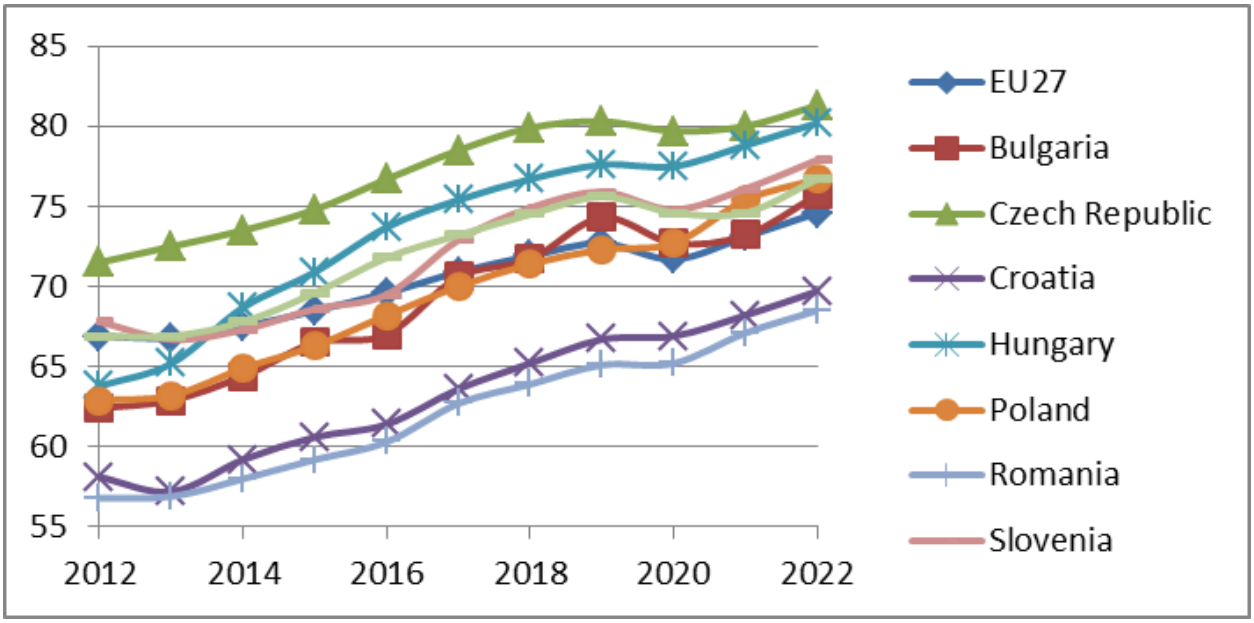

Figure 2: Employment rates in selected countries
(Source: EUROSTAT)

In all selected countries (Figure 2), including the EU27 average, a growth trend in employment rate is recorded. In the entire period, the Czech Republic had the highest employment rate, which in 2022 amounted 81.3%. The EU27 average for the same year was 74.6%, and the countries with an unemployment rate above this average were Bulgaria, Hungary, Poland, Slovenia and Slovakia. "The action plan for the implementation of the European Pillar of Social Rights" aims to increase the employment rate of persons aged 20 to 64 to at least 78%. In 2022, this level was exceeded by the Czech Republic (81.3%) and Hungary (80.2%). Romania and Croatia had the lowest employment rate in the entire observed period.

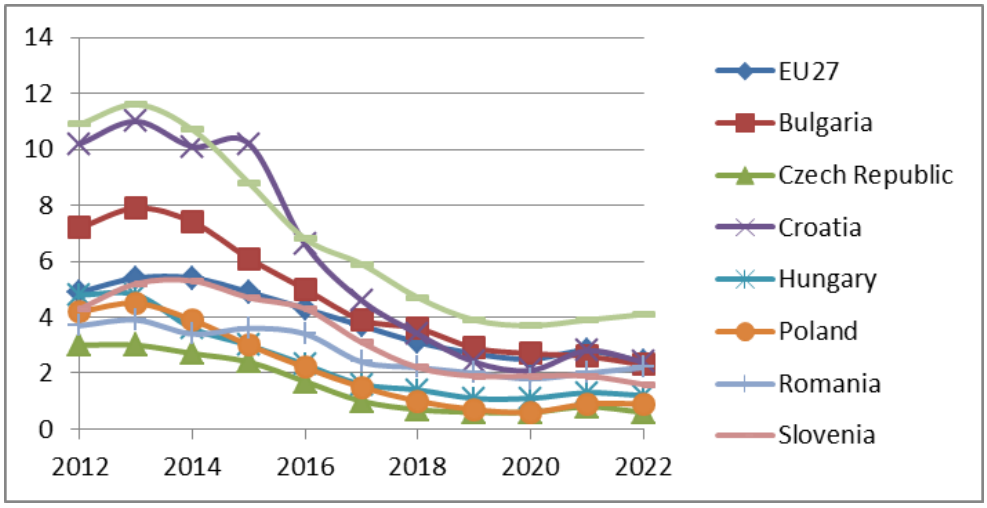

Figure 3: Long-term unemployment in selected countries
(Source: EUROSTAT)

Unemployment, especially long-term unemployment, has harmful economic and social consequences for the individual, and for the society as a whole. Figure 3 shows the rates of long-term unemployment. The indicator measures the share of the economically active population aged 15 to 74 who have been unemployed for 12 or more months. It is positive that in all observed countries the long-term unemployment rate decreased in the ten-year observed period. The Czech Republic had the lowest rate, which amounted to 0.8% in 2022. At the same time, the average long-term unemployment rate for the EU27 was 2.5%. In 2022 only Slovakia had a higher rate compared to the EU27 average.

	2012	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
EU27	*20,68*	*20,08*	*20,15*	*20,58*	*20,80*	*21,11*	*21,52*	*22,57*	*22,51*	*22,44*	*23,07*
Bulgaria	*21,26*	*21,21*	*21,08*	*21,01*	*18,57*	*18,52*	*:*	*:*	*:*	*:*	*:*
Czech Republic	*26,16*	*25,36*	*25,40*	*26,54*	*24,94*	*24,92*	*26,30*	*27,07*	*26,55*	*26,01*	*26,78*
Croatia	*19,31*	*19,38*	*19,00*	*19,27*	*19,75*	*19,65*	*20,06*	*21,29*	*22,23*	*20,73*	*:*
Hungary	*19,15*	*20,80*	*22,01*	*22,17*	*19,49*	*22,15*	*24,73*	*27,00*	*26,52*	*27,40*	*:*
Poland	*19,58*	*18,97*	*20,13*	*20,42*	*18,47*	*17,57*	*18,74*	*18,92*	*18,31*	*17,04*	*:*
Romania	*27,53*	*24,70*	*24,36*	*24,79*	*22,95*	*22,41*	*21,05*	*22,61*	*23,84*	*:*	*:*
Slovenia	*19,03*	*19,63*	*19,11*	*18,65*	*17,38*	*18,32*	*19,33*	*19,57*	*18,86*	*20,34*	*:*
Slovakia	*20,37*	*20,46*	*20,48*	*23,68*	*21,03*	*21,10*	*20,90*	*21,49*	*19,49*	*19,19*	*20,37*

Table 2: The share of investments in GDP)
(Source: EUROSTAT)

Since investments play one of the key roles in economic growth, the following table shows the share of investments in GDP for the analysed countries. This indicator shows investments for the entire economy. Table 2 shows that the trend for the EU27 average is slightly increasing in the observed period. The same applies to the Czech Republic, Croatia and Slovenia. Hungary had the largest increase in the share of investments in GDP; from 19.15% at the beginning of the observed period to 27.40% in 2021 (data for 2022 is not yet available for Hungary). The decline of this indicator in the observed period was recorded by Poland and Romania. Slovakia recorded a stable trend, with the exception of 2015, when this indicator had a slightly higher value. At the beginning of the observed period, Bulgaria recorded a downward trend, but data are not available for the period after 2017.

The following table (Table 3) summarises the findings for all observed countries in the analysed period. All analysed countries recorded a positive trend in GDP and employment, and a negative trend in NEET rate, and in the rate of long-term unemployment. Differences in trends exist only in the share of investments in GDP. While all observed countries recorded growth in this indicator, Bulgaria, Poland and Romania record a negative trend. The highest growth in real GDP per capita was recorded in Poland and Romania, and the lowest in the Czech Republic and Slovakia. However, it is positive that all observed countries have significantly higher growth compared to the EU27 average. Hungary, Bulgaria, Croatia and Slovakia have the largest decline in the rate of youth not in education, employment, or training (NEET), and the lowest have the Czech Republic, Slovenia and Romania. These countries also have a lower rate of decline in this indicator compared to the EU27 average.

	GDP	*NEETS*	*Employment*	*Long-term unemployment*	*Investments*
EU27	*13%↑*	*-27%↓*	*12%↑*	*-51%↓*	*12%↑*
Bulgaria	*29%↑*	*-32%↓*	*21%↑*	*-68%↓*	*-13%↓**
Czech Republic	*18%↑*	*-12%↓*	*14%↑*	*-80%↓*	*4%↑*
Croatia	*29%↑*	*-32%↓*	*20%↑*	*-76%↓*	*2%↑***
Hungary	*29%↑*	*-36%↓*	*26%↑*	*-75%↓*	*43%↑***
Poland	*32%↑*	*-31%↓*	*22%↑*	*79%↓*	*-13%↓***
Romania	*32%↑*	*-19%↓*	*21%↑*	*-41%↓*	*-13%↓****
Slovenia	*21%↑*	*-17%↓*	*15%↑*	*-63%↓*	*7%↑***
Slovakia	*19%↑*	*-32%↓*	*15%↑*	*-62%↓*	*No change*

Table 3: Trends of selected indicators from 2012 to 2022 for the analysed countries (Source: Author's calculation based on data from EUROSTAT)
**The rate for Bulgaria is calculated for the period 2012-2018 due to the lack of data for the following years*
***Rates for Croatia, Hungary, Poland and Slovenia are calculated for the period 2012-2021 due to the lack of data for 2022.*
**** The rate for Romania is calculated for the period 2012-2020 due to the lack of data for the following years*

The employment rate grew in all countries at a rate higher than the EU27 average (Table 3). The highest growth rates are recorded in Hungary and Poland, and the lowest in the Czech Republic, Slovenia and Slovakia. All observed countries were successful in reducing long-term unemployment, with the rate of decline of this indicator being higher than the EU27 average (51%). Only Romania has a lower rate of decline, which amounts 41%.

5. AVERAGE RANKING OF SELECTED CEECs

The mutual ranking of selected EU member states (Figure 4) is obtained by evaluating the average rank of individual countries by combining the four previously analysed indicators (GDP per capita, NEET rate, employment rate and long-term unemployment rate) in the following years:

- 2012 - the beginning of observed period,
- 2015 - for comparison with previous research ,
- 2019 - year before Covid-crises, and
- 2022 - the last year of the observed period.

From the data in Figure 4, the deterioration of the ranking of the EU27 during the observed period is immediately visible. Countries that are clearly ranked higher on an average basis are better than the European average, while countries ranked lower than the EU27 are challenged to reach at least the average level within the EU.

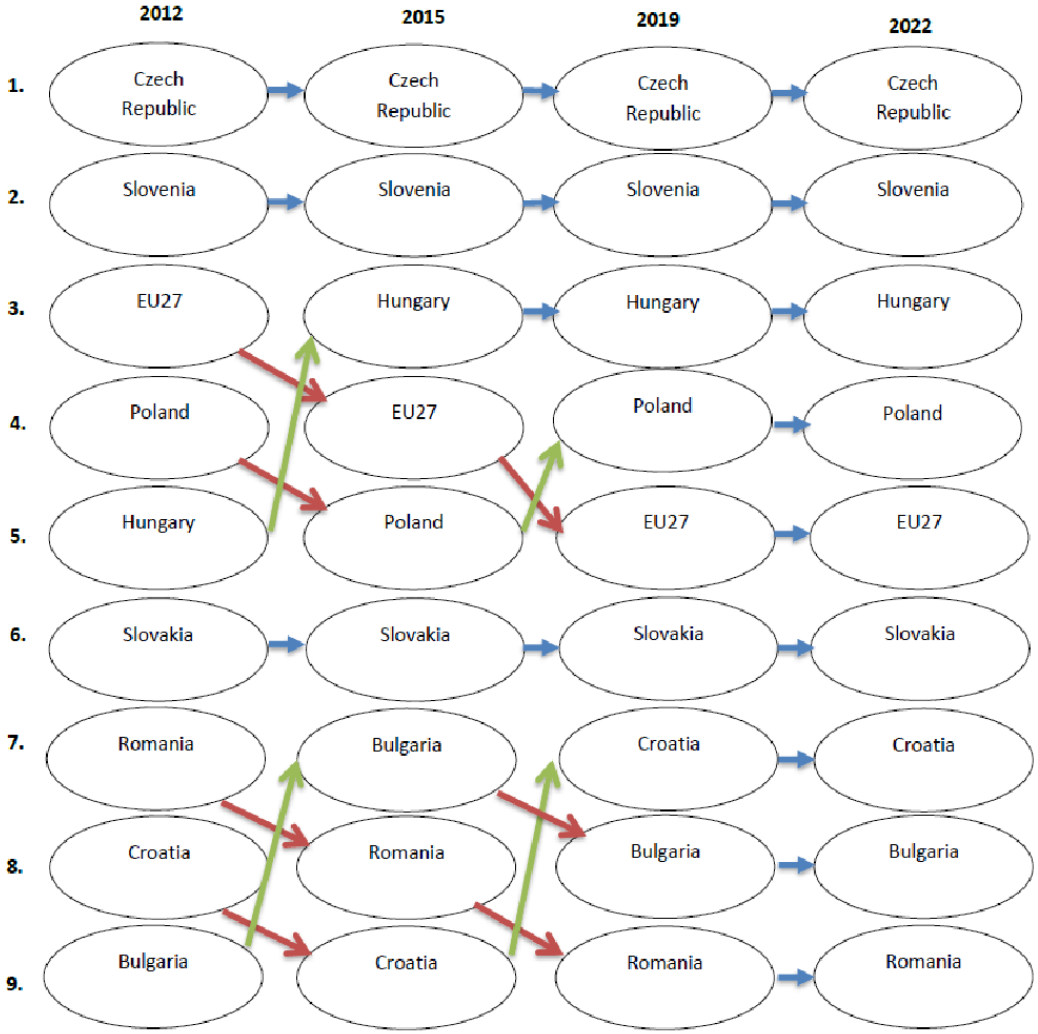

Figure 4: Mutual rank of selected countries
(Source: Author's calculations and presentation)

The Czech Republic is found to be the first in all four years, followed by Slovenia (2nd place) and Hungary (3rd place). The countries at the bottom are Romania and Bulgaria. It can also be noted that the ranking of individual countries did not change significantly over time. These findings are consistent with those of Carlsen (2021) who reports on partial rank-based analyses for 27 EU countries.

6. CONCLUSION

Decent work is based on the existence of an equal and inclusive work environment based on the principles of the right to work and freedom of work, gender equality, work without pressure and discrimination. Sustainable development and the labour market are closely related concepts that focus on sustainable development and employment opportunities for all people. Sustainable practices in the labour market can lead to job creation, promote social equality, encourage innovation and ensure long-term economic stability.

By integrating sustainability principles into economic and social policies, countries can work towards a more prosperous and just future. Sustainable economic growth and decent work are important for the development and success of European countries. The paper analyses the indicators that indicate whether the newer member states of the EU meet the preconditions for achieving the eighth UN goal of sustainable development. Based on the conducted analysis, it can be concluded that analysed countries have created the preconditions for achieving the eighth UN goal of sustainable development. In the observed period (from 2012 to 2022) all countries recorded higher growth rates in real GDP per capita compared to the EU27 average. This trend is in line with the eighth goal of sustainable development. Furthermore, strict measures introduced to prevent the spread of the COVID-19 pandemic in 2020 harmed economic growth as they led to an increase in youth unemployment and long-term unemployment and a decrease in employment rates and the share of investments in GDP. However, in 2021 trends in the labour market are improving. During the whole analysed period, mutual ranking of analysed countries is relatively stable. Findings of this research may have several implications for administrative bodies and policy makers in EU governments. When the indicators related to the eighth goal of sustainable development are lower, it is necessary to change the management model and establish cooperation with other countries in order to implement policies that will improve their relative position within the EU. However, it should be emphasised that programs and policies should be adapted to the particular needs and features of each region, because it is difficult to expect that a single approach will guarantee success for all.

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MODERN BANKING REGULATIONS REGARDING CLIMATE RISKS

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ABSTRACT
Climate change is one of the main challenges the world is facing today. As climate-related risks represent sources of financial risks, central banks and supervisors are obliged to ensure the resilience of financial systems to these risks. In order to assess their impact, stress tests were conducted by individual central banks, and the results indicate that the mentioned risks have a significant impact on financial stability. The aim of this paper is to show the importance of environmental and climate risks for the financial stability, as well as to provide an overview of the banking sector regulation in order to mitigate and better manage financial risks associated with climate change.
Keywords: *climate risks, financial stability, scenario analysis, stress tests, NGFS, Basel Committee on Banking Supervision, ECB*

1. INTRODUCTION

Climate change bears certain risks for the ecosystem and everyday life. Consequences of climate changes are more frequent floods, droughts, rising sea levels, etc., which lead to the extinction or change of the habitat of certain animal species and the migration of the population. In 2015, two important regulations were adopted – Paris Agreement and United Nations' Agenda 2030, which should contribute to limiting global warming. The impact of climate change on the economy is not negligible. Weather conditions directly affect food and energy prices. For example, in conditions of severe droughts, the prices of primary products, fruits and vegetables increase, due to limited supply. Subsequently, an increase in demand is also possible due to the people's need to stockpile products in conditions of shortage. There may also be an increased use of air conditioning, thus increasing the demand for energy, its price, and the cost of living. This, further, leads to a higher inflation. Consequently, frequent variations in supply and demand for food and energy would lead to volatile inflationary expectations, which makes it difficult for central banks to fulfil their (most common) primary goal – maintaining price stability. Climate change represents a risk for households and companies, and, therefore, for the financial system. Climate-related risks are manifested through extreme weather events and gradual climate change (physical risks) or through changes in certain regulations and policies to transition to a low-carbon economy (transition risks). These risks have an impact on the financial risks (credit risk, market risk, operational risk, liquidity risk). They could lead to an increase in credit risk if some of the drivers of these risks reduce debtor's ability to repay his debt (because of reduced income, loss of asset value, etc.) or to an increase in operational risk if the bank is unable to fulfill the clients' requests on time due to a climate disaster. Climate-related risks could also lead to a decrease in the value of financial assets, with sudden and significant decreases possible if these risks are not incorporated into the price of these assets. Also, the liquidity of certain financial instruments may decrease, and thus the banks' access to financing sources (Basel Committee on Banking Supervision, 2021). In 2017 the Network of central banks and supervisors for greening the financial system (NGFS) was launched with aim to give direct or indirect contribution to the greening of the financial system and to its stability. NGFS members agree that "climate-related risks are a source of financial risk. It is therefore within the mandates of central banks and supervisors to ensure the financial system is resilient to these risks" (Network for Greening the Financial System, 2019).

However, there is no consensus on the extent to which these risks should be covered by existing operational frameworks, and whether central banks are expected to play a supporting role in promoting green finance (Dikau & Volz, 2021). The main central banks' goals are low and stable inflation and maintaining financial stability. How far will central banks go in greening the financial systems depend on their mandates. The focus of this article is on banking regulations and it is organized as follows. The second chapter is dedicated to the conduction of scenario analyses and stress tests and Basel standard. The third chapter describes Principles for responsible banking and Net-zero banking alliance, which should contribute to the achievement of the Paris Agreement goals. The fourth part refers to the European Union regulation and the fifth to the regulation in China. Last chapter concludes.

2. CONDUCTING SCENARIO ANALYSES AND STRESS TESTS ON FINANCIAL INSTITUTIONS

As climate-related financial risks affect price and financial stability, it is necessary for central banks and supervisors to improve their frameworks for assessing climate risks. The main tools for these assessments are the scenario analyses and stress tests (macroprudential and microprudential). In this regard, the NGFS in it's *First Comprehensive Report* recommends that regulators assess the climate-related financial risks in the financial system and integrate them into prudential supervision (Network for Greening the Financial System, 2019). To assess the financial system stability, the scenario analyses are being used. The NGFS points out that it is important to answer two questions when assessing the impact of physical and transition risks:

- how many actions have been taken to reduce the greenhouse gases emission and
- how smoothly and predictably those actions are undertaken (i.e. whether the transition takes place in an orderly manner or not) (Network for Greening the Financial System, 2019).

Although there is a great uncertainty about how climate change will manifest itself, when, and what its primary and secondary effects will be, the NGFS has highlighted four scenarios that would cover the answers to both questions, as shown in Figure 1:

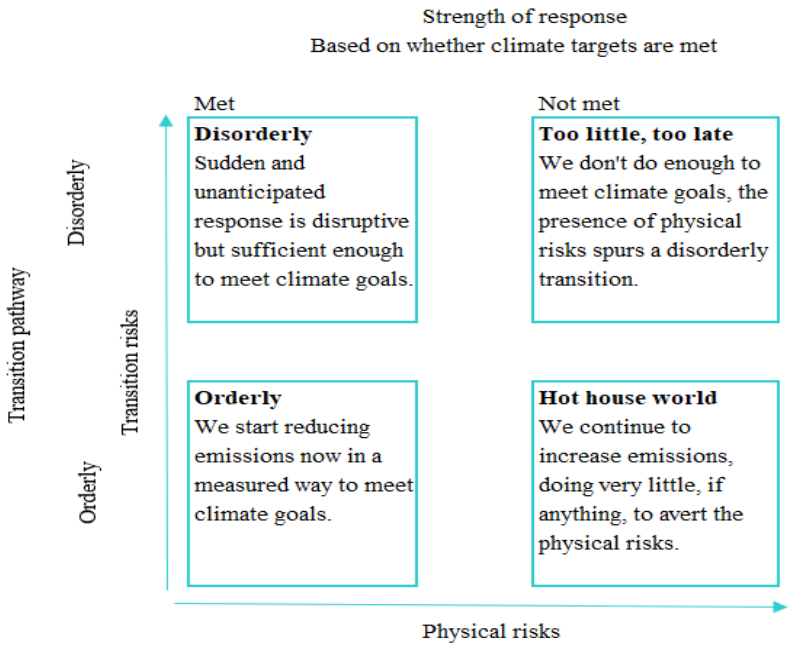

Figure 1: Designing a scenario analysis framework for central banks and supervisors (Source: Network for Greening the Financial System (2019), First Comprehensive Report, A call for action: Climate change as a source of financial risk)

Figure 1 shows the implications of physical and transition risks and how, by not taking appropriate actions, these risks grow. The upper two squares, where transition risks are high, show the scenarios that central banks and supervisors may encounter in short term (considering that the transition period lasts a long time and that this type of risk is greater at the beginning of the transition), while the bottom two squares represent scenarios that may occur in the long term. For the assessment of financial system stability, it is important to assess climate-related financial risks and include them in prudential supervision. The NGFS recommends that it could be done through rising awareness and sharing knowledge, assessing climate-related risks, setting supervisory expectations, promoting transparency to improve market discipline and mitigating climate-related risks through financial resources (Network for Greening the Financial System, 2019). Including climate-related risks when conducting stress tests would help reduce this type of risk and maintain financial stability. The European Central Bank (ECB), Bank of England, Bank of Japan and People's Bank of China (PBoC) are among the major central banks that conducted climate stress tests in accordance with the recommendations of the NGFS. They used three scenarios: one refers to an early action (which enables the achievement of the Paris agreement goals), the second one refers to a later action (which also enables achievement of Paris agreement goals) and the third one refers to not taking action. Results indicate that climate-related risks have significant impact on financial stability, benefits are greater and credit risks and credit losses are smaller in case of an early action. The ECB estimate that in the case of late-push transition, banks are exposed to a higher credit risk (by more than 100% in 2030 compared to 2022) compared to the scenario of the accelerated transition (credit risk increases by 60% in the observed period), while in the case of delayed transition costs and risks are higher in the long term (Emambakhsh et. al, 2023). The Bank of England estimate that mortgages will have a significant loss in the second and especially in the third scenario, due to "rising unemployment together with falling house prices and the general macroeconomic downturn" (Bank of England, 2022a). The Bank of Japan came to the conclusion that "banks' estimated increase in annual credit costs due to transition and physical risks was considerably lower than their average annual net income" (Financial Services Agency & Bank of Japan, 2022). The results of the stress test conducted by People's Bank of China show that companies operating in sectors that rely heavily on coal will have a lower repayment capacity and will face the possibility of default (Caswell, 2022). However, the main challenge in assessing climate-related risks is the lack of data. To overcome these problems, it is recommended to have a common and consistent set of global standards on information disclosure, the existence of global taxonomy and well-defined metrics, certification marks and methodological standards (Network for Greening the Financial System, 2022). Financial Stability Board (FSB), which strives to strengthen international financial stability through the development of strong regulatory, supervisory and other financial sector policies (Financial Stability Board, 2020), established the Task Force on Climate-related Financial Disclosures (TCFD) in 2015. This Task Force developed a set of recommendations that companies would follow when voluntarily disclosing climate-related financial risks. These recommendations became widely used in private sector reporting on climate-related risks, and the tendency is for such disclosures to become mandatory (which is the case in the European Union). However, from 2024, at the request of the FSB, the International Sustainability Standards Board (ISSR), which International Financial Reporting Standards Foundation established, will take responsibility for monitoring climate-related disclosures of companies (International Financial Reporting Standards, n.d.a).

2.1. The Basel standard and climate-related risks

The financial sector is giving more importance to climate-related risks, and one of the main issues concerns the existing Basel framework, which represents the global standard for prudential regulation of banks. The existing Basel III framework consists of three pillars: the first one relates to the calculation of capital adequacy for credit, market and operational risk, the second one to supervision, and the third one to bank disclosures. However, this framework has often been "criticized for not explicitly addressing the financial stability risks associated with systemic environmental risks" (Thompson, 2021). The existence of these risks led the Basel Committee on Banking Supervision to form the Task Force on Climate-Related Financial Risks (TFCR) in 2020. In the same year the results of the stocktake of member jurisdictions' existing regulatory and supervisory initiatives on climate-related financial risks were published (Basel Committee on Banking Supervision, 2022a). This was followed by two more documents, which were published the following year: *Climate-related risk drivers and their transmission channels* and *Climate-related financial risks – measurement methodologies* (Basel Committee on Banking Supervision, 2022a). Responding to criticism, the Basel Committee on Banking Supervision emphasized that "while the *Core principles for effective banking supervision* (BCPs) and the supervisory review process (SRP) are sufficiently broad and flexible to accommodate additional supervisory responses to climate-related financial risks", the publication of climate-related risk guidelines could be useful for both supervisors and banks (Basel Committee on Banking Supervision, 2022a). For this reason, *The Principles for the effective management and supervision of climate-related financial risks* were published in 2022, as well as answers to frequently asked questions related to these risks (Basel Committee on Banking Supervision, 2022b). A total of 18 principles were published: the first 12 relate to the effective management of these risks and are primarily intended for large internationally active banks, and the remaining six are guides for prudential supervisors. In short, these Principles imply (Basel Committee on Banking Supervision, 2022a):

- the development and implementation of processes for understanding and assessing the impact of risk drivers,
- the delegation of responsibilities and tasks through the organizational structure for the purpose of supervision,
- the adoption of appropriate policies, procedures and control systems,
- the inclusion of these risks in internal control systems,
- that banks should include risks that are assessed as material in their internal assessments of capital adequacy,
- identifying, monitoring and managing climate-related financial risks,
- internal reporting,
- understanding the impact of risk drivers on credit, market, operational and liquidity risk,
- conducting scenario analysis,
- that climate-related financial risks should be in banks' business strategies, their corporate governance and control systems,
- that supervisors should determine whether banks are able to identify, monitor and manage these risks and to what extent,
- that supervisors should require that banks apply climate scenario analyses, where appropriate,
- that supervisors should adopt adequate measures and have the capacity to measure compliance of banks' risk management with their expectations,
- that supervisors should consider conduction of scenario analyses and stress tests and disclose the results.

3. PRINCIPLES FOR RESPONSIBLE BANKING AND THE NET-ZERO BANKING ALLIANCE

In order to fulfill the Paris Agreement goals and the Sustainable Development Goals, the Financial Initiative of the United Nations Environment Program together with thirty banks formed the Principles for Responsible Banking in 2019, the most important sustainable banking framework in the world (United Nations Environment Program Finance Initiative, n.d.b). The number of signatory banks is continuously growing and there are currently 342 of them (United Nations Environment Program Finance Initiative, n.d.d). The signatories are obliged to incorporate the following six principles into their operations (United Nations Environment Program Finance Initiative, n.d.a):

- harmonizing of the business strategy with the Paris Agreement goals and Agenda 2030,
- contributing to increasing positive and reducing negative impact on people and the environment, through its products and services,
- encouraging clients to undertake sustainable activities,
- consulting with stakeholders in order to achieve goals,
- management and culture should be in accordance with responsible banking,
- periodic review of the implementation of the Principles and disclosure of created impacts.

The United Nations established the Glasgow Financial Alliance for Net-Zero in 2021. Aim of this Alliance is to ensure a larger number of financial institutions that commit to net-zero emissions (Glasgow Financial Alliance for Net-Zero, n.d.a). Within this Alliance there is the sector-specific Net-Zero Banking Alliance (NZBA), which currently has 142 members (United Nations Environment Programme Finance Initiative, n.d.c). When entering the Alliance, banks commit to (United Nations Environment Programme Finance Initiative, n.d.e):

- reduction of greenhouse gas emissions resulting from their business activities, in order to achieve net-zero emissions in 2050,
- setting medium- and long-term goals (for 2030, 2050 and transition years between these two) within 18 months of entering the NZBA,
- the first goal will refer to the sectors with the highest emissions of greenhouse gases that are in the bank's portfolio,
- annual disclosure on its impact on the climate and society,
- strong approach in transition plans.

4. EUROPEAN UNION REGULATION

4.1. Supervisor expectations

Europe aspires to become the first climate-neutral continent by 2050 and European Union committed itself to this through European Green Deal. This agreement also has a transitional goal - to reduce greenhouse gas emissions by at least 55% compared to 1990 by 2030 (European Commission, 2019). For this reason, numerous regulations have been amended or new ones have been adopted, the European Union Taxonomy has been created (which should help in understanding which projects can be considered as green ones), the Regulation on the European green bond standard has been proposed (which should help investors and issuers of these bonds to channel funds towards sustainable activities), etc. In accordance with this, the ECB has begun to consider how it can help in achieving environmental and climate goals, and has taken certain steps, such as the revision of the monetary policy strategy, the adoption of the Action Plan, the implementation of stress tests, etc. Nevertheless, the ECB also has certain expectations regarding climate and environmental risks from banks operating in the Eurozone. The ECB, together with national authorities, prepared and published *Guidelines on climate-related and environmental risks* in November 2020, which relate to supervisors' expectations on risk management and banks' disclosures.

This document invites banks to consider the aforementioned risks, since they are drivers of credit, market, operational and liquidity risks (European Central Bank, 2020). These expectations are compatible with the Basel Committee on Banking Supervision's Principles (European Central Bank, 2020):

- banks should understand the impact of climate and environmental risks on their business environment,
- banks are expected to incorporate these risks into their business strategy, to consider them when formulating business goals and risk management frameworks, as well as to supervise these risks,
- these risks should be considered when assessing risk appetite,
- responsibility is expected to be delegated within the organizational structure for monitoring these risks and for management to be informed of aggregated risk-related data so that appropriate decisions can be made,
- climate and environmental risks are drivers of credit, operational, reputational, market and liquidity risks, and their impact should be considered, managed, monitored and mitigated,
- institutions with material climate and environmental risks are expected to assess the appropriateness of the stress tests they carry out,
- banks should disclose important information regarding these risks.

In 2021, the European Commission adopted new rules with the aim of strengthening the banking sector. The rules refer to the implementation of Basel III, the strengthening of supervision as well as banks' obligation to identify, manage and disclose environmental, social and governance (ESG) risks, whereby both supervisors and commercial banks are obliged to conduct stress tests (European Commission, 2021). The ECB also published good practices, which were observed at 25 different institutions in order to (together with the Guidelines) make it easier for banks to improve the management of the mentioned risks (European Central Bank, 2022a). It also set a deadline for banks to comply with its expectations by 2024 (European Central Bank, 2022b).

4.2. Non-financial sector sustainability reporting

The non-financial sector, especially the economy, plays a key role in fighting climate change. It has the greatest influence on the level of global warming. Consequently, these effects are also reflected in the financial and macroeconomic stability of a country. From the perspective of the ECB, the non-financial sector disclosures are important both for the financial stability (in the sense that the transition to a low-carbon economy entails lower physical and, gradually, transitional risks) and for price stability. Therefore, the ECB has adopted an Action Plan to integrate climate issues into the monetary policy strategy, including asset purchase framework (where part relates to corporate bonds) and a collateral framework. In order to encourage companies to switch to a circular type of production, but also to make it easier for commercial banks to make a decision whether and under what conditions to grant a loan to a client (taking into account climate and environmental risks), the European Commission has adopted Corporate Sustainability Reporting Directive (CSRD), which implies that all large and all companies listed on the stock exchanges (except micro-enterprises) start disclosing information on business sustainability in accordance with the European Sustainability Reporting Standards (ESRS) from 2025 (for the fiscal year of 2024) (Directive 2022/2464). The ESRS were adopted in July 2023 by the European Commission and are aligned with the TCFD guidelines (European Commission, 2023).

5. REGULATION IN CHINA

As one of the highest polluting countries in the world, China has a goal to become a carbon neutral country by 2060 (International Energy Agency, 2021). Therefore, China has enacted numerous regulations that would contribute to the fulfillment of this goal. Special attention is drawn to the regulations adopted with the aim of greening the financial system. In order to develop the green bond market and reduce the possibility of greenwashing, *Green Bond Endorsed Project Catalogue* and *Chinese Green Bond Principles* were issued. Besides that, China encourages green capital flows through its policies. For example, the People's Bank of China introduced two monetary policy instruments in 2021: carbon emission reduction facility and special central bank lending targeted for the clean and efficient coal use, where central bank gives loans to commercial banks at a low interest rate in order to channel those funds toward green activities (People's Bank of China, 2022). In 2021, PBoC issued *Guidelines on Environmental Information Disclosure for Financial Institutions,* where it requires from banks to disclose environmental information at least once a year (People's Bank of China, 2021).

6. CONCLUSION

The importance of climate change for the financial sector is reflected through monetary and financial stability. Namely, weather disasters have an impact on key macroeconomic variables both in the short and long term, thus affecting the prices of food, energy, gross domestic product, (un)employment, etc. In this way, as a consequence of climate risks, high inflation occurs, which comes from the supply side indicating that climate risks pose a threat to the adequate implementation of monetary policy. Climate-related risks are also drivers of credit, market, operational and liquidity risks. Thus, for example, debtors may not be able to repay their debt to the bank due to destroyed facilities, the inability to sell products, banks may face cash outflows after an environmental disaster, the inability to meet client demands, etc. Therefore, it is important to assess climate-related financial risks and include them in prudential supervision. Climate issues led to the establishment of the Network for greening the financial system, with aim of connecting central banks and supervisors to exchange ideas and best practices in order to ensure financial stability and achieve the Paris Agreement goals. The Basel Committee on Banking Supervision published *The Principles for the effective management and supervision of climate-related financial risks*, and the ECB *Guidelines on climate-related and environmental risks*, which should contribute to banks taking these risks into account when formulating their business strategy, decision-making, assessment of exposure and appetite for risk, to identify, monitor, manage and mitigate them with the aim of preserving financial stability. Leading central banks, such as the ECB, the Bank of England, the Bank of Japan, the People's Bank of China, have conducted stress tests, in accordance with the scenarios proposed by the NGFS, and the results indicate that climate risks have a significant impact on financial stability. However, we are still in the initial stages of managing climate-related financial risks, and the main challenges still lie in quantifying the negative consequences of these risks, defining "green" activities, the lack of data and the creation of scenario analyses. There is also a dilemma whether, when assessing capital adequacy, different weights should be used depending on whether placements are "green" or not. It seems that, for now, the best option is to wait for more information and creation of global taxonomy. Nevertheless, banks should start directing their operations towards environmentally friendly activities (the Principles for Responsible Banking, the Net-Zero Banking Alliance and the Glasgow Financial Alliance for Net-zero should contribute to that) and further work on the improvement of data collection and the formation of certain models should solve this dilemma as well.

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AUGMENTED REALITY EXPERIENTIAL MARKETING IN TOURISM: LITERATURE REVIEW, CONCEPTUALIZATION, KEY DIMENSIONS AND FUTURE RESEARCH DIRECTIONS

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ABSTRACT

This paper aims to introduce the concept of augmented reality experiential marketing in tourism in the phase of a tourist's stay at a destination. The paper aims to explore how the tourism experience, augmented reality, and experiential marketing can be conceptualized based on previous research and to identify future research directions in this research area. This paper presents a systematic literature review using predetermined keywords in the Web of Science, Scopus, ScienceDirect, and DOAJ scientific databases. It considers the most significant research published in this field from 2010 to the present. Three elements have gained attention in recent research: experiential marketing, augmented reality, and the use of augmented reality in tourism. This paper uses the experiential marketing concept created by Schmitt (1999, 2010) and places augmented reality in the role of experience provider, resulting in a conceptualization of augmented reality experiential marketing in tourism. The paper offers new insights into the topic by creating a concept of augmented reality experiential marketing in tourism. It highlights the importance of using technology in creating a tourism experience.
Keywords: *augmented reality, experience, experiential marketing, technology, tourism*

1. INTRODUCTION

Tourism is undoubtedly one of the first examples of experience economy in action (Quan & Wang, 2004). Tourism can be considered a process of delivering positive experiences to tourists (Tung & Ritchie, 2011), with tourists visiting a destination to satisfy their needs and desires for experiences (Prebensen et al., 2013). Given the strong focus of tourism destinations on competitiveness (Goffi, 2013; Matošević Radić et al., 2021), no destination should neglect the need to create tourist experiences. Creating experiences, especially in tourism and marketing, is getting attention among researchers (Cisternino et al., 2021; Hincapié et al., 2021; Jiang et al., 2022). As the technology (namely augmented reality-AR) emphasizes the potential of immersion, interaction, and interpretation (Litvak & Kuflik, 2020), it represents an excellent tool for creating virtual content and implementing it into the current reality of tourists, thus adding value to the current tourist offering in a specific destination. Hence, the tourism industry is highly suited to using augmented reality to improve tourist experiences through experiential marketing.

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Research has shown that new technologies can help persuade consumers, as innovative consumers are willing to try them out because they are new, unique, and different, allowing them to explore products from multiple perspectives and increasing their utility (Yim & Chu, 2012). Consequently, new technologies can create the experiences tourists want and offer new opportunities for creating tourism products (Neuhofer et al., 2014). Destinations need to embrace and invest in technologies that will enrich the tourism experience and generate revenue, which are the most important results of augmented reality implementation (tom Dieck & Jung, 2018). Augmented reality provides stimulating and enjoyable experiences such as fun, inspiration, surprise (Olsson et al., 2013), and personal innovation for users (Faqih, 2022). This has proven important in achieving augmented reality satisfaction (Jung et al., 2015). Technology has become a part of human activities; it affects pleasure and enhances tourists' experiences (Tussyadiah et al., 2017). Augmented user experience enhances customer satisfaction and purchase intent (Poushneh & Vasquez-Parraga, 2017). The benefits of augmented reality implementation are reflected in value-adding to the visitor experience and educational experience and enabling socializing and fun. Developing a destination's offering through augmented reality experiential marketing stimulates demand among specific target groups. One of the goals of experiential marketing is to stimulate consumption and create loyal consumers (Le et al., 2019; Schmitt, 1999; Smilansky, 2009). Experiential marketing occurs before actual consumption, continues during consumption or the experiential process, and creates an unforgettable after-consumption experience (Ebrahim et al., 2016). This paper aims to conceptualize augmented reality experiential marketing in tourism, mainly in the phase of tourist stay in a destination and its use in the experience creation process. Accordingly, the paper examines how the tourism experience, augmented reality, and experiential marketing could be conceptualized based on the literature and explores future research directions. This paper uses the experiential marketing concept created by Schmitt (1999, 2010) and places augmented reality in the role of experience provider, resulting in the conceptualization of augmented reality experiential marketing in tourism. The paper is structured as follows. First, the main theoretical background and a literature review are provided in the scope of tourism experience, experiential marketing, and the use of augmented reality in tourism. Second, key dimensions are proposed in a conceptual model, and finally, future research directions are offered.

2. THEORETICAL BACKGROUND

2.1. The tourism experience

A tourism experience can be defined as "the subjective evaluation of an individual and his experience (affective, cognitive, and behavioral) of an event related to his tourism activities that begin before (planning and preparing), during (in the destination) and after the trip (the memory)" (Tung & Ritchie, 2011, 1369). The tourism experience is a complex psychological process (Quinlan et al., 2010), complex and holistic (Park & Santos, 2017), and interactive in nature, while the interaction between tourists and the tourism system involved in creating the experience includes a pre-trip phase, the phase of their stay at the destination, and a post-trip phase (Larsen, 2007). The importance of an unforgettable experience is especially emphasized in tourism, and to create one, four aspects must be satisfied: affect, expectation, consequence, and memory (Tung & Ritchie, 2011). In addition to the unforgettable tourism experience, the authors also underline the importance of the creative tourism experience and the extraordinary tourism experience. A creative tourism experience occurs when consumers engage in activities using simple materials and imagination; the whole concept depends on the tourist as a creative co-creator of the experience (Richards & Wilson, 2006). An extraordinary tourism experience is triggered by unusual events characterized by high emotional intensity and experience (Arnould & Price, 1993).

The co-creation of experiences in tourism will add value to both the visitor and the visited while contributing to the specificity and authenticity of the destination (Binkhorst & Dekker, 2009). The co-creation of experiences in tourism can be accomplished before staying at the destination, at the destination, or after tourists return to their place of residence. The most significant tourism experiences are created at the destination, where tourists find themselves in a new environment, undertake activities, and interact with people, which affects the strength of their emotions and feelings, and acquire new knowledge (Campos et al., 2018; Jiang et al., 2022). When we talk about the tourism experience, we should also consider every dimension that makes a tourism experience. Various research papers mostly use the four realms of experiences, created by Pine & Gilmore (1998), as significant tourism experience dimensions: education (Oh et al., 2007; Kim, 2010; Mehmetoglu & Engen, 2011; Kim et al., 2012), entertainment (Oh et al., 2007; Mehmetoglu & Engen, 2011; Ali et al., 2014; Lee & Smith, 2015; Kastenholz et al., 2018), escapism (Oh et al., 2007; Mehmetoglu & Engen, 2011; Ali et al., 2014; Lee & Smith, 2015;;Kastenholz et al., 2018) and aesthetics (Oh et al., 2007; Mehmetoglu & Engen, 2011; Ali et al., 2014; Kastenholz et al., 2018). Other important tourism experience dimensions include hedonism (Kim et al., 2012; Kim & Ritchie, 2014; Tsai, 2016;; Lubbe et al., 2017; Lončarić et al., 2017), memory (Oh et al., 2007; Tung & Ritchie, 2011;; Ali et al., 2014; Kastenholz et al., 2018; Zatori et al., 2018), involvement (Prebensen et al., 2013; Kim & Ritchie, 2014); and local culture (Kim & Ritchie, 2014; Cetin & Bilgihan, 2016; Tsai, 2016). As the tourism experience is one of the outcomes of the experience economy, researchers in the field have been looking for theoretical foundations in this research area. Most authors ground their research in Pine & Gilmore's (1998) experience economy and have tested their conceptual models using the four dimensions (education, escapism, aesthetics, and entertainment) in tourism (Mehmetoglu & Engen, 2011; Chang & Lin, 2015; Song et al, 2015). Other authors observe the tourism experience concept through stages of the travel journey (Kirillova et al., 2017; Pawaskar & Goel, 2016). The phase of the tourist stay at a destination is where the experience creators can deliver the highest level of experience (Neuhofer et al., 2012); the ultimate goal is creating an unforgettable experience to which the tourist will return. It is important to emphasize that all stages of the travel journey are equally important for creating an experience, and each stage requires a different approach and the use of tools that will be adapted to each tourist individually. In addition, the competitiveness of tourist destinations has driven the situation to the point where they should identify the destination dimensions that will create new experiences or enhance existing ones.

2.2. Experiential marketing

The development of experiential marketing has been influenced by the development of new technologies (Knutson & Beck, 2004) and their omnipresence (Schmitt, 1999; Smilansky, 2009), the omnipresence of communications and entertainment (Schmitt, 1999), more demanding consumers and increasing competition (Knutson & Beck, 2004), noise in communication channels, and the loss of importance of traditional communication channels (Smilansky, 2009). So today, what was long labeled as "non-traditional" marketing has become the new traditional, experiential marketing (Smith & Hanover, 2016). Unlike traditional marketing, experiential marketing focuses on experience rather than functional product benefits; it focuses on consumers driven by rational choices and emotions who want to be entertained, stimulated, emotionally touched, and creatively challenged (Schmitt, 1999). Experiential marketing is based on the fact that value is found not only in the object of the purchase (products and services) and its utilitarian and functional benefits but also in the hedonistic and experiential elements surrounding the products and services and the consumption experience itself (Zarantonello & Schmitt, 2013).

Same (2012) defines experiential marketing as a marketing tool focused on the tactical and operational level, where the main task is to develop and execute marketing campaigns. Experiential marketing is a business storytelling that requires a very high level of consumer involvement (Smith & Hanover, 2016). Although its implementation may seem simple, combining the brand message, interactive elements, and the target group and delivering them to the market to create a consumer-friendly experience is considered both an art and a science (Smith & Hanover, 2016). According to Batat (2021), experiential marketing is a tool that integrates the 7Es (experience, exchange, extension, emphasis, empathy capital, emotional touchpoints, and the emic/etic process). Experiential marketing campaigns are always created around one central idea involving real-time two-way communication between products/services and the target group (Smilansky, 2009). Schmitt (1999) is the first author to define experiential marketing as an integrated methodology that constantly engages the target group throughout the communication process and adds some value to products and services. In addition to Schmitt, other authors have developed their own concept of experiential marketing, like Yuan and Wu (2008), who consider it a tactic; Smilansky (2009) as a concept of Better + Idea + Set message; You-Ming (2010) as a method of communication; Muthiah (2013) as a tool; Smith and Hanover (2013) created the concept of the experience quadrants, while Batat (2021) as a tool that integrates the 7Es (experience, exchange, extension, emphasis, empathy capital, emotional touchpoints, and the emic/etic process). The most important advantage of creating experiential marketing is that consumers are willing to spend more on products or events that will give them new experiences. Consequently, they will gladly return to them (Schmitt, 2010). This has a positive effect on consumption and supply. However, Schmitt et al. (2015) reached a new conclusion that living a good life in a consumerism society does not lie in the distinction between owning material things and experiences. According to Smith & Hanover (2016), other advantages of experiential marketing are that it enables brands to spend more time with their stakeholders, requires less time to inspire action, and leads to longer relationships and advocacy that pay off over time. Adopting experiential marketing requires a new way of thinking about marketing, and companies that have shifted from traditional marketing to experiential marketing have come to realize that the benefits outweigh the painful transition process. It results in much stronger marketing, more engaged consumers, and greater returns on marketing investment (Smith & Hanover, 2016). Experiential marketing also enriches the company's offerings and engages customers in strong, long-lasting, happiness-inducing relationships (Batat, 2019).

2.3. Augmented reality and tourism

The augmented reality concept can be defined as an artificial environment that complements the real environment with virtual elements but allows the user to see the real world (Azuma, 1997, 2). In this sense, augmented reality creates interactive systems that complement the real-world elements with the help of supporting devices, which create layers with different types of processed data (mobile devices, special helmets, monitoring systems, visual display systems, etc.) (PB Works, 2014). The most used definition of augmented reality describes it as a digital layer of the unreal and real world that consists of computer graphics, text, video, and audio, which are interactive in real time (Papagiannis, 2017, 3). The most important features of augmented reality include interactivity, the presence of virtual reality elements, determination of geolocation, mobility, synchronization of virtual and real (Javornik, 2016), and context of experience transformation and personalized content (Papagiannis, 2017). Augmented reality affects all human senses; it is not limited to the sense of sight but includes hearing and touch (Azuma, 1997). Over time, augmented reality has become more than a technology. It is considered to be how people want to live with technology in the real world and how experiences can be created, especially those that are meaningful and help society to evolve (Papagiannis,

2017). Rapid advancements in software and hardware and significant investments in current technology have made the application of augmented reality readily accessible to different industries, with growing attention within the tourism industry (Bec et al., 2019). Tourism underwent a significant technological transformation in the 1980s when information and communication technologies (ICT) began to have a global impact. Technologies are no longer only related to functional devices used in everyday life but have become integral tools for creating modern experiences (Gretzel & Jamal, 2009). The creation of experiences in tourism has especially benefited from the integration of technology. New technologies have revolutionized the tourist experience (Jiang et al., 2022), enabled the development of new types of tourism activities that can transform traditional (conventional) experiences and result in the creation of new types of tourism experiences (Gretzel & Jamal, 2009; Neuhofer et al., 2014), such as experiences that use virtual reality, augmented reality, or other technologies (Bec et al., 2019; Lacka, 2020; Tsai, 2020). Augmented reality can overcome physical barriers and facilitate accessible tourism for all visitors (Trunfio et al., 2020). Accordingly, technological development has enabled the creation of different levels of experience. The most valuable experiences are created at the highest level of the experience hierarchy, using interactive and immersive technology solutions that allow tourists the highest level of involvement, active participation, and value co-creation through all stages of the tourist journey (Neuhofer et al., 2014). In recent times, augmented reality has attracted much attention from tourism professionals because it expands and enriches the tourists' reality and environment. Augmented reality has so far proven to be a technology that can provide tourists with much more personalized content and services that are tailored to their specific needs (Kounavis et al., 2012) and knowledge gain about the destination (Lacka, 2020), especially during their stay in a destination. During this phase of travel, augmented reality has proven to be a significant provider of experience, as it can enhance the memorability of the tourist experience (Jiang et al., 2022), which has a positive effect on tourist satisfaction and tourist loyalty (Kos Kavran, 2020) and subsequently trigger visit intentions (Lacka, 2020). Augmented reality enables the creation of immersive experiences that relate positively to destination satisfaction (Tsai, 2020). A better tourist experience is by using augmented reality; they will more often extend their stay, resulting in a better reputation for the destination, helping expand the target market and use of local infrastructure, and attracting investment (Cranmer et al., 2018). Although the value of the destination may not necessarily be financial, organizations need to embrace and invest in technologies that will enrich the tourism experience and generate revenue, which is the most important outcome of augmented reality implementation (tom Dieck & Jung, 2018). In addition, it can affect the arrival of tourists to a destination by lengthening the post-season and attracting tourists to a particular destination (Kos Kavran et al., 2016).

2.4. Augmented Reality Experiential Marketing

Augmented reality is used in experiential marketing campaigns because it focuses on the product/service and the whole consumer-created experience (Schmitt, 1999). Augmented Reality Experiential Marketing (AREM) combines augmented reality and experiential marketing. It is defined as a strategy that uses computer-generated virtual content as a new information measure to enhance personalized marketing content by acting on all five consumer senses and their experiences (Dadwal & Hassan, 2015, 8). AREM is a form of digital marketing, given that it is the result of technological advances in wireless technology and the diffusion of sensors, mobile technologies, and computer graphics (Dadwal & Hassan, 2015), whose objective is to use augmented reality to create interactive, rich and meaningful experiences and to engage consumers (Vong, 2014). Consequently, experiential marketing can be defined as a form of a relationship between reality and computer-generated simulations, thereby enriching consumer experiences (Dadwal & Hassan, 2015).

The advantages of AREM include content personalization, and the element of surprise and fun (Smith, 2010). AREM also allows consumers to access different information in the customer buying decision process. AREM can influence consumers' perceptions in the problem recognition phase; it can help the learning process in the information search phase, affect learning, motivation, and attitudes in the phase of evaluation of alternatives, and reduce uncertainty in products and services in the phase of post-purchase evaluation (Dadwal & Hassan, 2015). The disadvantages of AREM include user privacy, unwanted advertising, impact on the consumer body, and use of spam messages (Horská et al., 2017).

3. METHODOLOGY

An extensive and systematic literature review was executed, employing a set of predetermined keywords: "tourism experience", "augmented reality", "augmented reality in tourism", and "experiential marketing". This review included four major scientific databases: Web of Science, Scopus, ScienceDirect, and DOAJ. The initial phase of the research focused on identifying relevant academic publications, including journals, book chapters, and conference proceedings from business disciplines and subject terms marketing and tourism. This phase was confined to materials published from January 2010 to February 2022. The subsequent phase entailed a screening process, wherein only those papers that explicitly featured the predetermined keywords within their titles and/or keyword lists were selected for further analysis. The review was also limited to papers published in English. Additionally, any papers that diverged from the focus on marketing and tourism were systematically excluded, ensuring the review's thematic coherence and relevance. The initial database research resulted in the number of papers presented in Table 1.

Database/Keyword	Tourism experience	Augmented reality	Augmented reality in tourism	Experiential marketing
Web of Science	5448	383	33	924
Scopus	3918	834	184	2783
ScienceDirect	12978	3608	866	4605
DOAJ	544	51	16	126

Table 1: Database research results
(Source: authors)

4. CONCEPTUALIZATION OF AUGMENTED REALITY EXPERIENTIAL MARKETING IN TOURISM (AREMT)

New technologies can help persuade tourists, and innovative tourists are willing to try them because they are new, unique, and different. This allows them to explore products from multiple perspectives, which increases their benefit (Yim & Chu, 2012). Consequently, new technologies can create the experiences tourists want and provide new opportunities for creating tourist products (Neuhofer et al., 2014). Schmitt's (1999) experiential marketing consists of two concepts: strategic experience modules and experience providers. Strategic experience modules include sense, feel, think, act, and relate. Their goal is to create a relationship between a brand and a consumer, which results in sensory, emotional, intellectual, and action experiences (Schmitt, 1999; Song et al., 2015). Strategic experience modules can be implemented using experience providers that include communications, visual and verbal signs, product presence, co-branding, environment, electronic media, and people, and all marketing efforts occur before and after purchasing the product (Schmitt, 1999). Strategic experience modules and experience providers can be applied individually or in combination to create unforgettable experiences. Regarding technological development and the possibilities of creating additional tourism products that would enrich the offering of a destination, augmented reality is used as an experience provider as it represents the latest technological achievement.

Based on previous research and the research results of Kos Kavran (2020), in particular, the conceptualization of Augmented Reality Experiential Marketing in Tourism is proposed. Given the current AR technology capabilities, Augmented Reality Experiential Marketing in Tourism (AREMT) consists of three dimensions: affective experiences (feel module), creative cognitive experiences (think module), and physical experiences, behaviors, and lifestyles (act module), which result from the interaction between augmented reality and tourists during their stay at the destination. The feel module focuses on affective strategy in the phase of tourist stay at the destination. It relates to a tourist's affections, such as moods, feelings, and emotions. Schmitt (1999) states that the effects can range from mildly positive moods to strong emotions of joy and pride. For the feel module to work, a deep understanding of what can trigger certain emotions in tourists is needed, as well as the willingness of tourists to engage in perspective-taking and empathy. An important fact, especially for the tourism market, is that emotion-inducing stimuli and the willingness to empathize often differ from culture to culture. A tourism offering can generate an emotional experience to create an affective relationship with the destination (Gentile et al., 2007). The act module is related to tourists' physical experiences at the destination. It shows tourists alternative ways of doing things, alternative lifestyles, and interactions. Changes in lifestyles and behaviors are often more motivational, inspirational, and emotional (Schmitt, 1999), and the creation of experience for tourists should be exactly like that. The tourism offering may frequently provide such an experience when the tourism product and its consumption become the means of adhesion to certain values that the destination embodies and that tourists share (Gentile et al., 2007). The think module focuses on tourists' intelligence and the creation of cognitive (thinking) problems and intrigue. It also appeals to the intellect to create problem-solving experiences through surprise and provocation (Schmitt, 1999), and it is common in new technology products, such as augmented reality. As an experience provider in the proposed model, augmented reality becomes a part of the tourists' activities, affects their pleasure, and enhances their experience (Tussyadiah et al., 2017), satisfaction, and purchase intent (Poushneh & Vasquez-Parraga, 2017). The benefits of implementing augmented reality as an experience provider are reflected in adding value to the visitor experience, an enhanced educational experience, and enabling socializing and fun. If visitors have a better experience using augmented reality, they are most likely to spend more (Cranmer et al., 2018).

5. FURTHER RESEARCH AGENDA

This paper proposes some future research directions and topics. Given that AREMT consists of three strategic experience modules (feel, act, and think), there is a need for in-depth research into the characteristics and specifics of each module from the tourism perspective. Research should focus on what kind of emotions augmented reality creates in tourists and the intensity of those emotions. Furthermore, the research could also focus on exploring the level of tourists' willingness to co-create experiences offered by augmented reality and how it could affect their lifestyles and behaviors. Lastly, further research could explore the level of cognitive thinking of tourists that augmented reality creates. This model could also be tested in other phases of the tourist journey (pre-trip and post-trip) and the on-site phase in a destination covered in this paper. One particularly fruitful research area for the years to come will be using new, technologically developed augmented reality as an experience provider. Augmented reality continually enhances its technological capabilities, so it would be of great interest to see if it could create new strategic experiential modules besides the ones mentioned in the AREMT conceptual model in this paper. In addition to using augmented reality as an experience provider, other technologies, such as virtual reality or robotics, could also be used to test the creation of certain tourism experiences.

Future research could also include testing AREMT modules in various types of special interest tourism, such as adventure and congress tourism, in museums, exhibitions, or other tourist activities in which past events are revived.

6. CONCLUSION AND RESEARCH LIMITATIONS

This paper has explored the significant role of augmented reality (AR) in transforming the tourism industry through experiential marketing. By integrating a comprehensive literature review with the conceptualization of AR in tourism marketing, we have delineated the pivotal dimensions that AR brings to enhancing tourist experiences. The paper underscores the potential of AR to not only enrich the tourism offering with immersive, interactive experiences but also to foster a deeper connection between tourists and destinations. The conceptual model presented hereby highlights the affective, cognitive, and physical dimensions of tourist experiences augmented by AR, pointing towards a holistic approach to engaging tourists. AR's ability to overlay digital information onto the physical world offers tourists a unique, personalized, and enhanced understanding of their surroundings, thereby deepening their emotional and intellectual connection to the destination. Furthermore, the discussion on future research directions opens up new avenues for exploring the depth and breadth of AR in tourism. As technology evolves, so will the ways tourists interact with and perceive their environments. The potential for AR to contribute to sustainable tourism practices, enhance cultural appreciation, and improve accessibility for diverse tourist populations presents a promising area for future investigations. In essence, AR experiential marketing in tourism stands at the cusp of revolutionizing how tourists experience destinations, offering unprecedented opportunities for engagement, learning, and enjoyment. Embracing AR in tourism marketing strategies not only enhances the competitiveness of destinations but also enriches the overall tourist experience, promising a future where technology and tourism go hand in hand in creating memorable, meaningful, and transformative experiences. Research limitations are seen in the fact that some papers from journals and conference papers were excluded from the analysis due to their unavailability in search platforms or databases. It is also possible that some papers were not identified, even if they were included in the search term topic.

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MGSC PLANNING WITH THEORY RELATIVITY

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ABSTRACT

Optimizing the planning and management of process-oriented systems is a trend towards continuous improvement of production in the organizational business system. Today, smart and other various methods are being developed, which are implemented with algorithms in computer simulations of building models. The biggest management problem is the planning function. First, the obsolescence of standards and the rapid development of 4 industrial technologies that, despite their digital advantages, do not contribute to higher productivity of business systems. The creation of vectorial or parametric standards provides an entry point to today's digital simulation tools, but for them to be perfect, iteration loops must be found that simplify the algorithms for computer technologies. Thus, the MGSC planning method was developed using the financial S-curve, which operates under the assumption that the future is a function of the past. While the improvement of this theory can be identified with the theory of relativity and improves the planning of MGSC with a differential addition based on the relativity of effect.

Keywords: *process systems, Smart systems, norm vector, MGSC, theory of effect relativity*

1. INTRODUCTION

Every natural system is dynamic, so that even outer space [1] and terrestrial economic systems can be represented with vectors. Each system has n functional dimensionality, while the business vector system [2] consists of 4 functions. Within the management or administrative function, the most important sub-function is the planning of the development of the production process and the management regulation of the production processes, which lie in the function of the technology, organization, management and ICT system with the daily management of the production or business system. Nevertheless, planning in the construction industry is at a low level due to outdated standards. Therefore, the introduction of dynamic or parametric vector standards is recommended to increase the accuracy of planning and thus project costing. The biggest management problem is the planning function. DSP cost coding of estimates [3] eliminates the current problem of matching estimate items with normative items, i.e. the high quality production of estimates, costings and construction bid plans. The new way of creating cost estimates from normative model data in conjunction with BIM specifications and the parametric or vector definition of standards [4] enables the automation of the process of estimating and planning construction production according to the MGSC curve [5,6].

By comparing the room views with the MGSC curve, a supplement to the MGSC curve is created with parameters similar to the theory of relativity, only without the Suncana beam velocity. The contribution is to identify the MGSC with the theory of relativity and to improve the planning of the MGSC with a differential complement based on the theory of relativity and the quantum of effect.

2. THE UNIVERSE AND UNREST

The universe is our term for a vector expansion that basically does not stand still, but is constantly in motion in order to remain in its place, i.e. the Nemir or Sverun from Figure 1.

Figure 1. Spiral galaxy, NGC 1232
(Source:[1], ESO)

2.1. The vector of the universe and the universe

The vector space is dynamic and constantly in motion, so it is not limited.

2.1.1. Matter-energy and space

Matter in space today evolves from the quark of an atom to an element and then to materials or substances as components of stars or planets that we know today. Just as time is limited in a given activity, matter is also limited in a given system until their systems intersect and collide due to physical forces. In classical mechanics, matter or energy can be measured by mass and velocity at any point in time, whereas quantum mechanics can only measure them in limit states according to the principle of indeterminacy. Matter or energy therefore takes on a wave form.

2.1.2. Time

Every project, including PS, has a beginning and an end. The duality is therefore constant, but the question of the iterativity of the system is unlimited or limited by certain conditions. While the effect as an inverse function of the norm is limited to 1 h, today we enter the world of PS organization or the universe with parametric or vector equations.

3. VECTOR PS AND NORMS OR EFFEKTS

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3.1. Vektor PS

The new is always a function of the old. Thus, the new PS is created from the old capital. The new capital is therefore only an iteration instrument for the creation of a new PS. The postmodern organization begins with the introduction of information technology and defines

the organization systemically and processually. Such a process organization creates Business Resource Planning, i.e. ERP through the Information Business System of the American company SAP and the Japanese JIT and TQM systems. Relational databases create a vector organizational structure of the company, which is introduced into the matrix organizational structure with the third axis, i.e. the resource variable, which is stored in the database with histograms and enables access to data up to the resource level of Figure 2.

Figure 2. IIS construction company with cyclo-space vector structure
(Source: own)

The elaboration of the vector structure of the business system up to the level of the construction offer process through the offer and construction site and situation documentation, up to the level of operations, i.e. working with the same human resources, creates a process elaboration of the management of Figure 3 in five levels, i.e. processes.

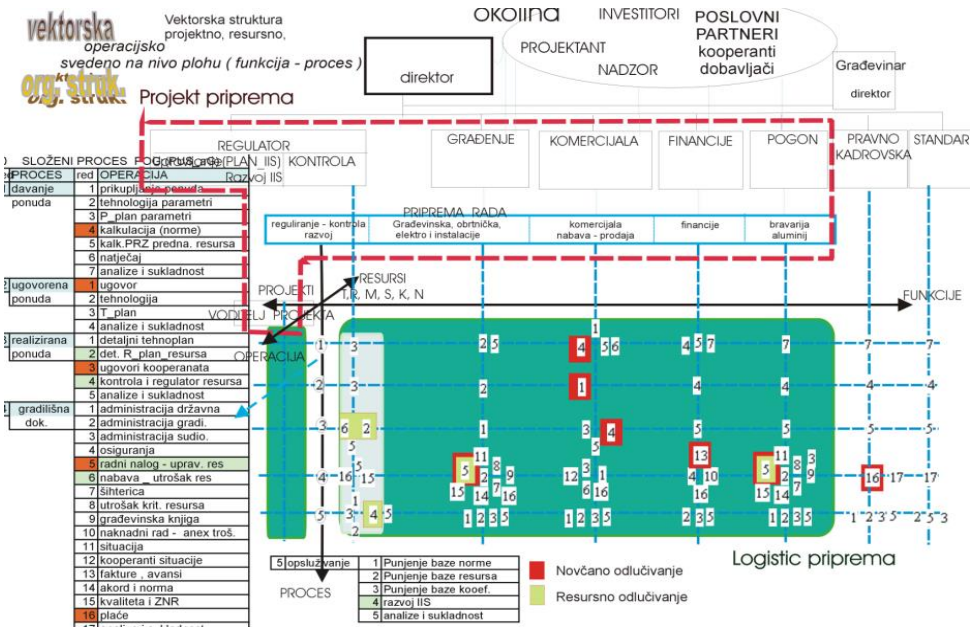

Figure 3. Vector project-process-operation-resource-oriented structure reduced to the level of the function-process-surface
(Source: own)

3.2. Vektor norm

Time enables the creativity of the norm and thus the plan for projects in PS. In absolute space and absolute time, we have an absolute project plan. The normative time can be represented as a resource effect in a three-dimensional formula. The variables are elements of the project construction Xk and the technology Yr, which are defined by the categorized variable of this organization Zo.

Thus, using the example of various technologies, tables were created on the function of the constructive element of execution (k) and the dimensions of this execution element (kdi) and on the resource (r), i.e. the execution technology, as well as on the organization with the definition of the basic type of the constructive element (kok) as an organizational unit (Eq. (1)) Figure 4.

$$VN = f(kd, ko, k, r) = kd_i ko_i f(k, r) \quad (1)$$

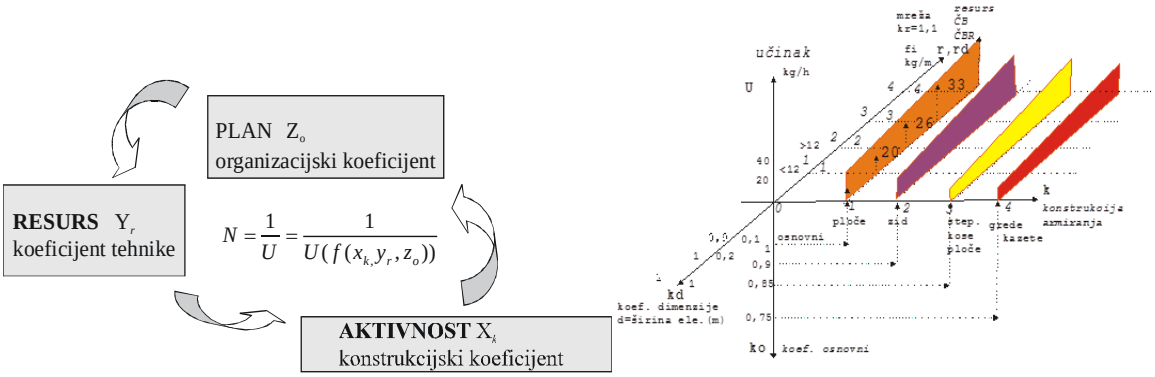

Figure 4: Effect and standard for the formwork system)
(Source: own)

4. THE UNIVERSE - MGSC PROJECT PLAN

The assumption resulting from the image of the galaxy is that the MGSC curve has the galactic track of Figure 5. This means that the motion in space, like all natural phenomena, has a distribution according to the Gaussian distribution, which cumulatively results in an S-curve.

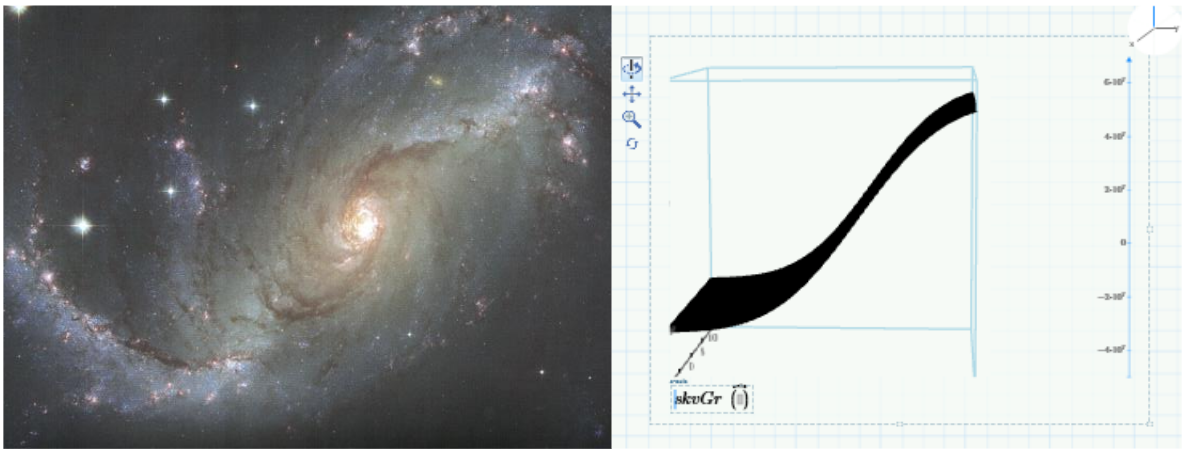

Figure 5. Galaktika NGC 1672, MGSC
(Source:[1], NASA/ESA, own)

4.1. MSP plan

Is a plan that defines the development of project activities in a given time t. The definition of the S-curve was achieved through the integration of management software, i.e. by using ODBC databases or newer XML Internet technology with MS Project software. The system enables the monitoring of resource efficiency by activity and on a daily basis through the data model shown in Figure 6.

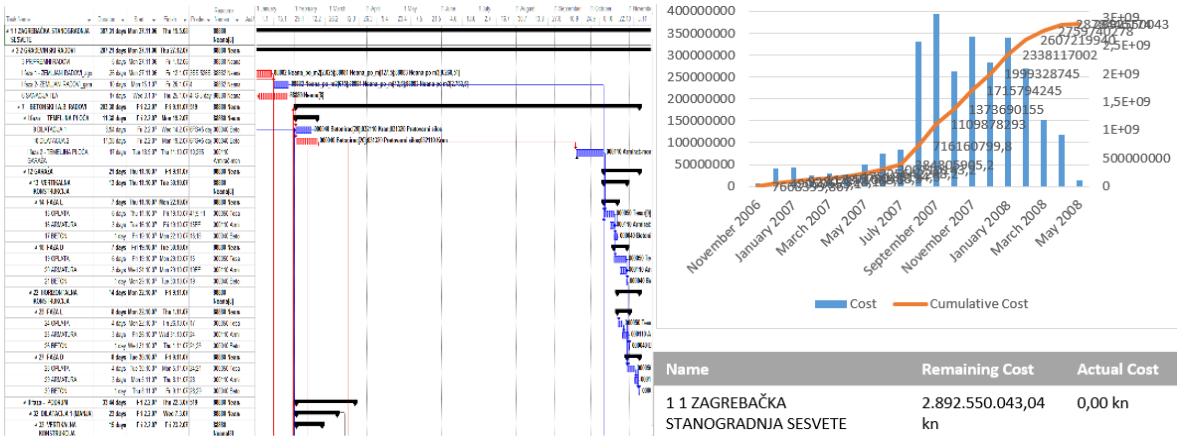

Figure 6: A report of project monitoring and cash flow (Source: own)

It is possible to monitor resource and financial indicators alternately with different reports.

4.2. Organizational differentiation in MGSC with DSP method for production processes

The model standardization of the cost description of items, i.e. the common harmonization of the item descriptions in the offer, i.e. the standards, creates a unique code to define the construction product with the DSP method, i.e. the DSP code (Eq. (2)). The DSP method creates a structural organization differential by level with the possibility of elaboration at the movement level.

$$DSP\ COD := [f_n([S_{ijk}]) = f_{n+1}([S_{ijk}])] \tag{2}$$

By converting the DSP code into the structural code of the MGSK curve, an organizational or financial differential is obtained by a three-dimensional structural model defined in the i,j,k structure S_ijk (Eq. (3)), and by replacing the structure S with the MGSK curve of the MGSK DSP COD (Eq. (10).

$$MGSc\ DSP\ COD := [f_{n+1}([skvGr(x,T)_{ijk}]) = f_n([skvGr(x,T)_{ijk}])] + \Delta f_{n+1}([skvGr(x,T)_{ijk}]) \tag{3}$$

In the implementation, the main problem is to define the change in the EAC and BAC-S curves caused by different risks or changes in labor intensity or resource input. This is solved by numerical iteration, i.e. by induction and iteration of the cost estimation equations Tproc using the planned normative costs Tp and their derivation. The derivative of the MGSC valuation curve is therefore the value of the difference between EAC, BAC and the value of the valuation cost functions (Tproc) and the plan (Tplan), i.e. the normative costs T (Eq. (4)) of the standard MGSC curve plus the differential costs ΔT.

$$T_{x+1} = skvGr(x,T) = \lambda kv \cdot \int_0^x \frac{1}{(a \cdot T+b)\cdot\sqrt{2\cdot\pi}} \cdot e^{\frac{-(x-\mu)^2}{kv\cdot(a\cdot T+b)}} dx + T'\Delta x \tag{4}$$

In the software budget, the cost axis is in thousands and the number of working months for the project that defines the variable x, and the expectation of μ from the variable x is x/2. The constant variable kv is 104, and λkv is a variable constant. The plan and risk curve from Figure 8 is shown.

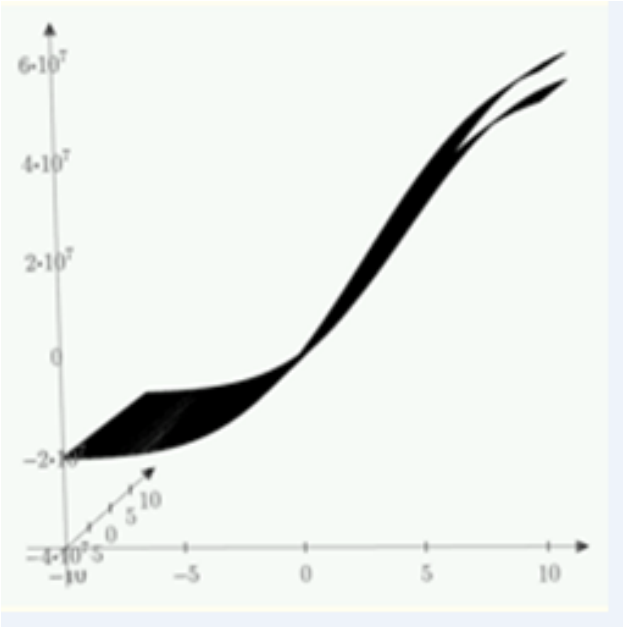

Figure 8*: MGSC priject Zagreb-Zaprešić*

4.3. Relative MGSC plan

The relative plan defines the development of the project activities in a certain time t and in a certain space with a certain intensity of activity development. The Cyclogram graphical plan also separates the activities according to space and intensity, but in absolute time. When simulating the MSP project model with a Gantt chart and an S-curve over the key resources given by the ABC curve, it is important to define the working time of the resource with costs (Eq. (5,6,7)) using the directional coefficient (a) of the linear direction of the resource cost representation plus the product with the intensity of the resource commitment (i) or the double directional coefficient.

$$\Delta t(R_j) = \Delta T(R_j)/T' \tag{5}$$

$$\Delta t_i(R_j) = \Delta T(\sum_{i=1}^{nr} a_{ri}\, \boldsymbol{i_{ri}} \boldsymbol{t_{ri}}\ )/T_i' \tag{6}$$

$$skvGr(x,T) = \lambda kv \cdot \int_0^x \frac{1}{(a\cdot T+b)\cdot\sqrt{2\cdot\pi}} \cdot e^{\frac{-(x-\mu)^2}{kv\cdot(a\cdot T+b)}} dx + \Delta T_i(R_j) \tag{7}$$

4.4. Quantum MGSC plan

The quantum plan defines the imaginary development of the project activities in a certain time t and a certain space with a certain frequency of activity development. The frequency results from a known physical equation related to the mechanics of the material, i.e. the strength of the material, and is a function of the effect, i.e. the norm (Eq. (8)).

$$f = \frac{\sqrt{\frac{3EI}{m}}}{2\pi} = \frac{\omega}{2\pi} = \sqrt{\frac{k}{m}}/2\pi \tag{8}$$

Thus, the strength (y=σ) is a linear function of the robot performance (x=r) (equation (9)).

$$y = \sigma = 68.25 - 52.3\, x \tag{9}$$

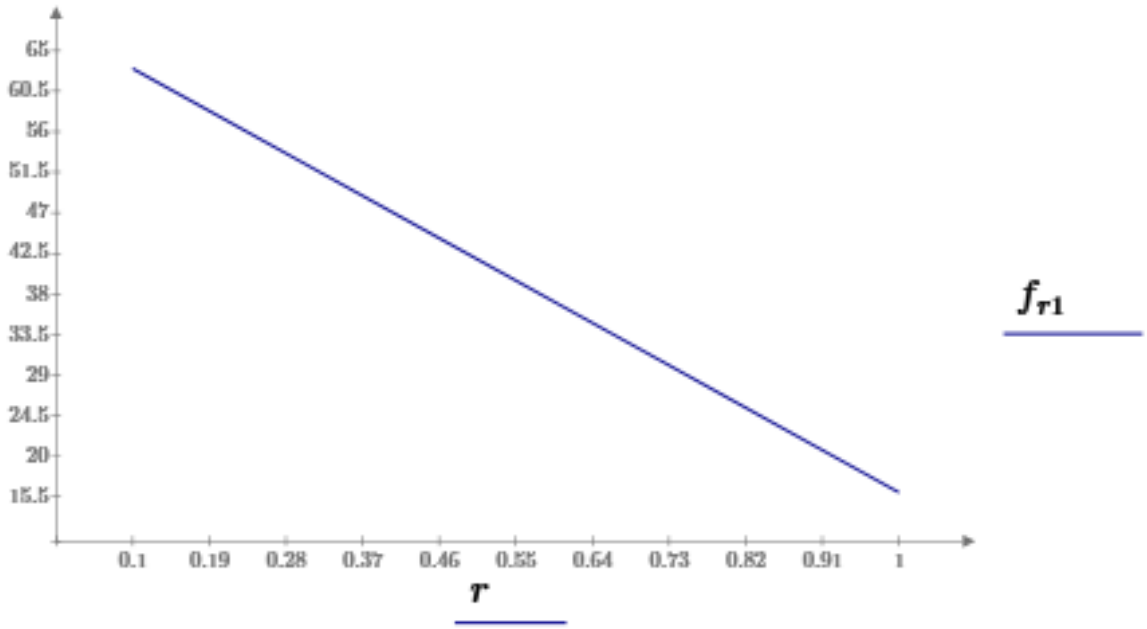

Figure 7: Linear dependence of material strength and work performance

By inserting or replacing σ by y, the frequency is defined by the effect of the robot (Eq. (10)).

$$f = \frac{\sqrt{\frac{3I\sigma}{m}}}{2\pi} = \sqrt{\frac{3I*(68.25-52.3x))}{m}}/2\pi \tag{10}$$

Since the norm plays a key role in planning, the plan for the Conject hydrodestruction technology of bridges can be represented by frequencies, i.e. we create a quantum plan. Thus, the norm is the inverse effect (Eq. (11)), so the duration of the activity can be defined as a wave.

$$N = 1/U = 1/(1{,}3 - 209\pi^2 f^2\ ) \tag{11}$$

5. CONCLUSION

The mathematical linking of all structures is possible. The vector-functional connection of certain phenomena is improved by the iterative DSP method. Thus, both organizational and technological models can be linked, so that planning is defined as an organizational component with a movement, an activity in time, which can be easily predicted with the MGSC curve. Based on the past of the project, a curve was thus created for the future of the project. From this it can be concluded that the future of the universe can be planned based on the past of the universe. The MGS curve is therefore valid for certain cosmic processes, but there is also the providence of God [7], according to which black swans also occur [8]. Today, smart and other AI methods are being developed that are implemented in computer simulations with algorithms. The creation of vectorial or parametric norms provides an introduction to today's simulation tools for digital twins.

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THE ROLE OF INTELLIGENT TECHNOLOGIES IN CONSTRUCTION COMPANIES IN SLOVAKIA

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ABSTRACT

In the construction sector, the application of intelligent technologies boosts process control and expedites decision-making. The foundation for digitising the building process is the integration of technologies such as blockchain, robust IT systems, cloud platforms, Internet of Things solutions, robotic devices, additive technologies, and robots. Intelligent technologies present a chance to establish a digital ecosystem in the construction sector that encourages cooperative innovation between business alliances. The main objective of the presented paper was based on a literature review to determine and explicate the terms that identify intelligent technologies in the construction industry and at the same time to interpret the results of research that analyse the current state of the ongoing digital transformation in the construction industry in Slovakia. From the results of the research, we conclude that more than 3/5 of companies in the construction industry partially perceive digital transformation in construction processes. In the surveyed companies, the strategy – Construction 4.0 – is currently in the planning process. Among the selected intelligent technologies, construction companies in Slovakia mainly use RFID and robotics.

Keywords: *digitalisation transformation, intelligent technologies, construction 4.0, construction industry*

1. INTRODUCTION

The economy of every country is heavily dependent on its construction industry. As per the World Economic Forum research, the construction sector currently contributes approximately 6 % of the global GDP and is projected to increase to approximately 14.7 % by 2030 (Craveiro et al., 2019). Among all economic sectors, the construction industry is one of the most responsive and active. This is due to the fact that it is essential to the social and economic advancement of every country, acting as a catalyst for commerce in resources like labour, capital, materials, and equipment to build an economy's infrastructure (Osunsanmi et al., 2018). Many business sectors will shift as a result of technological advancements leading to the fourth industrial revolution. The industrial sector is investigating Industry 4.0's digitalisation and automatisation technologies to identify advantages and enhance workflows (Lasi e al., 2014). Digital technology, sensor systems, intelligent machinery, and smart materials have all been brought to the construction sector by the fourth industrial revolution, or industry 4.0, where

building information modeling (BIM) has emerged as the primary hub for compiling digital project data (King, 2018). BIM offers another dimension of data that may interact and collaborate in real time throughout the project life cycle, making it a perfect stage for the creation of strong and inventive applications for the construction sector (Bilal et al., 2015). The related investigation of new technologies in the Architecture, Engineering, Construction, and Operations (AECO) sector is known as Construction 4.0 (Craveiro et al., 2019). The potential of digital processes, automation, and industrialised construction remains largely untapped in the context of construction projects (Oesterreich et al., 2016). However, the emergence of Construction 4.0 – that is, the industry's widespread adoption of automation and digitalisation – has created a chance to completely transform the construction sector (McKinsey & Company, 2017). Although Construction 4.0 is still in its infancy, it has the potential to drastically alter the way infrastructure, buildings, and the built environment are planned, built, and managed (Sawhney et al., 2020). The main objective of the presented paper was based on the literature review to determine and explicate the terms that identify intelligent technologies in the construction industry and at the same time to interpret the results of research that analyse the current state of the ongoing digital transformation in the construction industry in Slovakia.

2. REVIEW OF THE LITERATURE

Fidlerová et al. (2023) indicates that in the current economic development, digitalisation plays an important role in new innovative solutions. Industry 4.0, also known as the fourth industrial revolution, is the integration of the Internet of Things (IoT) and Internet of Services with the manufacturing environment. It is defined as the intelligent control of machinery, factories, and warehousing facilities by all industrial businesses worldwide through cyber-physical systems that share information to initiate actions (Gilchrist, 2016). With the availability of digital data and online digital access that may be used to automatically acquire and process electronic data discrete jobs into the value chain, this change has challenged the construction sector (Alaloul et al., 2018). Intelligent technologies have the potential to improve the performance of the construction industry. With increasingly complex projects and pressing labour shortages, it is important for the industry to have a holistic understanding of the specific applications of smart technologies in managing construction projects. Construction elements, constructing elements, and building furniture are the result of the integration of robotic technologies – also known to as construction automation technologies – with the construction industry (Bock, 2015). Hashim et al. (2013) identified the benefits of using intelligent tools in the procurement of construction projects, which include, but are not limited to, improved process quality, cost savings, user satisfaction, increased responsiveness and productivity, market expansion, and efficiency in project delivery. According to Antunes & Gonzalez (2015), the application of Industry 4.0 concepts to the construction industry is a novel idea that uses the Internet of Things (IoT) to integrate data across various platforms and adopt new technology like drones, 3D printing, and laser scanning in the hopes of improving the capacity to monitor construction projects during the design, construction, and use stages in order to deliver sustainable and smart buildings. The term Construction 4.0 was created in 2016 by consultancy company Ronald Berger. This company identified key technologies that could transform the construction industry, including building information modeling, IoT, sensors, robotics and augmented reality. All of these technologies hold the promise of improving efficiency, reducing costs, and improving collaboration and communication between construction stakeholders (Roland Berger, 2016). In the framework of constructing the digital revolution, the shift to Construction 4.0 necessitates a little reorganisation of the social-technical system. Apart from integrating state-of-the-art technologies such as building information modeling, IoT, and robotics, this change involves a fundamental restructuring of the dynamics of cooperation between project stakeholders.

The convergence of technical interfaces and human knowledge necessitates recalibrating organisational structures, decision-making processes, and communication channels. This comprehensive approach recognises that a concurrent evolution in social connections is necessary for the successful integration of digital technologies, and it places an emphasis on cooperation, adaptability, and skill development throughout the construction ecosystem (Zhang et al., 2024). According to Lu (2017), the construction industry 4.0 entails digitising the sector to create a clever and intelligent method of compiling data using cutting-edge and novel devices; this makes data analysis simple and enables quick decisions that support the creation of a more intelligent, effective, and responsive built environment. Construction 4.0 is the digitalisation and industrialisation of an industry that enables horizontal and vertical integration and real-time connectivity of stakeholders throughout the lifecycle of a construction project, while advancing the progress of construction processes through the use of mechanisation and automation and bridging the gap between the physical and cyber environments (El Jazzar et al., 2021). Within the Construction 4.0 framework, the following three transformational trends take place (Sawhney et al., 2020):

- Industrial production and construction – the problems and difficulties brought on by on-site construction procedures are greatly minimised by the use of prefabrication, 3D printing and assembly, offsite manufacture, and automation. Production can be digitally connected to (Building Information Modeling and Common Data Environment through this kind of industrialised process, enabling direct delivery of instructions for physical production and the feeding back of any production-related data from the physical layer into the digital layer.
- Cyber-physical systems – under Construction 4.0, the building site makes use of actuators to translate digital signals into physical actions, robotics and automation for production, transportation, and assembly, sensors and the Internet of Things (IoT) to sense critical data about physical objects – including people – from the physical layer.
- Digital technologies – the Construction 4.0 framework's digital layer is where the Digital Ecosystem, which is the foundation of the digital transformation, is produced. The foundation for integrated digital tools is provided by Building Information Modeling and Common Data Environment. The Construction 4.0 framework supports the delivery and business process with the use of artificial intelligence (AI), cloud computing, big data and data analytics, reality capture, Blockchain, simulation, and augmented reality. Digital ecosystems offer the creativity required to accomplish this, but interoperability and data standards are equally critical to this comprehensive change.

New approaches and digital procedures can provide new efficiencies that are drastically altering the construction industry (Maskuriy et al., 2019; Alaloul et al., 2019). A new paradigm known as Construction 4.0 uses artificial intelligence to help cyber-physical systems and digital ecosystems work together more intelligently, saving time and money while also enhancing sustainability (Alsharo et al., 2024). Construction 4.0 use a variety of technologies, including unmanned aerial vehicle imaging and 3D laser scanning, to automate processes and minimise delivery times while improving intelligence. The concept of Construction 4.0 also implies a comprehensive and profound transformation of the project management processes of construction firms through the use and exploitation of data collected in real time using new or existing technologies for decision-making purposes (Dallasega et al., 2018). In the Construction 4.0 era, new aspects include off-site construction, modularization, and additive manufacturing (3D printing) (Muñoz-La Rivera et al., 2020). The foundation of the Construction 4.0 environment is the building information modelling approach (García de Soto et al., 2019; Osunsanmi et al., 2020; Lekan et al., 2020). A new technique known as "digital twin" is emerging through the advancement of building information modelling in conjunction with data-driven construction management, lean construction thinking, artificial intelligence, and

artificial intelligence . Furthermore, as a new component of construction 4.0, a new procedure called product lifecycle management has been introduced, which oversees the product from design to disposal. Other components of Construction 4.0 include materials, information technology, and innovative tools tailored specifically for the construction sector. Other components of the developing industry include robotics and RFID, but important Construction 4.0 tools are also augmented reality, virtual reality, and the Internet of Things (Safura Zabidin et al., 2020; Forcael et al., 2020). The construction industry is undergoing a deep transformation through the integration of cutting edge technologies, collectively known as intelligent building solutions. This paradigm shift involves the use of (Arabi, 2023):

- Building Information Modeling (BIM) – is a collaborative process that uses intelligent 3D models to expedite project planning, design, and execution. It is the foundation of smart construction. Throughout the course of a project, BIM offers an extensive digital depiction of structures, enabling well-informed decision-making.
- Internet of Things (IoT) Integration – is incorporated into smart construction by dispersing sensors and gadgets throughout building sites. Real-time monitoring of tools, supplies, and environmental factors is made possible by this connection, which improves data-driven insights and proactive decision-making.
- Artificial Intelligence (AI) and Machine Learning (ML) – because AI and ML algorithms make predictive analytics, risk assessment, and work automation possible, they are essential to smart construction. Efficiency gains result from the optimisation of project scheduling, cost estimation, and overall project management using these technologies.
- Robotics in Construction – conventional building procedures are being revolutionised by the use of robotics in construction tasks, such as automated bricklaying and 3D printing. Robotics improves accuracy, shortens building schedules, and reduces manual labour, all of which lower project costs.
- Drones and Advanced Imaging – an aerial perspective of building sites is made possible by drones and cutting-edge imaging technology, which facilitate surveying, mapping, and progress monitoring. These tools contribute to safer and better informed decision-making, increase data accuracy, and improve project visualisation.
- Cloud-Based Collaboration – the foundation of the intelligent construction is made up of cloud-based collaboration systems, which facilitate smooth data sharing and real-time communication between project stakeholders. These solutions promote international cooperation, increase accessibility, and enhance project coordination in general.
- Augmented Reality (AR) and Virtual Reality (VR) – are revolutionising project design and visualisation. These immersive technologies improve project comprehension and lower errors by facilitating training, on-site mentoring, and stakeholder contact.
- Data Security and Privacy – ensuring strong data security and privacy protections becomes critical as digitalisation increases. To protect sensitive project data, smart construction systems make use of cybersecurity safeguards, encryption techniques, and industry best practices.
- Sustainability Integration – by utilising instruments and technologies for waste minimisation, energy efficiency, and environmental impact assessment, smart building actively supports sustainable practices. These solutions support an environmentally friendly industry by being in line with green construction goals.

3. METHODOLOGY

The object of the research were companies operating in the construction industry in Slovakia. The number of relevant respondents whose answers were included in the analysis was 58. The companies were categorised according to size based on the European Commission 2003/361/EC, which defines a small enterprise (10-49 employees), a medium-sized enterprise

(50-249 employees) and a large enterprise (>=250 employees). Medium-sized companies from the construction industry participated in the survey conducted with the highest proportion (55.17 %). Small companies were represented with a share of 24.14 %. The participation of large companies was recorded with the lowest share (20.69 %). According to the legal form of business, construction companies in Slovakia were almost evenly distributed in the research. The companies which indicated the legal form of a joint stock company obtained a share of 20.00 % and the companies which indicated the legal form of a limited liability company obtained a share of 38.00 %. In identifying the research sample, the geographical location of companies in the construction industry in Slovakia was also included in the analysis. On the basis of summarising the results from the questionnaire survey, we have summarised the results in Table 1. From the data, we conclude that companies operating in the construction industry in Slovakia were dominant in the Bratislava Region. Their share was 25.86 %. The second highest share of participation was also held by companies from the Trenčín Region, where the share of participation was at the level of 13.80 %. Identical share of participation in the survey was held by the surveyed companies from the Nitra and Banská Bystrica Regions (12.07 %), and also from the Žilina and Prešov Regions (10.34 %). Construction companies from the Trnava (8.62 %) and Košice Regions (6.90 %) participated in the survey the least.

Region	Absolute Frequency	Relative Frequency
Bratislava	15	25.86 %
Trnava	5	8.62 %
Trenčín	8	13.80 %
Nitra	7	12.07 %
Žilina	6	10.34 %
Banská Bystrica	7	12.07 %
Prešov	6	10.34 %
Košice	4	6.90 %

Table 1: Structure of the research sample geographical location
(Source: own elaboration)

4. FINDINGS AND DISCUSSION

We surveyed companies in the construction industry to find out whether their company is facing challenges related to digital transformation. Table 2 clearly summarises the results of the analysis, based on which we can see that 60.35 % of companies from the construction industry partially perceive digital transformation in construction processes. Almost 35.00 % of the participants (34.48 %) perceive an ongoing digital transformation led by Industry 4.0. Only 5.17 % of construction companies in Slovakia do not reflect the digital transformation in the construction industry at all.

Possibilities	Absolute Frequency	Relative Frequency
Yes, we perceive digital transformation	20	34.48 %
Yes, partially perceive digital transformation	35	60.35 %
No, we do not perceive the digital transformation at all	3	5.17 %
Total	58	100.00 %

Table 2: Digital transformation in construction companies
(Source: own elaboration)

The ongoing digital revolution with Industry 4.0 in construction companies requires having a business strategy in place – Construction 4.0, which deals with the digital transformation of the construction industry. Construction 4.0 is in the planning process in the surveyed companies with a share of 50.00 %. Construction 4.0 is in the process of implementation with a share of 31.03 %. Currently, no construction 4.0 concept is planned to be implemented by 10.35 % of the respondents. Implemented and continuously updated construciton 4.0 strategy is in place for 8.62 % of the respondent companies.

Construction 4.0	Absolute Frequency	Relative Frequency
Implemented and continuously updated	5	8.62 %
Implemented	18	31.03 %
In the planning process	29	50.00 %
No specific strategy at present	6	10.35 %
Total	58	100.00 %

Table 3: Construction 4.0 in construction companies
(Source: own elaboration)

Within the topic, construction companies in Slovakia were surveyed to find out what intelligent technology they use. Table 4 summarises data from selected intelligent technologies that are part of Construction 4.0. Among the selected intelligent technologies, construction companies in Slovakia mainly use RFID (55.17 %) and robotics (50.00 %). In the intelligent technology transition phase, the percentages of the selected technologies were almost equal. Respondents are considering switching to smart building (48.28 %), cloud computing (46.55 %), robotics (44.83 %) and GPS coordinates (43.10 %). The surveyed companies are not interested in BIM models (34.48%) as they are very costly and VR/AR (32.76 %). Currently, more than 3/5 of the respondents are not considering VR/AR at all (60.34 %).

Possibilities		Yes, we use	Yes, we are in the process of switching to the technology	No, we are not interested in the technology	No, we are not currently considering the technology	Total
BIM models	n	9	11	20	18	58
	%	15.52 %	18.97 %	34.48 %	31.03 %	100.00 %
Cloud computing	n	24	27	4	3	58
	%	41.38 %	46.55 %	6.90 %	5.17 %	100.00 %
Smart building	n	14	28	9	7	58
	%	24.14 %	48.28 %	15.52 %	12.06 %	100.00 %
RFID	n	32	23	1	2	58
	%	55.17 %	39.66 %	1.72 %	3.45 %	100.00 %
GPS coordinates	n	27	25	6	0	58
	%	46.55 %	43.10 %	10.35 %	0.00 %	100.00 %
VR/AR	n	4	0	19	35	58
	%	6.90 %	0.00 %	32.76 %	60.34 %	100.00 %
Robotics	n	29	26	0	3	58
	%	50.00 %	44.83 %	0.00 %	5.17 %	100.00 %

Table 4: Selected intelligent technologies in construction companies
(Source: own elaboration)

5. CONCLUSION

The use of intelligent technologies speeds up decision-making and increases the level of process control in the construction industry. The integration of technologies including blockchain, powerful IT systems, cloud platforms, IoT solutions, robotic devices, additive technologies, robotics is the basis for digitising the construction process. In the construction industry, intelligent technologies offer the opportunity to create a digital ecosystem that fosters collaborative innovation across business partnerships. Within the conceptual framework of the paper, we conclude that the integration of intelligent technologies in the construction industry represents a key moment in the evolution of the industry and offers a pathway to greater efficiency, safety, sustainability and innovation. Through the adoption of technologies such as Building Information Modelling (BIM), the Internet of Things (IoT), Artificial Intelligence (AI) and robotics, construction projects are undergoing a profound transformation, streamlining processes, reducing costs and improving outcomes. At the same time, through the use of intelligent technologies, there is a paradigm shift in the construction industry towards Construction 4.0. The issue under study was analysed in the company practice through a questionnaire survey. The results show that the largest share of medium-sized enterprises from the construction industry in Slovakia participated in the survey. According to the legal form of business, construction companies were mainly represented by limited liability companies. Construction companies from the Bratislava Region were dominant in the survey. More than 3/5 of companies from the construction industry partially perceive digital transformation in construction processes. In the surveyed companies, the strategy – Construction 4.0 – is currently in the planning process. Among the selected intelligent technologies, construction companies in Slovakia mainly use RFID and robotics. We are on the threshold of a new era in the construction industry, where the integration of intelligent technologies for construction is a major challenge. By leveraging data analytics, automatisation and connectivity, construction processes can be delivered with greater accuracy, sustainability and resilience, meeting the evolving needs of society while minimising environmental impact.

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INSURTECH BETWEEN THE FOURTH INDUSTRIAL REVOLUTION AND THE FUTURE OF THE INSURANCE INDUSTRY

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ABSTRACT

The purpose of this research is to derive a cause-and-effect relationship between the Fourth Industrial Revolution, in particular the emergence of InsurTech, and the initiated transformation of the insurance industry worldwide. The research object is InsurTech and its subject is InsurTech innovation. In the framework of the exhibition, the focus is placed on several issues related to the nature of InsurTech, as a category that emerged as a result of separation from FinTech; how the same InsurTech innovations are impacting current insurance business models; the demands they place on the insurance industry; the behaviour and number of emerging and traditional insurance companies - market participants. The development also defines the dimensions of the "InsurTech" paradigm within which the InsurTech revolution is expected to continue, completing the complete transformation of the insurance business.

Keywords: *FinTech, InsurTech, The Fourth Industrial Revolution, Omnichannel Trade, Internet of Things, InsurTech Ecosystems, Regulation*

1. INTRODUCTION

The fourth industrial revolution, also known as Industry 4.0, is identified with the digitalization of almost every aspect of human life. It is the ubiquitous adoption of the dozens of technological innovations that we are all witnessing, in addition to becoming active consumers, that has led to a profound transformation in several existing industries. Multiple processes accompanying the last years of human development, the more significant of which are directly related to the climate changes that have occurred, macroeconomic shocks, geopolitical instability and not least the global pandemic of COVID-19 (1), have reshaped the future of business (2) as it was known until now. Stepping into the new digital age has led businesses to rethink their philosophy and strategy, rethink their market behaviour and rewrite their formulas for profit and success. Achieving the latter involves making a large number of key decisions, ranging from those related to the need to make steep investments; offering fundamentally new and conceptually advanced products and services; applying innovative marketing means of distribution and market positioning; playing out alternative ways of assessing risk; and ending up redefining occupations and how to use available resources. The use of innovative technologies to improve or automate financial services and processes is known as "Fintech" (a combination of "finance" and "technology") (3). The latter encompasses a rapidly gaining potential industry that serves both business and consumer interests in multiple ways: from mobile banking, cryptocurrencies, and investment instruments to insurance. Analogous to Fintech (4), InsurTech is a combination of the words "insurance" and "technology" and originally started as a subcategory of it (5). As of now, although it has distinguished itself as an emerging category in its own right (6). InsurTech is entirely in a symbiotic relationship with Fintech as both technologies seek to enhance their respective traditional industries with advanced solutions.

The classical insurance industry (7,8), generally considered conservative, has been revolutionized by InsurTech thanks to the use of big data and its analysis; machine learning; artificial intelligence; the Internet of Things, blockchain, etc (9). Although InsurTech's objectives are constantly changing, the application of technological innovation aims to save costs, improve efficiency and optimize the management of business processes in the insurance value chain (10). At the same time, thanks to the InsurTech revolution, insurance is being transformed into an ecosystem that draws in adjacent industries such as cyber security, healthcare, agriculture, transportation, sharing economy, wealth management, etc.) (11) to produce improved service with higher value for both insurers and their customers.

2. LITERATURE REVIEW

InsurTech has been talked about since around 2010 (12) and since then hundreds of research papers have been generated in the scientific space. The differences found between them are related to their focus, placing a specific emphasis on reflecting the original ideas and those of their authors. Within this part of the publication, we will focus on some of them that we consider key in terms of added value, in terms of InsurTech theory and practice. Technological innovation over the last decade leading to the Fourth Industrial Revolution has placed several industries, including insurance, at a new inflexion point requiring them to change at every level - organisational-managerial, technology-manufacturing and product-distribution (10). InsurTech presents itself as an offshoot of Fintech (13) along with several other financial services illustrated in the following figure:

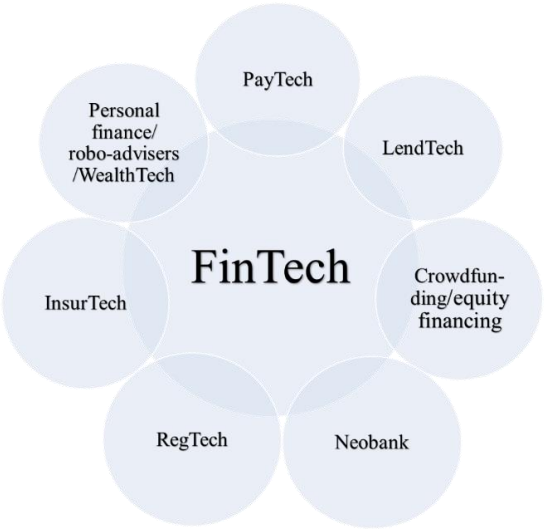

Figure 1: Some of the Common FinTech Services
(Source: Authors' design based on (13))

Technological innovations that are created and implemented to improve the efficiency of the insurance industry are a standout specificity of InsurTech (14). InsurTech is closely tied to two processes affecting the insurance industry - its digitalization and restructuring (15). In their research paper (16), the author's team defends that InsurTech appears as a significant tool whose function is related to strategic implementation for insurance companies, in the process of the digital revolution (16). The technological solutions offered by InsurTech are revolutionizing the insurance industry in the following ways: reducing financial costs, increasing efficiency and achieving the unprecedented tailoring of offers to individual customer needs (9). The broader impact of Insutech boils down to highlighting potential new investment opportunities; generating technological financial products; fostering the economic environment; creating new jobs and hence stimulating economic growth (17).

Furthermore, InsurTech is considered to be harnessing its capacity for efficient and reliable coverage for emerging risks of diverse genesis - heterogeneous natural catastrophes, extreme weather events, and supply chain interruptions (18). The 2021 publication "Financial Instruments InsurTech on the Financial Market in the current global context" presents the current situation of the insurance market in the context of the COVID-19 pandemic. The focus is on the role and importance of InsurTech, whose main purpose is related to providing support and development to different levels of economies - national, European and global (19). Several publications discuss the technologies that are among the arsenal used by InsurTech - big data and data analytics; blockchain; machine learning and artificial intelligence; and Things or Internet of Things (17). After presenting some of the scientific publications clarifying the nature of InsurTech, we next focus on its business models (20).

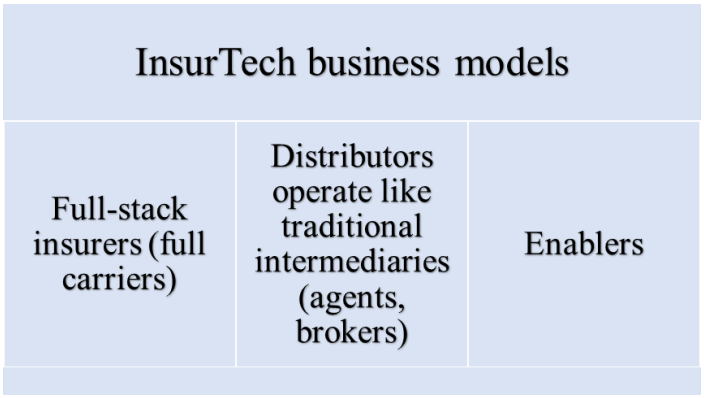

Figure 2: InsurTech business models
(Source: Authors' design based on (20))

In this development, some key applications of InsurTech for the insurance business are also presented (14):

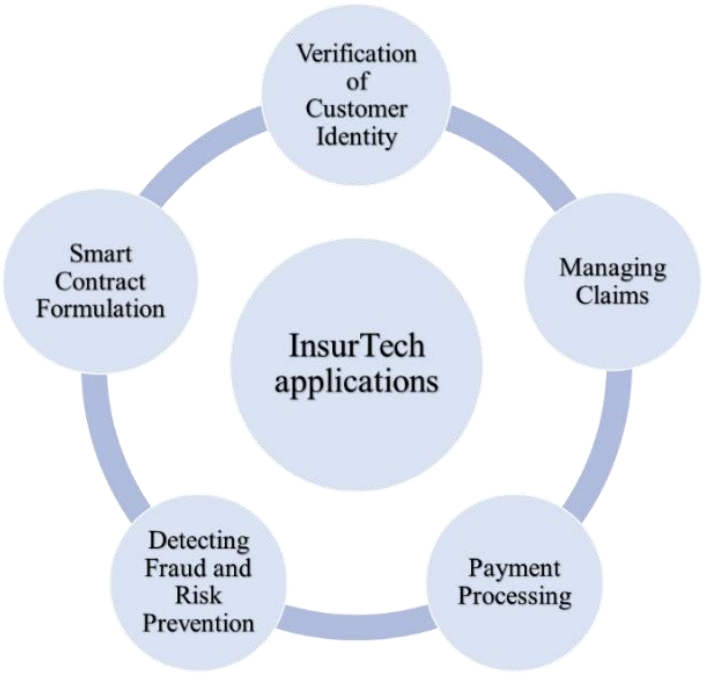

Figure 3: Key Applications of InsurTech
(Source: Authors' Design Based on (14))

The InsurTech process itself involves using data from all possible sources, (e.g. GPS tracking of cars and activity trackers on wristwatches). The collected data can be used for refinement purposes in the delineation of risk groups. This in turn will result in more competitive pricing of insurance products (21). Other authors focus their attention on the future of InsurTech and, in particular, on the creation of flexible and technology-neutral regulatory regimes concerning the application of technological innovation in insurance (22). In this regard, Pierpaolo Marano and Michele Siri (23) provide an overview of the EU's approach to InsurTech from a regulatory perspective and, more specifically, in the EU, within the Solvency II regime. The focus on the future development of InsurTech also touches on outlining projections for the development of the insurance industry in the context of artificial intelligence (24), and the reasons why this is happening (25). A significant number of publications are also devoted to the topic of growth resulting from investments in InsurTech (9) and the global insurance outlook (2).

3. DATE

According to data from a global survey conducted by FinTech Global Research, on InsurTech investments, a serious dynamic is found in the period 2019-2023. In the year 2021, a 115% growth in investments is reported, compared to the base year 2019.

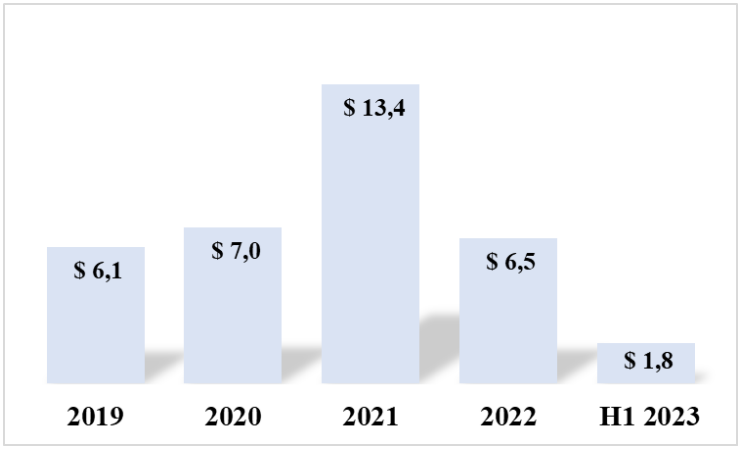

Figure 4: Global InsurTech Investment Falls Short in H1 2023 Whilst Deal Activity Remains Stable
**Note: In billion USD*
(Source: Authors' Design Based on (26))

The data of the FinTech Global Research global survey on InsurTech investments demonstrate dynamics for the period 2019-2023. A trend is being drawn in the direction of an upswing to a certain decline marked 2023. Despite the observed decrease in investments in this area (for the presented period), FinTech Global Research notes that global InsurTech deals are expected to reach 428 in 2023 (26). Moreover, the attitudes of the experts in this field are that the scale of the global insurtech market will grow in the future (27). They expect a CAGR of 52.7% over the period from 2023 to 2030, with the value of the same expected to reach $152.43 billion by the end of the forecast period. These forecasts are optimistic and reflect positive expectations for the InsurTech market in the direction of continuing its future development, projections for combining with new efficiencies and creating new opportunities and renewal. Completely in line with the positive forecasts and at the same time, indicative of the sentiments of investors in InsurTech, are the newly emerging companies that exceed the number of 100 from 2022 to 2023 alone. Regardless of the looming funding crisis and recession data in the Eurozone, the "swarming" of these companies has not slowed down in the least.

The following table presents the top 10 leading InsurTech companies in Europe driving change in digital insurance (28):

Company	Country
Wefox Group	Switzerland
Clark	Germany
Alan	France
Zego	UK
Coverfy	Spain
Many Pets	UK
INZMO	Germany
Veygo	UK
Ondo InsurTech Plc	UK
Coincover UK	UK

Table 1: Top 10 InsurTechs Based in Continental Europe (Source: Authors' Design Based on (28))

In a scientific study conducted by Vincent Y.L. Chang, he concludes that InsurTech has a significant disruptive effect on the competitiveness of insured companies while exerting a weak stimulatory effect on premium growth (29).

4. RESULTS

The new paradigm "InsurTech", has revolutionized the insurance industry, the main dimensions of which we will present in this exhibition. The first of these dimensions is related to the minimization of the human factor and its replacement by artificial intelligence (whose capabilities and potential remain partially revealed and underutilized), due to the use of knowledge-oriented and based on a huge volume of information analysis, which is achieved by combining modern cutting-edge technologies with classical insurance. Parallel to this, there is another, we would call a counter-process, the basis of which is the fact that InsurTech provides solutions modified by artificial intelligence, to the insurance business, but it is the human who remains to make the right management decisions and even to "train" and "tune" it. This is exactly what insurance management needs to invest in not only in innovative technology but also in training their employees to understand how InsurTech works so they can work more efficiently and make correct decisions based on the use of big data and artificial intelligence. The second dimension relates to the competitiveness of insurance companies. To maintain this quality, existing companies need to radically change their behaviour and especially their attitude towards alternative business ideas of new companies (many of which are start-ups), imposing current trends in the insurance business. At the moment, the insurance business is divided into two conditional parts: one part includes companies that support InsurTech innovation and invest in it, accepting the undeniable fact that it will provide them with a future and a place in the market, and the other part - companies that are against InsurTech because they believe that this transformation in their business will absorb huge funds - an investment that they find risky at this stage of its development. Moreover, one of the categories currently active in the insurance business, namely that of insurance brokers, takes InsurTech literally as a physical threat, as it threatens their business in the direct sense, making them completely redundant. The third dimension is related to the process of refocusing from the product/service to the customer. It is accepted as axiomatic that there is contingent complexity, both of the insurance products/services themselves and of the whole underwriting process. The modern customer has different expectations based on the digital technologies used.

They need an improved omnichannel shopping experience, and for this to take place on- and offline, and with a high degree of choice, the ability to compare the desired products, and in general for this to happen in a way - as close as possible to their expectations of convenience, security and protection. InsurTech has a solution for all these consumer expectations, achieving it in the insurance sphere, by offering a broad spectrum of technological and social changes; offering innovative flexible and parametric products; fast interaction and the ability to get real-time feedback; empowerment with the help of available information; improved accessibility to customers; and more. There are dozens of benefits for the insurance business from the solutions listed, but the most important of them are: improving the efficiency and effectiveness of operations; growth in sales - and consequently revenue; strengthening market positions; creating the opportunity to optimize the price of the insurance product; timely detection and prevention of insurance fraud attempts, etc. The fourth dimension is the change foreseen by the implementation of InsurTech and the need for regulation that is user-oriented and, at the same time, preserves the balance of the process of encouraging and further innovation. As we have repeatedly highlighted, InsurTech is revolutionizing and modifying the insurance industry in a way and at a speed that presents obvious challenges to regulators in countries around the world. The regulatory rules they create and enforce should be proactive, flexible and adaptable to the new realities dictated by the rapid intrusion of modern technology into the insurance industry, but also unconditionally preserve their core purpose - to protect the interests and rights of insurance policyholders. In this respect, the requirements that InsurTech will make of the new regulatory framework will be in the direction of: 1) technologically neutral and extremely flexible Performances, enabling the advancement of newly created technological solutions, rather than their obstruction; 2) striking the confidentiality and protection of personal data and information (given the fact that the basis of InsurTech is their processing) and preventing abuse (unauthorized access or theft) of the same; 3) determining the standards for ensuring data security, encryption, adoption of clearly and accurately described algorithms for countering cyber risks; 4) introduction of monitoring and evaluation programs, within which in the conditions of a controlled environment, start in InsurTech to be able to test your technological innovations - in the form of products and services; 5) the testing and promotion of new ethical practices based on transparency in the actions of insurance companies, introduced in the activity of InsurTech and educating the users of these products and services about the possibilities and current risks associated with them; 6) giving a regular objective assessment of the effectiveness of the regulatory framework as a result of the exercise of control over the free applications of the action; 7) implementation of cross-border cooperation between individual national regulators, given the fact that InsurTech operates in the conditions of a global market, often crossing non-harmonized jurisdictional regimes.

5. CONCLUSIONS

InsurTech, a product of the Fourth Industrial Revolution, has become a catalyst for the digital transformation of the insurance industry, designed to protect the lives and assets of individuals in society. Cutting-edge technological solutions such as artificial intelligence, big data, open data or blockchain underlying InsurTech are revolutionizing the way insurers deal with risk, leading to a long-term impact on operating business models. InsurTech is more than a technological reconfiguration of the insurance industry towards customer centricity and the advancement of corporate goals. It is precisely thanks to InsurTech that the insurance industry of the future is assigned the place of a reliable and stable guardian of public welfare, ethically and financially.

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TRANSFORMING SOCIAL SYSTEMS AND STRUCTURES IN CONDITIONS OF DYNAMIC CRISES

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ABSTRACT

In this publication we set an objectively complicated task to analyse the opportunities of strategic decision-making during crisis by attempting to make a partial analysis of the ongoing crisis caused by the COVID 19 pandemic and the emerged military conflict between the Russian Federation and Ukraine. Crisis circumstances require societies to quickly rethink and develop adequate strategies and respectively to formulate strategic goals and plan processes. In many cases preliminary analysis and assessment are practically impossible /especially when it comes to natural disasters or crises/ and this requires a different operational order of problem solving, which includes formulating new unconventional goals and then implementing planning not objectified by a particular and accurate analysis. All this puts whole systems and societies to the test, and those who are empowered to manage the process – under high pressure from unforeseen circumstances and not always objective judgments. Which, in turn, creates a number of subsequent critical issues in the management process. The role of socially dominant leaders is of particular importance in societies, as well as in making various decisions. Their role in strategic decision-making is also examined. Social systems and social structures are subject to various impacts and overcoming them is becoming increasingly difficult. An attempt has been made for a brief analysis and historical retrospective of the transformations of social systems and the ongoing processes of transformation.

Keywords: *Social systems, Management, Global crisis, Strategies, Management process*

1. INTRODUCTION

Setting goals and planning process actions in process management, and on a larger scale – strategic management during crisis is even more challenging. In accordance with the definitions of "crisis", in the broadest sense, crisis management is of strategic importance, as it is always a matter of rescuing and surviving of people, territories, sites, etc. On the one hand, crisis management corresponds to the principles of general management, but on the other hand, it is complex enough, which derives from the fact of rapidly and dynamically changing environment – both national and international. This is most often and clearly observed during crisis circumstances that affect a very large part of the population of a country, region, continent or even the whole world. Crises have a diverse nature, both in scope and in nature, and their management is correlated with this. Different options are considered for the development of strategies in crisis situations, depending on whether they relate to one administrative area, country, group of countries or cover the world. Overcoming crises, as well as liquidating their consequences, represent a particular challenge. Managing processes in such complex and unpredictable situations requires the preparedness of the heads of the different countries. Social systems are subject to particular stresses, and this even calls into question their existence as such. These are extremely interesting processes from a scientific and research point of view. Their analysis, study, and modeling would create conditions for a strategy for their management.

2. STRATEGIC MANAGEMENT IN TIMES OF GLOBAL CRISIS

Global crises are usually large-scale, both in terms of territory and their nature, and challenge many countries, existing alliances of different nature – political, economic, military or others.

In every crisis, people are most affected, i.e. the individual, regardless of which of the above structures they belong to and what their obligations are. Linus Carl Pauling, an American chemist born in German, winner of the Nobel Prize in Chemistry and Nobel Peace Prize winner, said: "Nations keep agreements, keep their treaties so long as they continue to do them good". Unfortunately, however, when crises emerge, especially global ones, keeping certain contractual relations is not always doing good. Crises are characterized as risks with a high degree of uncertainty, disruption of the interaction between the factors of each system and high dynamics. Violation of the values of all social groups is also an important part of the development of the crisis. The development of any crisis does not begin from the moment of the violation of the respective balances, but from the moment when the society prepares for it in its organizational structure. The principles that are followed in crisis management are related to speed, risk assessment, analysis, planning and impact. The implementation of all strategies and the achievement of all goals must definitely pursue the preservation of maximum values for the good existence of the people. The assessment of actions and possible perspectives is objectified by certain criteria and indicators. The fairness and accuracy of each assessment may be different, as well as different in accuracy and correctness for different groups of people, even for a particular individual. This questions or at least creates discomfort in the formation and implementation of each step of the strategy, regardless of whether it is implemented on a limited scale without significant fluctuations in the internal or external environment or in a situation of general and active dynamics. In every case or in any specific situation, the use of objective, measurable and realistic goals in the implementation of strategic management is of paramount importance and a task with a high degree of complexity. This directly corresponds to the planning of certain actions and activities in order to be able to meet the strategic goals to the maximum extent. Crisis circumstances require societies to quickly rethink and develop adequate strategies and respectively to formulate strategic goals and plan processes. In many cases preliminary analysis and assessment are practically impossible /especially when it comes to natural disasters or crises/ and this requires a different operational order of problem solving, which includes formulating new unconventional goals and then implementing planning not objectified by a concrete and accurate analysis. All this puts whole systems and societies to the test, and those who are empowered to manage the process – under high pressure from unforeseen circumstances and not always objective judgments. Which, in turn, creates a number of subsequent critical issues in the management process. All this definitely does not define this process as non-strategic, but puts it in a different environment. The strategic nature is determined at least by the fact that it directly or indirectly concerns a very large group of people, and that it determines the actions of one or more systems. In the last few years, such global crisis has become the pandemic caused by COVID-19. It has forced societies to make certain decisions of strategic nature to overcome the situation that threatens the lives and health of people around the world. It is more than obvious that the applied strategic approach includes many factors that change in the different periods of the crisis and seems to decompose the crisis itself into smaller elements in nature and scope. This does not change the strategic goal that is protecting human life and health. Undoubtedly, each country has its own crisis response programmes and plans, but it is important whether those states with power to govern societies are able to quickly and accurately assess the changing environment, to implement these programmes and plans adequately, and last but not least to reformulate their strategic goals and plans and put them at the service of the respective community. The implementation of any crisis management strategy is directly dependent on the capacity of its managers, both administratively and financially. The realities of the last few years have shown that not everyone can cope with this critical governance process in a relatively complex and difficult situation.

Everyone determines their actions for the benefit of their community, but not everyone has the financial and material ability, and last but not least, the intellectual scientific capacity to achieve all this. Imbalances, even without using the specific statistics, are present and show significant differences. Even in global crises, some societies cope faster with the specific crisis circumstances, while others more slowly. For some societies the consequences are quite severe, and for others – relatively acceptable. All of them have faced certain consequences, which must be assessed after the crisis situation in order to take appropriate corrective actions. It would be difficult to explain the speed of corrective action in different societies. This, in turn, corresponds to the ability to reformulate certain goals, as well as the ability to achieve them effectively. Linus Carl Pauling said: "If you want to have good ideas you must have many ideas. Most of them will be wrong, and what you have to learn is which ones to throw away". The world-famous chemist drew his conclusions based on the accumulated knowledge, experience and sufficient information, which helped him define the problem that the lack of a sufficiently large set of ideas from which to select those worth implementing leads to significant difficulties. The transfer of ideas, algorithms or the copying of entire processes from one society to another has historically shown that it does not always or at least in most cases does not mean good outcome. Scientifically based approbation of something or a process is too complicated when we talk about strategic management of social processes. Social processes practically include all management systems and their management has its high complexity at almost all stages, as well as a very complicated mechanism of influence. The second example of a high scale crisis that is currently taking place is the situation in Ukraine. By its nature, it is political, but accompanied by economic and social issues. It is regional in scope, but with signs of becoming global. The complexity of the political situation because of the military conflict between Russia and Ukraine puts societies in another crisis situation. Again, it cannot be defined as normal, so the existing crisis management plans cannot be implemented or even if it is possible – only partially. This places certain restrictions on societies when reformulating their strategic decisions and implementing effective strategic management. Analyses of this crisis are divergent and at this stage do not allow to develop a unified strategy for resolving it, precisely because political and military crises are among the most complex in the world. In addition, this crisis is multipolar and besides the two countries directly involved, it effects many other countries, alliances, each with its own strategic goals, inconsistent with the others or without any diplomatic rapprochement so far. I would like to draw attention to an analysis of the Bulgarian professor Marusya Lyubcheva dated February 25, 2022, published on the Internet portal Pogled.info, which describes a certain chronology of this conflict and tracks the change of certain relations from strategic partnership to military conflict (2023a). In the years when Bulgaria joined the European Union, the European Union was developing documents for a strategic partnership with Russia. Until 2009, the Strategic Partnership Report with Russia went through discussions in the European Parliament and was structured on trade, economy, energy, climate change, research, education, culture, security, including the fight against terrorism, non-proliferation of nuclear weapons and conflict resolution in the Middle East. Discussions covered Russia's accession to the World Trade Organization, which took place several years later. Russia was part of the Black Sea Synergy, the comprehensive report that placed not only the six Black Sea countries but also the wider Black Sea region in an important region for the European Union. Until the moment the European Union made a reorientation towards the Eastern Dimension or Partnership. The Black Sea region was forgotten and until 2018 it remained with only one report after the Synergy, delayed in its implementation. Everyone had high hopes for the Eastern Partnership. The signing of declarations of closer co-operation between the European Union and Ukraine, Belarus, the Republic of Moldova, Georgia, Armenia and Azerbaijan organized their relations.

It was also part of the neighborhood policy, defined by J.M. Barroso as "forming a circle of friends" and was implemented for the purpose of mutually beneficial economic and political relations between the European Union and the neighboring countries. The discussion also covered the South Caucasus region. The Eastern Partnership together with the Strategic Partnership between the European Union and the Russian Federation, offered a new approach to East-West relations, based on cooperation and mutual support for building a more secure and sustainable world order. Until it became clear that the idea was not purely European. The limit was in 2013 - Ukraine. When the aspirations of the Eastern Partnership countries for NATO membership began to dominate and displace the principles of the original idea. Many of the iconic politicians in the European Union at the time began to talk about modifying the Eastern Partnership. However, the events in Ukraine took place. Today we call them a "revolution", but in 2013 they were not named that. Only a few MEPs waved the Ukrainian flag in plenary and set out on a revolution in that country. There were also different opinions. And no one has the right to forget that. Personal archives also speak. Artificial and one-sided support of these events, without trying to solve the arisen problems through diplomacy. One conflict always involves at least two sides. And this conflict involved many countries. So, resolutions to impose sanctions were issued, one after the other, negotiations took place, certain pawn candidates were imposed in the elections in Ukraine, the government was financed without proper control as to what for and how the funds are used, funding of foreign NGOs that pursue policies not typical even for Ukrainians. Surely these backstage schemes will come to light one day, because the documents proving it are still there. Tension that has transformed the strategic partnership into a constantly evolving sanctions regime, in which the European Union has participated more and more. Economic crisis, energy security strategies that went wrong, difficult negotiations on climate change, not very successful foreign policy, complicated negotiations on the migrant crisis, etc. Despite attempts to come to an agreement, incl. Minsk agreements (which Ukraine has long refused to fulfill), the European Union has not done everything necessary to save itself. Surely, not all countries are democratic, according to officials in the European Union or the United States, but nowhere can democracy be imposed by force or behind the scenes. If it is necessary to force it, the risk of identity destruction or removal of dissidents is particularly high. Many people today are contemplating and looking for the ones to blame. For years, Europe, including Ukraine, has been guided by various desires, incl. the desire to bring back the attitudes to certain groups of people characteristic for the years of fascism. Who condemned or sanctioned them? Who condemned the so-called Maidan? Did the truth about the so-called Maidan come out? It turns out that we, Europeans, have not only supported the imposition of democracy and freedom. We imposed someone's interests, along with other external forces. The situation required a lot of strategic vision and assessment, which was the possible outcome. It required leadership devoid of the black and white thinking. There are at least two sides in a conflict, but this conflict involved more than two countries. We are all in this conflict. Now no one has the right to just blame". The complexity of this situation is determined by the special dynamics, as well as by the fact that societies and countries have different assessments of what is happening. Making quick decisions in this case is necessary, although there is a high risk that they would be ineffective. The strategic goals for overcoming this crisis are inconsistent due to the fact that the societies determine their strategic policy first of all in terms of national interests and then their belonging to certain political unions. The development of the crisis seems to be on parallel axes, and the complexity of the development of the economic and information component changes the attitudes and interests of the respective societies, as well as the consequences of certain strategic decisions. The restriction of certain freedoms related to access to reliable information is reminiscent of the Cold War. And this is an element of implementing the strategies of all participating countries.

This objectively dooms the people from the respective community to the one-sidedness of the received information and the lack of at least partial objectivity for its comparison. Probably such deep military crises create conditions for shifting the democratic conditionality and applying the elements of the tactical military art. Whether they give the appropriate result is difficult to predict when you are part of a crisis situation. All political leaders who are called to govern societies carefully determine or rather justify good or bad decisions and strategies they prepare for crisis management, with the national security of their societies. In any case, this has the greatest weight in determining the relevant strategic decisions, but they are not always adequate to the respective realities inside and outside the respective societies. Last but not least, the preparedness of the various levels of government is a response to the crisis. According to Linus Carl Pauling, "Science is the search for truth, the effort to understand the world: it involves the rejection of bias, of dogma, of revelation, but not the rejection of morality."(2023b). Do scientists play a part in crisis management and what is their role? They definitely do! The role and mission of scientists is not only to support this process, but to be part of the process of developing such strategic decisions in management, which would as much as possible and as quickly as possible meet the expectations of societies. This raises expectations about whether scientists are able to generate good enough ideas to convince societies about their usefulness and to suggest ways to effectively implement them. Due to the knowledge of the processes, the analytics with which scientists work and the ability to analyze databases, as well as the facts about each crisis, scientists can be at the forefront of the crisis management model. Another question is whether management elites rely on scientists or crisis management is done with other tools that do not involve scientists that much. It is a question of relevance, of conformity assessment, of systematicity, of justification and of the application of two principles which are applied in the technological sciences, namely the "principle of reasonable sufficiency" and the "principle of synergy". Their implementation can "alleviate" evolving crisis situations, even the one we quoted above (2023b). All this is a task of paramount importance and it must be carried out constantly, especially in times of crisis. Today, when societies are divided and set precedents for public judgement of one party or another, give certain qualifications, I believe that international scientific forums are the time and place for such discussion to suggest solutions and proposals. Restricting the participation of both (depending on who organizes the scientific forum) is unacceptable and rather offensive and does not create opportunities for the best prepared and most informed environment to fulfill its mission as an innovator (2023b). And because I am a chemist, I will still use the words of Linus Carl Pauling, who said: "I recognize that many physicists are smarter than I am - most of them theoretical physicists. A lot of smart people have gone into theoretical physics, therefore the field is extremely competitive. I console myself with the thought that although they may be smarter and may be deeper thinkers than I am, I have broader interests than they have". Objectively good strategic decision-making requires, above all, good preparation of the people whose responsibility is to make them, and especially of the teams that provide essential scientific and intellectual resources for making the same.

3. MANAGEMENT OF SOCIAL SYSTEMS IN A PERIOD OF DYNAMIC CRISES

In the social sciences, social structure is the aggregate of patterned social arrangements in society that are both emergent from and determinant of the actions of individuals (Olanike, 2011a). Likewise, society is believed to be grouped into structurally related groups or sets of roles, with different functions, meanings, or purposes. Examples of social structure include family, religion, law, economy, and class. It contrasts with "social system", which refers to the parent structure in which these various structures are embedded. Thus, social structures significantly influence larger systems, such as economic systems, legal systems, political systems, cultural systems, etc.

Social structure can also be said to be the framework upon which a society is established. It determines the norms and patterns of relations between the various institutions of the society. Since the 1920s, the term has been in general use in social science (Merton, 1938), especially as a variable whose sub-components needed to be distinguished in relationship to other sociological variables, as well as in academic literature, as result of the rising influence of structuralism. The concept of "social stratification", for instance, uses the idea of social structure to explain that most societies are separated into different strata (levels), guided (if only partially) by the underlying structures in the social system. It is also important in the modern study of organizations, as an organization's structure may determine its flexibility, capacity to change, etc. In this sense, structure is an important issue for management. On the macro scale, social structure pertains to the system of socioeconomic stratification (most notably the class structure), social institutions, or other patterned relations between large social groups. On the meso scale, it concerns the structure of social networks between individuals or organizations. On the micro scale, "social structure" includes the ways in which "norms" shape the behavior of individuals within the social system. These scales are not always kept separate. For example, John Levi Martin has theorized that certain macro-scale structures are the emergent properties of micro-scale cultural institutions (i.e., "structure" resembles that used by anthropologist Claude Levi-Strauss). Likewise, in ethnography, a recent study describes how indigenous social structure in the Republic of Panama changed macro social structures and impeded a planned Panama Canal expansion (Muller-Schwarz, 2015). Marxist sociology has also historically mixed different meanings of social structure, though doing so by simply treating the cultural aspects of social structure as phenomenal of its economic aspects. Social norms are believed to influence social structure through relations between the majority and the minority. As those who align with the majority are considered 'normal', and those who align with the minority are considered "abnormal", majority-minority relations create a hierarchical stratification within social structures that favors the majority in all aspects of society.

3.1. Transformations of social systems and structures

The social structures in the existing social systems are subject to many emerging tensions which are of different character and nature. The intensity of the impact of the factors of the social environment is different and creates essential conditions for extraordinary and drastic change. The existing outdated approaches and methods in crisis management cannot implement the intended set of actions and restore the system to an equilibrium position. All this poses a set of questions that should first be defined and then thoroughly researched and analyzed. Critical situations arising with great dynamics, which lead to a complete comprehensive crisis in social systems, lead to their uncontrollable state. The consequences of such a state are dangerous as a whole for the system itself, as well as for everyone involved in it. Military conflicts, mass strikes and discontent, social inequality, change of ruling regimes in a violent and undemocratic manner, and many others are factors that cause serious upheavals in social systems. Established social relations are questioned and unwanted processes are provoked that discredit them. The social and relevance of societies are put under serious tests, which requires the social leaders of societies to look for an opportunity for rapid change before the social systems collapse. The social structure of a system appears to be as stable as the relations between its elements are not threatened with disintegration. In recent times, there has been a permanent confrontation between the elements of the existing social systems.

3.2. Historical development of social systems and structures

The historical development can be traced as follows:

In the late 1890s, both Émile Durkheim and Ferdinand Tönnies foreshadowed the idea of social networks in their theories and research of social groups. Tönnies argued that social groups can

exist as personal and direct social ties that either link individuals who share values and belief (Gemeinschaft, German, commonly translated as "community") or impersonal, formal, and instrumental social links (Gesellschaft, German, commonly translated as "society") (Tönnies, 1887). Durkheim gave a non-individualistic explanation of social facts, arguing that social phenomena arise when interacting individuals constitute a reality that can no longer be accounted for in terms of the properties of individual actors (Durkheim, 1893). Georg Simmel, writing at the turn of the twentieth century, pointed to the nature of networks and the effect of network size on interaction and examined the likelihood of interaction in loosely knit networks rather than groups (Simmel, 1908).

3.2.1. Moreno's sociogram of a 2nd grade class

Major developments in the field can be seen in the 1930s by several groups in psychology, anthropology, and mathematics working independently (Scott, 2000a; Scott, Carrington, 2011b; Scott, 2000b). In psychology, in the 1930s, Jacob L. Moreno began systematic recording and analysis of social interaction in small groups, especially classrooms and work groups (see sociometry). In anthropology, the foundation for social network theory is the theoretical and ethnographic work of Bronislaw Malinowski (Malinowski, 1913), Alfred Radcliffe-Brown (Radcliffe-Brown, 1930; 1940), and Claude Lévi-Strauss (Lévi-Strauss, 1967). A group of social anthropologists associated with Max Gluckman and the Manchester School, including John A. Barnes (Barnes, 1954), J. Clyde Mitchell and Elizabeth Bott Spillius (Freeman, Wellman, 1995; Savage, 2008), often are credited with performing some of the first fieldwork from which network analyses were performed, investigating community networks in southern Africa, India and the United Kingdom (Scott, 2000a). Concomitantly, British anthropologist S. F. Nadel codified a theory of social structure that was influential in later network analysis (Nadel, 1957). In sociology, the early (1930s) work of Talcott Parsons set the stage for taking a relational approach to understanding social structure (Parsons, 1949; 1951). Later, drawing upon Parsons' theory, the work of sociologist Peter Blau provides a strong impetus for analyzing the relational ties of social units with his work on social exchange theory (Blau, 1956; 1960; 1964). By the 1970s, a growing number of scholars worked to combine the different tracks and traditions. One group consisted of sociologist Harrison White and his students at the Harvard University Department of Social Relations. Also independently active in the Harvard Social Relations department at the time were Charles Tilly, who focused on networks in political and community sociology and social movements, and Stanley Milgram, who developed the "six degrees of separation" thesis (Bernie 2009). Mark Granovetter (Granovetter, 2007) and Barry Wellman (Wellman, 1988) are among the former students of White who elaborated and championed the analysis of social networks (Granovetter, 2007; Mullins, 1973; Tilly, 1974; Wellman, 1988). Beginning in the late 1990s, social network analysis experienced work by sociologists, political scientists, and physicists such as Duncan J. Watts, Albert-László Barabási, Peter Bearman, Nicholas A. Christakis, James H. Fowler, and others, developing and applying new models and methods to emerging data available about online social networks, as well as "digital traces" regarding face-to-face networks.

3.3. Conditions for changes in social systems

It is relatively certain that in the near time, in a historical aspect, substantial and irreversible changes will occur in social systems and their structure. Changes at the macro level are brought about by the large set of crises that cannot be contained by familiar standard procedures. The essential question remains what these rapid changes will be and what consequences they will bring at the micro level. It is natural for the social system to make certain efforts to preserve itself and to resist the impacts on it. Many different examples can be translated into a new situation or successive stage of existence of the social system.

They will complete the picture of the qualitatively new and different situation that has arisen. Social leaders will have an increasing and significant influence on it and will try to manage the processes of change. For example, the Bilderberg Club was founded in 1954 and takes its name from the Dutch hotel where the first meeting was held. The founders are the influential British politician Dennis Healy, Joseph Rettinger, David Rockefeller, and the Dutch Prince Bernhard, writes Trud. The official reason for the creation of the Bilderberg group is the need to improve mutual understanding between Western Europe and North America through meetings of the most influential people in an informal setting or to establish democracy throughout the world. The conferences are financed from the budget of friendly corporations such as Nokia and Fiat. Members of the Bilderberg Club like to think that it is an organization of enlightened minds committed to the ideals of liberal democracy and the organization of a better order in our world. David Rockefeller at a group meeting in 1991 spoke unequivocally about this: "We are grateful to the Washington Post, New York Times, Time magazine, and other prominent publications whose leaders have attended our meetings for nearly 40 years and thank them for their discretion. We could not have developed our world order plan if the spotlight had been on us all these years. But in our time the world is more advanced and ready to move toward world government. The supranational sovereignty of the intellectual elite and world bankers is undoubtedly preferable to the national self-determination practiced in past centuries." But what is this notorious world order plan? Many critics have suggested that the group has darker motives. Perhaps this is the engine of the globalization process. Perhaps this organization wants to form a new world in which everyone buys the same goods, watches the same movies and TV programs, and believes the statements of the same politicians. Perhaps the critics are right and the group's goals are far more sinister? For example, the creation of a worldwide neo-Nazi state? (The meetings discuss effective ways to control the birth rate and reduce the population by 80%). (2024a).

4. CONCLUSION

The process of successive crises leads to the deepening of imbalances in social systems. The varying scale and intensity of the impacts on them put them through a series of cyclical trials. Establishing the scale of the changes that occur at the macro and micro levels is difficult to measure and the consequences are almost unpredictable. The standard toolkit of methods and approaches turns out to be insufficient to define and characterize all of this. The main factor is the speed of the processes and the lack of effective time for precise and objective analyses. This presents us as participants in transforming social systems with a set of challenges and tests of our fitness to be able to accept and adapt successfully to the changes that are occurring. The study of these processes requires a full-scale effort and different expertise. This is also imperative from the point of view of forecasting and planning the transformation processes and an effective solution for getting out of the critical state in which social systems fall. (Terziev, 2022a; 2022b; 2022c; 2022d; 2022e; Terziev, 2023c; Terziev, Lyubcheva, 2022f; Terziev, Solovev, 2022g; Terziev, Georgiev, 2023d; 2023e; Terziev, 2023f; Terziev, 2024b)

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LEARNING WEB DEVELOPMENT TROUGH GAMIFIED APPLICATIONS

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ABSTRACT

The human species has an inherit need for playing games that has been shown in all technological advances. A couple of mechanism in the human body activate while playing, and one of the more important ones is immersion, a complete dive into something virtually created. Gamification is also a term closely related to games which tries to use the process of immersion to teach complex things. As have, through the last decade, technologies related to the internet marked a strong growth, there developed a need for creative was to learn new possibilities of HTML, CSS and JavaScript. A part of web developers took the opportunity and developed web applications that teach new possibilities through implementing gamification. In this paper 5 applications of this kind were analysed through 5 questions.

Keywords: *game, immersion, gamification, internet, application, CSS, flexbox, grid, JavaScript*

1. INTRODUCTION

There is evidence that humans used to play games since the beginning of civilizations, from the archaeological evidence of ball games to dice made of bone or terracotta. Men surely used to play even before any archaeological evidence suggests. First board game, found in the archaeological digs in Egypt, was at first named "The game of thirty squares" to be later named Senet or Senat. First proof of this game dates around 3000 BC, and the interesting fact is the game was played by Alexander the Great, 3000 years later, when he conquered Egypt (Donovan, 2018). That is why it's no surprise that today different ways of playing games are present in our everyday life. To define the term game is nearly impossible as different definitions can consider only some forms of games, and other forms are neglected or overlooked. To put together games for children, sports games, board games or computer games into one definition is a monumental task. Computer or video games have taken the front position in todays world of games, especially when we talk about young adults and children. Adults, who have grown up when the computer technology was in a state of intensive growth and with it the development of computer game industry, now explore how human body mechanisms that activate while playing games and how they affect other segments of life, not only entertainment. One of the more important mechanisms that influence a computer games success is called immersion. Immersion is, according to the online Cambridge dictionary (Cambridge University Press & Asessment, 2024), "the fact of becoming completely involved in something". Robbie Cooper, a photographer, started his photographic and videography project called Immersion (Cooper, 2023) (National Science and Media Museum, 2010) (Smith, 2022) in 2008. Project involved recording subjects of various ages in interaction with a screen that had an integrated camera. The subjects played video games, watched TV, movies, or series. Result of the project is a fascinating collection of photos with subject totally immersed in what's happening on the screen, where the group of subjects playing video games stood out the most. The project resulted with few videos and a series of exhibitions. Body language of the subjects recorded during playing video games, shows a total immersion in the world and the mechanics of the game and peak concentration.

2. LEARNING TROUGH PLAYING

One of the most frequently used terms in the process of combining systems that are used in games and learning is the term gamification. The word was coined at the end of 2002 by Nick Pelling, game designer and consultant. He had a thought of explaining the usage of game user interface design, through which electronical transactions could become pleasant and fun (Pelling, 2011). Bigger use of the principle started during the 2010's where a lot of authors started applying game mechanisms to accomplish tasks. That is why defining gamification has a few approaches where Zichermann and Cunningham (Zichermann & Cunningham, 2011) write about the thinking process and game mechanisms that engage users and solve problems., while Kapp (Kapp, 2012), using definitions of few other authors, expands his and qualifies gamification as using mechanisms, aesthetics and way of thinking in games, to engage users, motivate activity, promote learning and solve problems. Through years the term was split and different approaches of game mechanics application in the learning process where developed, that initiated the development of additional terms like serious games, playful learning, and game-based learning (Plass, Mayer, & Homer, 2019). This paper won't make comparisons between specific approaches in gamification application but will analyse the approach of learning basic and advanced web development principles in HTML, CSS and JavaScript trough gamified web sites and web applications, that are free of charge, and are shown in table 1.

Table 1: List of tested applications

Name	Publisher	Knowledge needed	Year of publishing
CSS Diner	Luke Pacholski	HTML/CSS selectors	2016.
Flexbox Froggy	Codepip	CSS flexible box layout module	2015.
Grid Garden	Codepip	CSS grid layout	2017.
Flexbox Zombies	Mastery Games	CSS flexible box layout module	2017.
CodeCombat	CodeCombat	JavaScript	2013.

Source: author

3. APPLICATION ANALYSIS

All applications that are being analysed in this paper, except one, are completely free and most of them can be used without any login. They are not time consuming, and most of them can be finished inside one school period. In each application, the problems are solved by writing lines of code, and the effects of the code are displayed on the screen in real time so that the effects of the code on graphic elements are visible immediately. The goal of this application comparison is to see in which way these applications can contribute to learning HTML, CSS, and JavaScript. Compared where the ways in which gamification was used, which type of game it emulates, know much does the user have to know beforehand that the application can be used optimally, how the user inputs the code, and how the effects of the code are shown, how the applications show when there are mistakes in the code and the value for the user of learning coding through the application. Application comparison was done by the author of the paper, a web developer with 20 years of experience, so that the following research questions could be answered:

- RQ1: Which web development segment does it try to teach?
- RQ2: Which video game genre does it emulate?
- RQ3: Any previous knowledge needed to use this application?
- RQ4: How does the code input function, and how does the application react to this input?
- RQ5: How much can the users benefit from using this application?

These 5 questions were formed so that the comparison of applications could be made on a objective basis.

3.1. CSS Diner (Pacholski, 2016)

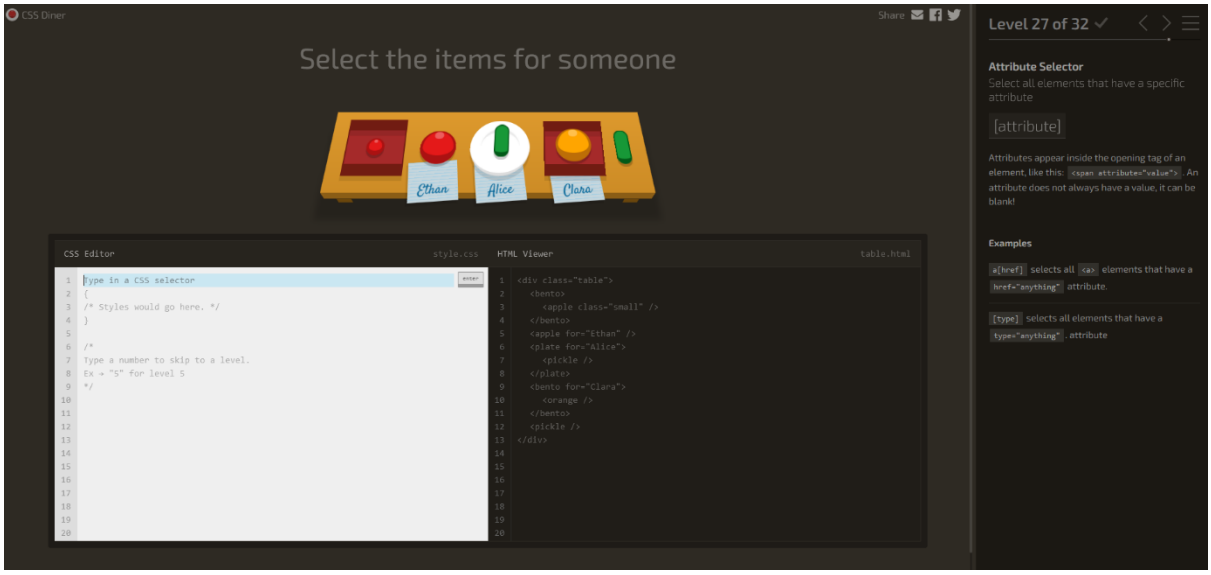

Figure 1: CSS Diner user interface

- RQ1: This application teaches how HTML elements are selected in CSS.
- RQ2: Gamification elements are taken from the adventure and puzzle games genres, where the user must find a way to select one or more elements on a specific level, to advance to the next level.
- RQ3: It's good to have some prior knowledge, but basic knowledge is enough.
- RQ4: The application is visually horizontally divided into two parts, where there is the assignment for the exercise on the top, and below a window with the HTML code, and a space to write CSS code – the solution of the exercise. If the code is wrong, the application shows it with a small animation, and when the solution is correct, the user goes to the next level.
- RQ5: The application gives good basic knowledge how selecting HTML elements can be made in CSS in many ways, but the problem is with the exercises that are shown abstractly and it's hard to apply gained knowledge in real world projects.

3.2. Flexbox Froggy (Codepip, 2015)

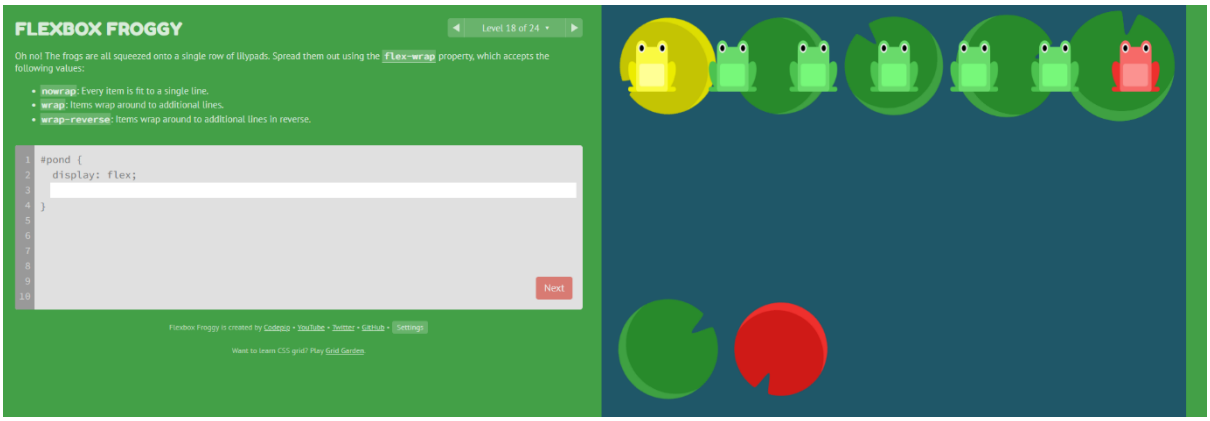

Figure 2: Flexbox Froggy user interface

- RQ1: This application teaches how to use the CSS flexible box layout module, usually called flexbox.
- RQ2: Gamification elements for this application are also taken from the adventure and puzzle games genres, where the user must find a way to move elements according to the assignment, to advance to the next level.
- RQ3: For this application, knowledge of web development layout concepts is needed. Flexbox isn't a subject for web development beginners.
- RQ4: The application is visually divided vertically into two parts, where on the left there is the assignment, problem explanation, and the place to write CSS code – the solution to the problem. On the right the element layout is shown. If the written code is wrong, the application shows it with a short animation, and when the solution is correct, the user goes to the next level.
- RQ5: Users can learn ways to use flexbox and all currently available flexbox properties, and the learning is fun. Problems occur when the user must apply the properties shown in examples in real world projects.

3.3. Grid Garden (Codepip, 2017)

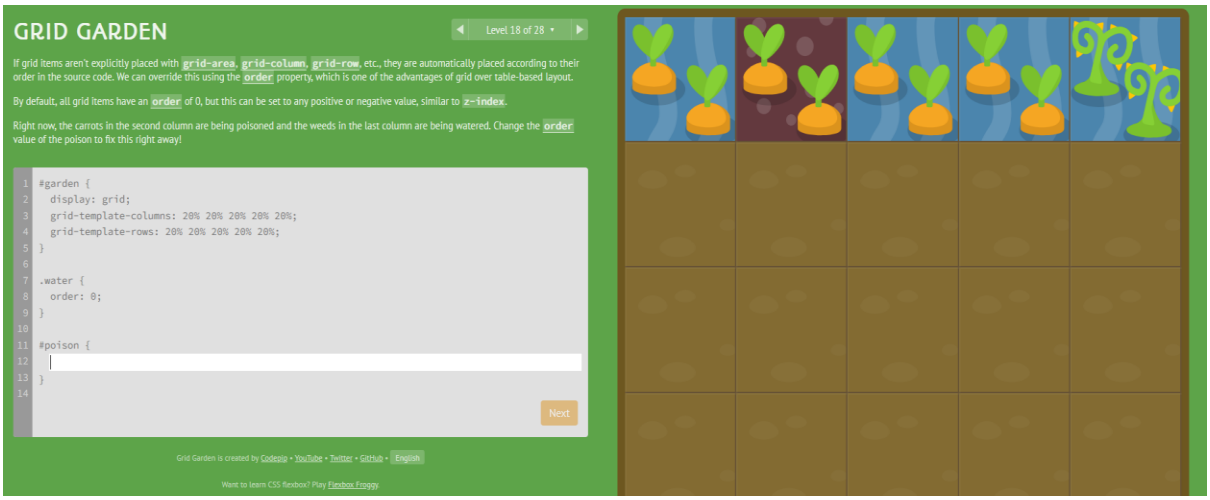

Figure 3: Grid Garden user interface

- RQ1: This application teaches the basics of the CSS grid layout module.
- RQ2: Gamification elements for this application are also taken from the adventure and puzzle games genres, where the user must find a way to move elements according to the assignment, to advance to the next level.
- RQ3: For this application, knowledge of web development layout concepts is needed, and some knowledge of flexbox is also welcome.
- RQ4: As the application publisher is the same as in Flexbox Froggy, the visual concept is the same, and functioning of the application. The user solves 28 levels of exercises, from the easier one to the more complex.
- RQ5: CSS grid concept is illustrated in a fun way with a lot of exercises, where all basics and a few advanced concepts can be learned. There is still the same problem when the user must apply the properties shown in examples in real world projects.

3.4. Flexbox Zombies (Mastery Games, 2017)

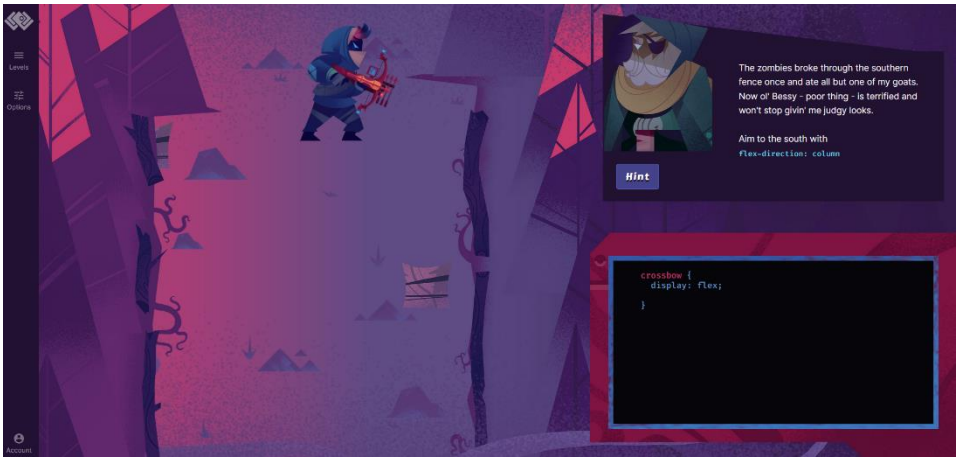

Figure 4: Flexbox Zombies user interface

- RQ1: This application teaches how to use the CSS flexible box layout module.
- RQ2: This application has advanced graphics and the element of gamification, where the user is a zombie hunter, and solves problems with the help of his guide. Because of this, it can be considered a turn-based fantasy game. The user follows a story, and, in this way, a bigger level of immersion is accomplished, with an amplification of the problem-solving motivation.
- RQ3: It is welcome to have prior knowledge of layout concepts in web development, but the application functions like a real game, so prior knowledge is not needed to motivate the user.
- RQ4: Applications user interface is divided into two parts, where in the bigger segment user follows the story through animated sequences, and in the smaller part the code is written. Mistakes in the code are not shown, only the right answer is animated. The problems make the story of the game, so the user cannot skip specific problems, but he can return to problems already solved.
- RQ5: Flexbox concept is explained in a very fun way and the user can learn all the principles of flexbox, but there is still the problem when the user must apply the properties shown in examples in real world projects.

3.5. CodeCombat (CodeCombat, 2013)

Figure 5: CodeCombat user interface

- RQ1: This application teaches programming languages JavaScript, Python, Lua, C++ and Java.
- RQ2: This application is the only one from this list that can be considered, in the full meaning of the word, a game. When looking at game genres, the application is an RPG1 game. The user pics a character and then he can customize the look of the character, use armour, tools, and clothes. Character also gains experience, develops, and unlocks new options.
- RQ3: Previous knowledge isn't needed because the game starts with concepts for beginners and advances to more complex concepts.
- RQ4: User interface is just like in standard games of the RPG type. While solving problems, the screen is divided into two parts, where the bigger one is reserved for the game and animations, and on the left edge there is a column for writing code. Once the code is run, an animation sequence starts at the end of which the user is informed if the task was completed successfully.
- RQ5: JavaScript is explained from beginners' concepts to advanced blocks of code and a significant improvement can be achieved. The goal of the application isn't only to learn. There is also an option to learn in a virtual classroom, where the person who assumes the teacher role, can control the virtual classroom, can follow the improvement of students, and give advice. In this way collaboration can be achieved. As the students can collaborate inside the game, there is more room to go from abstract concepts to using these concepts in real-world projects.

4. CONCLUSION

Using and analysing the before mentioned applications, a conclusion can be made that there are web applications that successfully import game elements inside the learning process. Gamified applications mostly teach single concepts or segments of web development technologies. Learning with this approach is easier more fun. If this concept is applied inside a classroom, there is a bigger chance of developing a competitive atmosphere which can further the educational process. None the less, most of these gamified applications don't give an answer to how this web technologies are applied in real-life projects. Another problem is the small amount of time that must be used to learn through these applications, because there is a small number of levels in free to play applications. Gamified approach to learning web development is interesting, and potentially successful, but more thought must be given to how gained knowledge can be applied in a project. There are more free games that teach same or similar concepts through gamification, and even more ones that have a fee. This way of learning is a fun concept and can be a fun way to supplement teaching of web development. To maximize the effect of learning in this way, it is recommended to use these applications in a classroom environment, with an experienced web developer as a moderator, the encouragement of discussion between users, and planning of how to implement these concepts.

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