Varazdin Development and Entrepreneurship Agency and **University North**
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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Economic and Social Development

108th International Scientific Conference on Economic and Social Development –
„Financial Literacy for Economic and Social Development“

Book of Proceedings

Editors:
Humberto Ribeiro, Daniel Tomic, Igor Klopotan

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MANAGEMENT IN THE FUNCTION OF MANAGING HUMAN RESOURCES IN ORDER TO ACHIEVE BUSINESS EXCELLENCE

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ABSTRACT

Management and human resources are the basis of the functioning of every company. The perception of the importance of human resources has changed throughout history, but today they are the most important factor of a company, putting material assets in second place. Human resource management is a process and a skill, and as a result, it can have multiple effects, both positive and negative. Quality strategies for assessing future manpower needs and procurement processes affect business. Human resource management mistakes affect business, employees, customers, stakeholders, that is, the entire internal and external system of the company. By implementing a quality system and quality management, companies have all the predispositions to achieve business excellence, which is reflected in all factors of the company, from employees, managers, owners and other stakeholders.

Keywords: *management, human resources, human resources management, quality management, business excellence*

1. INTRODUCTION

Today's movements indicate rapid and extensive changes, and the dominance of knowledge as fundamental resource on which social and economic is based development. The first step in the management process changes should be made by the management of the company is to recognize the situation in which there are changes necessary and necessary. When introducing changes in business system must be given equal attention restructuring process and management process human capital. Both processes are equally important for business excellence. In such conditions it occurs expresses the well-known thought ‘‘without a satisfied own staff, there is no satisfied customer, owner, manager and environment". The development and globalization of society bring various novelties, both to society and to business. Business processes, new technologies, management style and various other business segments play a major role in the achievement of company results. The purpose of this paper is to explain the importance of human resources in business and the achievement of business excellence, and to point out the importance of human resource management so that companies can achieve excellent business results in the future. As it is a process, the results may not be immediately visible, but in the long run they have great significance for the business.

2. THE CONCEPT OF HUMAN RESOURCE MANAGEMENT

Management is a very complex concept in defining which problems such as these arise semantic, as well as those of a content nature. From the semantic side, the problem arises in the fact that the word management itself overlaps with other words such as leadership, organization,

leadership, supervision, control and direction, so in professional literature the terms are often identified (Buble, 2006: 3). According to Buble (2006: 4), the term management refers to the process, holders of certain functions, skill, scientific discipline, profession, and sometimes to a function in the company. According to Gutić (2019: 13), human resources management was born in the lap of general management at that moment when the theories and practice of management clearly established and confirmed that it was then unsustainable management philosophy. Human resource management developed from the concept of management and the importance of human resources potential, which was gradually and over time increasingly emphasized. The multidisciplinarity of human resource management is the reason for the large number of definitions of this term with an emphasis on the individual approach to man. According to Bahtijarević-Šiber (1999: 25), the living factor of company organization today is made up of people, human resources, i.e. personnel. Those with their knowledge, skills, abilities and creativity today they contribute the most to the successful achievement of the company's goals. Human resources are greatly differed from material resources because material resources can sometimes be copied, while human resources unique to each company. Although two companies have the same number of employees, the same qualification and professional structure, the same age and gender structure, does not mean they have identical human resources. Total intellectual, professional organizational and others abilities are not a simple sum of individual abilities, but a new quality that depends on other factors. What differentiates them is the overall human management practices and programs potentials, organizational culture, structure, general social relations, management style, etc.

3. STRATEGIC MANAGEMENT OF HUMAN RESOURCES

Human resource management is the most important function of human resource management. The planning of human resources in the company is an important item on which the future success of the company's business and the general satisfaction of the employees depend. The company must decide on future manpower needs based on forecasts or expert opinions. If the needs of the company are small, there will be layoffs of employees using various methods that have a greater or lesser impact on the employees and a faster or slower impact on the company's operations. If there is a need to increase the number of people in the company, professionals are obliged to start the process of hiring people, i.e. announcing job vacancies through various platforms. It is possible to acquire people from internal and external sources, each of which has advantages and disadvantages. If the company has decided on a recruitment strategy, it is important that the candidates go through the entire selection process in order to choose the most suitable person for the required position. The selection process varies from company to company, and I always start by collecting documentation, solving various tests, and selection discussions, that is, interviews. A decreasing number of candidates enter each new round of interviews. A letter of intent is written to the selected candidate, and if the candidate accepts it, the entire process ends with employment. Improving and monitoring the performance of employees is important due to the formation of the employee's profile. Based on their competences, every employed person should have the right to some form of training and advancement. Monitoring is important because in this way information is obtained that is essential for some subsequent planning processes. Rewards and motivation play an important role in employee performance, because in this way employees are encouraged to make the most of their knowledge and skills, the ultimate goal of which is to achieve business excellence. Noe (2006: 146) cites consumer markets, which affect the demand for their products and services, and labour markets, which affect the acquisition of people to produce products and services, as the two most important ways in which social trends affect employers. In certain situations, surplus labour will produce costs that cannot be recovered during periods of low product demand, and in other situations, labour shortages will limit growth during periods of high

demand. There are three key ways to effectively use the labour market as a competitive advantage, according to Noe (2006: 46):

1) Companies must have a clear idea of their current configuration of human resources, especially they must know the strengths and weaknesses of the workers they currently employ.
2) Organizations must know where they are headed and be aware of the relationship between their current configuration of human resources and the configuration they will need in the future.
3) When there is a discrepancy between the current configuration and the configuration that will be needed in the future, the organization needs programs to take care of that discrepancy, which in conditions of labour surplus may mean creating an effective workforce reduction intervention, and in conditions of labour shortage this may mean preparing effective recruitment campaigns.

The process is based on the current needs for human resources within the company, which provides a basis for forecasting future needs for human resources. Emphasis is not placed on the labour market as in the previous model. The next step is formulating a strategy, and in accordance with the previous model, controlling and monitoring the process. According to Buble (2006: 370-375), the basic model of systematic human resources planning consists of an assessment of current needs for human resources, a forecast of future needs for human resources, formulation of a human resources strategy, and evaluation and updating. Buble (2006: 370-375) claims that the first step in the process of human resources planning is the assessment of current needs for human resources, that is, the task of this analysis is to first identify the personnel potential of the company, and then to evaluate the conformity of the identified potentials with the goals of the company. The analysis should provide answers to the questions of what personnel the company has at its disposal, what is the degree of qualification of the available personnel, what is the degree of qualification of the jobs, what is the distribution of personnel by types of processes and what is the distribution of personnel by basic groups of jobs, therefore the basis of this analysis is the creation of files employee and jobs file. According to Noe (2006: 147), forecasting is the first step in the planning process, so in personnel forecasting, the human resources manager tries to determine the supply and demand for different types of human resources. The goal is to predict the area in the organization where there will be a shortage or surplus of labour in the future. Forecasting the future state can be done using statistical methods or using judgment methods. Although the best option is a combination of both methods, statistical methods are excellent for tracking historical trends in labour demand and are much more accurate than those achieved through subjective judgment. On the other hand, certain events that appear on the labour market for the first time without historical support, need the subjective judgment of experts, which can be the only source of future conclusions. Noe (2006: 147-150) claims that on the basis of predictions, it should be determined:

1) Demand for labour force;
2) Labour supply;
3) Surplus and shortage of labour force.

Noe (2006: 147) argues that labour demand forecasts are developed for specific job categories or skill areas that relate to the current and future state of the organization. After the categories or skills are detected, the manager must obtain information that will help him predict the needs for people who have these skills or belong to these job categories, or whether they will increase or decrease in the future.

He lists the two main methods of forecasting labour demand, namely the method of leading indicators and the method of subjective opinion, and recommends the combination of one and the other as the most effective for the company. By determining the labour supply, a detailed analysis of the current number of people in various job categories within the company is obtained. The analysis is upgraded with predictions so that future changes in the near future are also displayed on the same. As in the case of labour demand, labour supply forecasts can be made using historical statistical methods or judgmental techniques (Noe, 2006 :148). The forecast of future needs is the second step of human resources planning, and personnel planning is much more difficult than determining current needs because today's conditions in which the company operates will not be the same tomorrow. The variables from which the manager starts in predicting the need for human resources are the future demand for the company's products, the future business economy, technological innovations, financial opportunities and changes in the business strategy. When forecasting future staffing needs it is also important to predict the external and internal supply of personnel. Forecasting external supply results from demographic trends, unemployment trends, changes in the occupational structure, trends in the need for a specific occupation, etc. The methods used to forecast external supply are most often expert assessment methods and simulation methods (Buble 2006: 370-375). Buble (2006: 370-375) claims that by forecasting the internal supply, one wants to determine the possibility of meeting future needs for personnel from the existing personnel pool, so based on information about employees, the following are created:

1) Staff tables – pictorial representations of all workplaces in the organization based on which the current state of the number of employees and filled workplaces, as well as future employment needs, can be seen.
2) Review of qualifications – review of school qualifications, work experience, professional interest, specific abilities, skills, jobs that the individual performed within the organization.
3) Review of management – a specific review of qualifications related to management.
4) Replacement cards – shows position holders, age, performance evaluation and the possibility of promotion.

Assessment of the current situation, both of the market and of the company and the need for human resources, is the first step in the planning process of human resource management. On the basis of a certain guideline, it is necessary to make predictions related to the appearance of a future surplus or shortage of labour and thus adapt to the market and remain financially at zero in terms of human resources. Predictions can be made based on past events or based on the expert opinion of people qualified in this field. Noe (2006: 148) states goal setting and strategic planning as the next step in his human resource planning process model. The purpose of setting a goal is to find a solution to the problem of surplus or shortage of manpower. These goals must derive directly from labour supply and demand analysis and must contain quantitative analyses that will show what will happen to a particular job category or skill area by a certain point in the future. After setting goals, the company needs to choose from among the many different strategies available to eliminate the surplus or shortage of labour.

4. QUALITY AND BUSINESS EXCELLENCE

Quality has taken on different meanings over the years. At the beginning of the 20th century, it meant inspection. All the finished products were rechecked, and some defects were corrected. In the 1940s, the word quality has acquired a statistical connotation. Pioneers of statistical quality control – like Shewhart, Dodge, Roming and Nelson - developed the idea that every production process is subject to a certain level of natural variation. It is the job of managers in charge of control quality was to, using statistical methods, discover that level and ensure production control process.

To include all other functions, in the 60s quality was extended beyond production using the concept of total quality control. With full quality control, the entire organization is mobilized in helping to create a quality product. Meanings of the term quality today has been expanded to include error-free, continuous production improvement and focus on the consumer (Lazibat, 2009: 41). Kotler (1998: 39) defines quality as a set of properties and characteristics of a product or service which affect his ability to satisfy expressed or unexpressed needs. Business excellence was observed from the context of the quality of the offer and guest experience. If sees quality as something related to good, average organization, then excellence ensures an excellent offer, experiences and results, and such companies become extremely successful. Therefore, it is considered that only quality - mediocrity is the enemy of excellence. It is also one of the main reasons why only some companies achieve excellence and achieve an offer that excites users and encourages progress. According to Oslić (2008: 160-161), models of excellence represent systematic, integrated and more permanent approach to improvement, that is, an integrated strategy for the gradual realization of business excellence. These models can serve to prepare the organization to compete for the appropriate level of excellence or for planning or continuous improvement. They enable objective determination of the position of the organization on the scale of excellence, but they also reveal the area in with which it is weak or strong. Discovered weaknesses represent valuable potential for improvement and should be used in annual quality plans and programs. More are possible approaches to the use of models, and to begin with, the structured approach was most often applied EFQM self-assessment questionnaire. Excellence, in the most general terms, means that what today we are doing well, tomorrow we must work even better and smarter, smarter than the competition in order to fully satisfied all interest groups. For an organization, excellence should most often mean the clear advantage of leaders and managers for continuous improvement of at least all key processes, creativity and innovation, working conditions, teamwork, motivation and general organizational cultures. At the employee level, excellence begins with their determination to do well on the first try, willingness to take responsibility, continuous learning, improvement and simplicity in everything they do.

5. METHODOLOGY AND RESULTS OF THE RESEARCH

The importance of human resources within a company is undeniably in the first place. Influence of people the company has changed throughout history, but today more than ever the emphasis is on people. In for years that are behind us, people had the habit of getting a job in a company and staying in the same one until retirement because it provided them with security in terms of income and future. Today, people they stay in companies for a short time and have a habit of changing jobs and the environment in which they work. Globalization, the growth and expansion of world markets, including new ones, have a great impact on these possibilities. For the purpose of carrying out the research of this work, a survey, that is, a survey questionnaire, was made. The questionnaire consists of four main parts. The first part refers to the elimination issue of s considering the sample. The second part of the questions were questions of the socio-demographic type were examined. In the third part, the factors of satisfaction at the respondents' workplace were examined, and in the fourth part partly the factors of an ideal company and the attitude towards certain conditions that companies offer. The third and fourth parts are designed in such a way that the questions are measurable with a Likert scale. The last question of the survey questionnaire was a free type question, which was not measurable for research, but due to freedom of comments and curiosity left in the survey questionnaire. The aim of the work is to detect the reasons why the workforce stays in the same company for a short time and the reasons for which she is willing to stay in the company for the long term in order to achieve business performance. The aim of the work is to prove that human resources management has a great influence on human resources in to the company, that is, by quality organization of work

and definition of working hours, accurate and clearly defined business tasks and requirements they set for employees, and others well-defined working conditions, has the ability to find, educate and retain quality human resources in the company and thus has the possibility of achieving exceptional business results success of the company.

- **Hypothesis 1**: Human resources are retained in the company for 6-12 months because of bad of human resources management in the company, and the same refers to the poor leadership of managers, undeveloped relations between management and employees, poor distribution of work tasks from by managers, and lack of motivation with bonuses, free days and other types stimulation by managers.
- **Hypothesis 2:** There is a positive correlation between quality management and long-term investments in human resources and retention of human resources in the company with the goal achieving business performance of the company.

Out of a total of 154 respondents, 150 respondents (97.4%) are employed in a company where they have a superior, while 4 (2.6%) are either unemployed or do not have a superior. 150 respondents are taken as a valid test sample of this questionnaire. The analysis of the sample shows that the majority of respondents are women, 114 of them (76%), while the smaller number are men, 36 (24%). The results show that respondents are divided into age categories 18-25, which is 32% of respondents, 26-35, 58% of respondents, 36-45, 7.3% of respondents and 46-55, 2.7% of respondents. The majority of respondents fall into the age category between 18 and 35 years (90% in total), while older respondents (between 36 and 55 years) are less represented in the sample. The results show that the largest number of respondents, 59 of them, which is 39.3%, have completed high school as their last level of education, also 44 respondents, 29.3% have completed undergraduate studies, and 43 respondents, which is 28.7%, have completed graduate studies. as the last level of education. The smallest part of respondents, only 1 respondent, which amounts to 0.7%, has completed elementary school as the last level of education. Most of the respondents have completed high school (39.3%), undergraduate studies (29.3%) or graduate studies (28.7%), which indicates that the respondents are educated and highly educated individuals. The largest number of respondents, 81 of them, have monthly incomes between 561 and 1000 euros, which is 54.0%. 53 respondents, 35.3% of them have an income between 1001 and 1500 euros. A smaller number of respondents have incomes outside these ranges.

Table 1: Cronbach Alpha

Reliability Statistics		
Cronbach Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,724	0,714	12

Source: authors' own work

The value of Cronbach Alpha is 0.724, which indicates moderately high reliability of the scale. This means that the research questions are relatively consistent in measuring the same construct, in this case, employee satisfaction and perception regarding communication, relationships with superiors, motivation at work and ideal company characteristics. A value above 0.7 is usually considered acceptable for research purposes. Inter-item correlations also indicate a certain level of association between individual items, although there are differences in the strength of these associations. This means that some questions are interrelated, while others are less so.

Table 2: T-Test for H1

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
How satisfied are you with communication with your superior in the company you work for?	150	3,03	1,220	0,100
How satisfied are you with the communication you have with your superior regarding the monthly work schedule?	150	3,27	1,247	0,102
How satisfied are you with the communication you have with your superior related to defining work tasks?	150	3,01	1,232	0,101
How satisfied are you with the communication you have with your superior regarding days off?	150	2,90	1,483	0,121
How satisfied are you with the communication you have with your superior regarding the possibility of advancement and training?	150	2,72	1,362	0,111
When I communicate with a superior person, I feel comfortable.	150	2,89	1,457	0,119
When I communicate with a superior, I feel confused.	150	3,21	1,372	0,112

Source: authors' own work

The results of the T-Test for seven different questions related to satisfaction with communication with a superior in various aspects of work indicate significant differences in the respondents' ratings. How satisfied are you with communication with your superior in the company you work for? answers to the question: T-value: 30,376, df (degrees of freedom): 149; Significance (p-value): <0.001; Size effects (Cohen's d and Hedges' correction): High. The results for this question show that there is an extremely statistically significant difference in satisfaction with communication with a superior person in the company. The participants are extremely satisfied with this aspect of communication. How satisfied are you with the communication you have with your superior regarding the monthly work schedule? Answers regarding satisfaction on a monthly level in connection with communication with superiors were evaluated: T-value: 32.142; df (degrees of freedom): 149; Significance (p-value): <0.001; Size effects (Cohen's d and Hedges' correction): High. The results for this question also show a highly statistically significant difference in satisfaction with communication about the monthly work schedule. The participants are very satisfied with this aspect of communication. How satisfied are you with the communication you have with your superior related to defining work tasks? Communication with superiors along with defining work tasks was evaluated by the interviewees as follows: T-value: 29.968; df (degrees of freedom): 149; Significance (p-value): <0.001; Size effects (Cohen's d and Hedges' correction): High. The results suggest that there is an extremely statistically significant difference in satisfaction with communication about defining work tasks. The participants are very satisfied with this aspect of communication. How satisfied are you with the communication you have with your superior regarding days off? The question of satisfaction with the communication you achieve with the ordered person related to days off was evaluated by the respondents in the following way: T-value: 23.957; df (degrees

of freedom): 149; Significance (p-value): <0.001; Size effects (Cohen's d and Hedges' correction): High. The results for this question also indicate a highly statistically significant difference in satisfaction with communication about days off. Participants express high satisfaction with this aspect of communication. How satisfied are you with the communication you have with your superior regarding the possibility of advancement and training? The interviewees evaluated the communication in connection with training as follows: T-value: 24.466; df (degrees of freedom): 149; Significance (p-value): <0.001; Size effects (Cohen's d and Hedges' correction): High. The results suggest an extremely statistically significant difference in satisfaction with communication about opportunities for progress and improvement. The participants are very satisfied with this aspect of communication. When I communicate with a superior person, I feel comfortable, the obtained results are: T-value: 24.322; df (degrees of freedom): 149; Significance (p-value): <0.001; Size effects (Cohen's d and Hedges' correction): High. The results show an extremely statistically significant difference in the feeling of comfort when communicating with a superior. Participants feel very comfortable in these situations.

Table 3: T Test for H2

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
A quality superior is fair.	150	4,64	0,788	0,064
The possibility of advancement in the company can motivate me to perform my work in the best possible way.	150	4,65	0,696	0,057
A quality superior can motivate me to perform my work in the best possible way.	150	4,79	0,619	0,051
The ideal company is one where I have the opportunity to progress.	150	4,66	0,633	0,052
An ideal company is one that is led by a quality superior.	150	4,79	0,538	0,044

Source: authors' own work

A quality superior is fair. Testing with a t-test shows that the average score for this statement ($M = 4.64$) is statistically significantly different from the zero value ($t = 72.102$, $df = 149$, $p < 0.001$). This result suggests that the survey participants statistically significantly evaluate the quality of their superiors as fair, with an average rating that is significantly higher than the neutral rating. The possibility of advancement in the company can motivate me to perform my work in the best possible way. The results of the t-test show that the average score for this statement ($M = 4.65$) is statistically significantly different from the zero value ($t = 81.713$, $df = 149$, $p < 0.001$). This indicates that the participants value the possibility of advancement as a motivating factor for performing work with an average rating that is significantly higher than a neutral rating. A quality superior can motivate me to perform my work in the best possible way. The results of the t-test show that the average score for this statement ($M = 4.79$) is statistically significantly different from the zero value ($t = 94.640$, $df = 149$, $p < 0.001$). This suggests that the survey participants believe that a quality superior can act as a motivator for achieving high quality work. The ideal company is one where I have the opportunity to progress. The results of the t-test show that the average score for this statement ($M = 4.66$) is statistically significantly different from the zero value ($t = 90.195$, $df = 149$, $p < 0.001$).

This implies that participants consider advancement within the company to be an important aspect, with an average rating significantly higher than a neutral rating. An ideal company is one that is led by a quality superior. The results of the t-test show that the average score for this statement (M = 4.79) is statistically significantly different from the zero value (t = 108.909, df = 149, p < 0.001). This suggests that survey participants consider a quality supervisor to be an important aspect of an ideal company, with an average rating significantly higher than a neutral rating. Overall, the results of the T-Test for H2 show that the survey participants express a high level of satisfaction and belief in the quality of their superiors and the possibilities of advancement in their company. The mean scores for all statements in the framework of H2 were statistically significantly higher than the zero value, which suggests a positive attitude towards these aspects. Specific conclusions for each question within H2 can be found in the previous answer, but overall, participants highly value the fairness of quality superiors, their motivational role and the importance of opportunities for advancement in the company. These results indicate the importance of positive interpersonal relationships and advancement opportunities for the motivation and satisfaction of employees in the organization.

Table 4: ANOVA test

		Sum of Squares	df	Mean Square	F	Sig.
The possibility of advancement in the company can motivate me to perform my work in the best possible way.	Between Groups	14,828	3	4,943	12,562	0,000
	Within Groups	57,446	146	0,393		
	Total	72,273	149			
A quality superior can motivate me to perform my work in the best possible way.	Between Groups	18,213	3	6,071	22,751	0,000
	Within Groups	38,960	146	0,267		
	Total	57,173	149			
The ideal company is one where I have the opportunity to progress.	Between Groups	13,079	3	4,360	13,664	0,000
	Within Groups	46,581	146	0,319		
	Total	59,660	149			
A quality superior is fair.	Between Groups	19,027	3	6,342	12,593	0,000
	Within Groups	73,533	146	0,504		
	Total	92,560	149			

Source: authors' own work

The possibility of advancement in the company can motivate me to perform my work in the best possible way. Between Groups variation: 14,828. Between groups degrees of freedom (df): 3- Average square variation between groups (Mean Square): 4.943. F-value (F): 12.562. Significance (Sig.): < 0.001. The results of the ANOVA for this question indicate a statistically significant difference in the participants' perception of how the possibility of advancement affects their motivation to perform their work as well as possible.

A quality superior can motivate me to perform my work in the best possible way. Between Groups variation: 18,213. Between groups degrees of freedom (df): 3. Average square variation between groups (Mean Square): 6.071. F-value (F): 22.751. Significance (Sig.): < 0.001. The results of the ANOVA for this question show a statistically significant difference in the participants' perception of how the presence of a quality superior affects their motivation to perform the work of the highest quality possible. The ideal company is one where I have the opportunity to progress. Between Groups variation: 13,079. Between groups degrees of freedom (df): 3. Average square variation between groups (Mean Square): 4.360. F-value (F): 13.664. Significance (Sig.): < 0.001. The ANOVA results for this question suggest a statistically significant difference in participants' perceptions of how important it is for the company to provide advancement opportunities. A quality superior is fair. Between Groups variation: 19,027. Between groups degrees of freedom (df): 3. Average square variation between groups (Mean Square): 6.342. F-value (F): 12.593. Significance (Sig.): < 0.001. The ANOVA results for this question indicate a statistically significant difference in the participants' perception of the fairness of their superiors. Overall, the results of the ANOVA analysis for all questions under hypothesis 2 suggest that there is a statistically significant difference in the participants' perceptions of these aspects in the organization. This indicates the importance of these factors in the motivation and satisfaction of employees in the organization. An organization could consider these results to improve the motivation and satisfaction of its employees. Considering the obtained values of Cronbach Alpha, which is 0.724, it can be concluded that the results of the survey are reliable for measuring the relevant constructs and can be used in the analysis of satisfaction and perception of employees in the company. There is a positive correlation between satisfaction with communication with a superior and various aspects of work, including the monthly work schedule, defining work tasks, days off, the possibility of progress and improvement, the comfort of communication, and the feeling of confusion in communication, which indicates that respondents who are more satisfied with communication with their superior people tend to be more satisfied with different aspects of their work, feel more comfortable in communication and less confused. This can be important for organizations that want to improve employee satisfaction and productivity through better communication with superiors. There is a positive correlation between the perception of the superior person's quality, the possibility of advancement in the company, the ideal characteristics of the company and the motivation to perform the job. This means that respondents who perceive their superiors as fair, believe in the possibility of advancement and the ideal characteristics of the company tend to be more motivated to perform their jobs. This can be useful for organizations that want to motivate their employees and improve their productivity through better perceptions of superiors, encouraging advancement opportunities and promoting ideal company characteristics. In addition, the participants of this research expressed a high level of satisfaction in all aspects of communication with a superior in the company where they work. Given the high size effects, these differences are not only statistically significant, but also practically significant. Respondents express a high level of satisfaction with communication with a superior in various aspects of work, which indicates a positive working environment and interpersonal relations within the organization. Survey participants also express a high level of satisfaction and confidence regarding the quality of superiors and advancement opportunities in their company. The participants highly value the fairness of high-quality superiors, their motivational role and the importance of opportunities for advancement in the company, so these results indicate the importance of positive interpersonal relationships and opportunities for advancement for the motivation and satisfaction of employees in the organization. There is statistically significant variability in satisfaction with communication with superiors between different groups of participants.

This suggests that the organization can identify specific aspects of communication that require improvement in order to increase employee satisfaction and productivity in the company. There is a statistically significant difference in the participants' perception of these aspects in the organization. This indicates the importance of these factors in the motivation and satisfaction of employees in the organization. An organization could consider these results to improve the motivation and satisfaction of its employees.

- **Hypothesis 1:** Human resources are retained in the company for 6-12 months due to poor management of human resources in the company, and the same refers to poor leadership of managers, undeveloped relationships between management and employees, poor distribution of work tasks by managers, and lack of motivation with bonuses, days off and other types of stimulation by managers. - **Confirmed**
- **Hypothesis 2:** There is a positive correlation between quality management and long-term investment in human resources and retention of human resources in the company with the aim of achieving business success of the company. - **Confirmed**

The largest number of respondents who responded to the questionnaire are employed persons who have a superior within the company where they work, aged 18-35, which is the target group of this research. The level of education, monthly financial income and age are data that match with regard to the current state of the labour market in the Republic of Croatia. But there are certain segments that are difficult to influence. The people who filled out the survey questionnaire are all adults who are employed and have a superior above them in the hierarchy of the current company where they are employed. The questionnaire was answered by 76% of women and 24% of men, which can be a limitation regarding the equal position of men and women on this topic. In addition, the survey was conducted via an online survey questionnaire, so another limitation is the credibility of the data, i.e. the non-existent guarantee that the results are correct, and that the respondents who completed the survey honestly answered the questions offered. The limitation may be the feelings and emotions of the respondents or an event that influenced the attitudes of the respondents on the day of filling out the questionnaire, for example a bad day at work.

6. CONCLUSIONS

In the last two decades there has been a change in opinion that quality management does not only mean compliance with specifications and requirements. Quality, also, it means satisfying, even exceeding needs and customer expectations. Approaches to using the criteria of human resource management, continuous education and quality awards are recognized as an applicable starting point for self-assessment in business systems. Awards for quality and permanent investment in education provide frameworks for achieving high quality levels, and are based on the principles of TQM. It is not certain that the implementation of TQM in business will system lead to business excellence, but it is very it is likely that the organization has achieved business excellence if he is a prize winner. Hence follows the basic proposal of this paper. It is important that Croatia is establishing an award for quality, as a key element raising organizational competitiveness.

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UNDERSTANDING FINANCIAL STABILITY IN THE EUROZONE: IS CROATIA FOLLOWING THE PIGS COUNTRIES' TRAJECTORY?

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ABSTRACT

This paper delves into the economic dynamics within the European Monetary Union (EMU) among its members, focusing on the period before and after 2008, particularly emphasizing Croatia's comparison with the 'PIGS' nations (Portugal, Italy, Greece, Spain) during their integration into the Eurozone. Utilizing Eurostat data, the analysis centers on the Macroeconomic Imbalance Procedure (MIP) indicators. Pre-crisis, certain countries displayed strengthened current account balances and increased external demand due to improved competitiveness, while others faced deficits prompted by reduced nominal interest rates. Despite adhering to Stability and Growth Pact criteria, the PIGS nations accumulated considerable debts, leading to post-crisis reforms aimed at rectifying structural weaknesses. Croatia's entry into the Eurozone raises queries about parallels with the PIGS nations during their crises. Comparative analysis of current conditions, reforms, and MIP indicators reveals Croatia's unique situation with a positive current account balance pre-Eurozone entry. A comparison of 2009 and 2022 indicators portrays significant improvements in Croatia's current account balance and net international investments despite the pandemic. Concurrently, while public debt escalated, private debt declined. Financial sector liabilities expanded, yet the growth rate of labor costs decelerated. These findings suggest Croatia entered the Eurozone with fewer imbalances, aided by ongoing EU reforms seeking to fortify economies and enhance resilience against potential crises.

Keywords: *Eurozone, macroeconomic imbalances, financial stability, Croatia, PIGS countries*

1. INTRODUCTION

The European Monetary Union experienced diverse economic trajectories among its member nations. Before the 2008 crisis, certain nations saw enhanced current account balances and increased external demand. This was supported by a boost in competitiveness characterized by significant decreases in relative price levels or unit labor expenses compared to their trade counterparts. On the other hand, other countries encountered persistent competitiveness difficulties, resulting in increased current account deficits. This decline in competitiveness often originated from domestic demand growth influenced by notably decreased nominal interest rates, fostering over-optimism among consumers, businesses, and banks about future incomes and profits. These challenges were exacerbated by insufficient banking regulations and inconsistent adherence to fiscal policies, despite overall fiscal metrics aligning with Stability and Growth Pact criteria, seen in countries like Spain and Ireland. Several Eurozone countries accumulated significant domestic and external debts due to excessive demand and credit expansion, often tied to unsustainable growth in real estate markets. During this period, specific attention was given to the so-called "PIGS" economies - Portugal, Italy, Greece, and Spain - which faced significant economic challenges. These countries witnessed considerable debt accumulation, structural weaknesses, and struggles in maintaining competitiveness.

Housing prices surged notably in Spain, Ireland, and Greece during specific periods, while insufficient investments in tradable goods sectors hindered returns needed to service accumulated debts. Heavy reliance on debt financing instead of equity-based foreign direct investments exacerbated repayment difficulties. Additionally, the lack of substantial reforms addressing structural inefficiencies further weakened these economies and complicated subsequent adjustments. The correction of macroeconomic imbalances and structural weaknesses commenced in 2008 but varied significantly in speed among member states, notably accelerating after the 2010 sovereign debt crisis. This crisis triggered strong cross-border repercussions due to diminishing confidence in financial markets. From 2010 to 2013, Greece, Ireland, Portugal, and Cyprus sought comprehensive financial assistance programs from the European Union/International Monetary Fund, involving extensive economic policy adjustments, encompassing fiscal, financial, and structural reforms. Simultaneously, Spain initiated an EU program to recapitalize its financial institutions, while other countries implemented fiscal consolidation measures and structural reforms to address underlying weaknesses. In light of Croatia's recent entry into the Eurozone, there arises the question of whether Croatia might face a situation similar to that of PIGS countries during the European sovereign debt crisis. This paper aims to analyze the current state of the Eurozone by comparing it to past circumstances and reforms. Chapter 2 provides a comprehensive review of the challenges and reforms in the Eurozone. Additionally, Chapter 3 examines macroeconomic indicators, comparing PIGS countries with Croatia, both before and after entering the Eurozone. The analysis aims to unveil potential challenges and opportunities for Croatia following its entry into the Eurozone. The analysis aims to reveal potential challenges and opportunities for Croatia concerning its entry into the Eurozone.

2. EUROZONE'S REFORMS AND RESILIENCE

At the initiation of the EMU, optimism prevailed regarding the Eurozone's potential as a driver for growth and convergence, especially among nations with lower GDP per capita. This surge in demand was initially interpreted as a favorable indication of progress.

2.1. Navigating Eurozone's Economic Challenges

Blanchard and Giavazzi (2002) revealed that the link between savings and investment notably weakened due to increased financial integration after the adoption of the single currency. They illustrated that the current account balances of member states were positively associated with income per capita, signifying a benign imbalance where economically promising nations capitalized on the euro's emergence and deeper financial integration. While persistent current account imbalances were not considered worrisome, they acknowledged significant nominal inflexibilities and a lack of effective countercyclical fiscal policies disrupting resource allocation. Subsequently, capital flows worsened imbalances due to domestic upheavals and ineffective capital allocation, resulting in asset price inflation from loans, excessive budget deficits, and unrealistic growth prospects. By the mid-2000s, scholars noted concerns about macroeconomic disparities among member states (Lane, 2006; Zemenek et al., 2009). Despite Acemoglu's (2004) work highlighting the importance of not just income disparities but also policy quality for long-term convergence, attention to institutional differences among entering Eurozone countries remained limited. Looking back, the efforts for catching up and convergence in many Eurozone nations proved unsustainable, failing to achieve productivity growth (Chen et al., 2012), especially among those with low income per capita that halted reforms during the EMU's inception. The sudden investment surge mostly favored housing construction, while an excessive increase in wages compared to productivity and inflation signaled an actual overvaluation, surpassing explanations offered by Balassa-Samuelson effects.

Empirical studies from 2010 to 2014 critically analyzed the imbalances in Eurozone countries, showing that sudden real estate booms hindered tradable goods sectors and raised concerns about future debt repayment prospects (Chen et al., 2012). These imbalances were further exacerbated by flawed national economic and financial policies, leading to mismatches in domestic lending and imbalanced oversight favoring some parts of the Eurozone (Giavazzi and Spaventa, 2010). These imbalances were reinforced by excessive credit expansion, misallocation of capital, and inadequate governance, ultimately revealing vulnerabilities during the global financial crisis of 2009 (Lane 2006; ECB, 2008; European Commission, 2008; Holinski et al., 2012; Ćorić, Šimović, and Deskar-Škrbić, 2015), particularly in models reliant on capital inflows, loans, and construction booms, such as the Croatian model of the 2000s.

2.2. Eurozone's Reforms in Response

During the onset of the sovereign debt crisis, all Eurozone countries facing substantial external imbalances encountered severe financial strain. Efforts to address these imbalances and structural weaknesses began in 2008 but progressed unevenly across member states, with the pace of adjustment varying significantly. Following the 2010 sovereign debt crisis, this adjustment process accelerated notably. Greece, Ireland, Portugal, and Cyprus underwent comprehensive EU and IMF financial aid programs between 2010 and 2013, necessitating extensive economic policy changes, including fiscal, financial, and structural reforms. Spain similarly initiated an EU aid program to reinforce its financial institutions, while other vulnerable nations implemented fiscal consolidation measures and structural reforms. Private investors' reassessment of macrofinancial risks during the crisis prompted a substantial reduction in cross-border exposures within the Eurozone (Tressel, 2012). Such a sudden-stop scenario, experienced in the Baltic states' financial crisis, was averted within the Eurozone's deficit countries. Their gradual current account adjustment was supported by EU or IMF financial assistance programs and central bank liquidity provisions, evident from a substantial increase in the TARGET 2 balance. While earlier literature explains the imbalances during the early EMU years, research on subsequent developments is still emerging. Ongoing adjustment processes and significant institutional changes, whose effects are not entirely discernible from current data, contribute to this. However, an expanding body of literature investigates the economic implications of high debt, deleveraging, and the relationship between private and public debt. This research is crucial for understanding future adjustment processes, as the burden of adjustment has shifted from flow variables to stock variables. Recent studies, such as Zorell (2017), examine risks associated with significant net foreign obligations and strategies for their resolution. Additionally, empirical studies highlight the vulnerability of economies with high debt levels to adverse shocks, affecting decision-making for households, businesses, and governments. Negative interactions between high private and public sector debt, coupled with a fragile financial sector, hinder investment decisions and overall economic growth (Sutherland and Hoeller, 2012). Certain thresholds (e.g., 70% to 90% of GDP) signify detrimental impacts of public and private debt levels on Eurozone growth (Baum et al., 2013), while further research underscores significant long-term negative effects of escalating public debt on production growth (Chudik et al., 2015). Improved insolvency laws are anticipated to play a significant role in reshaping the future by potentially alleviating high debt levels. This anticipation hinges on the integration of improved debt restructuring mechanisms within these laws. These mechanisms are paramount as they encompass more efficient court procedures and out-of-court measures, presenting a robust framework that could facilitate a sustained reduction in increasing debt. Research demonstrates a clear association between effective insolvency frameworks and the expeditious adjustment of non-performing loan ratios (Carcea et al., 2015). Consequently, periods of successful deleveraging are also more common in the presence of good insolvency frameworks (Consolo et al, 2018).

Increased GDP growth stands out as a critical determinant in fortifying debt sustainability, achievable through the advocacy and implementation of comprehensive structural reforms. Numerous studies have highlighted the profound impact of these reforms on the eurozone's GDP and productivity, forecasting substantial gains resulting from their diligent execution. However, it is essential to acknowledge the conditional nature of these anticipated gains, as their realization depends on multifaceted factors (Cette et al., 2016). Moreover, the detrimental influence of corruption on overall productivity further underscores the complex landscape within which these reforms must operate (Cota, Jakšić, and Erjavec, 2020). The turmoil witnessed during the late 2000s crises in the euro area emphasized the inherent weaknesses and fragility within the region's structure. The period from 2008 to 2012 underscored various challenges, including capital reversals, banking crises, liquidity issues, and inadequate policy responses, all contributing to an environment of economic uncertainty and instability. However, the landscape of the euro area in 2020 demonstrates a marked departure from the vulnerabilities of its earlier iteration, largely due to concerted efforts by policymakers to develop proactive measures aimed at averting and mitigating future crises. European policymakers have undertaken substantial overhauls in macroeconomic and fiscal surveillance within the EU, introducing reforms that reinforce the fiscal framework and bolster banking supervision and resolution mechanisms. Initiatives such as the Single Rulebook, Single Supervisory Mechanism (SSM), and Single Resolution Mechanism (SRM) stand as testament to the comprehensive restructuring of the eurozone's financial architecture. Consequently, the financial systems across eurozone countries exhibit greater resilience and preparedness than during the tumultuous periods preceding the crisis. Notwithstanding the notable progress achieved, numerous latent risk factors and potential triggers for future crises persist within the eurozone (Benassy-Quere et al., 2018). These persistent challenges include high public debt, entrenched non-performing loans in specific countries, incomplete elements within the banking union framework, and fragmented capital markets (Szczepanski, 2019). Addressing these persistent challenges requires a heightened focus on implementing reforms that can navigate the complex dynamics and interdependencies prevalent across the eurozone. Amidst the ongoing transformations and reforms, uncertainties regarding the euro area's future trajectory prevail. These uncertainties underscore the critical importance of sustained efforts toward reforms and the steadfast adherence to proposed stability programs (Eichengreen and Wyplosz, 2016; Beetsma et al., 2018; Feld et al., 2018; Heijdra et al., 2018; Pierluigi and Sondermann, 2018; Whelan, 2019). Continual dedication to these initiatives remains instrumental in steering the eurozone toward stability, progress, and resilience in its financial landscape.

3. COMPARISON OF CROATIA'S ECONOMIC INDICATORS WITH PIGS ECONOMIES

The analysis examines the MIP (Macroeconomic Imbalance Procedure) indicators for the PIGS countries (Portugal, Italy, Greece, Spain) and Croatia over several years before and after entering the Eurozone. Data sources for all indicators are derived from Eurostat. The indicators include:

- Current account balance: the balance of trade in goods and services, income, and current transfers; calculated as a three-year average and expressed as a percentage of the Gross Domestic Product (GDP),
- Net international investment position: the difference between a country's external financial assets and liabilities; a percentage of GDP,
- General government debt: the total debt accrued by the government; a percentage of GDP,
- Private sector debt: the total debt incurred by the private sector, excluding the government and public sector, a percentage ofGDP,

- Financial sector liabilities: the total obligations and liabilities of the financial sector within an economy, a percentage of GDP,
- Nominal unit labor cost: a 3-years percentage change in labor cost per unit of output.

The current account balance of the mentioned countries is illustrated in Figure 1, depicting periods ranging from three to four years before their entry into the Eurozone (depending on data availability), as well as four years following their entry. For Croatia, the analysis covers only the four years preceding 2023.

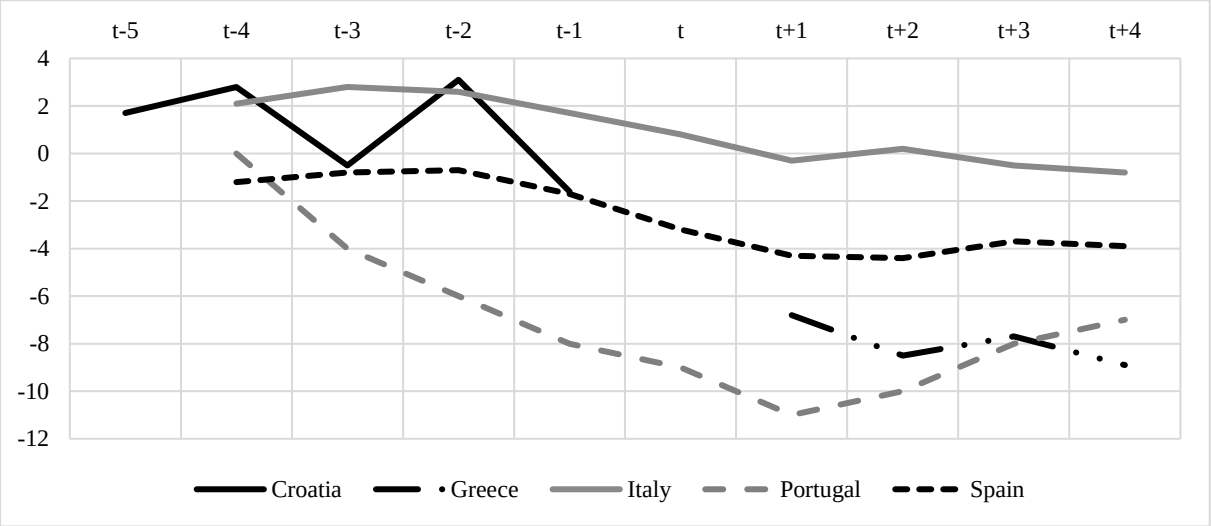

Figure 1: Current account balance (% of GDP)
(Source: Eurostat)

Figure 1 illustrates a noticeable difference between Croatia and the other countries during the analyzed period. Prior to joining the Eurozone, Croatia typically sustains a favorable current account balance (with the exception of 2018 when it stands at -0.5%), whereas the majority of other nations largely display substantially negative balances, except for Italy before its Eurozone accession. Figure 2 assesses the status of international investments throughout this period.

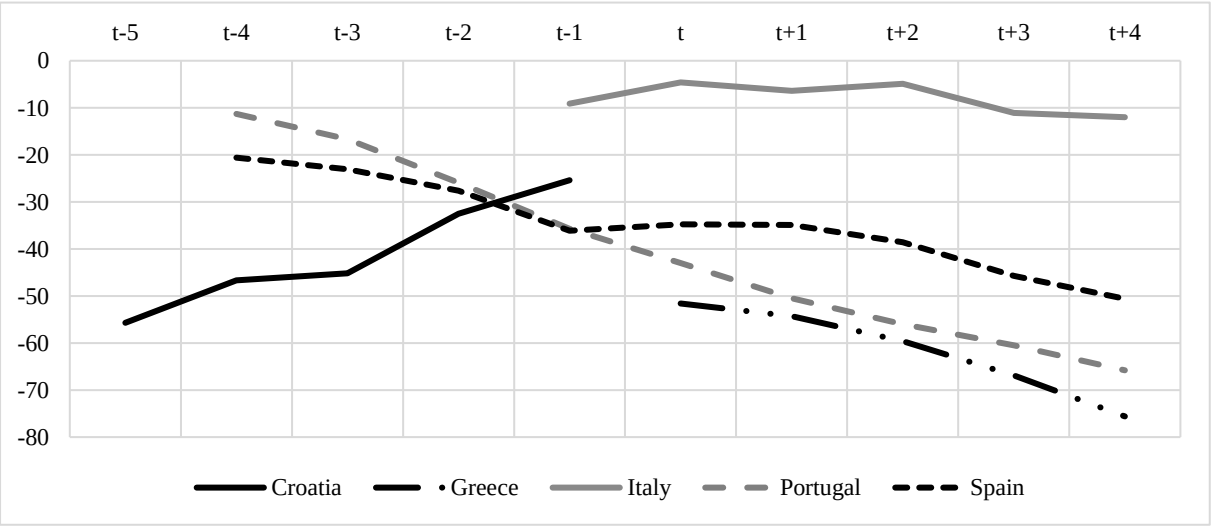

Figure 2: International investment position (% of GDP)
(Source: Eurostat)

Figure 2 clearly depicts Croatia's tendency of increasing international investments in the period before entering the Eurozone, culminating in a -34.6% figure in 2021, while other countries notably experience a decline, especially evident in Greece and Portugal. The general government debt is depicted in Figure 3.

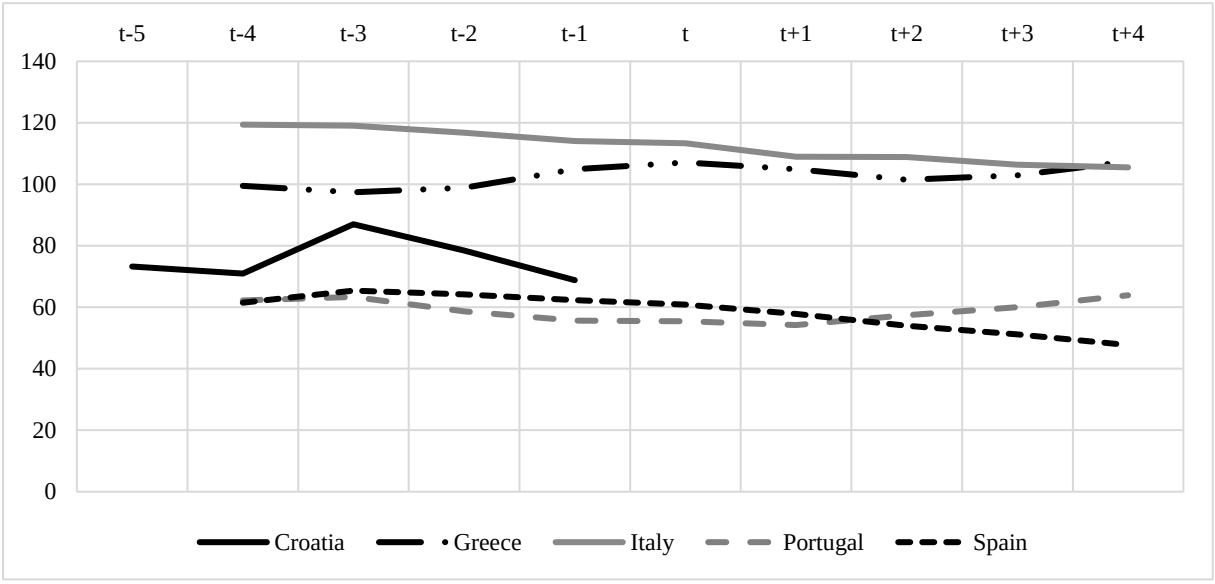

Figure 3: General government debt (% of GDP)
(Source: Eurostat)

When considering the general government debt, Croatia's situation appears relatively analogous to that of other countries, showing a consistent fluctuation around 80%. Similarly, the private sector's debt situation mirrors the previous indicator, hovering around 100%. Figure 4 portrays the private sector debt.

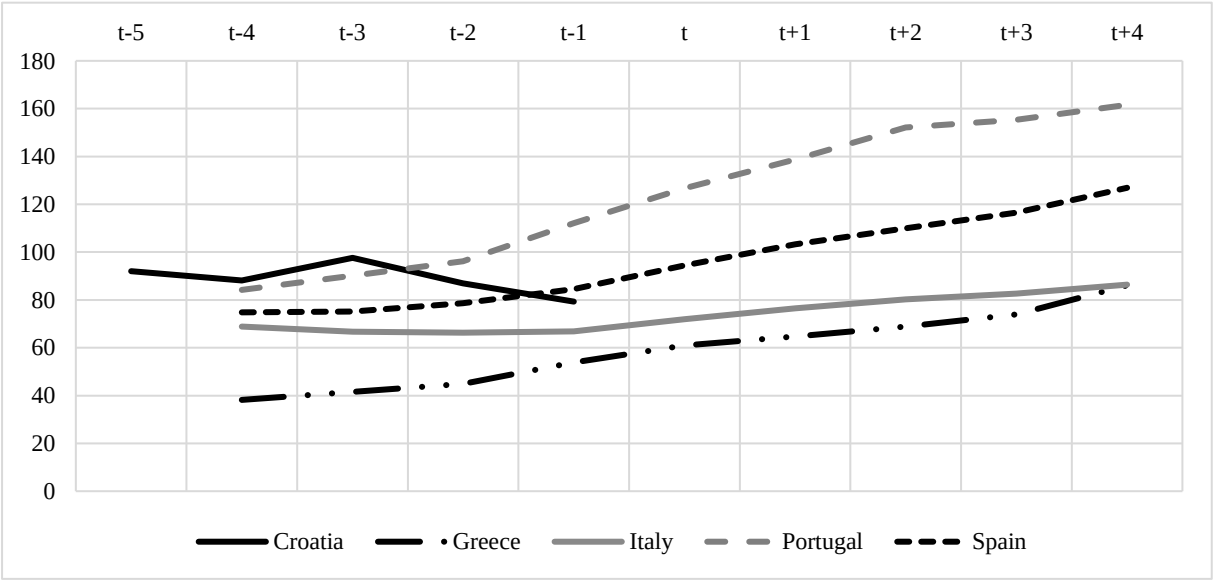

Figure 4: Private sector debt (% of GDP)
(Source: Eurostat)

In Croatia, a noticeable downward trend is visible, unlike other countries that clearly demonstrate an upward trajectory, as depicted in Figure 4. The fluctuations in total liabilities within the financial sector are depicted in Figure 5.

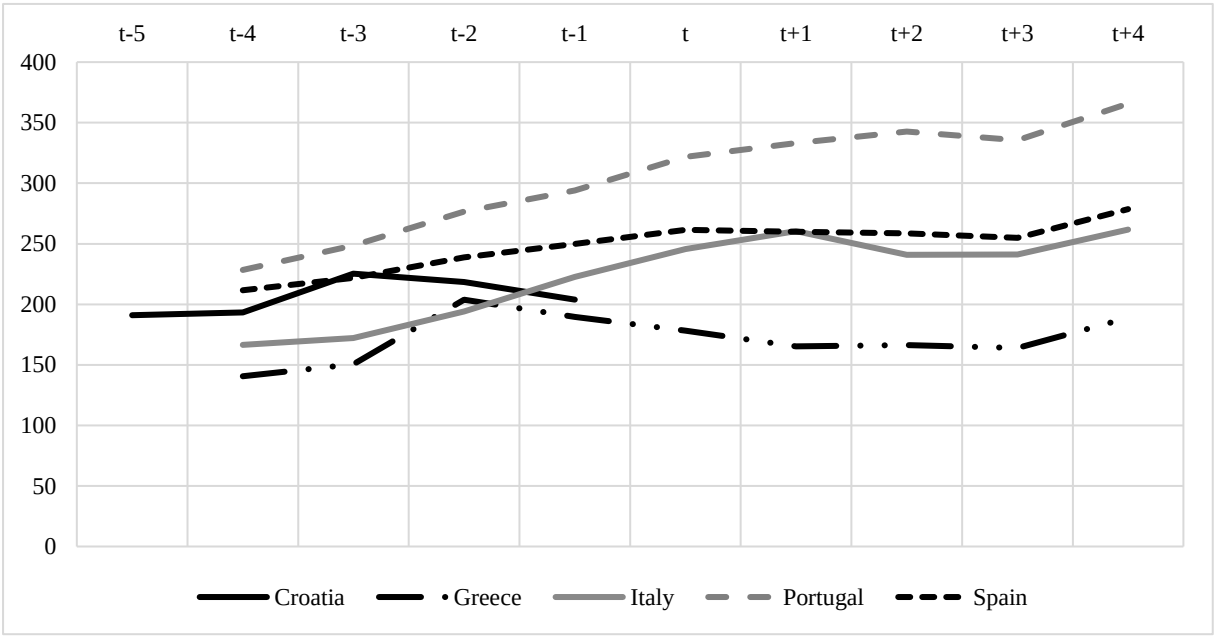

Figure 5: Financial sector liabilities (% of GDP)
(Source: Eurostat)

Croatia is positioned once more within a mid-range status among countries with varying financial sector liabilities, holding liabilities around 200%. Figure 6 shows how the cost of labor per unit changed over time.

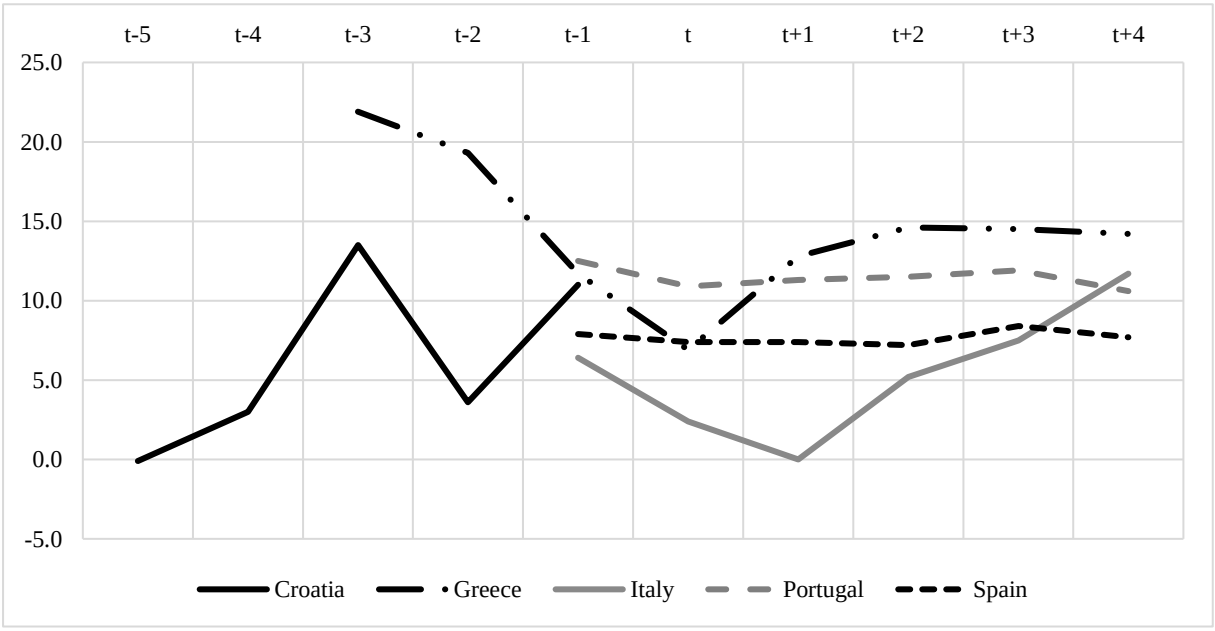

Figure 6: Unit labor cost (3-year % changes)
(Source: Eurostat)

Graph 6 illustrates that the three-year changes were relatively less stable before entry into the Eurozone, later mostly stabilizing at a certain level. Figure 7 contrasts all indicators concerning Croatia in 2009, post-crisis, and in 2022. Despite the impact of the 2020 pandemic, the metrics show significant improvement compared to 2009, suggesting Croatia's current standing is notably superior to that period.

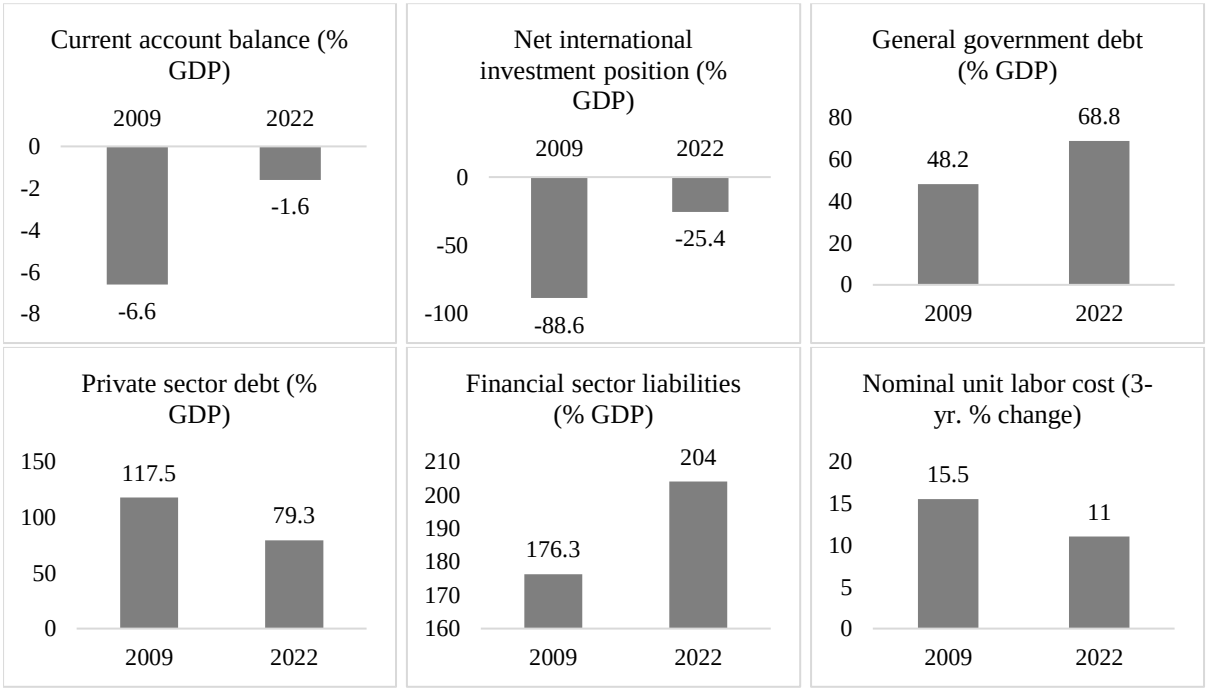

Figure 7: Comparison of MIP Indicators for Croatia in 2009 and 2022 (Source: Eurostat)

From 2009 to 2022, Croatia experienced a reduction in its negative current account balance and net international investment position. The government debt rose from 48.2% of GDP in 2009 to 68.8% in 2022, showing increased state borrowing. Conversely, the private sector debt decreased from 117.5% to 79.3% of GDP during the same period, indicating reduced private sector indebtedness. Croatia's financial sector liabilities grew from 176.3% to 204% of GDP, reflecting increased financial sector obligations. Labor costs growth decreased from 15.5% to 11% during this timeframe, indicating a slowdown in labor cost growth. Since the 2008 crisis, Croatia's economy has undergone significant deleveraging in the private sector and has improved its international position. Compared to the PIGS countries, Croatia entered the euro area with far fewer macroeconomic imbalances, reducing the risk of experiencing crises similar to those faced by PIGS nations after the global financial crisis in 2008 and the eurozone crisis in 2011. Moreover, the financial architecture of the EU is considerably more stable than it was before these crises, incorporating numerous signaling mechanisms, shock absorbers, and automatic stabilizers that prevent the re-accumulation of external and internal imbalances. Additionally, through the Recovery and Resilience Plans introduced as part of the Next Generation EU package, various structural reforms are being implemented across EU countries to further strengthen their economies, enhance productivity and competitiveness, and bolster their resilience to crises.

4. CONCLUSION

The European Monetary Union witnessed diverse economic trajectories among its member nations pre- and post-2008 crisis, characterized by varying competitiveness and current account balances. Some countries saw strengthened balances and increased external demand due to enhanced competitiveness, while others struggled with persistent deficits driven by reduced nominal interest rates. Despite meeting Stability and Growth Pact criteria, certain Eurozone countries accumulated substantial debts, notably impacting Portugal, Italy, Greece, and Spain (the 'PIGS'). These nations faced mounting debts, structural weaknesses, and challenges in maintaining competitiveness, intensified by housing price surges and insufficient sectoral investments.

After the 2010 sovereign debt crisis, comprehensive reforms were initiated in several countries to address these underlying weaknesses, varying in pace among member states. With Croatia's recent Eurozone entry, questions arise regarding its potential similarity to PIGS countries during the European sovereign debt crisis. This analysis aimed to compare the current Eurozone state with past conditions and reforms, particularly examining Macroeconomic Imbalance Procedure (MIP) indicators. These indicators encompassed current account balances, net international investment positions, government and private sector debts, financial sector liabilities, and labor cost changes. Notably, Croatia's dynamics differed, sustaining a positive current account balance before Eurozone entry, contrasting with negatives observed in other countries. Croatia displayed an increasing trend in international investments, unlike Greece and Portugal's declining trends. Comparing Croatia's MIP indicators in 2009 and 2022 highlighted significant improvements despite the 2020 pandemic's impact. Croatia witnessed reduced negative balances in current accounts and net international investments. While government debt increased, private sector debt decreased. Financial sector liabilities grew, yet labor cost growth decelerated. These differences indicate Croatia's comparatively fewer imbalances upon entering the Eurozone, with ongoing EU reforms aimed at strengthening economies and enhancing resilience against potential future crises.

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IMPACT OF ELECTRIC VEHICLE MARKET GROWTH ON AUTOMOTIVE INDUSTRY TRANSFORMATION: TRENDS, POTENTIALS, AND CHALLENGES ANALYSIS

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ABSTRACT

This paper aims to explore the impact of the growth of the electric vehicle market on the transformation of the automotive industry. The study will analyze key trends, potentials, and challenges arising from the expansion of the electric vehicle market in a global context. Through the collection and analysis of pertinent statistical data, the study will investigate the dynamics of increased electric vehicle sales and their impact on traditional automotive manufacturers. Additionally, it will examine automotive companies' investments in electric technology and the infrastructure changes required to support this burgeoning sector. Emphasis will be placed on identifying the significant potentials offered by the growth of the electric vehicle market, such as emissions reduction, technological advancement, and shifts in consumer behavior. Challenges encompass issues related to charging infrastructure, economic sustainability, and adaptation for traditional manufacturers to meet evolving market demands. The study will conclude with an analysis of the current trends in the car market across different segments of the vehicle industry. It will also provide insights into future market projections. The linear regression model forecasts that the current trends are likely to continue into the future. SUV sales are expected to remain strong, while traditional segments like medium and small cars may continue to face challenges. This paper will explore the multifaceted changes driven by the growth of the electric vehicle market and its influence on the automotive industry. The study will highlight potential benefits like emissions reduction and technological advancements, while also addressing challenges such as charging infrastructure, economic sustainability, and adaptation for traditional manufacturers. The study will conclude with an analysis of the current trends in the car market across different segments and provide insights into future market projections.

Keywords: *automotive industry, challenges, electric vehicles, potentials, trends*

1. INTRODUCTION

This paper delves into the increasing impact of the electric vehicle market on the automotive industry transformation, exploring trends, potentials, and challenges on a global scale. The study utilizes statistical data to investigate the rise in electric vehicle sales and their effects on traditional automakers, including investments in electric technology and necessary infrastructure changes. This research investigates the evolving dynamics of the automotive industry, specifically focusing on the interplay between Electric Vehicles (EVs) and Internal Combustion Engine Vehicles (ICEVs). By analysing historical and predicted sales trends up to the year 2033, the study aims to uncover insights into the transformative shifts within the market. This exploration is prompted by the evident trend of growing EV acceptance and the corresponding decline in ICEV sales, signalling a potential critical juncture in the automotive landscape. The study aims to examine the dynamics of the automotive industry, with a specific focus on the sales trends of Sport Utility Vehicles (SUVs), small and medium cars, as well as luxury and large cars. Utilizing linear regression analysis, the research seeks to predict the future trajectory of these vehicle segments.

Factors such as market dynamics, evolving consumer preferences, and external influences, including economic conditions and emerging technologies, will be considered to provide a comprehensive understanding of the automotive market landscape.

2. RESEARCH METHODOLOGY

The analysis involved using polynomial regression models to scrutinize historical automotive sales data, with a focus on electric vehicles (EVs) and internal combustion engine vehicles (ICEVs). The exceptionally high R-squared value from the polynomial regression model for total sales indicated precision. Initially, polynomial regression models provided a nuanced examination of historical EV sales trends. A combined sales chart facilitated a comparative assessment of trends between EVs and ICEVs. Extrapolation of polynomial fit models predicted future outcomes, offering insights into potential automotive market trajectories. For historical sales data, no specific statistical models were used; the approach relied on plotting graphs based on actual data. For future forecasting, a simple linear regression model was applied to each vehicle segment, assuming a linear relationship between time and sales. These statistical methods aimed to offer a data-driven understanding of automotive industry trends, underscoring the importance of leveraging such tools for informed decision-making and forecasting.

3. RESEARCH ON TRANSFORMATION OF THE AUTOMOTIVE INDUSTRY

In the exploration of the transformation of the automotive industry, Chapter 3 unfolds with a theoretical examination, offering insights into the Electric Vehicle (EV) and Internal Combustion Engine Vehicle (ICEV) market through theoretical perspectives. Following this theoretical foundation, the chapter transitions to empirical research, beginning with an analysis of EV sales spanning from 2016 to 2023 and forecasting future trends. Subsequently, the focus shifts to a parallel examination of internal combustion engine vehicle sales within the same timeframe. A comparative assessment of EV and ICEV sales trends, both historical and future projections, is meticulously scrutinized. The chapter culminates with a detailed analysis of trends segmented by various categories within the automotive industry. This comprehensive approach aims to provide a multifaceted understanding of the ongoing transformation within the automotive sector.

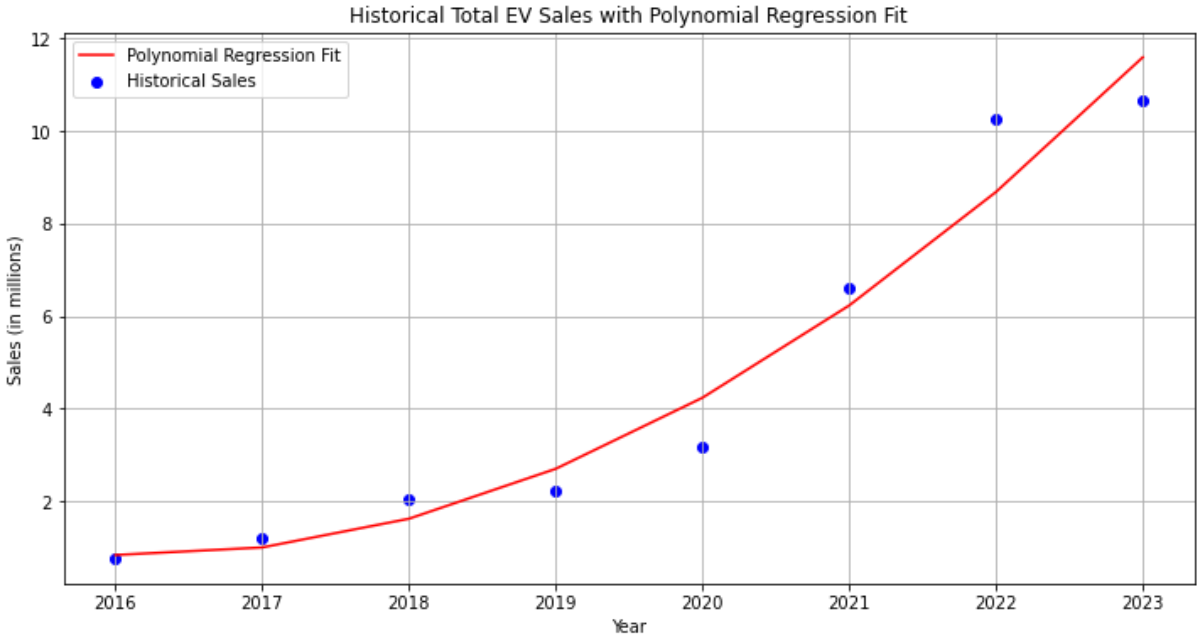
3.1. Theoretical Perspectives on the Electric Vehicle (EV) and Internal Combustion Engine Vehicle (ICEV) Market

Electric vehicles (EVs) have the potential to contribute to the decarbonization of transportation and the emergence of low-carbon cities due to the benefits of energy-efficient technology and low pollution. Thus, it has become one of the development trends of interest in the automotive industry (Zhao et al., 2015: Amini et al., 2017). Battery electric vehicles (BEV), hybrid electric vehicles (HEV), plug-in hybrid electric vehicles (PHEV), and fuel cell electric vehicles (FCEV) are gaining popularity in the transportation sector. There is a growing consensus that these vehicles will replace conventional, internal combustion engine (ICEV) vehicles in the near future (Ntombela et al., 2023). The automotive market is a dynamic and complex ecosystem shaped by various factors influencing consumer preferences, technological advancements, and environmental considerations. One crucial paradigm shift within this market is the emergence of Electric Vehicles (EVs) alongside the traditional Internal Combustion Engine Vehicles (ICEVs). This division reflects a broader trend towards sustainable and eco-friendly transportation solutions. The segmentation between EVs and ICEVs delineates a critical distinction in the automotive landscape. EVs, powered by electricity stored in batteries, have gained momentum due to their lower environmental impact and reduced dependence on fossil fuels.

On the other hand, ICEVs, fuelled by traditional combustion engines, have been the mainstay of the automotive industry for decades. Consumer preferences play a pivotal role in shaping the dynamics of the automotive market. SUVs, with their versatile appeal and robust design, have witnessed a surge in popularity, contributing to shifting market trends. Meanwhile, medium and small cars have experienced a decline, possibly influenced by the rising demand for SUVs. Technological advancements, particularly in the electric vehicle segment, have accelerated the transformation of the automotive market. Innovations in battery technology, range improvement, and the development of efficient charging infrastructure have bolstered the growth of EVs. The ongoing integration of smart and autonomous features further adds complexity and diversity to the market. Numerous recent innovations have been achieved with the goal of enhancing electric vehicles and the parts that go into them, particularly in the areas of managing energy, battery, design and optimization, and autonomous driving (Abro et al, 2023).

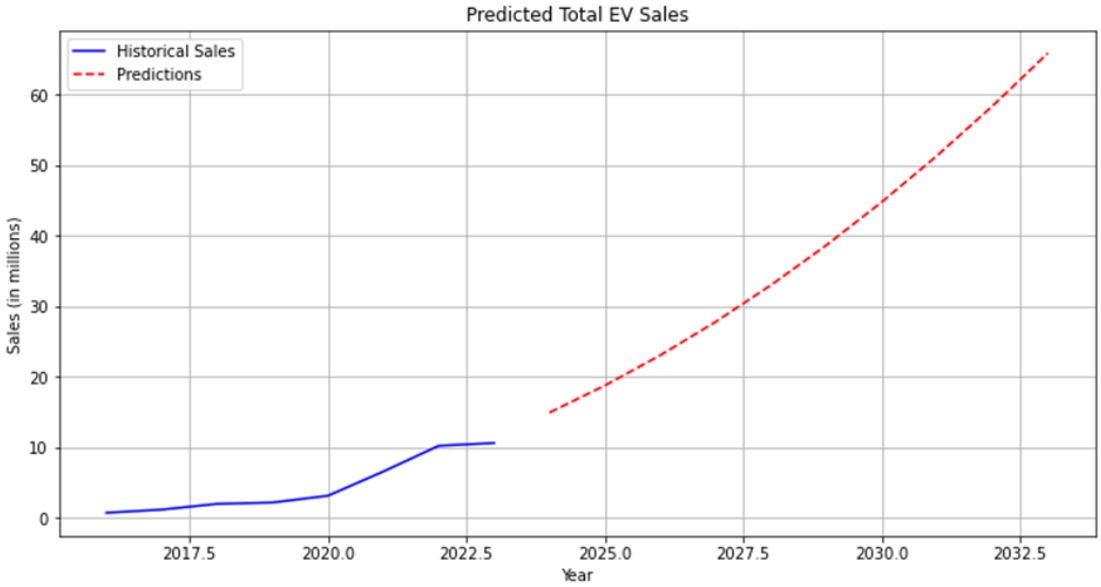
3.2. Electric vehicle sales from 2016. to 2023. and future trends

In this chapter, we will explore historical total electric vehicle sales from 2016 to 2023, indicating a trend of increasing sales over the years. The data for this research has been sourced from Statista Electric Vehicles Worldwide Statistics (2024).



Graph 1: Historical Total EV Sales with Polynominal Regression Fit
(Source: Created by the author based on data from Statista Electric vehicles worldwide statistics (2024))

Graph 1 shows the historical total electric vehicle sales from 2016 to 2023. The graph indicates that the sales have been increasing over the years, with a polynomial regression fit line predicting a continuous growth in sales. The blue dots labelled "Historical Sales" represent actual sales data from 2016 to 2020, while the red curve labelled "Polynomial Regression Fit" predicts the trend of increasing sales, extending into future years up to 2023. The graph provides a visual representation of the growth of the electric vehicle market and its impact on the automotive industry. Graph 2 shows the predicted total sales of electric vehicles for future years based on the polynomial regression model.

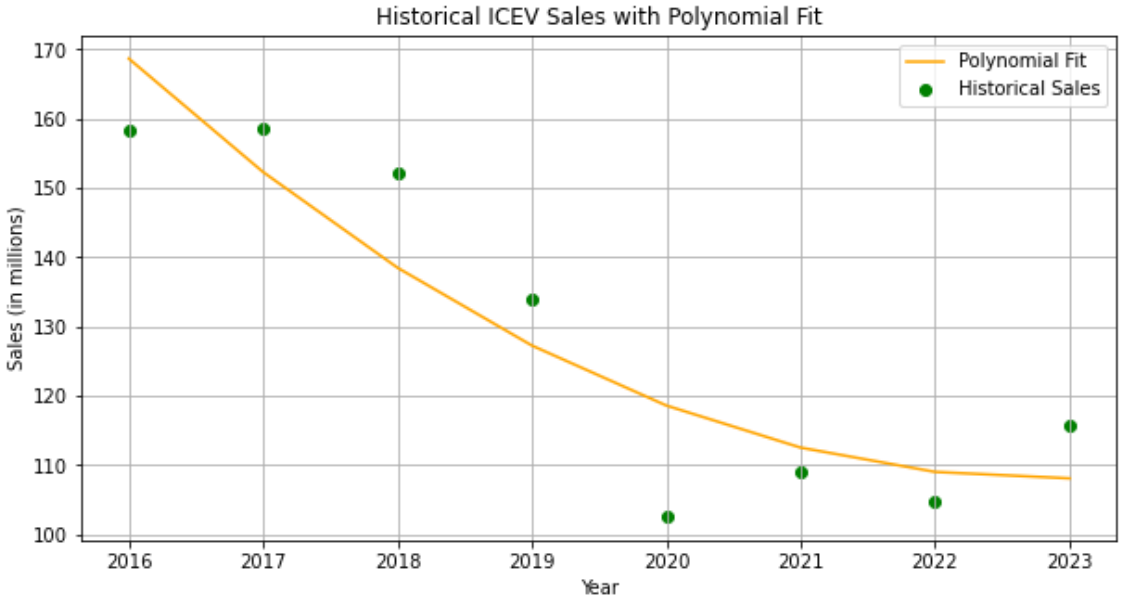


Graph 2: Predicted total EV sales till 2033.
(Source: Created by the author based on data from Statista Electric vehicles worldwide statistics (2024))

Graph 2 illustrates the forecasted aggregate sales of electric vehicles for future periods, derived from the polynomial regression model. The blue line, denoted as "Historical Sales," depicts a gradual uptick in sales from approximately 2017 until around 2025. Conversely, the dashed red line, labelled as "Predictions," forecasts a substantial surge in sales starting around 2025, projected to approach nearly 60 million by approximately 2032.

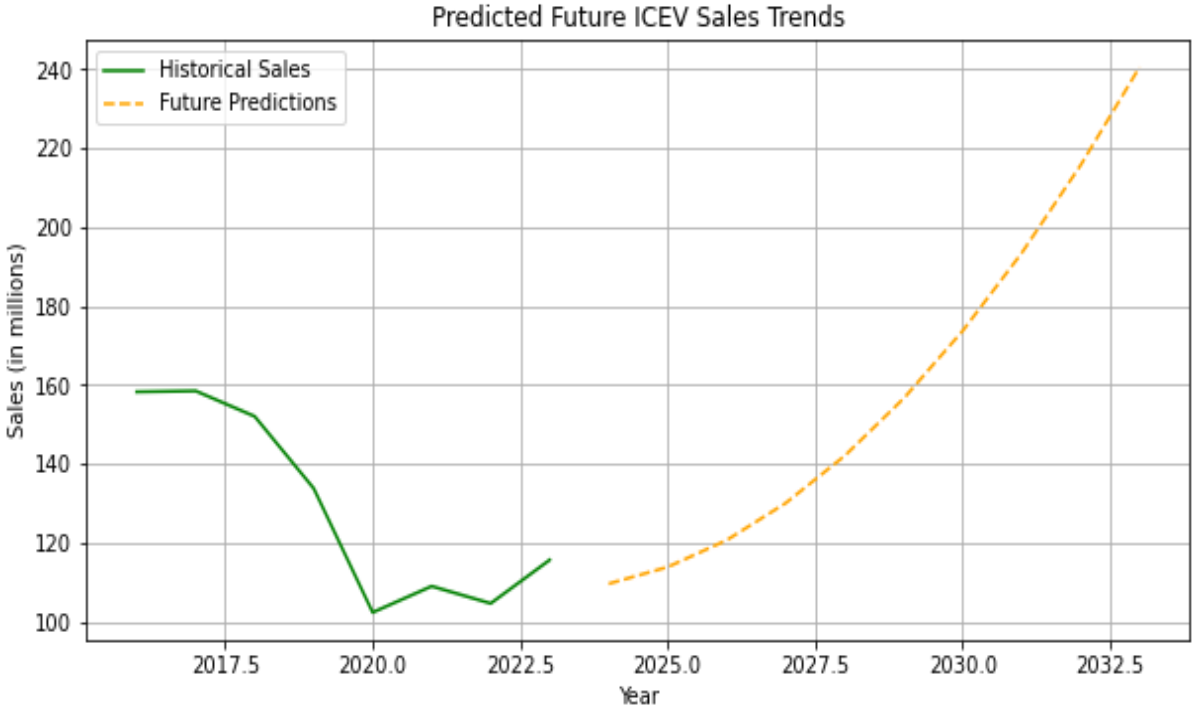
3.3. Internal combustion engine vehicle sales from 2016. to 2023. and future trends

Utilizing polynomial regression model, it is examined the internal combustion engine vehicle (ICEV) sales data from 2016. to 2023. and produced the ensuing Graph 3.



Graph 3: Historical ICEV sales with Polynominal Regression Fit
(Source: Created by the author based on data from Statista Electric vehicles worldwide statistics (2024))

Graph 3 shows the predicted sales of internal combustion engine vehicles (ICEVs) from 2016 to 2023 based on the polynomial regression model. The graph indicates that the sales have been decreasing over the years, with a polynomial regression fit line predicting a continuous decline in sales. Graph 4 illustrates the predicted future trends in internal combustion engine vehicle (ICEV) sales from 2024 to 2033 based on the polynomial model.

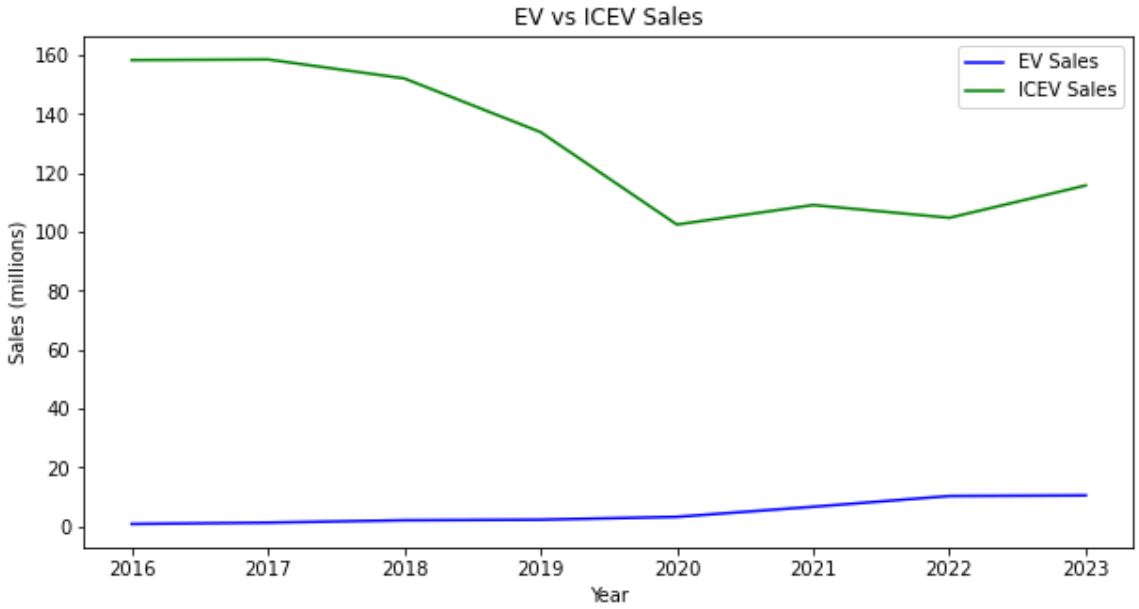


Graph 4: Predicted future ICEV sale trends.
(Source: Created by the author based on data from Statista Electric vehicles worldwide statistics (2024))

Graph 4 displays the predicted future sales trends of internal combustion engine vehicles (ICEVs) from 2024. to 2033. based on the polynomial regression model. The dashed yellow line labelled "Future Predictions" shows a steady upward trend, indicating an expectation of rising sales over the decade. The key things we can observe from these graphs are EV sales have been growing rapidly, while ICEV sales have been declining overall. The polynomial fits capture these opposing historical trends well. The predicted future trends show EV sales continuing to grow exponentially, potentially overtaking ICEV sales in the 2030s based on the polynomial extrapolation. ICEV sales are predicted to stabilize and recover slightly in the future after the initial decline, but likely at much lower volumes than their peak.

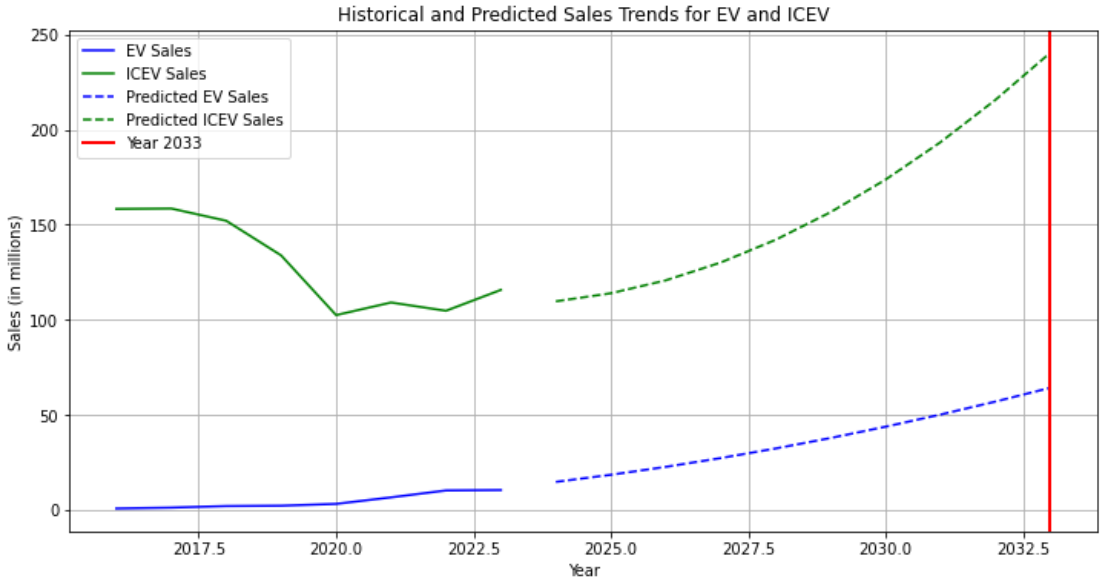
3.4. Comparison of EV and ICEV sales from 2016. to 2023. and future trends

This section compares the sales of electric vehicles (EV) and internal combustion engine vehicles (ICEV) from 2016 to 2023 and predicts future trends. According to the International Energy Agency, global electric vehicle sales in 2019 reached 2.1 million vehicles, which was an increase of 6% from 2018 sales (IEA Electric car sales, 2024). The agency also predicts a significant increase in electric vehicle sales after 2025, while the sales of ICEVs have been decreasing over the years (IEA Electric car sales, 2024).



Graph 5: Comparison of EV and ICEV sales from 2016. until 2023.
(Source: Created by the author based on data from Statista Electric vehicles worldwide statistics (2024))

It is shown on Graph 5 that while ICEV sales have grown steadily over the 2016 to 2023 period, EV sales have grown exponentially over the same shortened period. This trend over a shorter 7-year period illustrates the even more rapid adoption of electric vehicles, likely driven by improving technology and falling prices, making them competitive with traditional internal combustion engine vehicles. This rapid EV adoption over just 7 years underscores improving technology and declining prices, making EVs competitive with traditional internal combustion engine vehicles. Graph 6 illustrates the combined historical and predicted sales trends for electric vehicles (EVs) and internal combustion engine vehicles (ICEVs) up to the year 2033.



Graph 6: Comparison of EV and ICEV sales from 2016. until 2023. and future trends until 2033.
(Source: Created by the author based on data from Statista Electric vehicles worldwide statistics (2024))

The trend suggests that EV sales will continue to grow rapidly, while ICEV sales will decline and then stabilize. By 2033, the prediction indicates that EV sales will be approaching the sales volume of ICEVs, suggesting a significant shift in the automotive market towards electric vehicles. It is possible to draw conclusions about the market for electric vehicles (EVs) and internal combustion engine vehicles (ICEVs) now and in the future, based on the preceding graphs:

- Current Market (Up to 2023):

EV Sales: The solid blue line indicates that sales of EVs have been increasing up to the year 2023. This suggests a growing market acceptance and possibly improvements in EV technology, infrastructure, and government incentives.

- ICEV Sales: The solid green line shows that ICEV sales have experienced some fluctuations but generally indicate a decline leading up to 2023. This could be due to a variety of factors including environmental concerns, regulatory pressures, and the rising popularity of EVs.
- Future Market (2024 to 2033):

EV Sales: The dashed blue line predicts a continued rapid growth in EV sales. By 2033, the trend suggests that EV sales will approach the sales volume of ICEVs. This could be driven by continued advancements in EV technology, better battery life, lower costs, and increased consumer awareness of environmental issues.

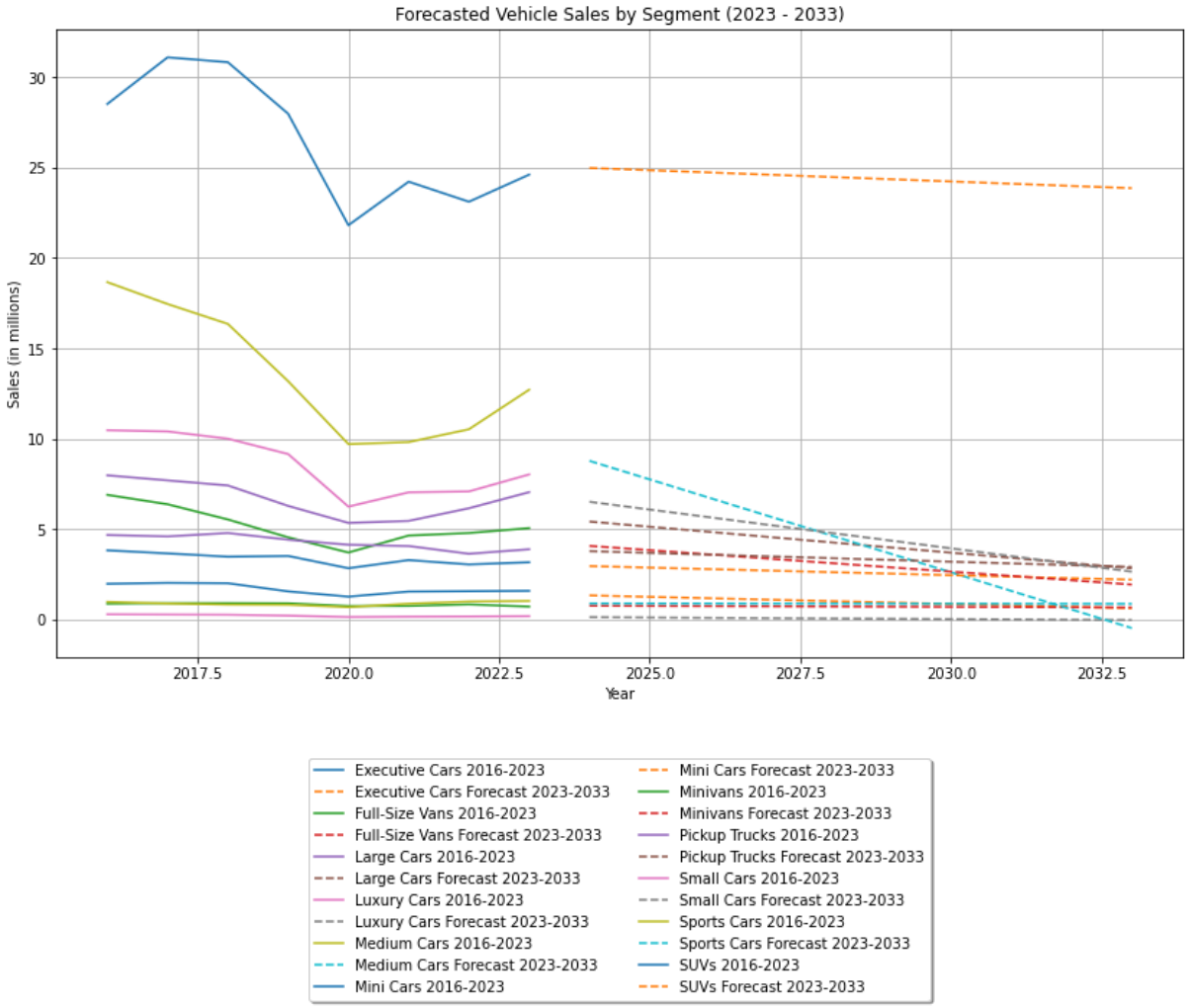
- ICEV Sales: The dashed green line forecasts a decline in ICEV sales followed by a stabilization. This indicates that while ICEVs may still have a significant market share, their growth is being overtaken by the rise of EVs. The stabilization might suggest a residual demand for ICEVs, possibly in markets where EV infrastructure is less developed or in vehicle segments where EVs are not yet competitive.

Overall Conclusion: The automotive market is undergoing a significant shift towards electric vehicles. The current trend up to 2023 and the predictions up to 2033 suggest that EVs will continue to gain market share at the expense of ICEVs. Factors such as technological advancements, environmental policies, and changes in consumer preferences are likely to further accelerate this transition. However, ICEVs are expected to maintain a presence in the market, at least in the short to medium term, until EVs can fully meet the diverse needs of consumers globally. These conclusions are based on the data and trends presented in the graph. It's important to note that predictions are subject to change based on a multitude of factors, including technological breakthroughs, policy changes, and global economic conditions.

3.5. Trend analysis by segment of automotive industry

The historical data on car sales across market segments have been analysed and forecasted the trend for each segment from 2023 until 2033. This will be accomplished by implementing a simple linear regression model for each individual segment, ultimately providing a comprehensive trend forecast chart for all segments from the year 2023.

Graph following on the next page



Graph 7: Historical sales data from 2016 to 2023 and forecasted trend chart for vehicle sales by segment for the years 2023 to 2033.
(Source: Created by the author based on data from Statista Passenger cars worldwide statistics (2024))

A simple linear regression model was used for each vehicle segment to predict future trends. Graph 7 reveals current market trends: SUVs exhibit robust growth, gaining popularity, while medium and small cars decline, possibly due to the shift towards SUVs. Luxury and large cars also witness reduced sales, suggesting a potential shift in consumer preferences towards practical or economical options. Regarding future market projections, the linear regression model anticipates the persistence of current trends. SUV sales are expected to remain robust, while medium and small car segments may encounter challenges. However, it's crucial to acknowledge that linear regression assumes unchanged past trends, which may not always align with market dynamics, technological advancements, and evolving consumer preferences.

4. CONCLUSION

This paper analyses the impact of the electric vehicle market growth on the transformation of the automotive industry, exploring global trends, potentials, and challenges. Utilizing statistical data, the study scrutinizes the increase in electric vehicle sales and their effects on traditional automakers, encompassing investments in electric technology and necessary infrastructure changes.

The potential benefits, such as emissions reduction and technological advancements, are highlighted, along with addressing challenges like charging infrastructure, economic sustainability, and adaptation for traditional manufacturers. The paper aims to provide insights into the multifaceted changes driven by the growth of the electric vehicle market and its influence on the automotive industry. The study concludes that SUVs are thriving, resulting in declines for small and medium cars, as well as luxury and large cars, signalling a shift towards practical choices. While linear regression predicts sustained SUV dominance and challenges for smaller cars, it overlooks market dynamics and evolving preferences. Caution is required with the basic linear model, given the complexity of the industry, influenced by economic conditions, regulations, and emerging technologies. Unforeseen events like COVID-19 can disrupt predictions. In summary, the growth of the electric vehicle market significantly impacts the transformation of the automotive industry. The study emphasizes potential benefits, such as emissions reduction and technological advancements, while addressing challenges like charging infrastructure, economic sustainability, and adaptation for traditional manufacturers. Additionally, the study notes the thriving SUV market, leading to declines in other car segments, with caution advised regarding the limitations of linear regression in predicting industry dynamics influenced by various factors.

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CRYPTO ASSETS: THE EMERGING TRENDS IN CROATIA

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ABSTRACT

Since the dot-com bubble, the potential of digitization has been evident, with technological advancements resolving issues surrounding financial transactions and documentation, thus globalizing investments. In today's digitally empowered era, where information is readily accessible, investments in various assets like stocks, digital currencies, property rights, copyrights, and art have gained popularity. At the same time, rapid technological advances continue to shape contemporary society and impact global economic processes. Digitization has led to the gradual integration of phenomena such as cryptocurrencies and non-fungible tokens (NFTs) into various societal aspects. Although cryptocurrencies trading takes advantage of the unique blockchain technology, ensuring the digital security is imperative. The emergence of NFTs, distinguished by their unique and irreplicable nature compared to traditional cryptocurrencies, has significantly boosted the popularity of digital assets. In the Republic of Croatia, both corporate entities and individuals are increasingly engaging with these emerging crypto assets, prompting a closer examination of readiness for adoption.

Keywords: *blockchain, cryptocurrencies, investing, smart contracts, non-fungible tokens*

1. INTRODUCTION

Cryptocurrencies have been present for several years, but in the past decade they have gained the greatest popularity and are accepted as modern money and an exclusive means of payment for various goods and services. Created on innovative blockchain technology, cryptocurrencies offer a range of benefits manifested in safer and more transparent financial transactions. The global pandemic and related restrictions have accelerated digital transformation, leading to increased dependence on online transactions, remote work, and digital experiences. However, as is often the case, there are obstacles to the development of cryptocurrencies, including issues with regulation and acceptance, which will be discussed in more detail in the remainder of the work. NFTs, also built on blockchain technology, have gained popularity as a means of establishing verifiable ownership and uniqueness in the digital world. From digital artwork to virtual real estate, NFTs have opened up new opportunities for artists, content creators, and collectors, transforming the art and entertainment industry in unprecedented ways. This paper will illustrate why cryptocurrencies and NFTs as digital assets are the future of trading worldwide, including the Republic of Croatia. It will present the global situation that has opened the door wide for new types of digital assets, highlighting the factors that lead to their popularity and acceptance.

After the introductory part, the second part of the investigation will interpret the current situation and the recent past that affects the development and emergence of digital currencies. In addition, it will explain how blockchain technology works and what advantages and disadvantages it brings. The same chapter will discuss smart contracts and will present what NFTs actually are through theoretical explanation and will list the advantages and disadvantages of their use. The third part will show the current state of crypto readiness in Croatia compared to other countries and how aware people are of the emergence of digital currencies and digital assets. Within the same chapter, the tax treatment of investments in crypto-assets will be described as a significant factor in adoption of these digital innovations. The last part of the paper presents conclusions and recommendations for further research.

2. THEORETICAL BACKGROUND

As a consequence of the great global financial crisis that struck and devastated the market in 2008, the idea of revolutionizing the entire financial system emerged. Leading banks, due to their irresponsible practices, lost their status and people's trust, demonstrating to the world that complete centralization and the need for trust in financial institutions were deeply flawed. It is precisely in this context that a futuristic innovation emerged which largely fulfilled its expectations, that is, cryptocurrencies. Speaking in theoretical terms, cryptocurrencies are actually digital forms of currency based on blockchain technology and primarily serve for digital transactions without a third party, i.e., intermediaries, banks. They use cryptography, initially designed to secure and verify each transaction and to verify the process of creating new currency units. Each cryptocurrency has unique characteristics that make it distinct, and many of them have different real-world applications, from trading to bill payments (Kriptomat.io, n. d.). When it comes to cryptocurrencies, the first thing associated with them is the famous Bitcoin. Bitcoin is currently the most popular and widely used cryptocurrency, whose emergence is considered one of the greatest monetary and technological revolutions (Čizmić, M., 2021). Learning from the experience, Bitcoin went through, and wanting to achieve similar successes, alternative cryptocurrencies, known collectively as altcoins, began to emerge from 2011 onward. The most famous altcoins today include Ethereum, Ripple, Litecoin, Binance Coin, Cardano, Dogecoin, and Polygon. One of the first altcoins was Litecoin, created by using the original Bitcoin open-source code. Litecoin at the time represented a simpler form of Bitcoin and offered some improved functionalities compared to it. It had the potential to be competitively stronger and more advanced than Bitcoin, but as the cryptocurrency market in general progressed and became saturated with new offerings, Litecoin's popularity greatly diminished. (Frankenfield, 2022). The largest altcoin in the market and also the closest competitor to the ruler Bitcoin is Ethereum, whose blockchain saw the light of day in 2015, and for which Vitalik Buterin, who is also considered the main founder of Ethereum, is responsible. The main difference compared to Bitcoin was the platform's ability to trade more than just the cryptocurrency itself, namely including smart contracts and the Ethereum Virtual Machine (EVM). Despite the various problems encountered over the years of development, the most significant price growth of Ethereum occurred in 2017 when it increased by over 13.000%. This tremendous growth attracted numerous investors and, according to experts, made it the most popular platform in the world of cryptocurrencies and blockchain. (Marr, B., 2018). Currently, there are more than 20.000 different cryptocurrencies, but it is important to emphasize that the majority of them will not experience a near future due to the large number of competitors. According to statistical data from 2023, there are currently between 420 and 500 million cryptocurrency users, which is 4.2% to 5% of the world's population (Statista, 2024). Comparing the growth figures of cryptocurrency users with those of the internet, predicts greater cryptocurrency acceptance in the coming years.

The strength of the market expansion is evidenced by the fact that $1.72 trillion has been invested in the crypto world so far (CoinMarketCap, 2024).

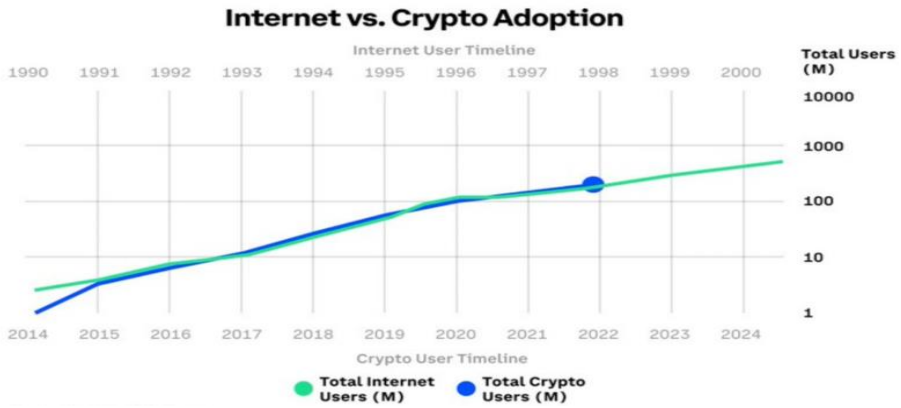

Figure 1: Comparison of Internet and Cryptocurrency Adoption from 2014-2024. (Source: Wan S., 2021)

2.1. Blockchain Technology

In 2008, a revolution in blockchain technology occurred when complementary related research emerged in Internet discussion forums. It was the work of the aforementioned Satoshi Nakamoto titled "Bitcoin: A Peer-to-Peer Electronic Cash System." As experts later noted, the blockchain protocol explained in Nakamoto's research paper is actually identical to David Chaum's protocol. The main difference lies in the advancement of Bitcoin's Proof-of-Work (PoW) consensus mechanism for verifying the validity of data blocks and coin mining. The result was the first modern blockchain launched in January 2009 along with the associated cryptocurrency Bitcoin. (Kriptomat.io, n.d.) Theoretically speaking, a blockchain is a distributed database shared by nodes of a computer network. They are best known for their key role in cryptocurrency systems in maintaining secure and decentralized transaction records, but are not limited to cryptocurrency use. Blockchains can also be used to make data immutable in any industry and make hacking or system cheating more difficult or impossible. Simply put, the blockchain is a virtual "ledger" where all crypto transactions are recorded. (Hayes, A., 2023). Blockchain is a combination of three leading technologies:

- Cryptographic keys: private and public keys,
- Peer-to-peer network containing a shared ledger - digital signatures,
- Computational resource for storing network transactions and records.

The basic concept of the blockchain was developed to operate without a central authority, i.e., without banks and regulators overseeing who conducts transactions. Despite this, transactions still need to be authenticated. This is achieved using cryptographic keys, sets of data (similar to passwords) that identify the user and grant access to their "account" or "wallet" within the system. Each user possesses their private and public key, which is visible to everyone. Using these keys creates a secure digital identity to verify the authenticity of users through digital signatures and to "unlock" the transaction they wish to execute. The main feature of blockchain technology is how it executes transactions. Before a transaction is added to the blockchain, it needs to go through several crucial steps, namely authentication and authorization. Each block contains a digital signature, a timestamp, and other important and relevant information. Blocks are transmitted to other network nodes, and when the private key is matched to the block, the transaction is executed promptly. It is important to note that no information about individuals' identities is stored in blocks, and all transactions remain anonymous (Ravikiran, A.S., 2023b).

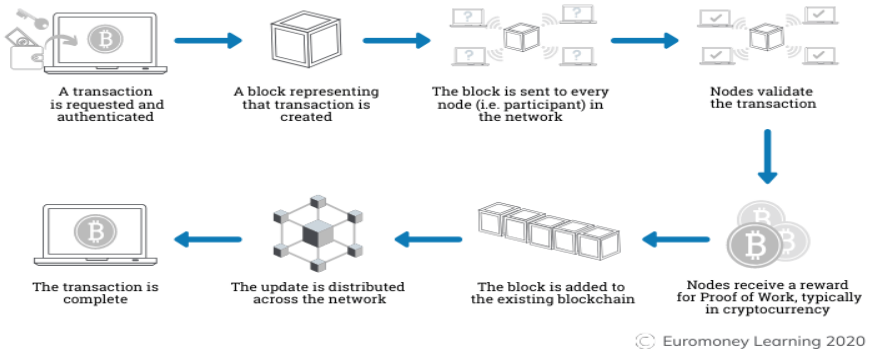

Figure 2: Method of conducting transactions using blockchain (Source: Euromoney, 2020)

Decentralization is a key characteristic of this technology. In a distributed chain of blocks, there is no single central institution that controls the network. In a distributed environment, the authorities and decisions are distributed among network nodes that collectively verify and agree on the transactions added to the block chain. This decentralized nature of blockchain technology contributes to transparency, trust, and security. It also reduces the risk of dependence on a single point of failure and decreases the chances of data manipulation (Ravikiran, A., S., 2023b). The structure of the crypto is set up in a way that over time leads to fragmentation and higher fees. This is primarily due to the transaction validation system and related compensations for validators. Validators are responsible for executing transactions on the blockchain, but these same validators are pseudo-anonymous, and nothing can guarantee that they are validating transactions correctly. Validators are not controlled by government institutions, nor are they accountable to the law. In order to compensate validators for correctly performing their job, the system must issue them high compensation to incentivize them to validate transactions correctly. This makes it much more profitable for everyone involved to validate correctly and receive higher compensation in the long run than to focus on short-term interests. The only way to ensure satisfactory compensation levels is to limit the capacity of the blockchain. By limiting capacity, the validators choose the priority of recording transactions. It is in their interest to give higher priority to those who pay higher fees, as can be seen from the following illustration.

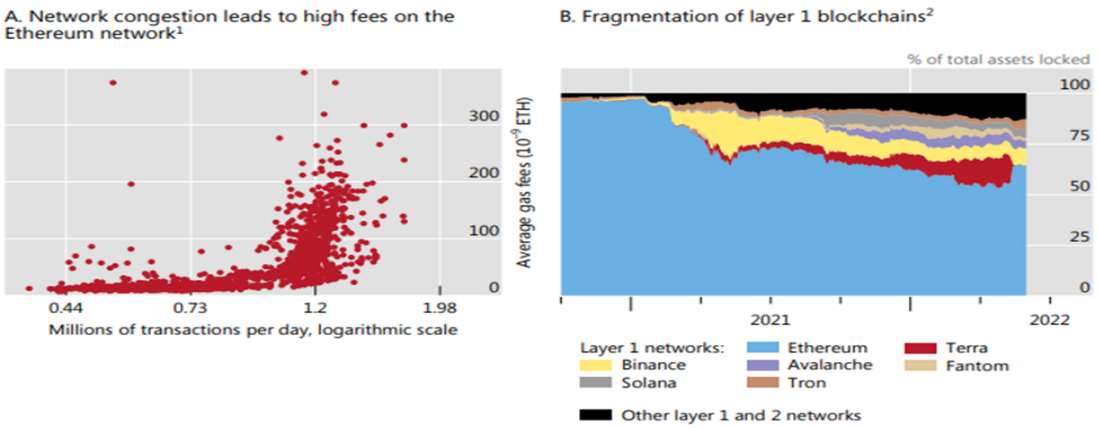

Figure 3: Congestion leads to fragmentation (Source: Boissay et al (2022); DeFi Llama; Etherscan; BIS. Annual Economic Report 2022)

The system limit is four transactions per second for Bitcoin and 30 for Ethereum. All solutions to this problem require either reducing decentralization and/or more complex technological solutions. Furthermore, it is difficult to determine the optimal solution because the compensation issue is not fully explored due to its complexity.

Since the compensation issue is not fully understood and the required level of decentralization and complexity of the structure in relation to maintenance costs has not been thoroughly researched, no further conclusions can be drawn. The main properties of Blockchain technologies are security, scalability, and the degree of decentralization. To ensure security, decentralization must be increased; however, if decentralization is increased, compensation for validators needs to be increased. If compensation increases, high costs will limit scalability. If scalability is limited, overall acceptance and adoption will decrease, which in turn will harm the system. A visual representation with examples can be seen in the following illustration:

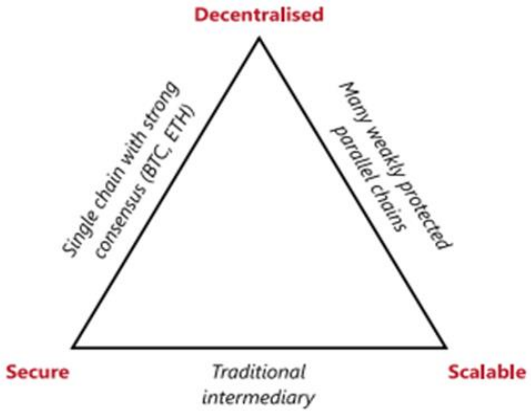

Figure 4: Buterin's scalability trilemma (Source: Auer, R., Monnet S., and Shin, H. S. 2021.)

Fragmentation of the system occurs precisely because new blockchains sacrifice security to gain a larger market share, and they often they fail due to a lack of security or improper structure. Since a blockchain with a limit of four transactions per second cannot communicate with one that has a limit of five transactions, there has been a need to develop communication channels that can connect them and facilitate communication between them. "Cross-chain" bridges are established as solutions. These bridges are essentially intermediaries that perform the function of transferring value between different blockchains. Bridges share the problem with validators and operate on a trust-based system and are not regulated by third parties. (Figure 5). Furthermore, they can be subject to Buterin's trilemma. To capture as much market share as possible, they sacrifice security and become victims of high-profile hacking. Unlike traditional monetary systems, where the most widespread system often continues to expand, due to Buterin's trilemma, crypto systems will continue to tend towards fragmentation.

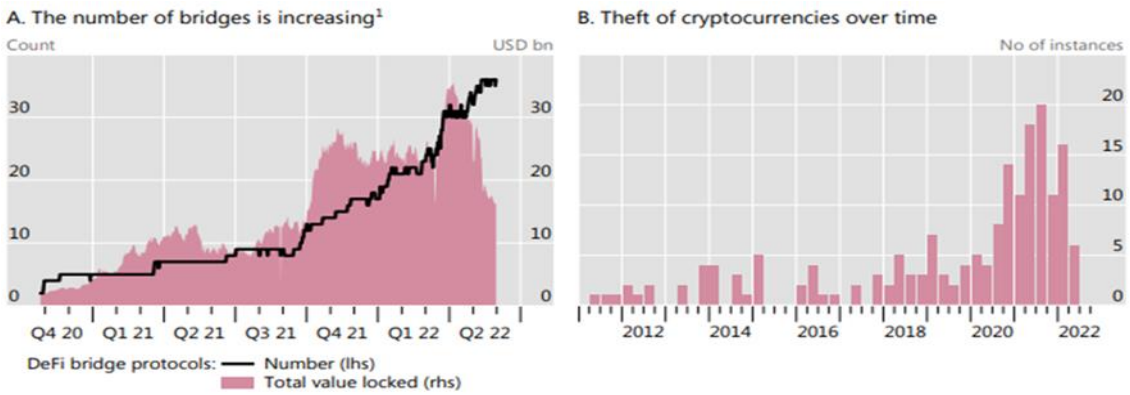

Figure 5: Cross-chain bridges and the number of thefts (Source: Boissay et al (2022); DeFi Llama; Etherscan; BIS Annual Economic Report 2022.)

The popularity of crypto is closely tied to its speculative nature. Fear of missing out combined with the potential for large gains is what attracts a large number of users. As long as the number of users and invested parties grows, the crypto market promotes this growth. However, when investors decide to cash out, there is a sudden drop within the system due to fear of investment loss. Such a market culture is akin to wealth redistribution and does not characterize a stable market into which individuals should invest if their goal is secure investment growth; rather, it is closer to gambling. From the following Figure, part A, it can be seen that as the price of Bitcoin increases, the number of users also increases, further drives up the price of Bitcoin and attracts new users who are drawn to the potential for further growth. In the part B of Figure 6, it can be seen that the majority of users are men up to 35 years old, that is, the age group most inclined to accepting risks, which is supported by the part C of the Figure 6 (BIS Annual Report 2022).

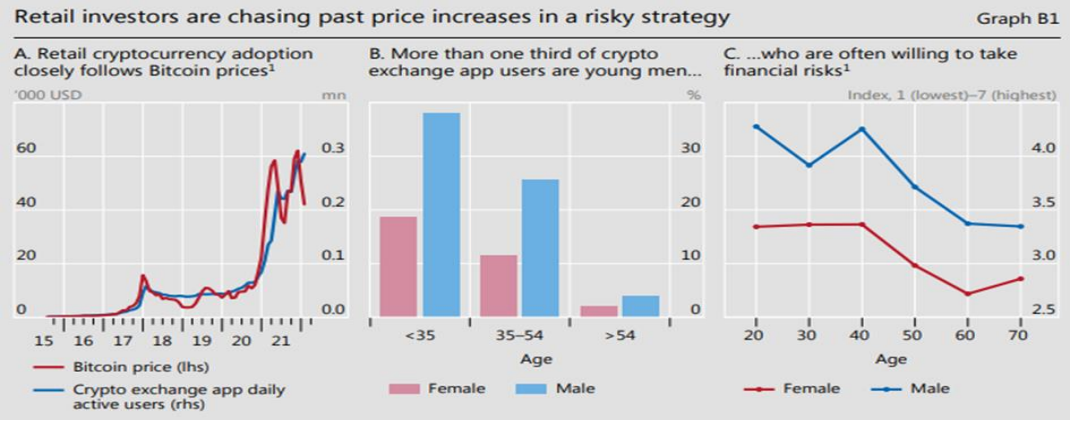

Figure 6: Segmentation of investors in crypto (BIS Annual Report 2022., Retrieved 4.02.2024. from https://www.bis.org/publ/arpdf/ar2022e3.pdf)

2.2. Ethereum Blockchain – Foundation for Smart Contracts and Decentralized Apps

In 2015, a team that included members who had previously worked on the Bitcoin project. Ethereum stood out as something different. While other blockchains focused solely on supporting specific cryptocurrencies, Ethereum was presented as a platform to run decentralized applications. With Ethereum's arrival, nodes became programmable and capable of executing code. Ethereum is a generalized type of blockchain that can set conditions for managing multiple types of transactions and values, thus solving this problem. (Vujičić, D., Jagodic, D., and Ranđić, S., 2018). When certain conditions are met, a specific action can be executed on the blockchain. This kind of business on the blockchain is called a smart contract. In addition to storing data, the Ethereum blockchain also contains executable source code, making it the foundation for thousands of blockchain decentralized applications. Smart contracts serve as the foundation for the NFT business. At their core, smart contracts operate on the principle of vending machines. Each vending machine has programmed hardware that, upon selection of a product and compensation for it, issues the desired product to the buyer (Szabo, N., 1997). Szabo defined smart contracts as a set of virtual promises with associated protocols for their execution. In the case of a smart contract, any two parties who agree to certain conditions can automatically execute them within the Ethereum blockchain with the consent of both parties. In the event that conditions cannot be met on the blockchain itself, the record can serve as proof and can be seen as a promised obligation in the eyes of the law. (Ali, M., Bagui, S., 2021). These contracts are encoded and stored on the blockchain, enabling the automation of agreements between creators and recipients. They are immutable and irreversible.

The main purpose of smart contracts is to automate contract execution without intermediaries, providing all parties with instant confirmation of the conclusion. Additionally, they can be programmed to trigger specific workflows based on specific conditions. (Arora, S., 2023). The Bitcoin protocol, which fundamentally records proof of payment, can be considered a rudimentary version of a smart contract. The flexibility of the Ethereum blockchain makes it ideal for hosting NFTs and dApps. (Ravikiran, A., S., 2023a).

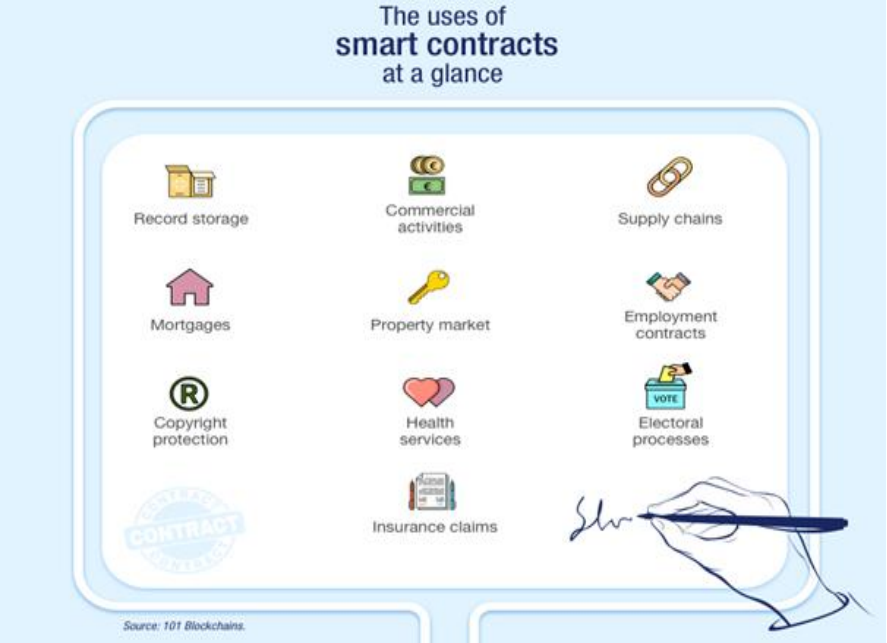

Figure 7: Smart Contract Usage at First Glance (Source: Iberdola, n.d.)

One of the significant advantages of blockchain networks is the automation of tasks that traditionally required third-party intermediaries. For example, instead of a bank approving the transfer of funds from a client to a freelancer, this process can be automatically handled through smart contracts. This results in reduced time and costs associated with traditional contract execution. (Arora, S., 2023). Ethereum enables the execution of actions on multiple types of blockchain using the Ethereum Virtual Machine (EVM). The EVM, which operates on the Ethereum network without downtime, enables the construction and communication of blockchains within the Ethereum network using any programming language. (Buterin, V., 2014). Depending on the desired standards and functionalities, on the Ethereum network, simple tokens can be launched for individual distribution purposes, or a complex network of rules and regulations can be created using security tokens, token burning and minting, and many others. These mentioned standards can comply with rules set by various financial agencies or regulatory bodies to enhance investors' sense of security and similar purposes. (Ali, M., Bagui, S., 2021). Despite its complexity, the potential of blockchain as a decentralized form of record keeping is almost limitless. From increased user privacy and enhanced security to lower processing fees and fewer errors, blockchain technology can be very beneficial in various aspects of our lives. Some of the main advantages of using cryptocurrencies include:

- Improved accuracy by eliminating human involvement in verification,
- Cost reduction by eliminating third-party verification,
- Transactions are secure, private, and efficient,
- transparent technology,
- Provides banking alternatives and a way to protect personal data for citizens of countries with unstable or underdeveloped governments.

While citing a myriad of benefits that come with cryptocurrencies and blockchains, it is also necessary to consider some downsides and inconveniences that may be encountered. Some of the most common disadvantages include (Jain, A. and Tombe, N., 2023):

- Significant technological costs associated with some blockchains,
- A small number of transactions per second,
- a history of use in illicit activities, such as the dark Web,
- Regulations vary depending on jurisdiction and remain uncertain,
- Data storage limitations.

Although blockchain technology can bring savings to users in terms of transaction fees, it is important to note that this technology is not free. For example, the Bitcoin network uses a proof-of-work system that requires large amounts of computational power to verify transaction validity. The actual energy consumption of millions of devices on the Bitcoin network is reflected in the fact that this number exceeds Pakistan's annual energy consumption. Fortunately, solutions to these problems are beginning to emerge. For example, there are bitcoin mining farms that use solar panels to harness solar energy, use excess natural gas from fracking sites, or are powered by wind energy (N26, 2022). Although promising security and user privacy, the blockchain network also has loopholes and allows illegal trading and other activities associated with the dark web (Hayes, A., 2023). Despite claims that cryptocurrencies enable anonymous transactions, they are actually pseudonymous, meaning that they leave a digital trail that can be decoded by federal investigative agencies. Therefore, federal or government bodies to intervene in tracking financial transactions of individuals. The lack of key transaction policies represents a significant drawback. Policies without the ability to refund or cancel transactions are often considered standard for incorrectly executed transactions via cryptocurrency wallets, with each cryptocurrency exchange or application having its own applicable rules. (Jain, A. and Tombe, N., 2023).

2.3. Non-Fungible Token (NFT)

NFTs existed long before they became popular in the mainstream. According to reports, the first NFT sold was "Quantum," designed by Kevin McKoy in 2014 on the Namecoin blockchain. Later, that NFT was minted and sold on Ethereum in 2021. NFTs currently are not gaining as much popularity in the world of digital art and collectibles as they did in 2021 and 2022 when they were in the so-called biggest "hype." Just as Bitcoin was considered the digital answer to traditional currency, NFTs were presented as the digital response to collectible items. This led to significant changes in the lives of digital artists, with mass sales attracting a new audience using cryptocurrencies. The NFT market reached an impressive $41 billion in 2021, almost equal to the total value of the global fine art market. (Ravikiran, A., S., 2023a). Non-fungible tokens (NFTs) are assets tokenized via blockchain, making their purchase, sale, and trading more efficient while reducing the likelihood of fraud. They are assigned unique identification codes and metadata that differentiate them from other tokens, thus imbuing them with the property of nonfungibility. Put simply, they are digital assets that can take the form of art, music, in-game items, videos, and more. They are bought and sold online, often using cryptocurrency, and are generally encoded using the same underlying software as many cryptocurrencies. (Kaspersky, n.d.). NFTs are created through a process known as minting, in which information about the NFT is recorded on the blockchain. At a technological level, the minting process involves creating a new block, validating the NFT information by validators, and closing the block. This process often involves the use of smart contracts that assign ownership and manage the transferability of the NFT. During minting, tokens are assigned a unique identifier directly linked to a specific address on the blockchain.

Each token has an owner, and ownership data (that is, the address where the NFT resides) is publicly available. Even if 10.000 NFTs depicting the same item are created (a comparison to traditional movie tickets), each token has a unique identifier and can be distinguished from others. (Kaspersky, n.d.) After setting up your wallet and depositing funds into it, you are ready to explore the NFT market and the platforms that offer buying options. Some of the most well-known ones are (Conti, R., 2023):

- OpenSea is a leading platform for NFT sales, offering various digital assets on its platform, and registration and browsing are completely free. It also supports artists and creators and has an easy process for creating your own NFT. The platform supports over 150 different crypto tokens as a means of payment, according to its name.
- Rarible is another major marketplace for various types of NFTs, similar to the OpenSea platform. On Rarible, you can buy, sell, and create various types of art, videos, collectible items, and music. However, unlike the OpenSea platform, on Rarible, you need to use their native platform token called Rari to perform buying and selling on the platform. Rarible is built on the Ethereum blockchain (although artworks can also be managed via Rarible tokens on the OpenSea platform).
- Foundation Marketplace: The Foundation app is designed as a simple and intuitive way to auction digital art, and sales take place through Ethereum. Since the launch of the marketplace in early 2021, more than $100 million worth of NFTs have been sold. The Foundation.app community invites artists to join the platform, while buyers simply need an Ethereum-funded crypto wallet to start purchasing.
- Magic Eden: Launched in September 2021, Magic Eden is an NFT marketplace operating on the Solana blockchain. Users can buy, create, and sell NFTs through this platform. Developers have the option to use the Magic Eden API to access various points and integrate data into their own applications. Magic Eden stands out for its low transaction costs and does not charge creators for listing their NFTs.

The use of NFTs offers many benefits, some of which are listed below (Garnett, A., G., 2022):

- Efficient Markets Considered one of the most obvious benefits of NFTs. NFT creators can now easily sell their large collections of digital assets. From minting (the process of turning digital files into NFTs via smart contracts) to secondary sales, all transactions are seamless and artists can easily generate revenue or profit from each sale.
- Accessible Investment: Investing in tokenized assets is available to everyone. The ownership of assets tokenized via NFTs can be more easily and efficiently transferred among individuals around the world. The technology is secure.
- Secure Technology: NFTs provide a digital record of each sale, secured on the blockchain via smart contracts. A person can create an NFT with confidence that they will be able to track the ownership chain anywhere with access to the public registry. Additionally, NFTs make markets more efficient.

Although non-fungible tokens have great potential, there are some disadvantages to investing in them (Garnett, A.G., 2022):

- Costly Minting: All NFTs must be created (minted) to exist. Creators or collectors who want to create NFTs on the popular Ethereum blockchain must pay a gas fee. In some cases, these fees can be extremely high.
- Market instability: Since the NFT market is relatively new, it is subject to significant fluctuations. It is not uncommon for the value of NFTs to double in just a few hours because of pure speculation. Also, some NFTs can lose most of their value in just a few minutes.
- Risk of Fraud: For every popular NFT like CryptoPunks, there are many cheap imitators. In addition, some unethical participants create NFT projects with the aim of collecting

money and disappearing, failing to fulfill the promises outlined in the project plan or documentation. Due to such situations, some people view NFTs as the Wild West of the digital world.

- Negative Environmental Impact: Since NFTs are created on the blockchain, there is concern about their impact on the environment. Most blockchains use mechanisms like "proof of work" that require significant energy consumption to confirm smart contract transactions. This energy consumption can have a negative impact on the environment.

3. CRYPTOCURRENCIES AND NFTS IN CROATIA

3.1. Crypto-Readiness Index

Digital currencies in the Republic of Croatia have slowly become a prevalent topic in recent years. An increasing number of people in Croatia are exploring, investing in and using digital currencies as an alternative form of financial asset. Although cryptocurrencies are still a relatively new phenomenon in the financial world, their popularity and acceptance in Croatia continue to grow. A growing number of people are exploring investment opportunities in cryptocurrencies as part of their investment strategy, while others use cryptocurrencies as a means of payment or participate in various projects based on blockchain technology. CryptoHead forms its index, Crypto-Ready, on several key factors. First, they take into account the number of cryptocurrency ATMs and their availability to the wider population. They also analyze the attitudes of governments of those countries towards cryptocurrencies and their legal regulations, especially regarding the possibility of using cryptocurrencies in the banking sector. Then, they checked people's interest in cryptocurrencies by analyzing the number of internet searches during the past year. This helps them assess the general interest of the population in cryptocurrencies. By combining all this data, they form an index ranging from 1 to 10 score, indicating the country's readiness to accept cryptocurrencies. Croatia surprisingly ranks quite high on this scale, specifically in the 13th place with an index of 5.66 (CryptoHead, 2024).

Rank	Country/Region	Annual Crypto Google search per 100.000	People Crypto Searches Annual Increase	Number of Crypto ATMs	People per Crypto ATM	Area per Crypto ATM	Tax and Legislation	Total Crypto-Ready Score /10
1	United States	14,796	140.00%	17,436	19,023	218	2	7.135
2	Cyprus	33,941	139.60%	0	888,005	3,572	2	6.47
3	Singapore	31,324	111.00%	10	568,581	28	2	6.3
4	Hong Kong	10,356	102.10%	124	60,276	3	2	6.27
5	United Kingdom	21,154	205.40%	200	333,984	468	2	6.06
6	Ireland	24,189	140.30%	35	142,211	775	2	6.05
7	Slovenia	21,849	147.70%	22	95,863	356	2	5.96
8	Australia	23,080	165.60%	32	806,220	92,810	2	5.94
9	Germany	2,551	112.00%	53	1,569,633	2,602	2	5.93
10	Canada	20,783	213.10%	1,464	26,265	2,633	1	5.86
11	Gibraltar	30,586	136.40%	0	34,003	2	0	5.72
12	Malta	18,754	79.00%	0	514,564	122	2	5.68
13	Croatia	12,799	203.60%	8	505,900	2,731	2	5.66
14	New Zealand	17,215	162.80%	0	5,129,242	104,428	2	5.65
15	United Arab Emirates	14,836	168.60%	1	9,503,738	32,300	2	5.64

Table 1: Top 15 Most Crypto-Accepting Countries (Source: Cryptohead 2024)

At the top of the list, alongside USA, are the states of Cyprus, Singapore and Hong Kong, which do not tax capital gains on cryptocurrencies, making them attractive to many investors. Croatia averages 8 crypto ATMs per 100.000 people and almost 204% annual increase in cryptocurrency-related searches.

According to data from 2024., Croatians showed significant interest in the world of cryptocurrencies this year, ranking 13th with an average of 12.799 searches per 100,000 inhabitants. Cyprus leads the world in cryptocurrency interest, according to research that found more than 33.000 searches per 100.000 people.

3.2. DeFi in Croatia

Decentralized finance (DeFi) is an innovative financial technology that is evolving using secure distributed ledgers, similar to those present in cryptocurrencies. DeFi components include stablecoins, software, and hardware that enable application development. The DeFi concept is characterized by the absence of a central authority. Instead, authority is distributed through decentralized access in order to provide greater power and control to individuals. In the DeFi model, all transactions involving buying, selling, lending, and payments with cryptocurrencies can be conducted without the mediation of a central authority, using a peer-to-peer (P2P) approach. One of the most prominent web services are decentralized applications operating on DeFi principles, enabling individual's various services from transferring capital worldwide to crypto gaming. According to an unnamed Croatian lawyer specialized in the digital economy, Croatia is a haven for the use of decentralized finance. It all started with the realization that exchanges (CEX = centralized exchanges) are the only centralized point in an otherwise decentralized cryptocurrency world. From this emerged the development of DEXes (Decentralized EXchanges), which are platforms allowing users to exchange one token for another through interaction with smart contracts. The main difference between these two approaches is that DEXes operate without an intermediary company, but also lack AML/KYC rules (anti-money laundering / Know Your Customer). Croatia was among the first in the European Union to implement the 5th AML Directive through the Law on Prevention of Money Laundering and Terrorist Financing, which came into force on January 1, 2020. From January 1, 2023, the new Anti-Money Laundering and Counter-Terrorist Financing Act (NN 108/17, 39/19, 151/22) is in force. This law imposes the obligation to perform AML checks on a wide range of entities, including crypto-projects. Article 9.2, paragraph 17, states that entities providing services for the exchange of virtual and fiat currencies fall under this obligation. However, the question arises: What exactly does "virtual to fiat" mean? HANFA, the Croatian regulator, officially states that there is no obligation to conduct AML checks when providing services for the exchange of virtual currencies or enabling exchanges between them, without involving fiat currencies. Therefore, as long as fiat currencies are not involved, this advanced stance of HANFA makes Croatia a unique country where you can safely launch a DeFi project without worrying about being forced to disclose the identities and sources of income of your users. (Hrdalo, V., 2021).

3.3. NFTs in Croatia

The popularization of NFTs has swept through the technological and financial worlds, and in Croatia, the number of domestic non-fungible (NFT) projects, after continuous growth in the second half of 2022, is encountering a slight stagnation. This is expected and nothing unusual, a consequence of the turbulent oscillations in the crypto world. Three female artists were among the first in Croatia to start exploring NFTs and released their own NFTs in early 2021. Shortly after, the digital agency Kontra created its own NFT as a smart contract with added value beyond economics. There are several versions of the Kontra NFT: some can be purchased, while the Agency will donate others to its employees, partners, and participants in the educational programs. An interesting aspect regarding Croatian NFTs is that even famous Croatian football player Luka Modrić has received his NFT collection. The Dutch animation digital studio created a set of four collector's artworks including two virtual jerseys that are fully wearable in the metaverse.

In the hospitality industry, there is an example of Noel, the first and still the only Michelin-starred restaurant in Zagreb, which became the first in Croatia to introduce NFTs for investing in restaurant experiences. The Noel Circle Club now offers NFTs in four value categories. Rouge, Noir, Platinum, and Diamond. The minimum initial investment in NFTs is 1.000 euros and owners will receive special benefits at the Noel Circle Club. Despite the assumption that digital art does not belong to the analog world, exhibitions of NFT artworks are becoming more common. One such exhibition has found its place in Brigada's gallery space located in the Kaptol Center in Zagreb, where visitors can see the first exhibition of its kind in Croatia until the end of February. This exhibition represents a blend of new technologies and art and will especially attract innovation enthusiasts. Fans of NFTs, the metaverse, and advanced technology will have the opportunity to view works by artists from the global Singular platform, owned by RMRK. This platform allows users to create and sell NFT tokens, similar to buying and selling digital real estate, clothing, and fashion accessories for avatars, as well as virtual models of property ownership. RMRK and their work are considered pioneers in a completely new era of NFT development. The wide audience will now have the opportunity to become acquainted with the world of NFTs and discover the reasons for the increasing popularity of investing in digital assets. (Čizmić, M., 2023). Michelangelo Labs, a Croatian art startup, transforms the most famous motifs from the digital NFT world into 3D printed physical sculptures. They recently presented three sculptures from well-known NFT collections at Lauba: Bored Ape Yacht Club, CrypToadz, and CyberKongz. The idea of this startup emerged in November 2022, with the aim of transforming the digital world into physical form and materializing Internet culture through pop art. The whole process is extremely creative as they transform 2D images into 3D sculptures. The exhibition at Lauba proves this, and the sculptures have attracted the attention of people who are not familiar with NFTs; they consider them to be true works of art, which greatly pleases him. He claims they are the first NFT 3D artists in our region. (Kolar, H., 2022). The domestic NFT scene in Croatia is currently thriving but still in its infancy, with a small number of participants in the market and a limited amount of investment. Nevertheless, the growth of this scene is exponential, as the popularity of non-fungible tokens has only recently gained momentum, although NFTs have existed for several years. Continuing at the same pace, it is expected that the Croatian NFT scene will become even stronger and continue to grow. Although there are quite a few local NFT projects, they need to offer something to the global scene in order to stand out, which means they do not necessarily have to rely solely on Croatia. It is commendable to see more and more young innovative NFT startups working to create new value in the world of blockchain and cryptocurrencies. The first Croatian NFT experts, artists, and investors have managed to get on the first train of a global trend, but the question remains where this ride will take them and whether new opportunities and projects will soon emerge in this dynamic area.

3.4. Tax Regulation of Crypto-Assets in Croatia

Tax obligations in Croatia must be settled, and there are no exceptions. Transactions with cryptocurrencies are currently not regulated and supervised according to Croatian laws. However, it is necessary to pay taxes depending on the way of acquiring cryptocurrency (Tkalec, M., n.d.):

- Sold cryptocurrencies - Income from the sale of cryptocurrencies in Croatia is considered a financial transaction. This means that they are taxed in the same way as other income from financial assets. The sale of cryptocurrencies is considered a type of acknowledgment, so income tax must be paid. The tax is calculated on the realized gain. The tax base is the capital gain reduced by transaction costs and the capital loss incurred in the previous year. The tax rate is 10% plus the city surcharge where you reside. There is one exception related to paying this tax. Gains from transactions in which more than two years have elapsed

between acquisition and sale are not taxed. However, if you have sold cryptocurrencies within a two-year period, you must pay tax.

- Exchanged cryptocurrencies - If you have exchanged your cryptocurrency for another type of cryptocurrency, you are not required to pay tax. Income tax will only be calculated if you exchange cryptocurrency for traditional money.
- Mining cryptocurrencies - Assuming that you acquired cryptocurrencies through the mining process, this is considered income from work. In case you further use these cryptocurrencies for speculative trading through exchanges or online merchants and realize gains, you are obliged to pay capital gains tax. The tax base is calculated as the difference between the acquisition and the selling value. However, if you continuously engage in mining to generate income over a longer period of time, and this is your only "job", you must register as a self-employed person. In that case, taxes are paid according to the payment rules for self-employment.
- Incentive-based cryptocurrencies - If you acquire cryptocurrencies through certain incentives or promotions, such as watching advertisements, filling out surveys, promoting products on your website, or other forms of advertising, then you are obliged to pay tax based on earned income or income from self-employment.
- Cryptocurrencies from the sale of personal property. Provided you acquire cryptocurrencies by selling your personal property, the income you earn is non-taxable. For example, if you sell a used table from your home in exchange for cryptocurrency, that income would not be subject to taxation.
- Donated cryptocurrencies - There is an option to receive cryptocurrencies through donations, including blogs, websites, or online applications for which you receive donations in the form of cryptocurrencies. In such cases, the income you receive is nontaxable if you possess certified documents confirming that the cryptocurrencies were donated by individuals who are not self-employed entrepreneurs, and if the gifts arise from income that has already been taxed with income tax or income that is not considered income. In other situations, you are obliged to pay income tax based on other income and contributions for pension insurance or income tax from dependent work, if you engage in self-employment. (Ministry of Finance. Tax Administration. Income from capital, n.d.)

4. CONCLUSION

Cryptocurrencies and NFTs represent something new and modern in the global financial landscape. Resisting and attempting to separate from traditional institutions, these digital currencies offer a revolutionary way of trading through their blockchain technology. Undoubtedly, their impact is already so significant that global banks will find it difficult to stop the hype surrounding them. The initial spread occurred in the US market, but it quickly moved to the rest of the world. In the Republic of Croatia, every story and news about digital currencies in our region symbolize something specific and exclusive. This novelty in global markets is increasingly finding a place and function within domestic frameworks. Despite wanting to quickly adapt to the market, we still face challenges that include uncertain and ambiguous legal regulations, security threats, and limited awareness of potential risks. It is necessary for authorities to establish a clearly defined regulatory concept and strike a balance between fostering innovation and preserving financial stability. It is also essential to provide adequate education and awareness to encourage broader acceptance of cryptocurrencies and NFTs. People need to have reliable information about their use, benefits, and risks so they can make informed decisions. Furthermore, there is a need for further development of the digital infrastructure to facilitate the broader use of these technologies. Faster and more stable Internet connections and better accessibility of smartphones and computers encourage the adoption of digital currencies in the daily lives of citizens.

Overall, cryptocurrencies and NFTs have the potential to significantly change the way we trade and perceive value in the Republic of Croatia. However, to fully exploit their potential, we must overcome obstacles and ensure appropriate regulatory frameworks, citizen education, and digital infrastructure development. If we adopt these steps, cryptocurrencies and NFTs could become an integral part of the Croatian economy and culture in the future. As a goal for future continuation of research on the topic, it would be worthwhile to examine tools specific to analyzing crypto projects on organized markets and platforms. This would serve to familiarize potential adopters or future investors with techniques for visualizing and filtering large amounts of data and transactions, all with the purpose of better understanding the nature of a topic that is often quite complex and incomprehensible to many.

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CONSUMER PSYCHOLOGY AS A FUNDAMENTAL ELEMENT OF BEHAVIORAL MARKETING STRATEGY

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ABSTRACT

The dynamic landscape of contemporary business demands a nuanced understanding of consumer behavior for the development and execution of effective marketing strategies. This paper explores the pivotal role of consumer psychology as a foundational element in crafting successful behavioral marketing strategies. By delving into the intricacies of how individuals make purchasing decisions, the study investigates the psychological factors that influence consumer choices and shape market trends. The paper begins by elucidating the key principles of behavioral marketing and its relevance in the modern business environment. It then shifts focus to the interdisciplinary nature of consumer psychology, emphasizing its integration into the strategic framework of marketing. Through an analysis of psychological theories and empirical studies, the research underscores the impact of cognitive, emotional, and social factors on consumer decision-making processes. Furthermore, the paper examines practical applications of consumer psychology in shaping marketing campaigns, product positioning, and customer relationship management. In conclusion, the paper emphasizes the imperative for businesses to recognize consumer psychology as a fundamental element in the formulation of effective marketing strategies. By aligning marketing initiatives with the intricacies of human behavior, organizations can enhance customer engagement, foster brand loyalty, and achieve sustained success in today's competitive marketplace. This research contributes valuable insights to marketers, business practitioners, and scholars aiming to navigate the evolving landscape of behavioral marketing in the digital age.

Keywords: *behavioral marketing, pscyhology, consumer, purchase*

1. INTRODUCTION

Consumer psychology is a branch of psychology that deals with understanding the processes behind consumer decisions and behaviors in purchasing products and services. This field is used to explore how people react to marketing messages, why they choose certain products, how they are loyal to brands, and how social, psychological, and personal factors influence their final purchasing decisions. Consumer psychology also deals with perceptions of value, consumer satisfaction, and post-purchase behavior, such as reviews and recommendations. Within behavioral marketing, consumer psychology plays a crucial role as it provides the foundation for understanding and predicting consumer behavior. Behavioral marketing uses insights from consumer psychology to develop strategies that will elicit a desired response, such as purchasing a product or engaging with a brand. This includes techniques of tailoring marketing to specific market segments based on their psychological profiles and behaviors. The possibility that neuroimaging will become cheaper and faster than other marketing methods; and second, the hope that neuroimaging will provide marketers with information that is not obtainable through conventional marketing methods. Although neuroimaging is unlikely to be cheaper than other tools in the near future, there is growing evidence that it may provide hidden information about the consumer experience. The most promising application of neuroimaging methods to marketing may come before a product is even released — when it is just an idea being developed (Ariely & Berns, 2010).

The main objectives of this research are:

1) *Impact of psychological factors on decision-making:* to explore how factors such as motivation, perception, attitudes, beliefs, and identity influence the consumer decision-making process.
2) *Consumer awareness of marketing influence*: to assess the extent to which consumers are aware of the influence of marketing strategies on their purchasing decisions and how that knowledge affects their behavior.

The results of this research can help shape ethical and effective marketing strategies that respect the psychological aspect of consumers, providing them with value and improving their overall brand experience.

2. LITERATURE REVIEW

The goal of behavioural marketing is to understand consumer behavior deeply to tailor marketing strategies that can effectively influence purchasing decisions. As far back as 1979, Kahneman, D. and Tversky, A. in their paper *Prospect Theory: An Analysis of Decision under Risk* made groundbreaking work introduces the concept of prospect theory, a critical foundation for understanding consumer decision-making that challenges traditional economic models by incorporating psychological insights. After that, Cialdini, R. B. (1984). in his book *Influence: The Psychology of Persuasion* analysed six principles of persuasion (reciprocity, commitment and consistency, social proof, authority, liking, and scarcity) which are fundamental to understanding how consumers are influenced by marketing messages. The main message that he delivers is that if you understand these six principles, then you can use them to your advantage when trying to persuade others to take a specific action or buy a specific product. At the core of his work is the now well accepted idea that decision making is effortful, so individuals use a lot of rules of thumb and decision making shortcuts (heuristics) when deciding what to do, how to behave or what action to take in any situation. Watson, L. and Spence, M.T. (2007) have proveded an extant review of cognitive appraisal theories of emotions, which makes transparent the looseness in terminology and differences in theoretical perspectives that existed then. Based on that review the paper advances a unifying theory of consumption appraisals and explore their relevance to marketers. The study of consumer behaviour emphasizes the "why" and "how" questions involved in decision making and buying behaviour. This exciting field visits a dynamic blend of themes of consumer marketing strategies, psychology and behavioural discipline. Authors Xie et al. (2012) draw upon basic processes from two leading theories in social psychology, the theory of planned behavior (TPB) and the model of goal-directed behavior (MGB), to develop a comprehensive approach to decision making more appropriate for many consumption decisions, and revise the representation and modeling of key variables to better reflect how social psychological processes relate to consumer behavior. Halkiopoulos et al. (2021) in their paper examined the effect of emotional intelligence on consumer decision-making and quantifies consumers' emotional capacities using a survey of social network users. Additionally, empathy, personality, and emotional intelligence are evaluated as distracting factors in the current project that mediate and affect consumer decision-making. This project distinguished itself by its application of data analysis methods to psychometrics. Five psychometric scales measuring empathy quotient and personality factors, emotional and cognitive aspects, were distributed to participants to help them understand how consumers to make personal decisions. The research found that emotional capacity predicts consumer success independently of cognitive ability, demonstrating the construct's significance in consumer behaviour. Industry 4.0 technologies have transformed the traditional methods of various study areas, using digitalization to fulfill sustainability and introduce innovative infrastructure. In the present era, every organization requires a distinct

marketing strategy in order to meet customer and market demands in the form of products and services. Customer satisfaction, customer retention, customer behavior, customer profiling, and rewards systems are key parameters in the effective implementation of an organization's marketing strategy for achieving better productivity (Kaur R. Et al., 2022.). Same authors in their study identified the applications of the Industry 4.0 enabling technologies for market strategies, such as strategic information for customer satisfaction of the target customer; development of digital infrastructure for receiving real-time feedback on products and services; forecasting customer behavior to develop personalized messages or services; using business analytics to strengthen the quality of a product or service; developing effective simulations to monitor, test, and plan product improvements, based on consumer and market demand. Furthermore, some authors examined the relationship between consumers' awareness and knowledge to effective consumers'behaviors (Ishak & Zabil, 2012). The result of their study demonstrates that awareness is prior to effective consumers' behaviors; while unawareness leads to ignorant and reduction of individual capacity in protecting and upholding their rights against sellers' expropriations. Nevertheless, consumers' awareness differs significantly between locations in which the urban dwellers showed lesser awareness compared to the less-urban areas. Regarding awareness, Ainsworth (2013) in his paper reports on a study that was undertaken to assess consumer awareness, and use, of product review websites.Results indicated that consumers, generally, are aware of the existence of product review websites and there is moderate usage of, and varied uses for, these types of websites. Gender and certain individual difference factors, in particular e-opinion leadership, have an impact on usage and perceptions of these types of websites. Also, Tchelidze, L. (2023) investigated the level of influence of brand activities through Facebook on consumers' awareness and to what extent the platform has contributed to the process. According to the results, frequent advertisements and brand activities have a considerable influence on consumers' awareness, and it can be said that such activities directly provide the possibility of "unaided" brand awareness. Awareness differentials seem to be a powerful influence on brand choice in a repeat purchase consumer product context. Consumers show a strong tendency to use awareness as a heuristic and show a degree of inertia in changing from the habit of using this heuristic (MacDonald & Sharp, 2000). Some findings suggest that interactive tools designed to assist consumers in the initial screening of available alternatives and to facilitate in-depth comparisons among selected alternatives in an online shopping environment may have strong favorable effects on both the quality and the efficiency of purchase decisions—shoppers can make much better decisions while expending substantially less effort. This suggests that interactive decision aids have the potential to drastically transform the way in which consumers search for product information and make purchase decisions (Häubl & Trifts 2000). However, research from the domain of automaticity proposes that the majority, if not all, of human behavior either begins as an unconscious process or occurs completely outside of conscious awareness. These automatic processes, including behavioral mimicry, trait and stereotype activation, and nonconscious goal pursuit, also impact attitudes, beliefs and goals without engaging consumers' conscious minds. Habits, a special type of automaticity, are behaviors completely controlled by contextual stimuli; habits occur outside of goals and intentions (Martin & Morich, 2011). Interactive decision aids represent a pivotal shift in how consumers interact with product information and make purchasing decisions. Marketers and retailers must invest in and develop these tools to meet changing consumer expectations and enhance the shopping experience. By creating platforms and informative content that enhance awareness businesses can build a more knowledgeable and engaged customer base. This approach may increase the likelihood of purchases especially when combined with utilization of digital platforms to deliver timely and enticing offers or promotions (Serdarusic et. al. 2023).

Understanding the subconscious factors that influence consumer behavior can provide marketers with strategies to subtly guide consumer preferences and choices without the need for overt persuasion. Effective marketing strategies should consider both conscious and unconscious consumer processes. By leveraging insights into automaticity and habits, marketers can create more targeted and effective campaigns that resonate with consumers on multiple levels. While the potential to influence consumer behavior is significant, it is important for marketers to use these insights ethically, ensuring that consumers are empowered and informed in their decision-making processes, rather than manipulated. These conclusions highlight the complex interplay between technology, unconscious processes, and consumer behavior, offering valuable insights for both researchers and practitioners in the field of marketing.

3. METHODOLOGY

The methodology for the survey involved collecting data from 76 participants over a period from December 18, 2023, to January 19, 2024. The participants comprised a diverse group, including students, employed individuals, a few high school students, and a few retired people, primarily from Zagreb, Croatia. The sample was intentional, indicating that participants were selected based on specific characteristics relevant to the research objectives. The survey collected responses on various aspects, including behavioral techniques, consumer awareness of marketing influences, and demographic information. This approach allowed for a targeted examination of attitudes and behaviors related to marketing strategies and their influence on purchasing decisions. The methodology for the survey was further enhanced by the application of statistical analysis methods, including the calculation of Mean, Median, and Standard Deviation, along with the use of the Mann-Whitney test. These statistical tools were utilized to analyze the survey data comprehensively, allowing for a detailed examination of the central tendencies, dispersion of responses, and comparisons between different groups within the sample. This analytical approach provided a robust framework for understanding the nuances of consumer behavior and the impact of marketing strategies among the participants

3.1. Research questions

There are three research questions relevant for this paper:

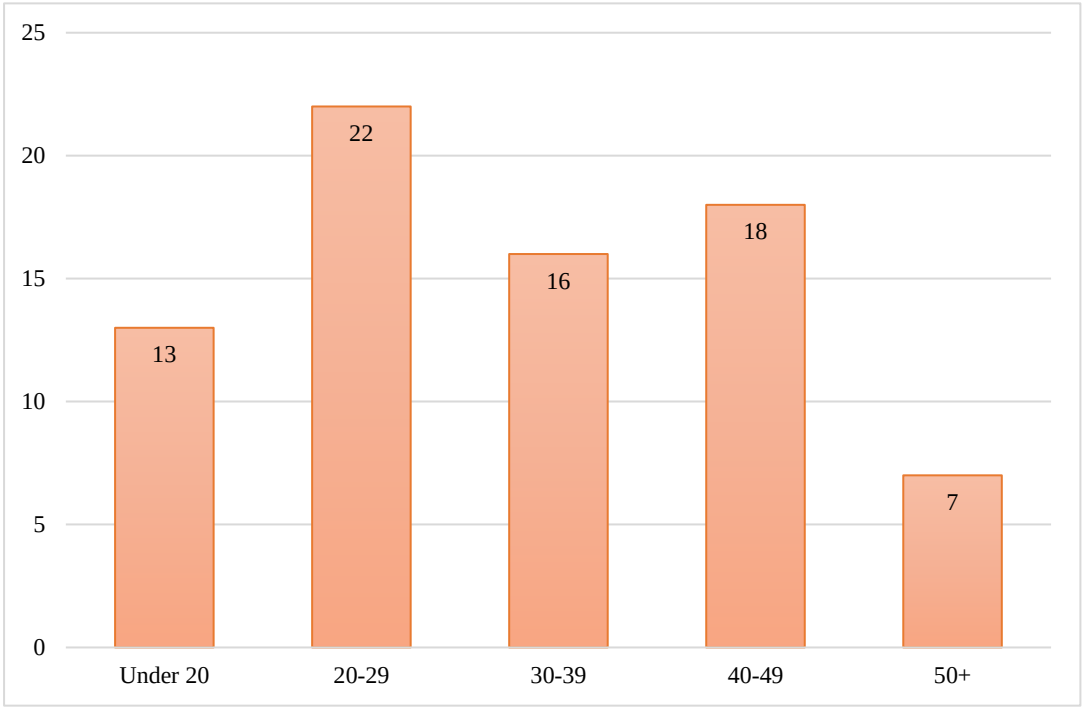
- RQ1: *Influence of Customer Reviews on Purchasing Decisions*
  Customer reviews significantly influence purchasing decisions in the digital age. Reviews act as a form of social proof, providing potential buyers with insights into the experiences of others who have purchased and used the product or service. Positive reviews can enhance trust and confidence in a brand or product, leading to increased sales. Conversely, negative reviews can deter potential buyers, highlighting issues or dissatisfactions that past customers have experienced. The overall rating, quantity, and quality of reviews can impact consumer behavior, with many shoppers reading reviews as part of their pre-purchase research to make informed decisions.
- RQ2:*Levels of Awareness of Marketing Strategies in Product Advertisements*
  The awareness of marketing strategies in product advertisements varies among consumers. Some individuals are highly aware and can identify tactics being used, such as emotional appeal, scarcity (limited time offers), social proof (testimonials, influencer endorsements), and the use of attractive visuals or music to capture attention. Others may not consciously recognize these strategies but can still be influenced by them subconsciously. Marketers strive to create ads that not only capture attention but also resonate with the target audience on a level that encourages brand recall and purchasing decisions. Consumer education and exposure to information about marketing practices can increase awareness of these strategies.

- RQ3: *Agreement Levels on Marketing Influence on Purchasing Decisions*
  Agreement levels on the influence of marketing on purchasing decisions can vary widely among individuals. Some consumers strongly agree that marketing efforts, including advertisements, promotions, and branding, significantly influence their purchasing decisions. They acknowledge that marketing can affect their perceptions of a brand and the desirability of a product or service. On the other hand, some consumers believe they are less influenced by marketing, claiming to make purchasing decisions based on personal needs, product quality, and price considerations. Despite these self-assessments, numerous studies have shown that marketing can subtly influence consumer preferences and choices, even if consumers are not fully aware of its impact.

Understanding these dynamics is crucial for businesses and marketers aiming to tailor their strategies to effectively reach and influence their target audience. The development of marketing strategies that are ethical, transparent, and customer-centric can help in building long-term customer relationships and brand loyalty.

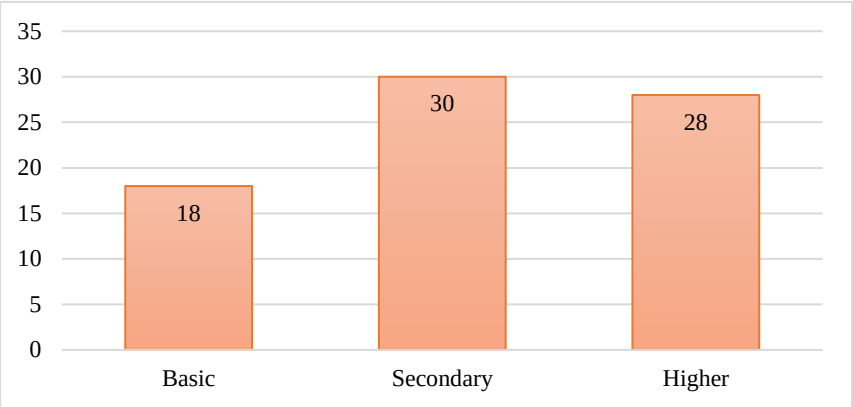
4. RESEARCH RESULTS

The results are grouped into graphs and tables for a clearer presentation. Each graph sheds light on different aspects of consumer behavior, from the influence of personal recommendations and reviews to awareness of marketing tactics and the demographic profile of the survey participants. The distribution spans across all age groups, with the highest representation from the 20-29 and 40-49 age groups. This suggests a wide range of ages among the survey participants, offering diverse insights into consumer behavior.



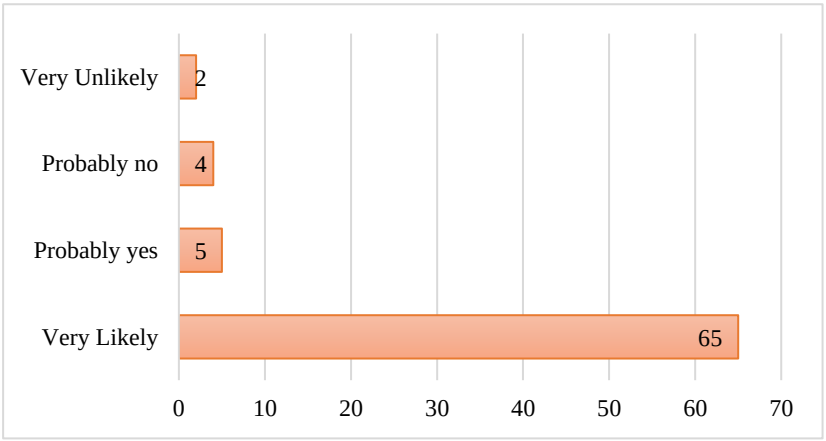
Graph 1: Age Group Distribution Among Respondents

The levels of education are fairly evenly distributed, with a slight preference towards secondary education. This indicates that the survey reached a diverse educational demographic, providing a broad perspective on consumer attitudes.



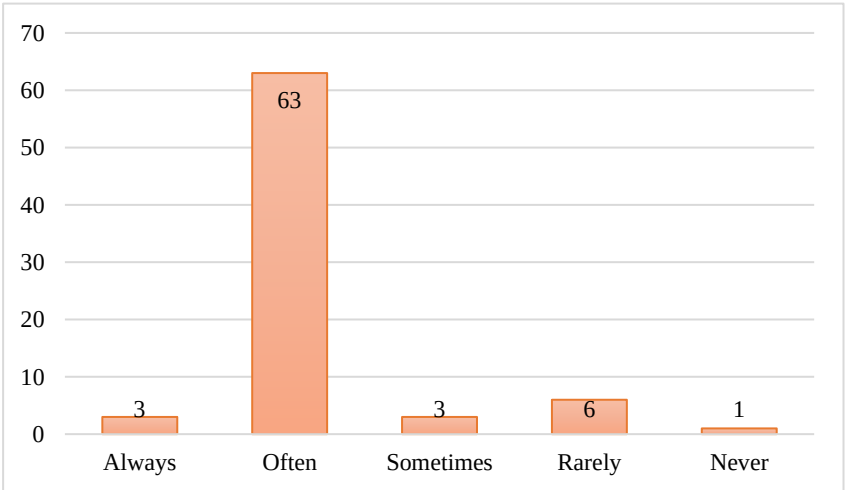
Graph 2: Levels of Education Among Participants

The majority of respondents are very likely to purchase a product recommended by friends or family, indicating the significant impact of personal recommendations on purchasing decisions.



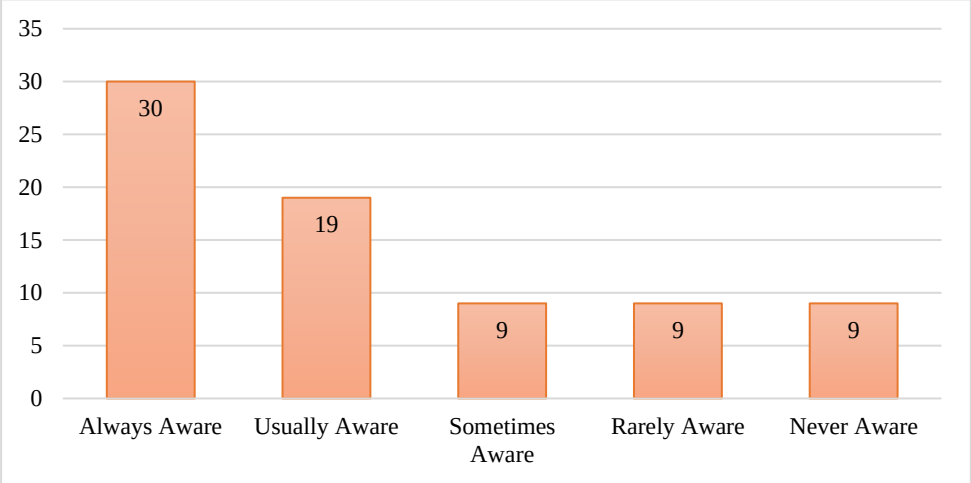
Graph 3: Probability of Purchasing a Product Recommended by Friends/Family:

Most respondents are often influenced by customer reviews when making purchasing decisions, highlighting the importance of online reviews in the consumer buying process.



Graph 4: Influence of Customer Reviews on Purchasing Decisions

The chart indicates that the vast majority of respondents, 63 out of 76, often consider customer reviews when making purchasing decisions. This overwhelming majority underscores the significant role that customer reviews play in the consumer buying process. With only a few respondents reporting that they sometimes, rarely, or never consider reviews, the data suggests that online reviews are a critical reference point for consumers seeking to make informed purchase choices. It highlights the trust consumers place in peer evaluations over traditional marketing messages. A substantial number of respondents are always or usually aware of marketing strategies used in product advertisements. This suggests that consumers are becoming more astute in recognizing marketing tactics.



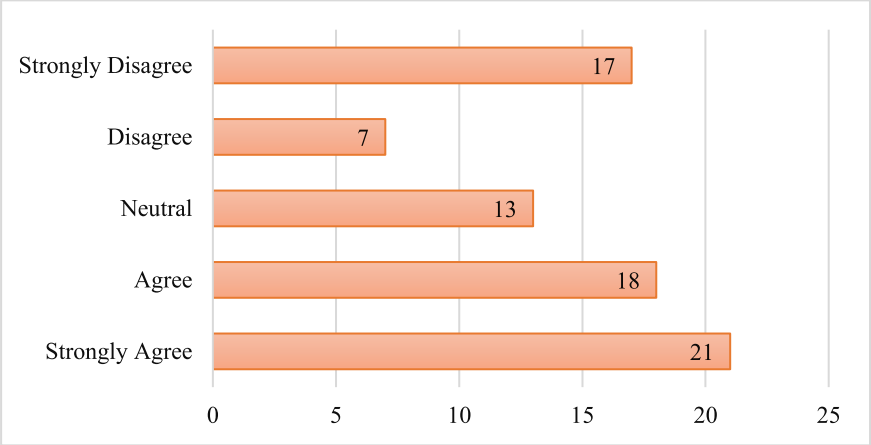
Graph 5: Levels of Awareness of Marketing Strategies in Product Advertisements

Statistic	Value
Mean	15.2
Median	9
Standard Deviation	8.35

Table 1: Levels of Awareness of Marketing Strategies in Product Advertisements

The mean of the observed frequencies is 15.2. This represents the average count of responses across all categories of awareness regarding marketing strategies. The median is the middle value when a data set is ordered from least to greatest. The median of the observed frequencies is 9, which means that when the categories are arranged in ascending order of their frequencies, the middle number is 9. This indicates that at least half of the categories have a frequency of 9 or fewer responses. The standard deviation of the observed frequencies is 8.35. This measures how much the responses deviate from the average (mean). A higher standard deviation indicates that the responses are more spread out over a wider range of values. In this case, a standard deviation of 8.35 suggests a moderate spread of responses around the mean. So, the *mean* of 15.2 suggests that, on average, participants tend to be between "usually aware" and "sometimes aware" of marketing strategies. This indicates a general tendency towards awareness but not at the highest frequency. The *median* of 9 shows that the most common response was "sometimes aware," which points to a moderate level of awareness about marketing strategies among the participants. Since the median is less than the mean, this indicates a skew towards the lower end of awareness in the distribution of responses. The *standard deviation* of 8.35 implies that there is a moderate variation in responses. Not all participants consistently reported the same level of awareness; their experiences vary significantly around the average.

These results suggests that while there is an overall moderate awareness of marketing strategies, there is a diverse range of individual awareness levels. Some people are very attuned to marketing strategies, while others may not notice them at all. Responses about agreement levels of marketing influence on purchase decision are distributed across the spectrum from strongly agree to strongly disagree regarding the influence of marketing on their purchasing decisions. This indicates varying perceptions of marketing's impact among consumers.



Graph 6: Agreement Levels on Marketing Influence on Purchasing Decisions

Statement	Number	Male	Female
Strongly agree	21	2	19
Agree	18	5	13
Neutral	13	4	9
Disagree	7	5	2
Strongly disagree	17	11	6

Table 2: Distribution of male and female by statements about agreement levels on marketing influence on purchase decisions

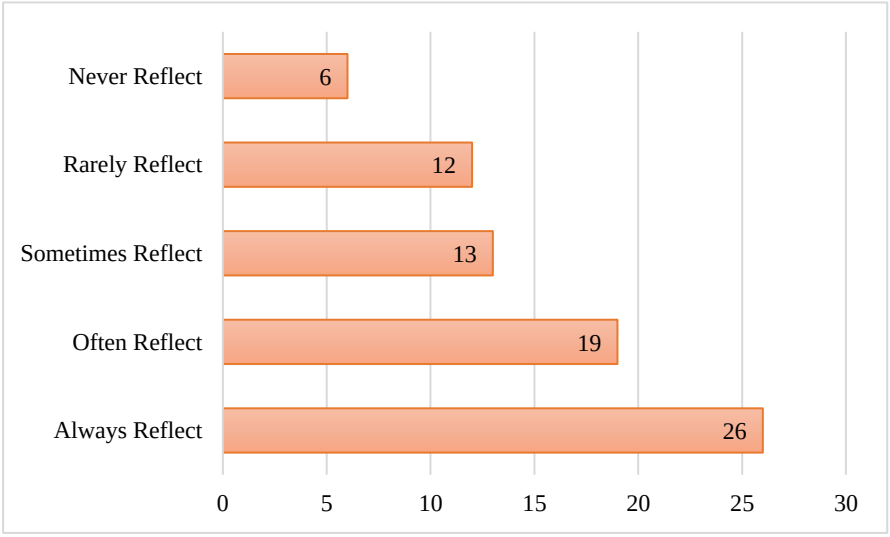
Male	Female	Male Female Combined
Sum of ranks: 21.5 Mean of ranks: 4.3 Expected sum of ranks: 27.5 Expected mean of ranks: 5.5 U-value: 18.5 Expected U-value: 12.5	Sum of ranks: 33.5 Mean of ranks: 6.7 Expected sum of ranks: 27.5 Expected mean of ranks: 5.5 *U*-value: 6.5 Expected *U*-value: 12.5	Sum of ranks: 55 Mean of ranks: 5.5 Standard Deviation: 4.7871

Table 3: Statistical values of combination male and female statements about agreement levels on marketing influece on purchase decisions

The *U*-value is 6.5. The critical value of *U* at $p < .05$ is 2. Therefore, the result is *not* significant at $p < .05$.

The *Z*-Score is -1.14891. The *p*-value is .25014. The result is *not* significant at $p < .05$.

The U-value for males is 18.5, which is higher than the expected U-value of 12.5, while the U-value for females is 6.5, which is lower than the expected U-value of 12.5. The critical value of U at $p < .05$ is 2. Since your calculated U-value of 6.5 is higher than this critical value, the difference between male and female responses is not statistically significant at the 0.05 level. The Z-Score is -1.14891, and the associated p-value is .25014. The Z-Score measures the number of standard deviations the U-value is from the mean U-value. A p-value higher than 0.05 suggests that the observed difference could have arisen by chance. The lack of a statistically significant difference indicates that male and female responses regarding the influence of marketing on purchasing decisions are not markedly different from each other. Even though there are more females than males who "Strongly Agree" with the statement, when considering the distribution of responses as a whole, the genders do not differ significantly in their perceptions of marketing's impact. These results suggest that gender does not have a significant influence on perceptions of marketing's impact among the surveyed consumers. Many respondents reflect always or often on the reasons behind their purchase decisions. This reflects a conscious consumer behavior where individuals consider their purchasing motives and the influence of external factors.



Graph 7: Frequency of Reflecting on Reasons Behind Purchase Decisions

The data shows a trend towards frequent reflection, with 'Often Reflect' and 'Always Reflect' being the most common responses. This suggests that a significant number of respondents are mindful consumers who actively contemplate their purchasing decisions, likely considering factors such as need, value, and external influences like advertising or peer recommendations. The chart points to a conscious approach to consumption where personal reflection plays a key role in buying behavior.

5. CONCLUSION

The conclusion synthesizes insights from the study on consumer psychology and its integral role in behavioral marketing strategies. It emphasizes the importance of understanding psychological factors—such as motivation, perception, attitudes, beliefs, and identity—in influencing consumer decisions. Highlighting the efficacy of interactive decision aids, the research underscores the transformative potential of these tools in enhancing the quality and efficiency of online shopping decisions. Furthermore, it delves into the realm of automaticity, illustrating how unconscious processes, including habits, significantly affect consumer behavior outside of conscious awareness.

This paper's findings advocate for marketers to harness both conscious and unconscious consumer processes, employing ethical and customer-centric strategies to foster brand loyalty and enhance customer engagement. By aligning marketing initiatives with the nuanced dynamics of human behavior, businesses can achieve sustained success in the competitive marketplace. The study contributes valuable insights for marketers, business practitioners, and scholars, offering a comprehensive understanding of the complex interplay between consumer psychology and marketing strategies in the digital age. The research presents insightful findings but also has its limitations, primarily due to its purposive sampling method and the relatively small and demographically narrow participant group, mainly from Zagreb, Croatia. This might limit the generalizability of the results to broader populations. Additionally, the reliance on self-reported data can introduce biases related to respondents' perceptions and willingness to accurately report their behaviors and attitudes. For future research, it is recommended to expand the study's scope to include a more diverse and larger sample that encompasses different geographic locations and cultural backgrounds. Incorporating a mixed-methods approach by combining quantitative surveys with qualitative interviews or focus groups could offer deeper insights into consumer psychology and the impact of marketing strategies. Furthermore, exploring the role of emerging technologies and digital platforms in influencing consumer behavior could provide valuable updates to the field of behavioral marketing.

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HUMAN RESOURCE MANAGEMENT PRACTICES IN AND AFTER COVID 19 PANDEMIC

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ABSTRACT

The COVID-19 pandemic has caused global health and economic crisis and has reminded organizations about the importance of HRM practices in the times of crisis. HRM plays an important role for all types of organizations to manage employees to work effective with creativity and quality and to be highly productive to achieve organizational goals and to gain and maintain competitive advantage over competitors. This is the main reason why HRM was one of the most important management functions in times of COVID pandemic. The main goal of this paper is to present different practices of HRM in times of COVID 19 pandemic as well as in the time after COVID 19 pandemic through review of the recent literature. Also, different trends and challenges of HRM practices that COVID 19 pandemic reveals will be presented. Mentioned practices will be analysed and discussed. In the concluding remarks also, research limitations and directions for future research will be stated.

Keywords: *Human resource management, crisis, post COVID 19 era*

1. INTRODUCTION

Since COVID 19 pandemic has spread all around the world it has caused many problems such as health crisis, but also nation's safety, economic development of countries as well as necessity for changing the organizational culture, division of work, team work, etc. It was considered as one of the turning points in history and the starting point for the new human era. In most of the situations work is done physically and in these new working conditions had to shift to online. Gonawan and Othman (2022) concluded that changes that might happen, trigger significant shifts especially if work, social, attitude and daily activities are examined. They also stated that this forces employees to be physically and mentally prepared. According to Dirani et al. (2020) every type of organization as well as governments and communities are in crisis mode. All of them are looking for leader guidance and the way how leaders respond to the crisis will have a high impact to the shift not just of the economic but also to the social and health foundations of their communities. Carnevale (2020) stated that COVID 19 pandemic has changed the environment for organizations and their employees and that have affected many organizational functions especially towards HRM. After the pandemic recedes, the strongest organizations will be those that have thrived on critical thinking, creativity and resilience. All of this is recognizable in leaders who exhibit a sensitivity to context, exceptional communication skills, empathy and compassion. According to Anjum, Rahman and Rahman (2022) in the post COVID 19 pandemic period there will be great uncertainty with the external environment, people work and of course future of business. Giurge and Bohns (2020) emphasize that HR innovation will become more crucial in the times after the crisis such as COVID 19 pandemic. The paper consists of six sections. After the introduction, methodology section is presented. The third section represents review of the HRM practices in the time of COVID 19 pandemic. The fourth section is related to challenges and trends of HRM in post COVID 19 era – analysis of the recent research. The fifth section is discussion, while in the sixth section are concluding remarks with the limitations of the research and directions for future research.

2. METHODOLOGY

This paper is a review paper, that has a part of the general literature review, that can be used in an informative purpose. The paper aims to examine recent literature on the topic that is focused to the influence of COVID 19 pandemic and practices of HRM. This topic is new and there are not so many papers written about the influence of COVID 19 pandemics on HRM practices. To prepare review of the recent researches about period of COVID 19 pandemic and period after COVID 19 pandemic, different internet sources and online data bases were used, such as Scopus, WOS, Google Scholar, EBSCO, JSTOR, Taylor & Francis etc. Founded relevant papers and conducted researches on examined topic were cited in this review paper. The research was limited to papers published in English language, using the terms such as *"COVID – 19 pandemics"*, *"HRM practices"* and *"crisis".* All those words were searched in the Title of the paper, Abstract or the Key Words of the paper. The papers without implications to HRM practices were not examined. Research conducted by ILO and McKinsey &Company were also used for the preparation of this paper. Articles cited in this paper are mentioned in section "References". The research was done in 2023.

3. REVIEW OF HRM PRACTICES IN THE TIME OF COVID 19 PANDEMIC

Modern organizations were exposed to risks that appeared due to new business trends, organizational dynamics, as well as the increased influence of other external factors in organizations, which makes it increasingly difficult to organize human resources. In 2020, due to the COVID 19 pandemic, the majority of organizations changed their business practices such as working hours, working conditions and business habits. COVID 19 pandemic had negative influence on doing business. Employers had to invest a lot of effort in communicating with their subordinates, so that the employees do not feel stress during the crisis, and to make it as easy for them to perform new tasks that the pandemic set up. Different organizations used different HRM practices such as: unpaid leave, reduction of working hours and others. According to Mwaniki and Gathenya, (2019) HRM implies a specific planned and first of all holistic approach to managing employees and they also emphasized in their research that it has become one of the most important factors for the survival as well as growth, and development of an organization in recent years. The challenge for businesses in today' circumstances is to plan for the new work force reality. New models of work have been present in majority of organizations such as mix of remote and on-site work. These new forms of work have helped the organizations to be more resilient. Resilience is one of the new trends that can help organizations to survive especially in the time of crisis. 400 million full-time jobs were lost in the second quarter of 2020 according to International Labour (2021) Organizations estimates. 23% of jobs are expected to change by 2027, with 69 million new jobs created and 83 million eliminated according to the recent World Economic Forum 'Future of Jobs' report (2023). In the conducted research for the purpose of this report, 803 companies that collectively employ more than 11.3 million workers in 27 industry clusters and 45 economies from all regions of the world were examined. In the conclusion of the report it is written that employers anticipate 69 million new jobs, that the new jobs will be created and 83 million eliminated among the 673 million jobs corresponding to the dataset. Business that are agile and focused to the future will probably survive. The focus will also be to the evolution of the new skills, especially "soft" skills. The COVID 19 pandemic has created a new set of challenges for the human resources in the organizations. Employees were confronted with embracing the demands of a new digital culture, while simultaneously balancing life in the home, and the impacts of isolation within their respective communities. The COVID 19 pandemic has enhanced the need to focus on an expanded learning framework more acute, concentrating not just to the functional skills and different training programs, but also on "soft" skills such as mindfulness and inclusion (2023).

According to the publication "HR says talent is a crucial for performance – and pandemic proves it" published by McKinsey & Company in July 2020. "(2020) during the COVID 19 crisis, changes in customer demand have caused a temporary spike in hiring in areas such as grocery while leading to massive layoffs in sectors such as hospitality. The COVID 19 crisis has shown to the organizations that shifts are needed from time to time especially in the part of managing and rewarding employees. HR departments are already using different analytical tools but they need to use those that are more open to understanding and promoting connectivity and engagement. Organizations also need to be more focused to well-being of their employees".

4. CHALLENGES AND TRENDS OF HRM IN POST COVID 19 ERA – ANALYSIS OF RECENT RESEARCHES

As it can be seen from the different conducted research's new paradigms have been defined in the field of human resource management in organizations (Manojkumar, Annisha, 2022, Pushova Stamenkova, Dimitrovska, Stošić,2023 i Aşkun, (2023)). Increased number of organizations are adopting hybrid model of work. In these research authors also conclude that the hybrid work model will be the dominant working model in the future. Something that is also very important are the strategies of change management, because employees want to take a part in the time of implementation of changes in organizations. After the crisis period the raising trend is employee wellbeing and health. A lot of organizations are offering different programs for mental and physical health release of stress at work and wellbeing as a whole. In this hybrid work education and different educational programs are also very important especially in the terms of life long learning. Changes in technology development, AI etc. have put the knowledge into the focus. The continuous development of different skills is becoming more and more important. Learning organizations need flexible and adaptable employees. According to (Pushova Stamenkova, Dimitrovska, Stošić,2023) the idea is that workers can be productive no matter where and when they do their work. This new trend has impact on the corporate culture, business ethics, loyalty, morale etc. In the future employees need to be in the focus as well as scenario planning, creation of new vision and investments in innovation that need to be aligned with the different strategies and organizational culture (Vrdoljak Raguž, 2021). The study by Smith (2020) shows that people were willing to communicate with their company on a different daily and weekly basis. Gigauri (2021) stated that with the intention of improving situation in a company during the pandemic, HRM should be always ready for the communication with employees. For HR managers support by top management is the most important in the time of crisis. The conclusion that arises is that the communication system is a prerequisite for good leadership and HRM practice. Therefore, the key activity in the time of COVID 19 and in the time after COVID 19 pandemic, is communication. Great emphasis is on digitalization and detailed planning internal and external communications. Internal communication within the company is extremely important because of new information, uncertain financial situation and motivation of workers for further work. According to Kumar Sharma (2022) new technology that has developed in the era of digitalisation, should be seen as an opportunity. It can be said that it is an opportunity, not threat to the existing jobs. It will be necessary to develop different training programs for managers that will help them to develop new management skills that will be necessary for the future. Anjum et. al. (2022) precise the main discussion of trends and challenges in the period after COVID 19 pandemic. Those discussions are mainly focused to: habituated with remote work, engaging employees with work, boosting employee morale and embrace empathy, higher flexibility and maintaining work-life balance and changing workforce maintenance through efficiency to resilience. All those challenges can help managers to implement strategies related to the new HRM practices. The biggest change in the period of COVID 19 pandemic was the transfer of different activities of HRM in the virtual environment.

Different organizations used different online platforms for diverse activities of HRM. In majority of cases they used for hiring employees and especially for interviewing the candidates in selection process, Zoom, Google Meet, MS Teams etc. It is interesting to notice that those online platforms are still present and probably are going to be one of the normal procedures in selection process but also in the communication processes in the organizations in the period of post COVID 19 pandemic. Regarding the employment, there were organizations that needed to reduce the number of employees (for example in tourism sector) but also those that needed new employees because of some new habits from the side of the customers, such as in IT sector (for example online purchase). Social networks are becoming very important sales channel and different companies use this for gaining and maintaining competitive advantage. Those kinds of new trends will be present also in the period after COVID 19 pandemic.

5. DISCUSSION

In this paper the main research method was desk research and usage of different secondary data. Moreover, it can be noticed that those data indicate positive and negative HRM practices that were implemented in business during and after COVID 19 pandemic. Different practices had reflection on employees physical as well as mental health. The main organizational change regarding HRM was "remote work" that were challenging not only for employees but also for managers especially in the coordination and control of the delegated organizational goals. Dissanayake (2020) conducted detailed analysis of HRM practices in pandemic crisis, and defined HRM practices during a pandemic and in the period after pandemic. For the period during the pandemic he divided it regarding the time to: proactive and reactive. Proactive mainly focused to training and task restructuring and reactive focused to: cross training, frozen recruitment, flex time work, special leave policies, remote work etc. For HRM practices in post pandemic period main focus was to: job design and work scheduling, training, leave, workplace counselling, salaries, healthy organizational culture etc. with specific HRM practices again based on remote work, retraining of employees, work rescheduling, alternative work arrangements, psychological counselling, salaries reforms, training for health practices etc. Saxena (2023) concluded in his research that it is evident that right HRM practices and strategies could increase employee morale, efficiency, mental wellbeing and productivity and also stated that the challenges are the indicator for HRM to practice flexible and adaptive approaches oriented to the employees and employer satisfaction. Majority of other researchers pointed out that crisis situations can be an opportunity but also the trouble for organizations. In some cases, COVID 19 pandemic accelerated implementation of specific HRM practices based on digitalisation, innovation and creativity, that is something that the new business environment in digitalised world, especially in Industry 5.0 need from the organizations to be more flexible and adaptive with a lot of agility approaches in their HRM practices.

6. CONCLUDING REMARKS

During the COVID19 pandemic, human resource departments proved to be a key link for the survival of organizations and its strategic importance was recognized. In the future, trust and relationships will be essential for the effective HRM. Managers should show empathy and compassion to the workers, while supporting them with flexibility (Howlett, 2020). COVID 19 with social distancing and remote work has intervened on trust and relationships between managers and employees. In these circumstances' managers need to find the solutions for those new working conditions. Managers will also need to understand what factors affect leadership in organizations especially if they want to deal with problems caused due to pandemic of COVID 19 (Chen, Sriphon, 2021). Research limitation of this paper is a review of the literature with the probability that the literature was chosen subjectively. Practical implications of this paper lie in analysis of different practices of HRM in and after COVID 19 pandemic.

Future research can be done in more comprehensive literature review and also with the detailed analysis of HRM practices in companies in post COVID era.

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ARTIFICIAL INTELLIGENCE IN THE CRIMINAL JUSTICE SYSTEM WITH EMPHASISE THE SITUATION IN THE REPUBLIC OF CROATIA

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ABSTRACT

The development of artificial intelligence (AI) fundamentally shook the deep-seated belief about intelligence as immanently human, and with its metamorphosis from a "concept" to a "technology," it affected (almost) all aspects of human interaction. Due to the wide range of its applications, along with the possibility to learn from its mistakes, upgrade its knowledge, and become "smarter," AI is truly a "tool" that promises revolutionary results. However, the incorporation of the AI into the criminal justice system through automated evidence analysis, predictive risk analysis, and process automation, can lead to the violation of fundamental human rights, such as the rights of defendants in criminal proceedings, especially the presumption of innocence and the right to a fair trial. If we add bias, discrimination, and non-transparency in decision-making based on AI, the potentially harmful extent of its application is straightforward. The paper explores different modalities of AI application, primarily in criminal procedure but also in the broader spectrum of criminal justice, from evidence analysis, predictive risk analysis, and process automation to judicial decision-making with a particular emphasis on the Croatian criminal justice system. The paper used a combination of descriptive analysis, literature research, and legal documents to conduct the study. By combining the methods above, it aims to get a complete picture of the current state, challenges, and possibilities of applying AI in the criminal justice system and to identify critical points that require harmonization with legal standards to ensure fairness, transparency, and protection of the defendant's fundamental rights in the criminal proceedings. This paper provides a basis for further research and consideration of how best to integrate AI into the criminal justice system while respecting legal and ethical principles.

Keywords: *artificial intelligence, criminal justice, criminal proceedings, ethical principle, protection of human rights*

1. INTRODUCTION

Artificial intelligence (from now on AI) today encompasses the entire spectrum of technologies, and with its wide application, it has deeply woven itself into every pore of social interaction. It is a technology that has dramatically changed and facilitated the current way of performing specific tasks; it's about an innovation that called into question the possibility of (machine) appropriation of "intelligence" as an inherently human trait; it is about a phenomenon whose attempt to define (quite) lags behind its application. AI is undoubtedly one of the most intriguing and topical areas of technology that is stirring up a global race for its use and development, even though it lacks unified legal regulation. There are many attempts to define what AI really is. Back in 1950, British mathematician Alan Turing introduced the Turing test, which tests "the ability of a machine to exhibit intelligent behavior equal to or indistinguishable from that of a human" (Turning, 1950). In other words, for a machine to be considered (artificially) intelligent, it is necessary that in interaction with a human, the latter thinks that it is talking to its equal, that is, to a human. The period of AI officially began in 1955, when the term was coined by emeritus Stanford Professor John McCarthy, defining it as "the science and engineering of making intelligent machines" (Stanford University, 2020) that "behave in ways

that would be called intelligent if humans were so behaving" (McCarthy et al. 2006, p. 11). It means the ability to independently (machine) react to external stimuli and perform intellectual tasks without human intervention (Rigano, 2019, p. 1). These are algorithms that are "trained" to recognize patterns and target "terms" in large data sets, thus facilitating and speeding up their generation (Barbaras, 2020, p 93). For Minsky (1968, p V), AI is "the science of making machines do things that would require (human) intelligence." Kaplan and Haenlein (2020, p 17) define AI as a system's ability to interpret external data, learn, and build on its knowledge to achieve the goal it is aimed at flexibly and adaptively. According to the proposed EU definition, AI is software "that can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with" (European Commission Proposal 2021, art. 3. para. 1.). The ability to collect, generate, and reproduce data and traits is intrinsic in human beings, i.e., their intelligence. In this respect, AI systems act intelligently because through a certain degree of autonomous behavior, *de facto,* they act independently in such a way that they select, among various imputed and "learned" patterns/data, the one that's adequate for achieving the goals they are striving to. "Machine learning thus implies that AI systems identify patterns in available data and then apply the knowledge to new data" (Ligeti, 2019, p. 2). As can be seen, machine learning is inherent to artificial intelligence, but AI goes beyond the concept of machine learning since it is not limited to only acquiring data and gathering knowledge based on (past) experience but "control, move, and manipulate objects based on learned information" (Kaplan, Haenlein, 2019, p. 17). Back in 1988, Holloway and Hand (1988, p. 70) in their article published a prediction about AI that (years later) came true: "Artificial intelligence is no longer an academic term, but a reality." Through the ability of unlimited data consumption, constant building on (acquired) knowledge, and learning from its mistakes without ever getting tired (Rigano, 2018, p. 2), AI is "an ideal solution to the problem of personal bias and administrative inefficiency" (Barbaras, 2020, p. 93).

2. THE INTEGRATION OF AI IN THE CRIMINAL JUSTICE SYSTEM

AI has dramatically facilitated and improved the working methods of law enforcement agencies and judicial authorities in combating certain types of crime (European Parliament Report, 2021). Various modalities of its application have found their place in criminal justice, from facial recognition technology, speech recognition, and sound surveillance (i.e., gunshot recognition algorithms) to autonomous research, analysis of specific databases, automated translation, and anonymization of decisions to predicting (predictive policing). In the judiciary, AI tools can be utilized to assist judges in the (predictive) evaluation of the risk of recidivism and as guidelines in determining appropriate sentences (predictive justice) (European Parliament Report, 2021). It is clear that the legal profession is (about to) begin "the transition to computer-aided human legal practice" (Pentland, 2019, p. 2). In addition to the indisputable boons and benefits provided by AI, the fact is that it also carries many potential risks, such as intrusion into personal and family life, various forms of discrimination, or non-transparent decision-making (Taherdoost, Madanchian, 2023, p. 39). The potential risks are even more significant in criminal proceedings and criminal justice because they can lead to violations of fundamental human rights, especially the presumption of innocence, the right to an effective legal remedy, and the right to a fair trial (European Parliament Report 2021). The Report on Artificial Intelligence in criminal law and its use by the police and judicial authorities in criminal matters emphasizes the need for "full respect of fundamental human rights" and EU values, but also the need for the introduction of several fundamental principles "into the life cycle of artificial intelligence" related to understanding the algorithms used by AI, the transparency of its application, risk level assessments, as well as and mandatory human control, critical judgment and reasoning (Ibid).

3. REGULATORY FRAMEWORK

Given that AI systems, in addition to the benefits of its use, entail certain risks for human rights, and as it is a strategically important economic driver, it is necessary to determine the regulatory framework of its application, which would (at the same time) encourage innovation and development in the AI sector but also guaranteed the preservation of fundamental human rights and security for citizens. Precisely in the context of the AI regulatory framework, the EU has opted for a balanced approach, that is, the so-called human-centric approach of developing and using AI, i.e., focusing on the protection of EU values and fundamental rights but in a way that doesn't hinder technological progress or interfere with fostering digital skills.

3.1. Declaration of Cooperation on Artificial Intelligence

In April 2018, EU member states signed the Declaration of Cooperation on Artificial Intelligence, committing to cooperation on the most important issues related to AI, especially in creating a comprehensive European approach to AI and encouraging European technology and industrial capacity (AmCham, 2018, p. 3).

3.2. The Coordinated Plan on Artificial Intelligence

The Coordinated Plan on Artificial Intelligence, which was published in 2018 (and updated in 2021), represents the joint effort of the European Commission and the member states to increase Europe's global potential in terms of market competition. The plan defines investment areas and encourages member states to develop national AI strategies (European Commission, Fostering a European approach to AI, 2021, p. 2).

3.3. Ethics guidelines for trustworthy AI

High-Level Expert Group on Artificial Intelligence (AI HLEG), appointed by the European Commission, brought 2019 the Ethical Guidelines for Trusted AI. In addition to the three imperatives (components) on which the "life cycle" of reliable AI must rest (lawful, ethical, robust), the ethical guidelines also contain a list of four ethical principles,[1] and seven key requirements that AI systems must fulfill to be reliable.[2]

3.4. White Paper on Artificial Intelligence: a European approach to excellence and trust

In 2020, the White Paper on Artificial Intelligence: a European approach to excellence and trust was adopted, aimed at promoting twin objectives: (1) to promote the uptake of AI through a regulatory approach and (2) to address the risks associated with certain uses of this new technology (European Commission, 2020, p. 1). It is a document that represents a transition from a "soft-law" approach to regulating AI to a hard-law regulatory framework.

3.5. EU AI Act

In April 2021, the European Commission presented the world's first comprehensive legal framework for AI - the AI Act. The AI Act has been described as a midway solution between lax rules in the US and strict regulations in China. The act aims to ensure a balance between the innovation and reliability of AI systems. In this context, the AI Act classifies AI systems into different risk categories from minimal, low, high, to unacceptable one, depending on the risk

[1] Four ethical principles that must be respected in order to ensure trustworthy AI systems are: 1) respect for human autonomy; 2) Prevention of harm; 3) Fairness; and d) Explicability (AI HLEG, 2019, pp. 12-13).

[2] Ethics guidelines define seven key requirements that AI systems must satisfy: 1) human involvement and supervision; 2) technical reliability and security; 3) privacy and data management; 4) transparency; 5) nondiscrimination and fairness; 6) societal and environmental welfare; and 7) accountability and responsibility. See AI HLEG, 2019, p. 14; Kaplina et al., 2023. p. 155.

they represent for users.[3] The higher the level of risk is, the higher the mandatory requirements that must be met, i.e., the permissibility of high-risk systems depends on their compliance with certain mandatory requirements before their placement on the Union market and an *ex-ante* conformity assessment. AI systems that pose unacceptable risks of human rights violations will be banned. As it is the first legal proposal of its kind, the AI Act represents a precedent that could set (global) standards for regulating AI technologies at the world level.

3.6. The situation in the Republic of Croatia

The Republic of Croatia adopted the Smart Specialization Strategy S3 2021-2029 to keep pace with technological progress. At the end of 2021, the Digital Croatia Strategy for the period until 2032 was adopted, the goal of which is for Croatia to become "a country of digitally and economically competitive companies and digitized public administration" (Puškalić, 2023). In April 2023, The Judiciary Committee of the Croatian Parliament issued an Opinion in which it supported the position of the Republic of Croatia on the Proposal for a Regulation of the European Parliament and the Council on adapting the rules on non-contractual civil liability concerning AI (Croatian Parliament, 2023a). One month later, in May 2023, the Parliament received the Proposal for a Resolution on AI as "a relevant step forward in strategic harmonization with the European Union, the Council of Europe, UNESCO, OECD and many other international entities" (Proposal for Resolution, 2023, p. 12). Member of Croatian Parliament Selak Raspudić stressed that the regulation of AI lags far behind its development (Croatian Parliament, 2023b) and that "the potential of AI should be accepted and monitored with a watchful eye, working to ensure that the benefits become a reality and that abuses become and remain part of the scientific fantasy" (Ius-info, from May 11, 2023). However, the Government proposed to the Croatian Parliament not to accept the Proposal for a Resolution on AI since the Government undertook to adopt a National Plan for the Development of AI, which will determine the AI development framework and contribute to its implementation in the economy and society (Opinion of the Government of the Republic of Croatia on non-acceptance of the Proposal for a Resolution on AI, from September 21, 2023). The National Plan for the Development of AI is expected to be completed in 2024.

4. USE OF AI IN CRIMINAL PROCEEDINGS WITH EMPHASISE THE SITUATION IN THE REPUBLIC OF CROATIA

Leveraging applied machine learning algorithms for automated decision-making and decision assistance has become a reality of contemporary life and has slowly infiltrated criminal justice (Doshi-Velez et al., 2019, p. 1).

Some authors group the use of AI in criminal proceedings, and also through its broader application in criminal justice, into three categories considering the closely related ways of its application:

1) using AI as a tool in 'predictable' decision-making (predictive policing/predictive justice);
2) using AI in the process of gathering and data analysis
3) using AI for other auxiliary tasks in criminal proceedings (Kaplina et al., 2023, p. 151).

[3] The minimal risk category to fundamental rights and safety includes most AI systems, such as spam filters, to which restrictions and obligations will not apply. Limited-risk AI systems will have to meet specific obligations of transparency (for example, in communication via a chatbot, an individual must be aware that he is communicating with a machine). AI systems considered high-risk will have to comply with strict requirements for their application to reduce the risk. Unacceptable AI risks that represent a clear threat to the fundamental rights of citizens will be prohibited by law. The latter include AI systems or applications that manipulate the user's behavior to bypass its free will or certain applications for predictive policing (the partial ban on predictive policing). Also, real-time biometric identification systems in public spaces by law enforcement agencies will be prohibited, with limited exceptions (e.g., if such use is necessary for law enforcement purposes) (European Commission Proposal 2021).

4.1. Using AI as a tool in 'predictable' decision-making

In the criminal justice system, predictive algorithms make it possible to predict the crime's place (and time), the prediction of violent crimes, the prediction of response to court summons, and the prediction of recidivism (Dressel, Farid, 2018, p. 1). Predictive policing can be useful for combating crime and optimizing police resources, but ethical doubts and concerns about bias or discrimination in the algorithms used are justified. In principle, information gathered through predictive policing can be used as part of an investigation or as evidence, but predictive policing methods themselves do not form a direct part of the criminal proceedings. In the context of predictive justice, AI has proven to be an auxiliary tool in making court decisions, which aims to increase the objectivity of court decisions and reduce the arbitrariness of actions (Chen, 2019). Predictive justice uses AI to "carry out statistical analyses based on data extracted from court decisions previously rendered" (Thao, 2023, p. 65). In other words, AI can generate the most optimal correct arguments for a specific case, from assessing the danger of re-offending (when deciding on bail) through the quality of evidence and its evaluation to predicting the length of the criminal procedure (Reiling, 2020, p. 3). However, the statement that predictive policing and predictive justice provide neutral and objective information, because they are devoid of human bias, has been refuted by numerous studies that have proven that AI systems used in the administration of justice embed existing prejudices and perpetuate discrimination (Peeters Schuilenburg, 2018, p. 274). Using automated AI systems to profile individuals and predict their risk for committing future criminal offenses undoubtedly undermines the presumption of innocence. Furthermore, the complexity of algorithms and insufficient knowledge of the nature and inner workings of AI system technology make it impossible to critically review decisions based on such algorithms, which conflicts with the right to a reasoned decision and the fairness of the procedure (Fair Trials, 2022, p. 22). Although the contemporary police and judicial systems of some countries (e.g., the USA)[4] use algorithms that predict the probability of the place and time of committing a criminal offense (predictive policing), as well as the probability of the risk of re-offending when it comes to decision on bail or when sentencing (predictive justice), in Croatia, predictive police and judicial methods are not accepted and are not used in practice (Đurđević, Ivičević Karas, 2023, p. 231). In general, EU member states do not utilize risk assessment tools, although pilot programs have been implemented in France and the United Kingdom, while special committees have been formed in the Netherlands and Greece to examine the impact of the potential use of AI on the justice system (Chelioudakis, 2020, pp. 73-74). Although no doubt well-managed AI can help increase the level of objectivity and reduce the judge's arbitrariness, the fact is that well-managed AI depends on the reliability of the algorithms on which it rests. And since the implementation of (reliable) algorithms is in human hands, it is an AI system subject to human error and potential bias. Therefore, the application of AI tools should be viewed through the prism of an auxiliary mechanism that helps and benefits humans and which is not perfect but is "better" than humans. In this regard, AI mechanisms must constantly be subject to validation and human evaluation in all phases of their use, as well as systematic risk checks (Wiewiórowski, Fila, 2022). The primary AI guiding thread should not be exclusively providing "correct" results in criminal cases but striving to achieve the set goals in an atmosphere of respect for human rights to enable the criminal procedure to be impartial, fair, and devoid of discrimination (Fair Trials, 2022, p. 8).

[4] Several AI tools are in use in the USA: PredPol, which is used to predict the place of a crime and allocate police resources based on it; HART (Harm Assessment Risk Tool) indicates the degree of risk of re-offending and is a helpful tool in making bail decisions: COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) is the most prominent application that seeks to predict the risk of re-offending within two years, and based on 137 questions answered by the defendant or information obtained from criminal records (Cf. Dressel, Farid, 2018, p. 1; Ligeti, 2019, p. 8; Sushina, Sobenin, 2020, p. 435; Thao, 2023. p. 66).

4.2. Using AI in the process of gathering and data analysis

AI systems greatly facilitated and accelerated the processing of a large amount of collected digital data, which would have taken months and years for the competent authorities. Summarization systems make extracting the most relevant information easier and significantly reduce the time needed to analyze large amounts of text, such as documents seized in criminal investigations (Wiewiórowski, Fila, 2022). For example, evidence processed using AI tools helped to dismantle encrypted criminal networks across Europe (EncronChat) (Quezada-Tavárez, Vogiatzoglou, Royer, 2021, p. 532). However, in Croatia, AI is not (yet) used as a tool for extracting useful data from the vast amount of information collected during criminal investigations. This is evidenced by the multi-year duration of investigations and the failure to initiate criminal proceedings in complex cases under the jurisdiction of the Office for the Suppression of Corruption and Organized Crime (USKOK), in which, due to the extensive material collected and limited human capacity, the analysis of evidence takes months, even years (Đurđević, Ivičević Karas, 2023, pp. 235-236).

4.2.1. Facial recognition technology

Facial recognition technology is the most common form of remote biometric identification (RBI) system in real-time in public places that enables the comparison of unique biometric attributes of an individual with a database. In Croatia, facial recognition technology is used to establish identity, for example, in airports or border crossings. However, in Croatia, this tool in the investigation of criminal offenses has a limited range of applications, given that it is primarily used as an auxiliary tool and is unlikely to be used as an independent method of establishing facts or assessing the reliability of evidence in criminal proceedings (Đurđević, Ivičević Karas, 2023, p. 231). With the entry into force of the EU AI Act, the use of real-time remote biometric identification systems in public places for the purposes of criminal prosecution will be prohibited, except in three exhaustively specified and narrowly defined situations in which the use is necessary to achieve the protection of the public interest, the importance of which exceeds the risks. In such a situation, each individual use will require the prior approval of a judicial or independent administrative body (Art. 5. para. 3 of the Commission proposal) (Papakonstantinou, Zarkadoulas, 2023, p. 238; Schröder, 2022).

4.2.2. Firearms Identification

AI algorithms can be used to analyze audio files of shootings, that is, the recorded sound of shootings from smartphones or surveillance devices (Rigano, 2019, p. 7). In the USA, scientists from Cadre Research Labs, LLC, are developing algorithms to detect gunshots, which would determine the type of weapon used in committing the crime by the gunshot sound (Ibid). Those mentioned above would facilitate investigations of criminal offenses in which firearms were used to detect the type of weapon used. Concerning Croatia, AI algorithms for detecting the sound of gunshots are not used for now.

4.3. Using AI for other auxiliary tasks in criminal proceedings

AI can perform other auxiliary tasks in criminal proceedings using natural language recognition technologies.

4.3.1. Automated translation

Overcoming language and communication difficulties between judicial bodies of EU member states is one of the strong arguments for the application of AI in the context of cross-border cooperation in criminal justice (Wiewiórowski, Fila, 2022; Đurđević, Ivičević Karas, 2023, 234-235). However, specific legal terminology represents a "challenge for generic automated translation systems" since currently existing systems are not precise enough in recognizing and

demarcating specific legal terminology from generic language (Wiewiórowski, Fila, 2022). To achieve high-quality translation, it is necessary to "learn" specific terminology and integrate it into AI tools, which require time and significant resources (Ibid). This is an area in which the application of AI tools will undoubtedly contribute to greater efficiency and higher quality assurance of the right of defense.

4.3.2. Automated transcription of the trial

Automated transcription of the trial is the only AI tool directly incorporated under the umbrella of the Croatian criminal procedure. The latest amendment to the Criminal Procedure Act from July 2022 (Official Gazette 80/2022) expanded the possibilities of using digital technology in the trial phase. This new legal solution is incorporated in Art. 409a para. 2 of the Criminal Procedure Act and provides the automated transcription of the trial "with the help of an automatic transcription device," whereby the court is not released from the duty of keeping a "classic" record (in reduced content). However, the transcript of the trial will only be an auxiliary tool (along with the audio recording) that is attached to the record along with the audio recording (Burić, 2022).

4.3.3. Anonymization of court decisions and case law search

The use of modern technologies in the work of judicial bodies enables easier control of the judiciary work, ensures transparency, and promotes the entire system's efficiency (Ministry of Justice and Administration, 2020). In the Republic of Croatia, the digitization and computerization of the judicial system are ensured through the e-communication, e-Case, and SupraNova systems, while the Judicial Practice information system enables insight into the judicial practice, primarily of the Supreme Court of the Republic of Croatia, but of other courts in the Republic of Croatia as well. Although the official website of the Supreme Court of the Republic of Croatia states that the Supreme Court publishes all its decisions (without selection) and other courts only the most significant court decisions, the fact is that numerous court decisions are not online published or available. The above problem of the Croatian judiciary has been justified by the need to anonymize all court decisions before online publication, which is a long-term process that requires much time. Therefore, the use of AI tools through specially created electronic forms for court decisions, in such a way as to automatically select relevant data while omitting data that violates privacy, would facilitate and speed up the process of online publishing court decisions (Uzelac, 2020, p. 8, item 9). This problem should be eliminated by the entry into force of the Amendments to the Courts Act, which prescribes the obligation to publish online all court decisions by which the procedure is completed on a special website with prior anonymization and compliance with the rules on the protection of personal data (Art. 1. Proposal on Amendments to the Courts Act), which is one of the measures prescribed by the National Recovery and Resilience Plan 2021-2026 (Stojanović, 2023). The online publication of court decisions brings to life the principle of publicity, enables continuous access to information about the work of the courts, ensures the transparency of the work of the courts, and strengthens citizens' trust in the judicial authority.

5. CONCLUSION

The use of AI systems in specific segments of criminal justice undoubtedly facilitates and shortens the process of taking actions, such as automated translations, transcription, anonymization of court decisions, or summarization of digitally collected data. As can be seen, using AI tools to analyze large amounts of data by identifying patterns and providing relevant information can be helpful to judges (and judicial bodies) when making decisions. However, the application of AI technology in the process of collecting, processing, interpreting, and applying the results, as an integral part of predictive activities (predictive policing, predictive

justice), may represent a risk to the fundamental rights of individuals. As can be seen, there is no active application of AI tools in the actions of police or judicial bodies in the Republic of Croatia. The lack of application of AI algorithms in the predictive work of the police and judges in the Republic of Croatia lies in a cautious approach, especially since the comparative pilot projects pointed to (potential) programmed software errors that can lead to discriminatory results or affect the judges' impartiality when making decisions. Also, the impossibility of critically reviewing and challenging the decisions made based on AI algorithms, due to insufficient knowledge of the very nature of technology and the inner workings of AI systems, may violate the right to a fair trial. The first "tangible" introduction of AI tools into the Croatian criminal procedure represents the expansion of the use of digital technology in the trial phase through the introduction of the provision of a mandatory audio recording of trials in criminal proceedings and (as a result) its automated transcription. Possible opportunities for expanding the use of AI tools in the Republic of Croatia are in the field of automated interpretation and translation, especially in the context of international cooperation in criminal matters, in searching (a large amount of) digitally collected data, and anonymizing court decisions with the aim of more efficient online publication of court judgments, an obligation which the Republic of Croatia assumed a long time ago, but has not yet fully fulfilled.

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DIGITAL OPTIMIZATION: CORE CONCEPT OF DIGITAL TRANSFORMATION

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ABSTRACT

The aim of this paper is to analyse the importance of digital optimization in the process of digital transformation of organizations. Digital optimization and digital transformation are inseparable processes because digital optimization is the foundation of digital transformation. One of the goals of the digital transformation of the business system is to build a stable digital optimization of the system, which is the basis for creating competitive advantages. Digital optimization has a direct effect on reducing costs and increasing income, and without a digitally optimized system it is not possible to stabilize the existing business system. Digital transformation enables the development of a new business model and new forms of monetization of products and services, while at the same time a part of the business system remains in the existing structure of digital optimization, which still achieves the effects of a competitive advantage on the market. Digital optimization is the basis for the growth of income from services that are built as complementary additions to the basic product. The paper presents the development matrix and the relationship between digital transformation and digital optimization as equally important processes in the development of the organization. As an example of the development process of digital optimization, the global music industry, which has completely digitally transformed its business model, is cited. In addition, the examples of Netflix, The New York Times and Alibaba as global corporations that are in the continuous process of digital transformation and digital optimization of business processes are discussed.
Keywords: *digitization, digitalization, digital optimization, digital transformation, servitization*

1. INTRODUCTION

Digitization is the process of adopting digital technology in everyday business activities, and in general it can be concluded that it is exclusively related to the development of the IT sector. Digitization and digital transformation are often used as synonyms for the same meaning, and in practice they have almost equalized according to their basic meaning (Verhof et.al. 2019; Vial 2019). One of the fundamental goals of digital transformation is the digital optimization of new business activities, which is the basis for building competitive advantages. Digitization of business activities determined the limits of digital transformation and digital optimization. Different forms of production transformation appeared even before the process of digital transformation, but they were closely related to the processes of the manufacturing industry. Coal or steam power replaced human and animal power in the First Industrial Revolution. Oil and electricity replaced steam power in the Second Industrial Revolution. Cybernetics and the development of computers marked the Third Industrial Revolution, although Rifkin (2016) disagrees with this because the fuel was still oil. Each of these industrial revolutions aimed to optimize new business activities, but without the use of digital technologies, none of these optimizations can be accepted as digital optimization. Abiodun et.al (2022) emphasizes that industrial revolutions developed new products and new production paradigms based on technological development, but were not digital transformations.

Only the Fourth Industrial Revolution is recognized by the digital transformation of business processes. The first three industrial revolutions had different types of limitations in the production process and other business activities due to the very nature of industrial production. Products were exclusively physical, and organizations were highly dependent on the capacity of production facilities, and upgrading or reducing capacity was a very expensive operation. The development and digitization of production processes significantly influence the change in this situation. Digitized production processes are no longer defined by a given capacity, that is, the flexibility of management and production is much greater. In the platform economy model, this possibility of scaling production is one of the fundamental competitive advantages (Parker et.al. 2016; Moazed, Johnson 2016). Industrial revolutions are based on the phrase uttered by Henry Ford that a customer can have any car, but the best one is black. Digital transformation and digital optimization are exactly the opposite of this notion of standardization from the period of previous industrial revolutions. Flexibility and process scaling define the fundamental difference between industrial revolutions and digital transformation, i.e. digital optimization. Research conducted by Imran et.al. (2021) pointed to flexibility as a significant part of digital transformation. Organizations are under continuous pressure because flexibility replaces standardization, and flexibility is a fundamental factor in digital optimization Abiodun et.al (2022). The fourth industrial revolution, i.e. Industry 4.0, developed models that meet the criteria of digital optimization using AI, IoT, and system decentralization using autonomous systems and flexibility of production systems (Fragapane et.al. 2020). Digital transformation and digital optimization imply flexibility, not standardization Imran et.al. (2021). The paper analyzes models of digital transformation that lead to digital optimization. The music industry was mentioned as a diameter, which significantly felt the drop in income under the pressure of the first wave of digitization, but legal protection mechanisms enabled the transition to a new production paradigm. As an example of digital transformation from a classic linear or pipeline system to digital transformation and optimization, the corporations Netflix and The New York Times are discussed. Alibaba is an example of a corporation that was founded as a digital infrastructure, but went through multiple processes of digital transformation and digital optimization.

2. DIGITAL OPTIMIZATION VS. DIGITAL TRANSFORMATION

Digital transformation refers to a "process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" (Vial 2019). In the context of the digital transformation of business activity, the digital transformation was preceded by the processes of digitization and digital optimization. The introduction of digitization into business processes, in its beginnings, implies the conversion of analog data into digital content. The process is known as digitization, i.e. the transformation of data into 0 and 1 in order to store it as a digital record (Boratyńska 2019). Digitization defines the process of converting information from analog to digital, which can result in changes in the existing business model in order to provide value to stakeholders (Bokolo 2021). Figure 1 shows that process as converting analog/paper information to file based digital information stored on computers. Digitization of data is the basis of digitization of the entire process. Digitization refers to the socio-technical method of adopting digitization techniques to improve social and institutional contexts (Seth et al. 2020). Therefore, digitization has not only focused on cost savings, but also includes developing processes that improve citizen experiences (Verhoef et al. 2019). The terms digitalization and digital transformation are often used to explain the same phenomenon, but digital transformation is a much broader term than digitalization. Digitization marks the beginning of the process of digital transformation, which in its first phase goes through the process of digital optimization.

Digital Optimization is use of digital technology and information across and process to enhance business operations process efficiencies productivities gains, leading to higher through put or lower operation cost (Gagre 2018). Digital optimization is the process of using digital technology to improve existing operating processes and business models (Patel 2019). First, digital optimization is like grabbing the lowest-hanging fruit on the technological tree. It keeps you even with your competition, but it will never advance you past them. Second, it means you're focusing more on your company than you are on your customer, and that will never cut it in today's marketplace (Newman 2019). Digital optimization implies orchestrating the existing process in the direction of lowering costs and increasing production efficiency. It is aimed at building competitive advantages within the existing industry or ecosystem in a short period of time. Depending on the position of competitors in the industry or the position of competing ecosystems, digital optimization can also be used to create competitive advantage in medium-term plans (Lozić 2019).

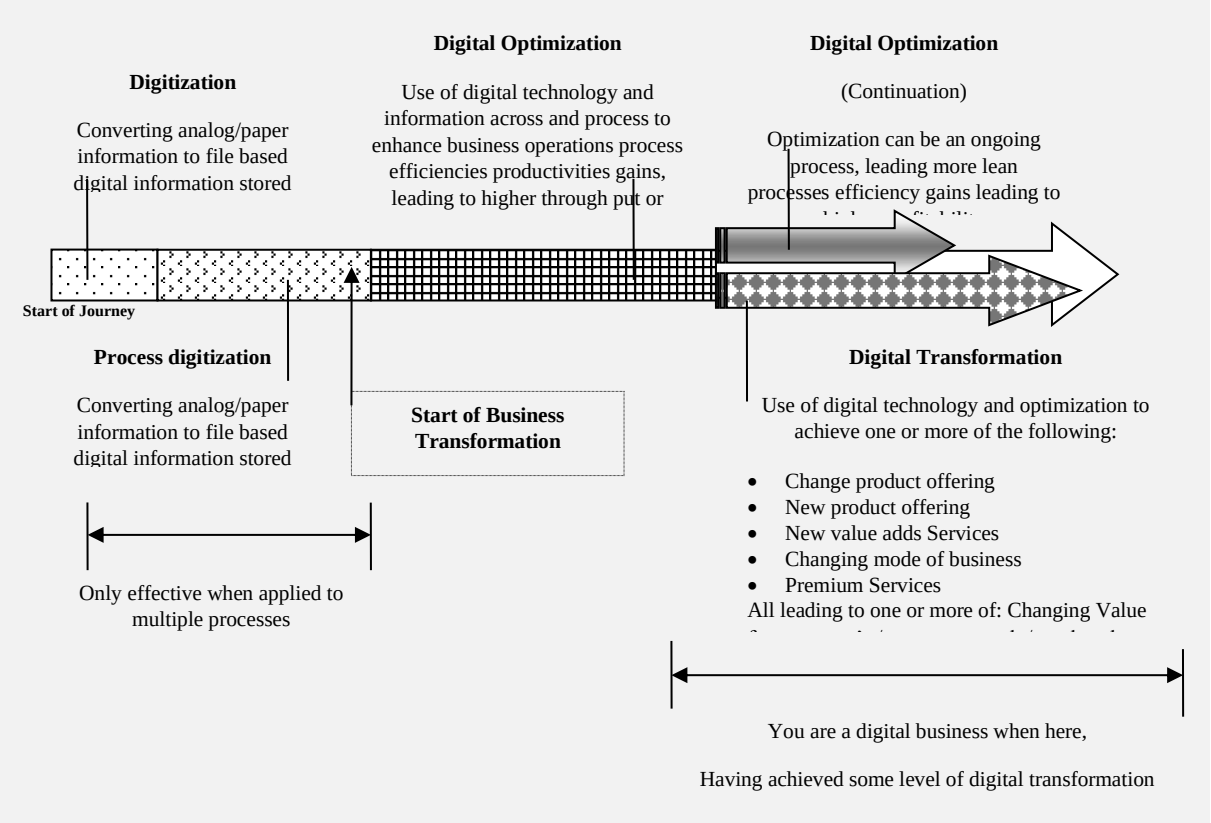

Figure 1: Digital Optimization vs. Digital Transformation
(Source: Gagre, 2018.)

Business optimization and business transformation are continuous processes that ensure stability and organization progress. Once achieved optimization is only the basis for the continuation of transformation. The results of business digital transformation at one point will require a strictly controlled process of business optimization. However, the question arises as to why some organizations do not exploit the results of optimization or transformation results. Digital optimization improves efficiency and effectives of a current business model (Libert, Back 2018). Digital optimization adjusts the results of existing business practices and focuses on business efficiency. Changes introduced into the business process are associated with incremental innovations and building an organization without answers to changes in the environment.

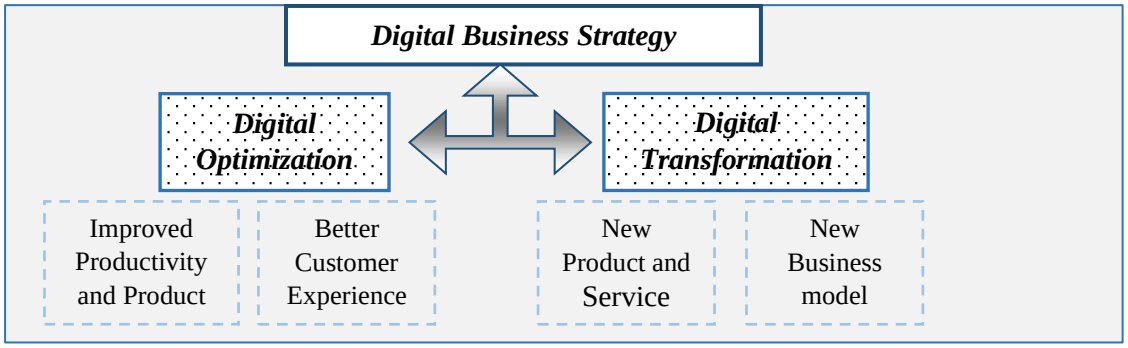

Figure 2: Digital Optimization vs. Digital Transformation (Source: Patel, 2019.)

Patel (2019) precisely separates the process of digital optimization from the digital transformation process. At the heart of the process is the digital business strategy. Figure 3 shows the fundamental differences between these two processes. Digital optimization improves existing business processes and customer relationships. Digital transformation directly affects new products and services as well as the construction of brand new business models. Digital optimization is the integration of digital technology to directly improve business models and operational activities (Yelkenci 2022). A digital business can be defined as one that creates "new business designs by blurring the digital and physical worlds (Schreckling, Steiger 2017: 15). This process is known as the blurred borders of the organization. In other words, what are important are not the digital technologies themselves. The real focus is on transforming the business; technology only serves to support the new business model (Wade et.al. 2018). Digital transformation is based on the management strategy of the organization's development. But, at the same time, it focuses on new technologies that will enable the organization to get concrete advantages. The use of modern technology deletes precisely defined business scope limits (Lozić 2019).

3. DIGITAL OPTIMIZATION AS A FOUNDATION FOR DIGITAL TRANSFORMATIONS

Digital transformation and digital optimization are mutually inseparable processes. The process of digital transformation is aimed at digital optimization. Once the level of digital optimization is reached, it is the basis for thinking about a new level of digital optimization of the process. Figure 3 (Lozić, Fotova Čiković 2024) shows the basic model of complementing digital transformation and digital optimization. The matrix relationship of these two processes is based on the development of technology and markets. Every new technological solution is the basis of digital transformation, and directly affects the construction of a new market. In area 1.1. digitalization of the production process has directly influenced digital optimization. Digital optimization of the already existing optimized process moves to phase 2.2. Digital transformation enables the development of a new market, the use of new and more modern technologies, and a new level of digital optimization. One part of the process is transferred to the new level 2.1, and the same market is kept as in the previous process, with the improvement of technological solutions in the already existing process. This type of development best corresponds to the level of incremental innovation. Existing digital optimization is the basis for digital transformation and transition to area 3.3. Digital transformation and the development of new technology directly affect the development of a new market. This includes new products, users, new services, new monetization models, etc. In area 3.2. part of already existing products and services and already reached optimization level are transferred. In area 3.1. they retain some of the existing business processes with minimal technology improvements to reduce business costs. These improvements are related to sustainable innovation.

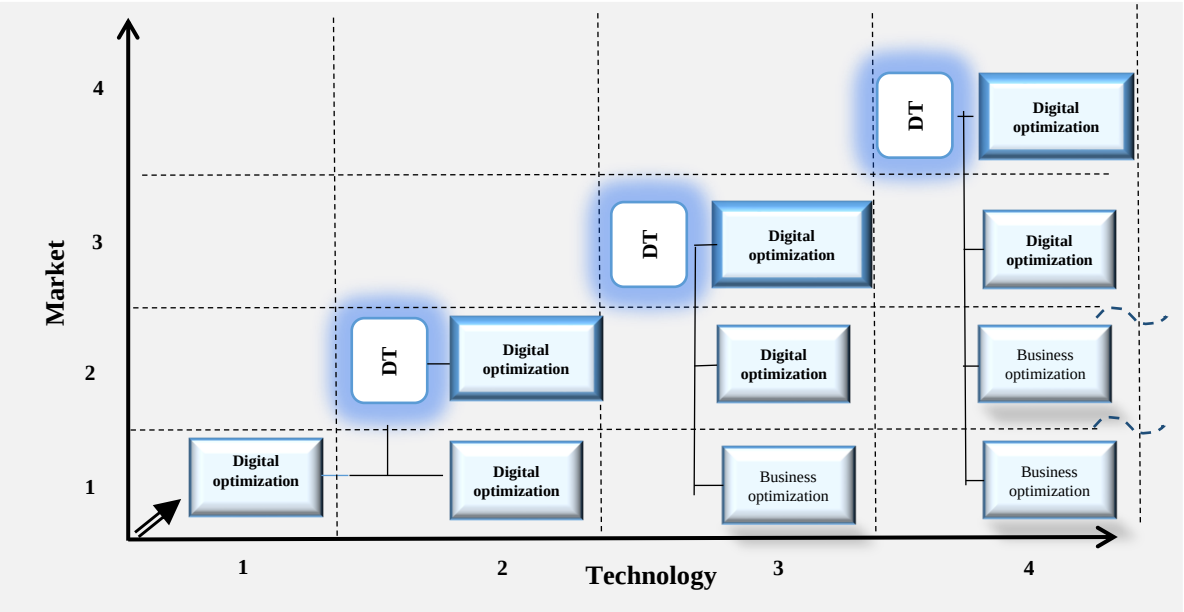

Figure 3
(Source: Lozić, Fotova Čiković 2024.)

Each new phase of development is at the same time a combination of digital transformation of processes, transfer of already existing digitally optimized business processes, and part of Business optimization that the organization keeps with the improvement of technological processes, i.e. the use of new technological solutions in already existing markets. Lozić and Čiković (2024) cite the example of the global music industry, which was digitally transformed in a very short period of time.

3.1. Global music industry

The music industry was one of the first to start using digital technologies. On the one hand, there was also a threat from the environment, and piracy and unauthorized copying of music content seriously threatened the future of the music industry. The appearance and shutdown of the Napster platform marked the beginning of digital transformation and a new business paradigm (Waldfogel 2018). The first forms of digitization appeared with the use of CD discs on which music content was distributed. Digitization of the process is presented in area 1.1. The thick arrow indicates the process of initial digitization by which the degree of digital optimization was achieved. Content was still distributed on physical media and sold in brick-and-mortar stores, but it was completely digitized. The development of the MP3 format was a digital transformation and transition to phase 2.2. Music content was monetized as individual songs as opposed to the habit of buying entire albums. In addition, various forms of music content downloaded from the Internet without going to brick-and-mortar stores were monetized. A part of the content was still sold in brick-and-mortar stores, but the distribution was also transferred to the Internet. The existing digital optimization of the production process was retained, but new distribution technologies were used, which directly affected the rationalization of business costs. The development of streaming technology was a new digital transformation of the system, i.e. a transition to area 3.3. A completely new market has been created, using a completely new digital infrastructure. Instead of selling and distributing on the Internet, a completely new user community was built. Generation Z has fully embraced the platform community model and subscription to user content (Seemiller, Grace 2019). The development of the new market went hand in hand with a complete change in the technological infrastructure.

A part of sales and distribution on the Internet was retained in areas 3.2. and 3.1. The digital transformation of distribution and monetization is developing the Synchronization model and the market is developing in area 4.4. The model of digital optimization and distribution and monetization on streaming platforms is transferred in area 4.3. Streaming platforms retain their core business and monetization model, while developing new monetization models from selling advertising space, podcasting, selling "big data" data, and the like. The sale and distribution of content in already digitally optimized business operations is transferred with the upgrade of new technological improvements.

3.2. The New York Times

The New York Times is part of the media industry. As a classic newspaper publisher, it belongs to the old media industries that were the first to be hit by digitized business processes and new media industries. In phase 1.1. The New York Times digitized its business processes, but still sold a physical product in a brick-and-mortar store model. The development of digital editions and subscriptions was made possible by digital transformation, i.e. transition to phase 2.2. One part of the production was transferred to digital content and was distributed on the Internet in a subscription model, while the rest was distributed as a physical product and the model of achieved digital optimization was retained. Development phase 2.2. it was very turbulent for The New York Times as advertising revenue plummeted and digital advertising revenue could not make up for the losses. Transition to phase 3.3. marked the exit from the crisis. The corporation has been completely digitally transformed. Distribution and monetization have been completely transferred to the Internet. Only small parts of business activities, related to transactional activities, were transferred to area 3.2. and 3.1. The next phase of digital transformation, i.e. the transition to phase 4.4, will include the use of AI, Machine Learning and Deep Learning so that the corporation can start producing and distributing part of the content that is defined and selected by the use of digital tools, but also by selling data from "big- data" and similar business operations. Research has proven that manufacturing companies that have gone through the process of digital transformation and digital optimization have new and different strategies in the competition within the industry than the old and overcome strategies of cost reduction and price reduction (Niu et.al. 2023).

3.3. Netflix

Netflix began business as a service for renting video content on physical media. The contents were digitized on physical media, and Netflix was a service, that is, an intermediary between the content owner and the user. Netflix and Spotify are the largest streaming platforms globally, and they use the same content distribution models. Netflix produces part of its content, unlike Spotify, which does not have its own content production (Lozić 2020). In phase 1.1. the content is digitized on physical media, and Netflix has digitally optimized distribution. Moving to phase 2.2. Netflix has developed distribution in the streaming platform model. Phase 2.2. implies a complete digital transformation of the process. The monetization model has changed from pay-per-use to subscription for a fixed time slot. With the digital transformation of the production process, Netflix starts producing its own content and moves into phase 3.3. Part of the distribution business process in the SVOD model is transferred to phase 3.2. as a digitally optimized business process. By developing algorithms for identifying audience tastes, i.e. using tools such as AI and "big data", the platform digitally transforms the business process and moves to phase 4.4. The globally known series "House of Cards" is the result of analysis using AI technology. In doing so, the platform transferred to phase 4 the already existing digitally optimized business processes of content distribution on the platform, production of own content, data processing in the "big-data" model, and the like.

3.4. Alibaba

The Alibaba corporation was founded as a digital infrastructure for retail in the platform economy model. The process of initial digitization was carried out through the stabilization of retail activity, i.e. digital optimization in phase 1.1. is based on the optimization of business activities related to mediation in the platform economy model. Digital transformation enabled the platform to develop business in the cloud, that is, the processing and use of data that became a new form of monetization. By operating and monetizing data from the cloud, the corporation moved to phase 2.2, while it is in phase 2.1. transferred the digitally optimized part of retail intermediation in the platform economy model. Transition to phase 3.3. it is made possible by the digital transformation of business processes related to payments. The platform developed a special payment system and a "cloud card" model called Alipay, which facilitated transactions on the platform and significantly reduced business costs. By launching its own card payment and subscription model, the platform created a new monetization model and increased revenue and net profit. It transferred already existing digitally optimized business processes to phase 3.2. and 3.1. Transition to phase 4.4. it was made possible by the digital transformation of business and the development of the "Innovation and entertainment" sector. Every new monetization model was directly created as a result of the digital transformation of business. Digital optimization of the existing phase was a prerequisite for the digital transformation of business in the next development phase. The Tinder platform is also undergoing a similar development of digital transformation, as a digital infrastructure. The platform is part of the Match Group, which brings together several similar dating platforms (Lozić 2021). All platforms are founded as digital infrastructure that is digitally optimized by scaling, and new technological solutions are introduced.

4. DIGITAL OPTIMIZATION AND NEW FORMS OF MONETIZATION

Digital transformation is focused on the development of technology and the creation of new demand. New demand arises as a result of the development of new markets in the context of new users and the new structure of demand for products and services. In this context, Imran et.al. (2021) emphasize the need to develop as many services as possible that accompany product development. Classic managerial strategies define it as the development of complementary products that increase the value of the core product. The classic linear model of product production and distribution included strategies to defend the position in the industry and strategies to defend against substitutes that reduced the value of the basic product. The strategies of defense of position in the industry, ie defense against substitutes, are related to Porter's industrial analysis and the production of physical products. Digital transformation is aimed at developing the market in the context of complementary products, especially services that accompany the basic product and with it new models of service monetization. Each new phase of digital transformation is the basis for digital optimization. In the optimization phase, organizations develop competitive advantages based on the development of complementary products and services, the development of a new user community, and new monetization models. The model of the change in the monetization structure in the context of digital transformation and business process optimization is shown in Figure 4. Bosch and Olsson (2020) determine the development of the monetization model in the context of the development of complementary products in the automotive industry. Research results have proven a strong link between digital transformation and increased value, productivity and competitiveness in the automotive industry (Thuy et.al. 2023). The development of the business process is shown on a scale from Product sales (limited sales revenue) to the Multisided ecosystem model. The lower part of the figure shows the evolution of the monetization structure. Each subsequent stage of digital optimization determines an increasing share of income from services in the total income.

In the fourth and fifth stages shown in Figure 3, organizations develop revenues that come from activities related to the development of technologies, rather than the sale of products. For the most part, it is income from the monetization of data that the organization collects from the organization's environment, as well as from the production and distribution process.

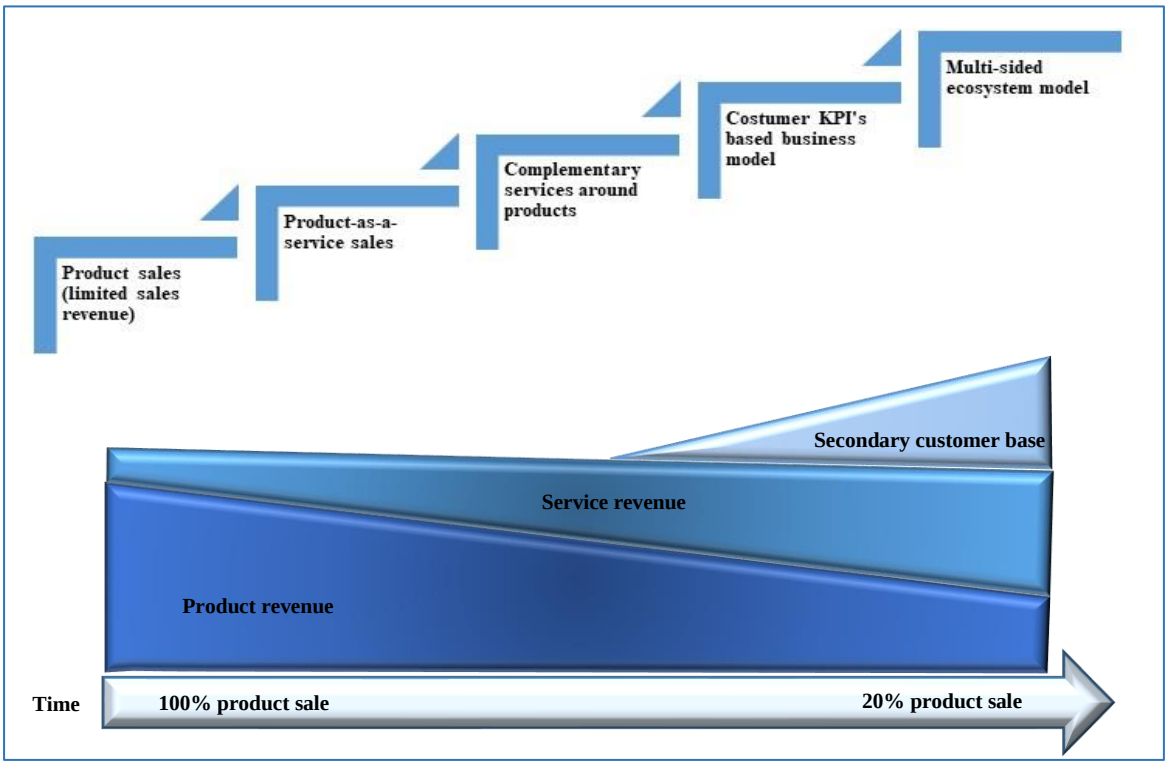

Figure 4: Evolution from a traditional to a digital company: The product upgrade dimension (Source: Bosch, Olsson, 2020.)

Abioudun et al. (2022). point out that new models of digital transformation and digital optimization change not only the production and distribution system of the organization, but also the culture of the organization, which is ready to take greater risks, is more open to cooperation, experimentation and acceptance of changes. The process in which the organization fundamentally changes the processes of value creation, i.e. the business model and gradually creates an increasing percentage of revenue from services is called servitization (Kryvinska, Bickel 2020). The emergence and exponential growth of the OnlyFans platform is an example of a digital optimization model in the platform economy model. The basic income of the platform comes from the subscribe model, as well as the income of profile owners, and the model of developing an increasing number of profiles enables an increasing choice for subscribers. The growth of the number of profiles and subscriptions is directly related to the growth of income (Lozić 2023), and thus the influence of the servitization model in the business process is increasing. Figure 3 shows this process in phase 5, i.e. the Multi-sided ecosystem model. The organization realizes only 20% of the income from the basic product, and the rest is accumulated from some types of services. Haesslein (2022) points out that subscription-based models have long been the trend in mechanical engineering. It is when the customer only pays for the output, outcome, or actual performance that a machine provides. It can be concluded that digital optimization is the basic premise of the servitization process, which is a source of long-term competitive advantage (Linde et.al. 2021), and building revenue from the sale of data that the organization generates in its business process (Barrett et.al. 2015).

Nokia was the untouchable leader in the mobile phone market, but neglected the processes of digital transformation and digital optimization of production. The business strategy was based on the realized process of digital optimization, which relied on the sale and distribution of the classic physical product. The degree of optimization once achieved was not enough at the moment when the rivalry between Apple and Google became too strong. Nokia continued to apply a product-based competitive logic, focusing on individual product attributes and related market segments to deliver value, while first Apple and later Google redefined the competitive arena by focusing on the digital product system of the platform economy, whose functionality and value increases with the provision of additional connected products and services through applications (Cennano et.al. 2020). Dash and Chakraborty (2021), point out that digital transformation is the introduction of new technology, systems and models as an attempt to improve customer service and experience. Imran et. al. (2021) conclude that digital transformation and digital optimization is directly related to the change in the culture of organizations that must be faster and more agile and have more and more services connected to based products.

5. CONCLUSION

Digital optimization is a process related to digital transformation, and it is aimed at stabilizing the system after the transformation and building competitive advantages. Digital transformation introduces new technologies and creates new demand models. In addition, it creates a new user community and new monetization models. By moving to a new phase of business activity, as shown in Figure 3, the organization moves to a new phase of digital optimization of business activities. Digital optimization, as a result of digital transformation, is completely different from the optimization of production processes of organizations from the era of industrial production of goods and services. The optimization of the production of organizations from the period of industrial production is mainly focused on the optimization of capacity, lowering of production costs and product price policy within the industrial branch. Digital optimization as a result of digital transformation is associated with the development of complementary products and services and new monetization models. The results of the research proved that organizations from classic linear production industries are more difficult to adapt to digital optimization and new monetization models than creative industries and industries related to media industries. Digitized systems have scaled production capacities much more easily, and thus costs, and it is much easier for them to establish different levels of digital optimization. Organizations from classic pipeline production took a longer path from digitization to digital optimization than organizations that were founded as digital infrastructure. The automotive industry, as one of the "old industries", is an example of a classic linear industry that very quickly developed digitization and digital optimization models. In contrast, the Amazon platform, which started business as a digital infrastructure, then took over the chain of Whole Foods stores and transferred a part of the business to a classic linear model. The digital platform Alibaba has developed different business models, that is, through digital transformation, a different service monetization model has been developed, which has conditioned the digital optimization of each business model. Pipeline modal industries went through development stages from selling a physical product to operating in a platform economy model. Each transition from phase to phase implied digital optimization of the business activities of each previous phase. Organizations founded as digital infrastructure began their development as digitized entities and developed several different business models in special ecosystems. Digital optimization is the process of building competitive advantages and optimizing one segment of business activities without which further digital transformation would not be possible.

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THE DEGREE OF CONCENTRATION IN FOOD RETAILING - A COMPARISON BETWEEN SEVERAL EU COUNTRIES

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ABSTRACT

Trade is an economic activity in which legal and natural persons mediate between producers and consumers with the aim of organizing the market or facilitating the availability of products. The emergence of trade has also led to the emergence of concentration. As we will be dealing with the topic of concentration in trade in this paper, it is necessary to clarify what concentration in trade is. Concentration in retailing is the share of market control by a few retailers, i.e. the amount of market share controlled by individual retailers in a given market. The degree of concentration correlates with the level of market share, while the market structure indicates the (in)competitiveness of the observed market as a whole. There are several methods for measuring concentration in retail, and for the purposes of this paper we have used the concentration coefficient and the Herfindahl-Hirschman index. The aim of this paper is to analyze the degree of concentration for four EU countries (Croatia, Finland, the Netherlands and Germany) for the period from 2016 to 2021. Based on an analysis, the authors of the study have shown that Croatia and Germany have a moderate degree of concentration, while Finland and the Netherlands have a high degree of concentration; the calculation was based on the Herfindahl-Hirschman index. Using the concentration coefficient for CR5, it was shown that Finland and Croatia have a duopolistic market structure, while the Netherlands has a market structure dominated by one dominant firm and Germany has a triopolistic market structure. The author(s) used the following methods in this paper: descriptive research method, deductive research method, analytical method and compilation method. The author(s) used secondary data for the preparation of this paper.

Keywords: *trade, food retail trade, concentration, market structure*

1. INTRODUCTORY CONSIDERATIONS

Trade is an economic activity in which legal and natural persons mediate between producers and consumers with the aim of organizing the market or facilitating the availability of products. The emergence of trade has led to changes and developments, and these changes have led to the emergence of concentration. In this paper, the author(s) are primarily focused on the issue of concentration, which indicates that market power in retailing, especially food retailing, is under the influence of a few retailers who can significantly influence the market as a whole. The paper is divided into six chapters in which the author(s) attempt(s) to explain basic concepts such as the notion of trade and the notion of market structure, which is defined on the basis of certain factors such as the number of participants, entry/exit barriers, economies of scale. Based on the aforementioned factors, the market structure is determined on the supply side, most commonly distinguishing the following four basic types of market structures: perfect competition, monopolistic competition, oligopoly and monopoly. After defining market structures, the authors define the concept of concentration itself, i.e. retail concentration, and indicate the growth strategies used by firms to increase their market share.

The author(s) also write about the importance of defining the relevant market in which market concentration is measured. They explain in more detail how concentration is calculated using methods such as the concentration coefficient and the Herfindahl-Hirschmann index. An essential part of the paper is the analysis of the concentration of the retail market, especially the food market. In this paper, the authors analyze in detail the markets of Croatia, Finland, Netherlands, and Germany in order to determine the degree of concentration and the market structure of the observed markets.

2. METHODOLOGY OF THE PAPER

2.1. Research subject

The subject of the research in this paper is the study of concentration trends in the retail sector, more precisely in the retail sector with predominantly food products, i.e. groceries.

2.2. Research goals

The main goals of this research is to determine the degree of concentration and market structure of the observed markets, which include the markets of Croatia, Finland, Netherlands, and Germany.

2.3. Research methodology

In writing this paper, the author(s) have used the method of analysis and the method of synthesis, the inductive method and the deductive method, the method of abstraction and description, and the method of compilation. The author(s) processed secondary data for the purpose of writing this paper.

3. LITERATURE REVIEW AND HYPOTHESIS CREATION

In this chapter, the author(s) present basic definitions of trade, market structures, and their characteristics, and concentration in trade, based on each author(s) prior knowledge. Trade is an economic activity in which legal and natural persons mediate between producers and consumers, all with the aim of organizing the market or enabling the availability of products. Tomašević (1970) states that trade is "an economic activity that consists in the constant purchase of various types of goods from producers, their storage, and preservation, which are necessary for the regular sale of a wide range of goods to a large number of consumers, in such quantities, in such a way, in such a place, and at such a time that meets the requirements of consumers" (Segetlija, 2006:21). What is market structure? "A term that describes the way in which a particular market or sector of the economy is organized and its character" (Karić, 2009:63). Determining the market structure provides an insight into the state of a particular market, making it possible to determine how the market will behave in terms of the number of buyers or sellers, the entry and exit barriers that may exist when entering/exiting a particular market. By determining and/or measuring the share of market structure in an individual market, it is possible to determine the degree of competitiveness of the market and how and to what extent certain companies can influence the market as a whole. The type of market structure is determined by analyzing the following factors (number of bidders, number of buyers, economies of scale, type of products, barriers to entry and/or exit, mobility of goods, and government intervention). "The determination of the number of suppliers determines the number of companies operating in a given market sector, the level of their competition" (Jolić, 2021:10), i.e., "their composition, which indicates the degree of concentration of suppliers on the market" (Karić, 2009:63). "Economies of scale or economies of scope represent a situation in which the production volume of a company increases in relation to other companies in the industry under consideration, which can lead to it completely (monopoly) or partially (oligopoly) driving other competitors out of the market.

The market structure is influenced by the nature of the product, i.e. its characteristics, so that if different producers offer the same product, it can be stated that the market is perfectly competitive and the extreme that can occur is a monopoly, i.e. only one company offers a unique product that cannot be replaced by a similar product on the market. Barriers to entry depend on the motivation of new suppliers to enter the market, i.e. the level of potential profit, while the term barriers to exit encompasses factors that induce suppliers to remain in a particular market even when circumstances are unfavorable. It should be noted that industries with large economies of scale also have high barriers to market entry. The mobility of goods can affect the price of a product, so that industries that have a good infrastructural link between production and sales enable more uniform prices for the various suppliers. Government intervention can also influence the market structure. Namely, if the state wants to control the market, it will impose high tax rates or special permits required to conduct business, while otherwise it will relieve the burden on bidders and allow them to enter the market more easily and simply" (Jolić, 2021:10-11). For a better understanding of this paper, it is necessary to define market concentration. Market concentration can be defined as "the degree to which a small number of firms control a large part of the market" (Cambridge Business English Dictionary, 2021). As the focus of this paper is on the retail concentration of retail companies, it is necessary to emphasize the following definition: "Retail concentration refers to the market share generally owned by the leading 2 to 5 mass distribution companies in a country or in the global market as a percentage of the total market size" (Retail Concentration, 2014). In order to determine the degree of concentration, concentration must be measured, i.e. the relevant market must first be determined, i.e. the market in which the degree of concentration is to be determined, and then the market share of each individual entrepreneur in the relevant market. Once the relevant market and the market share of the undertakings present on that market have been determined, various methods can be used to calculate the concentration. Although there are various methods of measuring concentration, the focus of this paper will be on the two most commonly used methods, namely the concentration coefficient.The concentration coefficient is a ratio that indicates the size of a company in relation to its industry as a whole. A low concentration coefficient in an industry indicates greater competition between companies in that industry, while a coefficient of almost 100% indicates an industry characterized by a monopoly position (Keton, 2020). The Herfindahl-Hirschmann Index (HHI) is a standard measure for calculating market concentration. The calculation requires the sum of the squares of the companies' percentage market shares. (Belykh, 2017).

Formula 1. Concentration coefficient

$$CR_n = \sum_{i=1}^{N} S_i$$

Source: Author(s) processed and adapted to: Pešić S.S., (2015), Koncentracija u trgovini na malo kao determinanta profitabilnosti maloprodajnih preduzeća, Doktorska disertacija, Beograd. Available at: https://nardus.mpn.gov.rs/bitstream/handle/123456789/5317/Disertacija2604.pdf?sequence=6&isAllowed=y (accessed 27 January 2024).

N is the number of companies on the market, while Si is the market share of the ith company. After calculating the concentration coefficient, it is necessary to interpret the data obtained, which can be used to determine the market structure.

If the coefficient is calculated for CR5, i.e. for the five companies with the largest market shares, the following market structures emerge with regard to the level of the coefficient, as described by Dobson et al. (2000):

- A dominant company exists if the market share of the largest company MS1 <lock>><</lock> 1.5*MS2,
- Duopoly exists if MS2 <lock>><</lock>is 12.5 % and MS2 <lock>><</lock> 1.5*MS3 if there is no dominant company on the market,
- Triopoly exists if MS3 <lock>><</lock> 10% and MS3 <lock>><</lock> 1.5*MS4 if there is no dominant company, i.e. a duopoly,
- Symmetrical Oligopoly if there is no dominant company, duopoly or triopoly on the market and if the market share of each company is greater than 8% and is at least 67% of the size of the previously better-placed competitor,
- A non-concentrated market exists if there is no company with a market share (MS) of more than 10% and if the concentration coefficient CR5 <lock><</lock> is 33%

The Herfindahl-Hirschman Index (HHI) is a standard measure for calculating market concentration. The calculation requires the sum of the squares of the percentage market shares of the companies. (Belykh, 2017). The growth of the Herfindahl-Hirschman Index indicates the growth of the market share of the leading companies, the growth of concentration and reduced competition also applies in the event of a decline.

. Formula 1. Herfindahl-Hirschmanov index

$$HHI=\sum_{i=1}^{N} Si^2$$

Source: Author(s) processed and adapted to: Pešić S.S., (2015), Koncentracija u trgovini na malo kao determinanta profitabilnosti maloprodajnih preduzeća, Doktorska disertacija, Beograd. Available at: https://nardus.mpn.gov.rs/bitstream/handle/123456789/5317/Disertacija2604.pdf?sequence=6&isAllowed=y (accessed 27 January 2024).

Where N is the number of companies on the market, while Si is the market share of the ith company. The obtained HHI indices can be interpreted as shown in Table 1. Therefore, if the market is poorly concentrated with HHI index values less than 1,000, the market will be considered competitive, but if it exceeds 1,800, the market is highly concentrated and the competition is low, i.e. on there is a monopolistic market structure.
The author(s) put forward three hypotheses in this paper:

- Hypothesis 1: The retail market of the observed countries shows an increase in the degree of concentration throughout the observation period.
- Hypothesis 2: The retail market of the observed countries does not have a market share of MS1> 50%.
- Hypothesis 3: The retail markets of the observed countries have an oligopolistic market structure.

4. ANALYSIS OF CONCENTRATION IN RETAIL

4.1. Analysis of retail concentration in Croatia

In this paper, the author(s) examined the concentration of retail sales on the Croatian market based on publicly available data from the Financial Agency (FINA) in the form of annual

financial reports. The relevant market observed according to the National Classification of Economic Activities is G-47.11 Retail trade of non-specialised stores, mainly food, beverages and tobacco. The author(s) processed the data for the period from 2016 to 2021, the data of 105 companies, and the author(s) have selected and in this paper presented 10 companies with the largest market share.

	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKE T SHARE	Name	MARKE T SHARE	Name	MARKET SHARE	Name	MARKET SHARE
	2016		2017		2018		2019		2020		2021	
1	KONZUM	27,67	KONZUM	23,76	SCHWARZ GRUPA	23,63	SCHWARZ GRUPA	21,46	SCHWARZ GRUPA	23,11	SCHWARZ GRUPA	23,14
2	SCHWARZ GRUPA	19,73	SCHWARZ GRUPA	22,18	KONZUM PLUS D.O.O.	22,32	KONZUM PLUS D.O.O.	18,45	KONZUM PLUS D.O.O.	22,84	KONZUM PLUS D.O.O.	22,53
3	PLODINE D. D.	9,36	PLODINE D. D.	10,19	SPAR HRVATSKA D.O.O.	10,28	SPAR HRVATSKA D.O.O.	11,06	SPAR HRVATSKA D.O.O.	10,64	SPAR HRVATSKA D.O.O.	10,62
4	SPAR HRVATSKA D.O.O.	9,13	TOMMY D.O.O.	7,25	PLODINE D. D.	9,27	PLODINE D. D.	9,69	PLODINE D. D.	9,50	PLODINE D. D.	10,03
5	TOMMY D.O.O.	6,40	SPAR HRVATSKA D.O.O.	6,17	TOMMY D.O.O.	6,94	TOMMY D.O.O.	7,69	TOMMY D.O.O.	7,10	TOMMY D.O.O.	7,52
6	STUDENAC D.O.O.	3,64	STUDENAC D.O.O.	4,09	STUDENAC D.O.O.	3,85	STUDENAC D.O.O.	4,18	STUDENAC D.O.O.	4,16	STUDENAC D.O.O.	5,03
7	KTC D.D. KRIŽEVCI	3,45	KTC D.D. KRIŽEVCI	3,75	KTC D.D. KRIŽEVCI	3,63	KTC D.D. KRIŽEVCI	3,86	KTC D.D. KRIŽEVCI	3,54	KTC D.D. KRIŽEVCI	3,48
8	NARODNI TRGOVAČKI LANAC D.O.O.	2,51	NARODNI TRGOVAČKI LANAC D.O.O.	2,78	NARODNI TRGOVAČKI LANAC D.O.O.	2,65	NARODNI TRGOVAČKI LANAC D.O.O.	2,70	NARODNI TRGOVAČKI LANAC D.O.O.	2,61	NARODNI TRGOVAČKI LANAC D.O.O.	2,42
9	LONIA D.D.	1,25	LONIA D.D.	1,44	LONIA, D.D.	1,48	LONIA D.D.	1,40	LONIA D.D.	1,16	RIBOLA, D.O.O.	1,12
10	GAVRANOVIĆ D.O.O.	1,15	RIBOLA, D.O.O.	1,20	RIBOLA D.O.O.	1,20	RIBOLA, D.O.O.	1,26	GAVRANOVIĆ D.O.O.	1,09	TRGOVINA KRK D. D.	1,03

Table 1: Market share by sales of the largest retailers according to NKD G-47.11
Source: Author(s) processed and adapted to: FINA (2020), *Registar godišnjih financijskih izvještaja,* available at: http://rgfi.fina.hr/ (accessed 26 Janurary 2024)
*Note: * KTC d.d. and LONIA d.d., whose activities are classified under G-47.19 (Other retail trade in non-specialised stores), but which were included in this study due to their importance.*

Table 1 shows the market share of the ten largest retailers. Where it can be seen that the largest retailer was Konzum, which recorded a sharp decline in market share in 2019. The reason for this was the major financial crisis of the Agrokor Group, under which Konzum operated, and the consequences were also felt in 2019 as the trend of declining market share continued. The recovery of Konzum is visible in 2020 and 2021, but the positive growth in market share still shows a decline in 2021 of 18.59% compared to the observed year 2016, when Konzum had the largest market share in all observed years. The decline in Konzum's market share was exploited by the Schwarz Group, which operates on the Croatian market through Lidl and Kaufland and took the lead in 2018 and continued to grow in 2021, when its market share amounted to 23.14%. It is important to note that Lidl held 10.76% in 2016 and 14.10% in 2021 independently and Kaufland recorded 8.98% of the market share in 2016 and 9.03% in 2021. One can also note the decline of Plodine market share and the growth of Spar, which could lead to foreign companies completely displacing Croatian retailers or reducing their market power in the coming years. Konzum as the largest retailer in the Republic of Croatia (in the observed period) had 624 stores, while the Schwarz Group (in the observed period) had 153 stores (Lidl-107, Kaufland-46), which means that Konzum (in the observed period) was still the market leader by the number of stores (Jolić 2021:20).

Year	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	Change 2021/2016 (%)	Index change 2021/2016 (%)
CR3	56,77	56,13	56,23	50,97	56,59	56,29	-0,48	-0,84
CR4	65,90	63,38	65,50	60,66	66,09	66,32	0,42	0,64
CR5	72,30	69,55	72,44	68,35	73,19	73,84	1,54	2,14
CR10	84,30	82,81	85,25	81,75	85,75	86,92	2,62	3,11

Table 2: Concentration coefficient in the Republic of Croatia for the period from 2016 until 2021

Source: Author(s) processed and adapted to: Jolić (2021:21)

The calculation of the concentration coefficient is shown in Table 2, which indicates a decrease in concentration in the relevant market, with the sharpest decrease in 2021 for the first three largest retailers at 0.84% compared to the observed year 2016, when the concentration coefficient reached its highest level. The graph therefore shows that the concentration is highest or CR3 (56.77%) and CR4 (65.90%) in 2016, while CR5 (73.84%) and CR10 (86.92%) have the highest concentration coefficient in 2021 (Jolić 2021:21).

Year	2016	2017	2018	2019	2020	2021	Change 2021/2016 (%)	Index change 2021/2016 (%)
HHI-first 5	1367,12	1250,79	1296,52	1076,29	1309,61	1313,00	-54,12	-3,96
HHI-first 10	1401,46	1292,82	1335,17	1119,50	1348,79	1358,58	-42,88	-3,06

Table 3: Herfindahl-Hirschman index in the Republic of Croatia for the period from 2016 to 2021

Source: Author(s) processed and adapted to: Jolić (2021:22)

The Herfindahl-Hirschman Index, as shown in Table 3, decreases by 54.12% in 2021, i.e. by 3.96% compared to the observed year 2016 for the first five largest retailers. A slightly smaller decrease in the Herfindahl-Hirschman Index is observed for the ten largest retailers, by 3.06% in 2021 compared to the observed year 2016. From the above, it is clear that the observed relevant market is moderately concentrated throughout the observation period, regardless of the decrease in the Herfindahl-Hirschman Index.

Country	Year	CR5	MS1	MS2	MS3	MS4	MS5	Market structure
Croatia	**2016**	72,30	27,67	19,73	9,36	9,13	6,40	Duopoly
	2017	69,55	23,76	22,18	10,19	7,25	6,17	Duopoly
	2018	72,35	23,63	22,32	10,28	9,27	6,94	Duopoly
	2019	70,49	21,46	18,45	11,06	9,69	7,69	Duopoly
	2020	73,16	23,16	23,15	10,78	9,63	6,44	Duopoly
	2021	72,3	23,99	23,37	11,01	10,4	7,8	Duopoly

Table 4: Determination of market structures in the Republic of Croatia for the period from 2016 to 2021

Source: Author(s) processed and adapted to: Jolić (2021:23)

Having established that the observed market is moderately concentrated, it was also important to determine its market structure, which is shown in Table 4. The relevant market was dominated by the two largest retailers (Schwarz Group and Konzum), which changed their positions during the observation period. The reason for the faster takeover of the Schwarz Group's largest share was, as already mentioned, the crisis that affected Konzum. During the crisis, Konzum was operating with half-empty shelves, so customers were looking for alternative retailers, and the Schwarz Group was clearly the best answer to their needs (Jolić 2021:23).

4.2. Analysis of retail concentration in Finland

The author(s) has researched and included data for the period from 2016 to 2021.

	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKE T SHARE	Name	MARKE T SHARE	Name	MARKET SHARE	Name	MARKET SHARE
	2016		2017		2018		2019		2020		2021	
1	S-GROUP	47,20	S-GROUP	45,90	S-GROUP	46,40	S-GROUP	46,20	S-GROUP	46,00	S-GROUP	46,1
2	K-GROUP	36,20	K-GROUP	35,80	K-GROUP	36,10	K-GROUP	36,50	K-GROUP	36,90	K-GROUP	36,6
3	LIDL	9,30	LIDL	9,30	LIDL	9,60	LIDL	9,60	LIDL	9,50	LIDL	9,6
4	TOKMANNI GROUP	1,70	TOKMANNI GROUP	1,60	TOKMANNI GROUP	3,00	TOKMANNI GROUP	3,10	TOKMANNI GROUP	3,20	TOKMANNI GROUP	3,3
5	SUOMEN LÄHIKAUPPA OY	1,50	STOCKMANN	0,80	MINIMANI	0,50	MINIMANI	0,50	MINIMANI	0,60	MINIMANI	0,6
6	STOCKMANN	1,00	MINIMANI	0,60	M-KETJU	0,50	M-KETJU	0,40	M-KETJU	0,30	M-KETJU	0,3
7	S-GROUP	47,20	S-GROUP	45,90	S-GROUP	46,40	S-GROUP	46,20	S-GROUP	46,00	S-GROUP	46,1
8	MINIMANI	0,60	M-KETJU	0,50								
9	M-KETJU	0,60										

Table 5: Market share by sales of the largest retailers, mainly food, on the Finnish market
Source: Author(s) processed and adapted to:

a) Finnish Grocery Trade Association (2017), Finnish grocery trade 2017., available at: https://www.pty.fi/fileadmin/user_upload/tiedostot/Julkaisut/Vuosijulkaisut/EN_2017_vuosijulkaisu.pdf. (accessed 26 January 2024)

b) Finnish Grocery Trade Association (2018), Finnish grocery trade 2018., available at: https://www.pty.fi/fileadmin/user_upload/tiedostot/Julkaisut/Vuosijulkaisut/EN_2018_vuosijulkaisu.pdf (accessed 26 January 2024),

c) Finnish Grocery Trade Association (2019), Finnish grocery trade 2019., available at: https://www.pty.fi/fileadmin/user_upload/tiedostot/Julkaisut/Vuosijulkaisut/EN_2019_vuosijulkaisu_lr.pdf (accessed 26 January 2024),

d) Finnish Grocery Trade Association (2020), Finnish grocery trade 2020., available at: https://www.pty.fi/fileadmin/user_upload/tiedostot/Julkaisut/Vuosijulkaisut/EN_2020_vuosijulkaisu.pdf (accessed 26 January 2024),

e) Finnish Grocery Trade Association (2021), Finnish grocery trade 2021., available at: https://www.pty.fi/wp-content/uploads/2021/08/Finnish-Grocery-trade-2021.pdf (accessed 26 January 2024),

f) Finnish Grocery Trade Association (2022), Finnish grocery trade 2022., available at: https://www.pty.fi/wp-content/uploads/2022/08/EN_2022_vuosijulkaisu.pdf (accessed 26 January 2024).

The data in Table 5 shows that the market share of the largest retailers in the Finnish market is based on turnover. From this table, it can be concluded that the market leaders are S Group and K Group, which together achieved a turnover of 13,951 million euros in 2016, while the other

market players together achieved only 2,787 million euros, which corresponds to only 16.65% of total turnover. This trend continued across all years observed, with the market share changing slightly over the years. Only the Tokmanni Group continued its steady growth trend (in the years observed). The S Group and the K Group were unable to significantly increase their market share, although the K Group purchased Suomen Laehikauppa Oy in 2016 and the S Group purchased Stockmann in 2017. It can be seen that the market position of the first four retailers has not changed, i.e. none of the other market players have been able to jeopardize their position. The strength of these two groups is also evidenced by the data on the number of stores in the Finnish market provided by the Finnish Grocery Trade Association (2022), which states that there were a total of 4,476 stores in 2021, of which 1,066 were owned by S Group and 1,230 by K Group, which would mean that 51.30% of the stores are owned by these two groups (Jolić 2021:25).

Year	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	Change 2021/2016 (%)	Index change 2021/2016 (%)
CR3	92,70	91,00	92,10	92,30	92,40	92,3	-0,40	-0,43
CR4	94,40	92,60	95,10	95,40	95,60	95,6	1,20	1,27
CR5	95,90	93,40	95,60	95,90	96,20	96,2	0,30	0,31
CR6	96,90	94,00	96,10	96,30	96,50	96,5	-0,40	-0,41

Table 6: Concentration coefficient in the Republic of Finland in the period from 2016 to 2021
Source: Author(s) processed and adapted to: Jolić (2021:26)

From the calculation of the concentration coefficient, it can be deduced that the retail market in the Republic of Finland has a high degree of concentration. A closer look at Table 6 shows that the concentration coefficient for the first three leading retailers was highest in 2016 and decreased the most in 2017, but in 2021 there is still a small trend decrease of 0, i.e. 43%, compared to 2016. CR4 is the highest in 2021, by 1.27% compared to 2016. The reason for the increase in concentration is, as already mentioned, the growth of the Tokmanni Group's market share. CR5 recorded the same share in both 2016 and 2019, but there was an increase in 2020, which continued in 2021, by 0.31 percentage points compared to 2016. On the other hand, if we look at CR6, it is still slightly lower in 2021 than in 2016, when it recorded the highest growth (Jolić 2021:26).

Year	2016	2017	2018	2019	2020	2021 (%)	Change 2021/2016 (%)	Index change 2021/2016 (%)
HHI-first 5	3629,91	3478,14	3557,58	3568,71	3578,46	3568,18	-61,73	-1,70

Table 7: Herfindahl-Hirschman index in the Republic of Finland for the period from 2016 to 2021
Source: Author(s) processed and adapted to: Jolić (2021:27)

The data in Table 7 shows that the Herfindahl-Hirschman Index shows a visible but insignificant decrease in concentration of 1.70 % in 2021 compared to 2016. The changes mentioned are small and have not significantly reduced market concentration, meaning that the Finnish market is still considered a highly concentrated market according to the calculation in Table 7.

Country	Year	CR5	MS1	MS2	MS3	MS4	MS5	Market structure
Finland	**2016**	95,90	47,20	36,20	9,30	1,70	1,50	Duopoly
	2017	93,40	45,90	35,80	9,30	1,60	0,80	Duopoly
	2018	95,60	46,40	36,10	9,60	3,00	0,50	Duopoly
	2019	95,90	46,20	36,50	9,60	3,10	0,50	Duopoly
	2020	96,20	46,00	36,90	9,50	3,20	0,30	Duopoly
	2020	*96,20*	*46,10*	*36,60*	*9,60*	*3,30*	*0,60*	Duopoly

Table 8: Determination of market structures in the Republic of Finland for the period from 2016 to 2021
Source: Author(s) processed and adapted to: Jolić (2021:27)

From the data in Table 8, it is clear that Finland is struggling with high concentration and it is clear that the top five largest retailers hold 96.20% of the market share, but if you look closer, the concentration of the Finnish retail market is in the hands of two leading groups (S Group and K Group), which together hold 82.70% of the market when looking at the data for 2021. This means that the market structure of the Finnish retail market is a duopoly, as shown in Table 8. All this means that prices in Finland are still well above average in many product categories compared to other EU countries. The strong position of the two leading groups means that the companies "can "decide" on their pricing strategies due to the relatively low level of competition. Both the Council and the Commission of the European Union warn against too high a degree of concentration and state that Finland must take the necessary measures to make the Finnish retail market more competitive and more accessible to the entry of new competitors (European Parliament, 2016).

4.3. Analysis of retail concentration in Netherlands

To prepare this paper, the authors used data for the food retail sector in the Netherlands, based on processed and published data from the United States Department of Agriculture, to determine the concentration of retailers in the Dutch market. The data covers the period from 2016 to 2021, and based on it, information on the market share of the ten largest retailers is presented.

Table following on the next page

	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE
	2016		2017		2018		2019		2020		2021	
1	ALBERT HEIJN	35,30	ALBERT HEIJN	35,30	ALBERT HEIJN	35,30	ALBERT HEIJN	34,70	ALBERT HEIJN	35,00	ALBERT HEIJN	35,90
2	JUMBO	18,40	JUMBO	18,70	JUMBO	20,20	JUMBO	19,10	JUMBO	21,50	JUMBO	21,80
3	LIDL	10,30	LIDL	10,50	LIDL	10,50	LIDL	10,90	LIDL	10,70	LIDL	10,70
4	ALDI	7,00	ALDI	6,70	ALDI	6,70	ALDI	6,80	PLUS	6,70	PLUS	6,50
5	PLUS	6,20	PLUS	6,40	PLUS	6,40	PLUS	6,40	ALDI	5,50	ALDI	5,20
6	DIRK	3,70	DIRK	3,80	COOP SUPERMARKTEN	4,10	DIRK/DEKA	5,50	DIRK/DEKA	5,30	DIRK/DEKA	5,10
7	COOP SUPERMARKTEN	3,10	COOP SUPERMARKTEN	3,10	DIRK	3,80	COOP SUPERMARKTEN	3,20	COOP SUPERMARKTEN	3,90	COOP SUPERMARKTEN	3,90
8	EMTÉ	2,60	EMTÉ	2,50	DEEN	2,20	DEEN	2,10	DEEN	2,00	DEEN	1,50
9	DEEN	2,20	DEEN	2,20	HOOGVLIET	2,10	HOOGVLIET	2,10	HOOGVLIET	2,00	HOOGVLIET	2,00
10	HOOGVLIET	2,1	HOOGVLIET	3,1	DEKAMARKT	1,8	SPAR	1,2	JAN LINDERS	1,2	SPAR	1,20

Table 9: Market share by turnover of the largest retailers, mainly food, on the Dutch market
Source: Author(s) processed and adapted to:
a) USDA Foreign Agricultural Service (2017), The Dutch Food Retail Market, available at: https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Retail%20Foods_The%20Hague_Netherlands_12-18-2017.pdf (accessed 28 Januray 2024),
b) USDA Foreign Agricultural Service (2018), The Dutch Food Retail Market, available at: https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Retail%20Foods_The%20Hague_Netherlands_7-26-2018.pdf (accessed 28 Januray 2024),
c) USDA Foreign Agricultural Service (2019), The Dutch Food Retail Market, available at: : https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Retail%20Foods_The%20Hague_Netherlands_6-26-2019.pdf . (accessed 28 Januray 2024),
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f) USDA Foreign Agricultural Service (2022), The Dutch Food Retail Market, available at: : https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Retail%20Foods_The%20Hague_Netherlands_NL2022-0038.pdf (accessed 28 Januray 2024).

Table 9 shows the market share of the top ten retailers, mainly food, which have the largest share of the Dutch market. At first glance, it is clear from the table that the order of the top five companies has not changed during the period under review, i.e. none of the other market players have been able to threaten their position. At the bottom of this list is the Albert Heijn Group, which had an unchanged market share of 35.30% until 2019, although this fell slightly in 2019 compared to 2016, 2017 and 2018, by 0.6 percentage points and around 1.7% respectively. Albert Hejin's growth trend continued in 2020 and 2021, when the company achieved the largest market share of 35.90% in 2021. In the Dutch market, the first two companies mentioned above (Albert Heijn and Jumbo) held a 57.70% share in 2021, while the German retailers (Lidl and Plus) had a combined market share of 17.20% in 2021, which increased slightly, i.e. decreased,

in the years observed. The United States Department of Agriculture (2020) states that in 2019 there were 4,300 stores in the Dutch market and 996 stores were owned by the market leader, i.e. 23.16% of the stores were owned by the Albert Heijn Group, while the market follower Jumbo owned 675 stores or 15.70%.

Year	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	Change 2021/2016 (%)	Index change 2021/2016 (%)
CR3	64,00	64,50	66,00	64,70	67,20	68,40	4,40	6,88
CR4	71,00	71,20	72,70	71,50	73,90	74,90	3,90	5,49
CR5	77,20	77,60	79,10	77,90	79,40	80,10	2,90	3,76
CR10	90,90	92,30	93,10	92,00	93,80	93,80	2,90	3,19

Table 10: Concentration coefficient in the Republic of the Netherlands for the period from 2016 to 2021
Source: Author(s) processed and adapted to: Jolić (2021:30)

Table 10 shows the calculation of the concentration coefficient for the top three, four, five and ten retailers in the period from 2016 to 2021 in the food retail market in the Netherlands. The concentration coefficient increased the most in 2020 and 2021, when the top ten retailers held 93.80% of the market. However, if we look at the index of change, we see that market concentration increased by 3.19% in 2021 compared to 2016. The largest increase in concentration can be seen among the first three largest retailers, namely by 6.88% in 2021 compared to the observed year 2016.

Year	2016	2017	2018	2019	2020	2021	Change 2021/2016 (%)	Index change 2021/2016 (%)
HHI-first 5	1778,18	1791,88	1850,23	1774,91	1876,88	1947,83	169,65	9,54
HHI-first 10	1817,49	1836,63	1893,97	1825,66	1929,62	1996,74	179,25	9,86

Table 11: Herfindahl-Hirschman index in the Republic of the Netherlands for the period from
Source: Author(s) processed and adapted to: Jolić (2021:31)

The calculation of the Herfindahl-Hirschman Index for the first five or ten retailers, mainly food, is shown in Table 11. Looking at the HHI index for the top five largest retailers, it can be seen that market concentration increases by 9.54% in 2021 compared to 2016. It can also be seen that the market concentration according to the HHI index was highest in 2021 for the top five retailers, while the data for 2016, 2017 and 2019 show that the market is moderately concentrated if only the market share of the top five retailers is taken into account. In 2020 and 2021, on the other hand, there is a change that shows a high concentration of the market according to the HHI index. Looking at the HHI index for the first ten years, it can be seen that the market power of the last five retailers increased, leading to an increase in concentration, and it can be said that the retail market, especially the grocery market, is highly concentrated in the Netherland.

Country	Year	CR5	MS1	MS2	MS3	MS4	MS5	Market structure
Netherland	**2016**	77,20	35,30	18,40	10,30	7,00	6,20	Dominant company
	2017	77,60	35,30	18,70	10,50	6,70	6,40	Dominant company
	2018	79,10	35,30	20,20	10,50	6,70	6,40	Dominant company
	2019	77,90	34,70	19,10	10,90	6,80	6,40	Dominant company
	2020	79,40	35,00	21,50	10,70	6,70	5,50	Dominant company
	2021	80,10	35,9	21,8	10,7	6,5	5,2	Dominant company

Table 12: Determination of market structures in the Republic of the Netherlands for the period from 2016 to 2021

Source: Author(s) processed and adapted to: Jolić (2021:32)

It has been established that there is a dominance of one dominant company in the Dutch food retail market in all periods observed. It has already been mentioned that the Albert Heijn Group has the largest market share and therefore it can be stated that it has a dominant position in the retail market in the Netherlands in relation to other companies present in this market, which can be seen in Table 12. According to the research conducted by Kassa (2018), Albert Heijn is the most expensive retailer with a food basket costing 46.01 euros. Jumbo as the main competitor proved to be the cheapest with a price of 41.25 euros, the market also noticed an increase in food prices compared to previous years. This market power of the Albert Heijn Group allows it to keep prices slightly higher, while competitors try to maintain or strengthen their market share by offering slightly lower prices to consumers.

4.4. Analysis of retail concentration in Germany

The author(s) analyzed the concentration analysis of the food retail market in Germany based on Statista data and included data on the food retail market share for the years 2016 to 2021.

	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE	Name	MARKET SHARE
	2016		2017		2018		2019		2020		2021	
1	EDEKA GRUPA	25,30	EDEKA GRUPA	23,50	EDEKA GRUPA	26,20	EDEKA GRUPA	26,80	EDEKA GRUPA	27,10	EDEKA GRUPA	27,2
2	REWE GRUPA	15,10	REWE GRUPA	17,50	REWE GRUPA	16,10	REWE GRUPA	16,20	REWE GRUPA	20,80	REWE GRUPA	20,6
3	SCHWARZ GRUPA	15,00	SCHWARZ GRUPA	15,90	SCHWARZ GRUPA	15,70	SCHWARZ GRUPA	16,00	SCHWARZ GRUPA	16,20	SCHWARZ GRUPA	17,00
4	ALDI GRUPA	12,00	ALDI GRUPA	12,20	ALDI GRUPA	12,00	ALDI GRUPA	11,50	ALDI GRUPA	11,40	ALDI GRUPA	10,9
5	METRO GRUPA	5,20	METRO GRUPA	5,60	METRO GRUPA	4,80	METRO GRUPA	4,60	DM	3,40	DM	3,5
6	LEKKERLAND	4,60	LEKKERLAND	3,80	LEKKERLAND	3,90	LEKKERLAND	3,70	ROSSMANN	2,90	ROSSMAN	3,10
7	DM	3,50	DM	3,20	DM	3,50	DM	3,60	METRO GRUPA	1,80	BARTELS-LANGNESS GRUPA	1,70
8	ROSSMANN	2,80	ROSSMANN	2,60	ROSSMANN	2,90	ROSSMANN	3,00	BARTELS-LANGNESS GRUPA	1,70	METRO GRUPA	1,70
9	GLOBUS	1,70	GLOBUS	2,10	BARTELS-LANGNESS GRUPA	2	BARTELS-LANGNESS GRUPA	2	GLOBUS	1,60	GLOBUS	1,50
10			BARTELS-LANGNESS GRUPA	1,8	GLOBUS	1,6						

Table 13: Market share by sales of the largest retailers, mainly food, on the German market
Source: Author(s) processed and adapted to: Statista (2020), Market share of the leading companies in food retail in Germany from 2009 to 2021., available at: https://www.statista.com/statistics/505129/leading-companies-in-food-retail-germany/ (accessed 29 Januray 2024)

Table 13 shows that the largest food retailer in Germany is the Edeka Group, whose market share grew during the observation period. In 2021 and 2022, the Rewe Group is moving away from the Schwarz Group, with which it held an equal market share in the period from 2016 to 2019. The table also shows that no new companies appeared on the market during the observed period and the existing ones have a visible increase in market share, the position in the top 9 largest companies has only changed between the existing largest players. The decline in the market share of the Aldi, Metro, DM and Lakkerland groups, which are not among the top 9 according to the 2021 and 2022 data, is also striking. In 2019, there were 37,400 stores in the German market, and the Edeka group owned 11,207 stores, i.e. 29.97% of the stores, the Rewe group 28.32% of the stores and Schwarz 10.61% of the stores, which would mean that the three largest groups owned 68.9% of the stores in the German market.

Year	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	Change 2021/2016 (%)	Index change 2021/2016 (%)
CR3	55,40	56,90	58,00	59,00	64,10	64,8	9,40	16,97
CR4	67,40	69,10	70,00	70,50	75,50	75,7	8,30	12,31
CR5	72,60	74,70	74,80	75,10	78,90	79,2	6,60	6,61
CR9	85,20	86,40	87,10	87,40	86,90	87,2	2,00	0,60

Table 14: Concentration coefficient in Germany for the period from 2016 to 2021
Source: Author(s) processed and adapted to: Jolić (2021:34)

The concentration coefficient on the German market increased during the observation period, i.e. the influence of the first nine companies increased by 0.60% in 2021 compared to the observation year 2016. The strongest increase in concentration can be observed among the three largest groups, which is also shown in Table 14. From this, we can conclude that the first three groups will hold a market share of 64.8% in 2021.

Year	2016	2017	2018	2019	2020	2021	Change 2021/2016 (%)	Index change 2021/2016 (%)
HHI-first 5	1264,14	1291,51	1359,18	1390,09	1571,01	1584,26	320,12	25,32
HHI-first 9	1308,28	1327,36	1399,05	1429,74	1588,11	1601,90	293,62	22,44

Table 15: Herfindahl-Hirschman index in the Republic of Germany for the period from 2016 to 2021
Source: Author(s) processed and adapted to: Jolić (2021:34)

The Herfindahl-Hirschman index also increased during the observation period, as shown in Table 15. Based on the data presented, it can be seen that the German retail market, especially the food market, is moderately concentrated, but the growth of 25.32 % in 2021 compared to the observed year 2016 for the first five largest retailers, i.e. 22.44 % for the first nine.

Country	Year	CR5	MS1	MS2	MS3	MS4	MS5	Market structure
Germany	**2016**	72,60	25,30	15,10	15,00	12,00	5,20	Triopol
	2017	74,70	23,50	17,50	15,90	12,20	5,60	Triopol
	2018	74,80	26,20	16,10	15,70	12,00	4,80	Triopol
	2019	75,10	26,80	16,20	16,00	11,50	4,60	Triopol
	2020	82,90	23,47	19,50	15,93	15,91	8,09	Triopol
	2021	79,2	27,2	20,6	17	10,9	3,5	Triopol

Table 16: Identifying market structures in the Republic of Germany for the period from 2016 to 2021

Source: Author(s) processed and adapted to: Jolić (2021:35)

After determining the degree of concentration on the German food retail market, the structure of the market was also determined. Table number 16 shows that an unchanged market structure can be seen in the period from 2016 to 2021, which is in the hands of the three largest retailers. The data shows that market concentration is increasing and that there are not just one, but three leading groups that have managed to increase their market share at the expense of other companies in this market over the entire observation period.

5. DISCUSSION

Based on the analysis the retail market in four European Union countries (Croatia, Finland, the Netherlands and Germany), the authors identified different characteristics such as geographical location, population and market size. Despite these differences, there is a common trend in all countries, namely the process of market concentration. Although this is a long-term process, it can be seen that the attention of researchers and the public is decreasing, partly due to the difficulty of accessing data, which is now often only available on request and for a fee. Against this background, it is extremely difficult to obtain new, complete data collected using the same methodology, which makes it difficult for us authors to conduct further research in the area of market concentration for the years 2022 and 2023. The author(s) put forward three hypotheses in this work. The first hypothesis, which should be proved or disproved, is whether the retail market of the observed countries showed an increase in the degree of concentration during the observation period. In Germany, there is a constant increase in concentration, with the highest growth measured by the HHI index, which was 25.32% for the first five retailers in 2021 compared to the observed year 2016. Finland shows a decrease in concentration when we look at the concentration coefficient for the top three or six largest retailers. According to the Herfindahl-Hirschman index, the Finnish retail market for the first five largest retailers shows the largest decrease in concentration of 1.70% in 2021 compared to 2016 when looking at all markets analysed in this period. The measurements in the Dutch market indicate an increase in concentration during the observation period, and according to the HHI index, the largest increase in concentration is recorded for the ten largest retailers, amounting to 9.86% in 2021 compared to the observation year 2016. In Croatia, a decrease in concentration is recorded for the first three largest retailers, while the HHI index for the first five largest retailers indicates a decrease of 3.96% in 2021 compared to the observed year 2016. Therefore, we can see that the concentration changes during the period and does not always show a linear growth, but can increase and decrease depending on the changes in the market. Based on the above, the first hypothesis is partially proven. The second hypothesis was to prove that there are no individual retailers with a market share of more than 50% in the observed markets, i.e. that no market share of MS1 <lock>><</lock> 50% was recorded in the observed markets. The existence of such a level of concentration by a single company is rare, but not impossible. This is supported by the fact that S Group, which operates in the Finnish market, has a market share of 46.21% in 2021, and there is a possibility of acquiring a larger market share if the Finnish state does not

intervene in the retail market. In other countries, the market share of one company is not as high, but it can be seen that the market share of the first and second largest retailers is very different. For example, Albert Heijn has a 14.1% higher market share in the Dutch market than Jumbo, the second largest retailer. The second hypothesis can be confirmed, as no single company holds more than 50% of the market share in the markets observed. The third hypothesis states that the markets of the observed countries have an oligopolistic market structure. This hypothesis can be confirmed, as each of the countries mentioned has an oligopolistic structure, i.e. the dominance of one, two or three market participants. In Finland and Croatia there is a duopoly, i.e. the two largest companies have the greatest influence on the entire market, while in the Netherlands one company has the greatest influence on the market and in Germany market power is divided between the three largest companies. In this paper, the authors pose the following research questions for future academic research: To what extent has the COVID-19 pandemic affected the growth or decline of concentration in the countries observed, but also in the European Union as a whole? To what extent and in what ways has the COVID-19 pandemic impacted food retail operations, i.e. increased demand or decreased supply, changing consumer behavior and challenges in the supply chain and safety and health measures?

6. CONCLUSION

Concentration is a trend that occurs in various sectors of the economy and affects all market participants, from producers to distributors (retailers) and end consumers. It can be a "positive" or "negative" concept. If we are talking about large retailers who have a large share of a particular market, concentration is a positive term for them because they are able to influence all other participants and shape the rules in the market according to their own standards, and they will defend themselves by saying that they are socially responsible companies that contribute to the community, are responsible and safe employers, and that they only offer the highest quality products at the lowest prices and take care of their customers and suppliers. However, looking at concentration from the perspective of buyers and producers, the concept of concentration is rather negative, so buyers often find themselves in a situation where their shopping baskets are increasingly expensive and the products they buy are imported and often of lower quality. In the case of manufacturers, it is not only the price of the product that is a problem for retailers, but also the quantity, as manufacturers often do not produce enough products to fit on retailers' shelves (this is especially true for small businesses). The author(s) have clearly and indisputably demonstrated that four geographically different markets have almost identical results in the same relevant market, i.e. that all the countries mentioned have markets dominated by one or two or three largest retailers. Accordingly, concentration in the Croatian and German markets is expected to increase, as these markets are moderately concentrated. However, the Netherlands and Finland are already highly concentrated markets and further concentration could lead to the disappearance of the already small number of retailers in these markets. The further increase in concentration can be limited with the help of mechanisms belonging to the states, the European Commission and the Council.

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FROM VOLUNTEERING TO LABOR MARKET: EXPERIENCES OF YOUTH IN THE CITY OF SPLIT

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ABSTRACT

Youth unemployment rates as well as the first steps young people have to go through to find their place in the today's labor market have been a subject of much research. The main characteristics of volunteering are voluntarism, non-payment, solidarity and added social value through understanding and respect. Volunteering has a long tradition in Croatia, and it is mainly associated with the concept of unpaid and voluntary, work. The subject of this research is the relationship between volunteering and the labor market, i.e. how the experience of volunteering has helped people in the labor market and at work. The research was conducted in July and August 2023, using the qualitative method of a semi-structured interviews. The interviews included fifteen participants, employed young people aged 18-34, of different gender, education, and marital status. All participants stated that employers always respond positively to volunteering and that the skills they have acquired during volunteering help them in their current job. Most of the participants believed that volunteering is not recognized in Croatia and that the state does not encourage its citizens to volunteer. The participants conclude that a formal system for recognizing the skills and competences acquired through volunteering is necessary.

Keywords: *Employment, Labor Market, Skills, Volunteering, Youth*

1. INTRODUCTION

Volunteering is of great public and political interest when it comes to issues of the functioning of the labor market and the entry of young people into the workforce. In many countries, there are discussions about how to maintain and promote volunteering and how to encourage different groups to volunteer. Volunteering is not only an expression of individual commitment and a spontaneous result of community life but is often consciously organized and managed. The combination of voluntarism and organization in establishing prosocial behaviour makes volunteering a very interesting and relevant social phenomenon (Ledić, 2001). Volunteering in the Republic of Croatia is regulated by the Law on Volunteering, the National Strategy for Creating a Stimulating Environment for the Development of Civil Society, and the Code of Ethics for Volunteering (Skočić Mihić, Lončarić, Rudelić, 2011). Volunteering has an impact on the people involved and is considered a profitable endeavour with numerous benefits. Volunteering offers not only the opportunity to help others, but also the chance to develop professional skills and advance one's career. Although volunteering is not the focus of sociological academic interest, this paper examines this phenomenon in more detail due to the benefits it brings to both the individual and society. This paper discusses the benefits that volunteering brings to young people in the labor market. The social group of young people was chosen because of their weakness in the labor market.

It is difficult for young people to find a job due to their lack of experience. Therefore, it is assumed that volunteering is one of the ways to gain the necessary experience and skills for the labor market. In Croatia, according to Eurostat data for 2023, 25 thousand young people under the age of 25 (19%) were unemployed (Eurostat, 2023). Given the problem of youth employment in Croatia, the aim of this paper is to present volunteering as a form of activity and work that could offer young people a solution to their lack of experience and skills. To this end, the attitudes of individual volunteers towards the benefits of volunteering in the labor market are presented.

2. POSITION OF YOUTH AND VOLUNTEERING

In developed economies, the number of educated people has risen in recent decades. The demand for well-educated workers has increased as much as the supply, which goes hand in hand with technological change, which is accompanied by a corresponding change in corporate governance and the organization itself (Bečić, 2013). The labor market is the place where supply and demand for labor meet, at the level of employment, preparation, promotion, competition and finally dismissal. All of this affects the price of labor and its creation. The state of the labor market is important for any country because it significantly affects the standard of living of the country's citizens (Bolta, 2020). Youth unemployment is a particular problem in Croatia. The low demand on the labor market has led to discouragement in the search for work. This is the main reason why some young people choose to stay in the education system longer, while others belong to a growing group of young people who are not in education, employment, or training (NEET). Croatia is one of the countries that has the biggest problem with the group of young people who are not unemployed and are also not in the education and training system (Obadić, 2017). Eurostat data shows that the transition period between the end of training and the first job varies from country to country, with the average in the European Union member states being 6.5 months. The time span increases with decreasing educational level and is shortest for young people with high education degree (5 months). The average age of entry into the labor market is 21 years (Eurostat, 2012). Leaving the education system is not the same as entering the labor market, as some people are in education and on the labor market at the same time, while others leave the education system and remain outside the labor market. There is a discrepancy between the demand and supply of labor. At the same time, the Croatian Employment Service, in cooperation with employers, analyses the future demand on the labor market and estimates it annually (Obadić, 2017). In Croatia, the proportion of people aged between 18 and 24 who are not in education is the lowest in the EU (2.8 %), while the EU average is 10 %. As Croatia is one of the countries with the highest youth unemployment, it is possible that young people in Croatia stay in education for a long time to protect themselves from a very tight labor market. Therefore, young people in Croatia usually do not enter the labor market before the age of 25. The unemployment rate among those who do enter the labor market is high. In other Mediterranean countries, young people remain excluded or try to enter the labor market, while most young people in Croatia continue their education. In the end, however, only a small proportion of them complete higher education. The education system in Croatia serves as a kind of protection from the labor market, and the reasons for this are sought in its financial profitability and availability (Economic Lab, 2017). Young people are discriminated against on the labor market because of their age. Age is a risk factor when looking for a job. In fact, employers most often want people who are young (fully employed) but also have as much work experience as possible, which is impossible in the first active years of working life. The data show that 76% of young people believe that they are a social group that is worse off compared to others in the labor market (Bušić Crnković et al. 2012, 26). Research by the Croatian Youth Network shows that young people between the ages of 15 and 19 are most frequently affected by age discrimination. In addition to age discrimination, there is also

gender discrimination and discrimination based on belonging to national minorities and disability. The most common discriminatory question at a job interview, which is mainly aimed at women aged between 25 and 29, concerns family planning. 35% of young people say that discrimination encourages them to be even bolder and more persistent (MojPosao, 2022). Volunteering is defined as a non-profit and unpaid activity that describes a person who voluntarily and unpaid performs a specific task. The term is derived from the French word volontaire - voluntary, after the Latin voluntaries, which means voluntary. Volunteering is already characterized by voluntariness and freedom of choice in its root word, whereby the element of freedom is considered a fundamental aspiration of democracy and human freedom (Malogorski, 2019). Voluntary work arose from the human need for community, camaraderie and mutual support and help and reached its peak in the nineteenth century. (Ajduković, Cajvert, 2004). The aim of volunteering is to create solidarity among people through voluntary action in the community. In the beginning, volunteering in Croatia was mainly about helping others and drawing attention to the problems and needs of our society. The terminology and meaning of volunteering vary from country to country. In Germany, volunteering is traditionally understood as an "honorable task" and "civic engagement", while in the prevailing Anglo-Saxon culture, volunteering is primarily seen as unpaid work in the field of charity and community involvement (Dekker, Halman, 2003). Volunteers refer to motives because they are what their social group or organizational culture promotes and other motives cannot be acknowledged (Pearce, 1993). Volunteering not only contributes to personal social affirmation, but also offers young people the opportunity to acquire skills and abilities that are useful both for everyday life and for the labor market. Encouraging young people to volunteer therefore has several benefits. Not only is it a source of social energy to help groups in need, but it is also an experiential way of learning for young people to create and develop a social and democratic society. For many of them, volunteering can be one of the first professional experiences and provide them with a lot of knowledge and tools that will help them on their way to professional life (Bušić Crnković et al., 2012). In the last decade, new approaches to organized volunteering have been developed in line with European Union regulations (Forčić et al., 2007). The concept of civil society has become an overarching concept for thinking about the benefits of volunteering for community life. Some of the basic characteristics of volunteering are voluntariness, non-payment, solidarity, appreciation, understanding, respect, protection etc. The terms that define volunteering may vary in different cultures and languages, but the common point of volunteering is that one contributes to the common good voluntarily and without being paid, in a spirit of solidarity and without expectation of material reward (Wilson, 2000; Malogorski, 2019). Under Croatian conditions, volunteering develops in parallel with the development of a democratic society that follows the contours of the activities of civil society organizations (Ledić, 2001). Volunteering in the Republic of Croatia has a long tradition that can be associated with the concept of solidarity, even though in earlier times the concept was applied to different forms of activity than the current interpretation of volunteering. With the adoption of the Act on Volunteering in 2007, a legal framework was created for its development in all strata of society. In the Republic of Croatia, a volunteer is a person who is at least 15 years old, whereby minors who have reached the age of 15 conclude a volunteering contract and volunteer only with the written consent of their parents or legal representative (Forčić, 2007). The National Strategy for Creating a Stimulating Environment for the Development of Civil Society also covers the area of volunteering and emphasizes the role and importance of educational institutions in developing awareness of volunteering for the common good through the education system (Government of the Republic of Croatia, 2006 according to Skočić Mihić, Lončarić, Rudelić, 2011). Other sectoral strategies and documents that apply alongside the Act are the National Strategy for the Creation of a Stimulating Environment for the Development of Civil Society from 2006 to 2011, including the Operational Plan for the period 2006-2011

(part of which sets out the priorities for the development of volunteering) and the Code of Ethics for Volunteering (Narodne novine, 2008). The research conducted indicate that volunteering remains primarily within the sphere of interest of civil society organizations. The results of the research show that citizens who have volunteered at least once in the last twelve months have mostly organized activities or actions (39.3%) or provided practical help (31.8%). 27.1% of them gave advice or information and 20.6% led a specific group or took part in decision-making. The activities in which respondents most frequently participated (32.3%) were organizing and preparing events and volunteering in the community. The research also showed that older people are more involved in volunteering activities than younger generations, while there is almost no difference between genders when it comes to volunteering. According to the so far conducted research, people with a high level of education were more likely to volunteer in their community than people with a low and medium level of education. Students and retired people were less involved in voluntary activities in schools and kindergartens than high school students and employed people (Franc, Šakić, 2005). In recent years, the regional volunteer centres in Croatia have noticed an increase in young people's interest in volunteering. Due to a lack of research, there are no exact figures. It can only be said that the work to promote and affirm volunteering in secondary schools has had a great influence on the growing interest in volunteering. In the Republic of Croatia, there is no official, systematically collected data on the development of volunteering (including the number of volunteers, indicators of the economic value of volunteering, etc.). (Volonterski centar, 2011). In most definitions of volunteering, i.e. voluntary work around the world, there are three or four common elements, namely (Dingle, 2001):

- optional, it is performed (among other things) for the benefit of others, i.e. society as a whole or a particular organization,
- it is not paid,
- it takes place in an organized context.

The criterion of non-payment in volunteering is not entirely straightforward. It is only a small step from undisputed expense allowances and generally accepted small material benefits to accepting payments below market value and reformulating the criteria for unpaid work. Volunteering is therefore not primarily done for financial gain. Many definitions do not include such a standard, and unorganized informal volunteering is sometimes explicitly recognized (Govaart, 2001). Recognizing the skills acquired through volunteering plays an important role in encouraging young people to volunteer. Since there is no recognition of volunteering experiences that can be useful later the labor market, many young people focus on finding internships and placements to improve their competitiveness on the labor market. Volunteering is not only an opportunity to help people in need, but also a way to gain professional skills and advance your career. Because volunteering is skills-based, volunteering also involves professional/business skills that the organization would otherwise have to pay for, while volunteer organizations can encourage volunteers to get involved so that the nonprofit doesn't have to pay employees to do the work. Skills gained through volunteering can be transferred to the workplace. For example, if you are applying for a job with a non-profit organization, it is important to highlight the skills you have gained through volunteering on your resume. Organizations often prefer applicants who have excellent communication, teamwork, and time management skills. The most cited skills that can be gained through volunteering and are applicable in everyday life and the workplace are (Steimel, 2018):

- time management skills
- teamwork skills
- strong work ethic
- leadership skills

- compassion
- communication skills
- dedication
- problem solving skills
- coaching skills
- interpersonal skills.

Volunteering has great benefits for society, but there are also a whole range of positive effects of volunteering on the individual. It helps young people to develop many skills and gain self-confidence and self-esteem. It trains and prepares them for various opportunities for social engagement and can help them find a job. Volunteering also enables informal education, which is precisely why it is one of the key elements of the European Union's Lifelong Learning Strategy (Bušić, Crnković et al., 2012).

3. MATERIALS AND METHODS

The subject of the research is the relationship between volunteering and the labor market. Young people are still considered a vulnerable group in the labor market, especially if they have just left the education system. Volunteering is one of the ways to prepare young people for the labor market. The overall aim of the study was to investigate how the experience of volunteering affects young people's entry into the labor market, i.e. whether the experience of volunteering helps them to find a job more quickly. Since people who volunteer develop some skills during this experience, the aim was to find out whether this helps them find a job or work when they are already employed, and to investigate how employers feel about volunteering. In accordance with the defined research objectives, the participants in this study were selected using the targeted sampling method. A qualitative research approach was used, and the semi-structured interview method was applied. 15 participants took part in the study. All participants were between 18 and 34 years old, employed and had different genders, educational levels, and marital statuses. The aim of the study was to examine people who volunteered and for whom the experience of volunteering and the skills and knowledge they acquired in the process helped them in the labor market, so that they stayed in the organization where they volunteered or were employed in another organization after volunteering. Gender, education, and marital status were not important criteria for the selection of participants, while employment and age were important. We focused our study only on currently employed individuals to examine how the volunteering experience helps them in their current job. All participants had to be in the age group of 18 to 34, as we wanted to gather the views of young volunteers and their experiences in the labor market. At the beginning of the interview, the purpose and aim of the study were explained in detail to all participants, and informed consent was obtained from all participants. The interview was recorded using a dictaphone and the audio recordings are in the researchers' archive. All participants were assured of strict confidentiality and anonymity at all stages of the research, and participants were able to withdraw from the interview at any time. The interviews were conducted in an informal setting or via video call, depending on the participants' capabilities. The interviews were conducted in July 2023. The first part of the interview consisted of a series of questions designed to determine the socio-demographic characteristics of the participants. Data was collected on gender, age, education, and marital status. The second part of the interview consisted of a group of questions relating to the participants' experiences of volunteering. The third part of the questions was about the participants' experiences in the labor market and how volunteering helped them in getting hired, while the fourth group of questions asked their opinion about volunteering in Croatia. The questions were open-ended, and participants could answer at their own discretion.

4. RESULTS AND DISCUSSION

The socio-demographic characteristics of the interview participants were determined by variables such as gender, age, employment, vocational training, and marital status. Four men and eleven women took part in the study. All participants were employed and belonged to the age group of 18 to 34 years. After their vocational training, two participants had a high school degree and had college education, all others higher education – university degree. In addition, two participants were married, seven were in a partnership and the other six participants were not in a relationship. The questions asked in the second part of the interview were related to volunteering experiences, where and for how long they had volunteered, what the motive was and what skills the participants had acquired while volunteering. The participants volunteered in various associations, organizations, and companies. When selecting the sample, particular attention was paid to the heterogeneity of the sample, i.e. people should be included who volunteer in different places, not just in the civil sector. Some participants got a job exactly where they were volunteering, i.e. they were offered a job while they were volunteering. These participants emphasized in the interview that they got a job exactly where they volunteered. They were the best candidates; they had the necessary skills and knew how the organization and the company worked.

> *"They were looking for employees, two employees were wanted, and of course the priority was to have someone who had volunteered before. And so, me and my colleague were accepted."* (Participant no. 6)

Another situation that occurs during the interview is when the participants have gotten a job in companies in the same field. For example, participant no. 14 volunteered at the school radio station and later gets a job at another radio station. This participant pointed out that she got a job because of the skills and knowledge she acquired during her voluntary service.

> *"For them, the fact that I went through all the basics of radio journalism, regardless of the fact that it's not my profession, was actually one of the main reasons to hire me, because I came in as a semi-finished product and of course we had really good communication skills. "* (Participant no. 14)

The next circumstance is the employment of participants based on the skills they have acquired during their voluntary service, but in companies that do not belong to the same scope in which they did their voluntary service.

> *"I met all the requirements for this job, at the interview I was given the task of writing something like a short blog post and a design for an Instagram post, and apart from that I managed the social networks in the association where I was a volunteer."* (Participant no. 15)

The participants can be divided into two groups: those who volunteer in their profession and those who volunteer outside their profession. Furthermore, we can see that the participants who volunteered in their profession volunteered for up to six months, while the participants who volunteered outside their profession volunteered for several years. Participants who volunteered only to gain experience volunteered for up to six months, while participants who volunteered to meet people, develop their skills, and help others volunteered for several years. Intrinsic motivations for volunteering kept volunteers much longer. Other studies show that the duration of volunteering depends on the relationship between motivation and satisfaction with volunteering.

Something similar can be found in the work of Cheung, Yan and Tang (2006), which found that satisfaction with volunteering and personal growth-oriented motives were significant predictors of continued volunteering. In terms of motives, participants emphasized two motives: gaining experience and developing skills and knowledge. The motive of meeting new people was mentioned as the third motive.

> *"The motive was to enrich my CV, I had very little volunteering experience on my CV at the time and I wanted something that was interesting to me, something that I would be happy to invest my time in and that would be useful." (Participant no. 10)*
> *"Well, quite simply, in my 4th year of college, I was about to graduate and had nothing to offer on my CV, I thought, it's never too late. While there are a lot of us on the market, there is very little work. I thought that I could gain some skills and knowledge through volunteering." (Participant no. 7)*
> *"The biggest motive was to meet new people and gain new knowledge and experience." (Participant no. 2)*
> *"The Entrepreneurship Academy meant a lot to me because I study project management at the Faculty of Business and Economics and basically... There we worked according to the scheme that you have a realistic project; someone comes up with an idea, someone has a ready-made team, and someone is just an individual with an idea. And the rest can be an individual without an idea. I didn't have an idea, I applied as an individual and I wanted to join a team and work on the realization of a certain idea. (...) I liked the concept, I liked the company, I liked the way they train young people and help young start-ups, ideas and young companies, and so I basically stayed." (Participant no. 13)*

Since the participants volunteered in various associations and organizations, they took on various tasks related to the work area of the association or organization. In performing these tasks, they also acquired various skills. When asked what skills they thought they had acquired through volunteering, participants cited communication skills as the most important skill, followed by interpersonal skills and practical, work-related skills in third place. Skills related to time management, writing projects, leading a team and presentation skills were mentioned slightly less frequently, depending on the area of work the association or organization they were volunteering with was involved in and the tasks they were performing.

> *"Above all, the relationship with people, knowing when they ask me something, what to tell them, how to help them, that was a good foundation for me when I work with them today."* (Participant no. 3)
> *"Definitely communication skills and soft skills, in addition to some practical skills, like how to create a communication plan."* (Participant no. 4)
> *"Well, definitely my time management, which was very poor before volunteering, and also my presentation and communication skills, because before volunteering I had very few opportunities to present something in front of a large number of people."* (Participant no. 2)
> *"Well, some networking, acquaintances, good people who can guide you, volunteering is a great experience and employers look at that and some of the students jump out."* (Participant no. 8)
> *"I would say first of all I learned to really work, to love something, because when something is done for love and not for money, from my point of view it's something completely different, a different feeling, a person works much harder*

> *and doesn't need any material proof or compliments, they don't really need anything except to learn to work and do what they really love. Other than that, the organization of work, and I see that today in how much I've learned to organize my time and other people's time so that I can get as many things done as possible with as little time as possible. "* (Participant no. 14)

Regarding the volunteer booklet or confirmation of the three participants, they stated that they had not received a certificate[1] or booklet[2], while all the others stated that they had received a certificate or booklet or both. Participants indicated that the tasks they performed during the period were most often noted on the certificate or booklet. From this part, we can see that associations, organizations and companies comply with the law that requires them to issue a certificate or booklet for volunteering. We also conclude that the organizers of volunteering want to obtain a formal value by publishing volunteer certificates or booklets. This question was important for us to investigate the extent to which participants are aware of their right to a volunteer certificate and booklet and whether they publish associations and organizations of volunteer certificates and booklets, as this is their duty. In addition, this is another way of recognizing volunteering, i.e. documenting the skills that volunteers develop while volunteering. Participants' experiences in the labor market were investigated by asking questions about the time of entry into the labor market and skills in writing a CV and a motivation letter. Most participants stated that they did not know how to write a CV and motivation letter and that they were never taught this in formal education and were forced to look for help on the internet or ask older colleagues. Only two participants stated that they had learned how to write a CV during formal training. When asked whether they should mention their volunteer work in their CV, all participants answered "yes" and emphasized that they considered this to be very important.

> *"Yes, because I think that employers today appreciate it when I mention what I did during my voluntary service and what skills I acquired."* (Participant no. 2)
> *"Even today I still state it, no matter what I've done for 5 years in a really strong media house, when I apply for any kind of job, I still state my volunteering experience because I think it's very important, I think it speaks for everything For the people who have volunteered, if I was the employer tomorrow it would certainly mean something."* (Participant no. 14)
> *"Because I felt like it gives me extra points and I can develop different skills through the volunteering experience that are just as valuable as any skills I've gained at work."* (Participant no. 10)
> *"Well, I gained a lot of skills and I had to list them all. When I got my first job, the boss asked me to tell her about the association, there were more jobs, at an interview they admitted to me that they hired me because I did this volunteer*

[1] "A certificate of competences acquired through volunteering is a document that certifies the participation of volunteers in a longer-term volunteering program and describes its activities and tasks as well as the content of what the volunteer has learned or developed during the volunteering and uses the crucial competence of lifelong learning. The purpose of this certification is to help the volunteer recognize their knowledge and skills, as well as the autonomy and responsibility of the volunteer experience, so that they can enhance and complement their resume and better present themselves to potential employers. The recognition also helps to acknowledge informal and informal learning through volunteering. For the organizers of volunteering, the certification of competences acquired through volunteering is the opportunity to take advantage of the European system of evaluation and recognition of their work" "(Ministry of Labor, Pension System, Family and Social Policy, 2023).

[2] "At the end of the volunteer assignment, the volunteer organization is obliged to issue the volunteer with a booklet of volunteering. It serves as proof of the volunteer's commitment and as a scrapbook of the voluntary activities that the volunteer has carried out for the benefit of the community. The information that the certificate must contain is regulated in Article 34 of the Law on Volunteering. Instead of issuing a separate certificate, the organizer of the volunteer work can enter the volunteer's voluntary commitment in their volunteer booklet. The volunteer booklet makes it possible to document a large number of volunteer experiences gained at various volunteer organizations" (Udruga MI, 2023).

work where they could see that I had done a lot and developed a lot of skills. There are always positive reactions to volunteering, everyone asks about it." (Participant no. 11)

When it comes to the reaction of employers to volunteering, all participants stated that employers have always reacted positively to volunteering.

"So, they were positive and asked me how I volunteer, what I do and so on, they were interested." (Participant no. 5)
"Everyone has reacted positively; I had a job interview recently and they asked me about it as well and I can see that it means something to them as well. So there were mostly positive reactions and they always asked me what we did specifically, what projects or what is done at the academy, etc." (Participant no. 13)

When asked which skills they had acquired during their voluntary service had helped them in the recruitment process, the participants most frequently stated: communication skills, interpersonal skills, teamwork, and practical skills related to their profession. In fact, participants mostly repeated the same skills they had acquired during their voluntary service, with communication skills standing out as particularly important. In the last part of the interview, we focused on the Croatian context of volunteering. When asked whether they considered volunteering to be recognized in Croatia, two participants answered "yes", while the others say „no ". As mentioned in the theoretical part, the Croatian law on volunteering was only adopted in 2007 and there is no official, systematically collected data on the development of volunteering. Volunteering in Croatia is still developing and the interest in volunteering is increasing, but it is far from other European countries.

"In general, I don't believe that. When I was volunteering in an association, volunteers from other countries came to us, for example from Ukraine, Macedonia, etc., and in talking to them I had the impression that volunteering is better developed there. There could be several reasons for this, she would say that our young people rarely turn to it because somehow they don't see any positive change and the reason immediately and right away and we live in such a country where you'd rather get a job as a waiter in the summer than volunteer because there's money." (Participant no. 4)
"No, but maybe it's being recognized more lately, but I don't think it's enough." (Participant no. 5)
"I think that in recent years more and more employers appreciate it. I think everyone wants someone who they say, when you graduate from school, you have a diploma and that's it. You're a tabula rasa, you don't know anything, or no one will hire you. And I think that volunteering, especially today where every department has an association that's related to the department, if not the same, and where you can gain experience related to your profession, that's proof to a future employer that that person already knows how to do something, that they have experience." (Participant no. 14)

The last question related to participant' opinions on the state's promotion of volunteering. In this sense, only two participants gave an affirmative answer, while the others saw no suitable incentive for volunteering.

"Not really, the state wouldn't say yes, the faculties and the associations themselves would, but the state, I don't think." (Participant no. 13)
"No, I think that Croatia as a country no, the citizens yes, young people up to 35 encourage it and in Zagreb I see that there have been changes in the last 10 years, but Croatia as a country that should work because a lot of young people are leaving, the country has no plan how to do all the volunteering that is there and there is a lot of it, how to bring all this volunteering to the level that young people want to volunteer. There is no such thing and there are a lot of young people who are willing and eager but have nowhere to go or don't know how. Young people might find some of their purpose through volunteering because it's too early to choose your own path at 18. You should have the opportunity to volunteer in high school. In America, you must volunteer if you want to get into a good college. Active high school students become active citizens who then take an interest in changing our society." (Participant no. 11)
"I don't think volunteering is encouraged or that college professors emphasize the value of volunteering or that kids are taught the value of volunteering in elementary school or high school, I don't think it's seen as something to invest time in. There are a lot of opportunities that you can find if you look for them." (Participant no. 10)

5. CONCLUSION

Volunteering in the context of scientific interest at a general level is not yet sufficiently represented in Croatia. Croatia only passed a law on volunteering in 2007. Furthermore, the Republic of Croatia does not have official, systematically collected data on the development of volunteering (including the number of volunteers, indicators of the economic value of volunteering, etc.). The main objective of the research was to find out how volunteering experiences help volunteers in the labor market. We investigated where and for how long they volunteered, what the motive was, what skills the participants acquired during volunteering, how it helped them in their current job and how employers reacted to volunteering. At the end of the interview, we asked the participants for their opinion on whether they think volunteering is recognized in Croatia and whether Croatia encourages its citizens to volunteer. Although the benefits of volunteering for individuals and society are great and significant, it seems that Croatia has not yet fully recognized this. In addition to the benefits for individuals and society, we also wanted to examine the benefits of volunteering for the labor market. Since young people are a vulnerable group in the labor market, especially if they have just left the education system, volunteering could be their ticket to the labor market. Young people cite lack of experience, which employers are looking for, as the biggest problem when looking for work. Through volunteering, they can gain the necessary experience and skills they need in the job market. When we talk about the skills that the participants of this study acquired during volunteering, the majority cite communication skills as the most important, followed by interpersonal skills and in third place are practical work-related skills. All participants pointed out that they always mention volunteering experiences in their CVs and that employers always respond positively to their volunteering experiences. From this we conclude that volunteering still has an impact on the labor market and helps young volunteers to get hired faster. On the other hand, it is worrying that the majority of participants believe that volunteering is not recognized in Croatia and that Croatia does not encourage its citizens to volunteer. Here Croatia still has a lot of room for development, especially in terms of promoting volunteering and formally recognizing the skills acquired through volunteering. The results of the study show that the skills they acquired during their voluntary service helped all participants in their recruitment and in their current job.

From this we can conclude that volunteering can really help young people without work experience to find employment more easily. On the one hand, volunteering can serve to adapt young people to the adult world and the labor market while developing the skills needed for future work.

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THE ROLE OF CRITICAL MINERAL RAW MATERIALS IN ACHIEVING THE EUROPEAN GREEN PLAN: PERSPECTIVE OF THE REPUBLIC OF CROATIA

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ABSTRACT

Mineral resources represent a key component of industrial development, possessing significant economic and utility value crucial for maintaining and improving the quality of life. The economic importance of certain mineral resources, such as energy minerals or metal ores, is well-documented and widely recognized in both professional and general public spheres. Given the current situation at the end of the 21st century, the challenge is to find effective strategies to prevent destructive changes caused by greenhouse gas emissions resulting from human activities. In this context, analyzing long-term trends in the use of geostrategic resources and mineral raw materials shows that the world is undergoing an inevitable transition - an energy transition. The purpose of this work is to present the fundamental transformation of the global energy and economic sectors based on this transition. The demand for specific mineral resources, metals, and minerals such as cobalt, lithium, magnesium, and aluminum, is growing rapidly. Digitalization, industry, and energy transition are transforming and increasing the demand for these raw materials. In this context, critical mineral resources and their circular use become increasingly important in the economy. Therefore, it is clear that the implementation of the European Green Deal strategy will not be possible without the use of critical raw materials. It is essential to note that less than 5% of the world's critical resources are extracted in the EU, while the EU's industry accounts for approximately 20% of the global consumption of these resources. The results of the analysis show that strengthening European supply of critical mineral resources is extremely important for the European Green Deal and the resilience of key industries. Thus, this fact underscores the need for further research and innovation in this area.

Keywords: *critical mineral resources, economy, environment, EU Green Deal, energy transition*

1. INTRODUCTION

Mining, as a key industry, not only has a direct impact on the global economy but also possesses deep interactions with many sectors, including construction, pharmaceuticals, medicine, agriculture, machinery, electronics, energy, and the automotive industry. This multifaceted connection confirms mining as a fundamental pillar supporting diverse industrial value chains. Contemporary technological advancements are globally focused on minimizing the use of fossil fuels to reduce CO_2 emissions into the atmosphere. The future development of mining will be influenced by various factors, including demographic trends such as population growth, as well as the demand for energy and mineral resources.

Additionally, economic growth, environmental conditions, and assessments of existing ore reserves will be crucial factors shaping this industry. Commercial mining is estimated to provide employment for up to two million workers, with a steady recorded growth, while small-scale mining contributes to social development with as many as thirteen million employees worldwide (Walser, 2002). The International Energy Agency (IEA) indicates that global energy demand will increase as the human population grows. The ongoing energy transition is unprecedented in scope and speed, with climate goals requiring net-zero emissions by 2050, essentially meaning the complete phase-out of fossil fuels in less than 30 years with a simultaneous increase in renewable energy production. The growth of renewable energy sources must accelerate to achieve the target by 2030. According to current policies, it is expected that the global capacity of renewable energy sources will reach 7,300 GW by 2028. However, to meet the goal established at COP28 last year, which is at least 11,000 GW by 2030, there is a need for a significant increase in the production of renewable energy (according to the monthly report of the International Energy Agency IEA). World governments have committed to doubling the capacity for electricity and heat production from renewable sources by 2030. However, there is still no agreement on financing mechanisms for the transition to clean energy in developing countries. In its monthly report, the IEA emphasizes that the most significant challenge in achieving this goal will be increasing funding and implementing renewable energy in most emerging and developing economies (https://www.iea.org/news/massive-expansion-of-renewable-power-opens-door-to-achieving-global-tripling-goal-set-at-cop28).

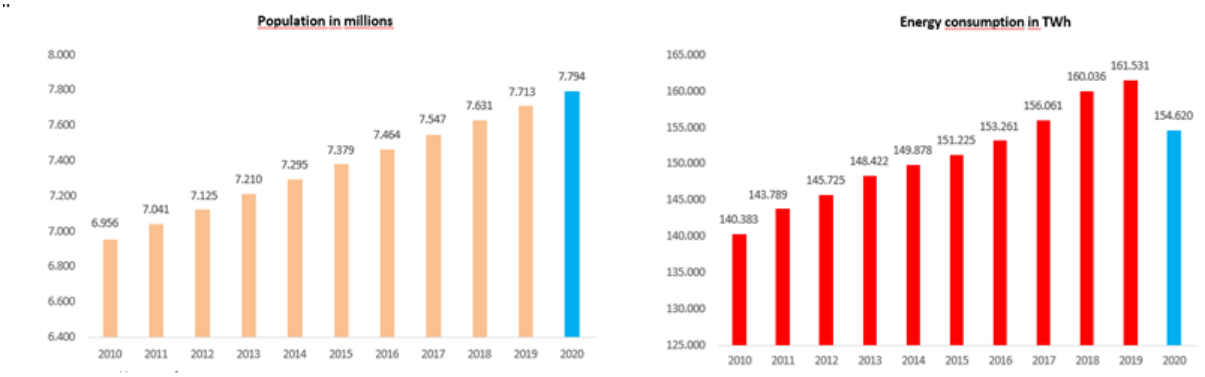

Figure 1: Movement of population growth distribution from 1800 to 2100 (Source: Author's processing based on UN Population Division data, 2022.).

Figure 1. illustrates the population growth and energy consumption growth from 2010 to 2019. It is evident that population growth was 11%, while energy consumption increased by 15%, with energy consumption per capita rising from 20.18 to 20.94 MWh. It should be emphasized that the share of renewable sources in total electricity consumption increased from 3.53% in the period of 2010-2019 to 10.33%. In other words, energy production from renewable sources increased by a factor of 4.13. Global projections indicate an expected increase in primary energy demand by 17.4% over the next decade. This trend places fossil energy sources - oil, natural gas, and coal - at the center of the energy portfolio, although a decrease in their share is anticipated. At the same time, the share of renewable energy sources is expected to grow from 13% (recorded in 2011) to 18% by 2035. Woetzel and colleagues (2009) note that the process of urban population growth and the strengthening prosperity in China, Russia, India, and Brazil lead these countries to use mineral resources in unprecedented quantities compared to the period 20 years ago. By 2025, China is projected to have about 200 cities with over a million inhabitants, resulting in increased demand, higher prices, and modern technology for products that support the growing global exploration of mineral resources such as metals: lithium, cobalt,

platinum, antimony, rare earth elements, and tungsten. This rapid urbanization not only generates higher mineral demand but also fosters the development of technologies utilizing specific mineral resources like lithium, cobalt, and rare earth elements. Despite optimistic projections, some scientists, such as Cohen (2007) and Ragnarsdóttir (2008), warn of potential challenges related to scarcity and depletion of mineral resources. However, it is important to note that such alarming scenarios often stem from simplified analytical models and improper differentiation between the terms "resources" and "reserves." In light of the increasing importance of energy transition[1], the issue of mineral supply security becomes a crucial aspect of the global discourse on energy security. Considering that the energy sector takes a forefront position as the leading consumer, technologies utilizing renewable energy sources and clean technologies are becoming critically relevant. This makes them the most dynamic segment of the growing demand in a global context (Pavlović et al., 2023).

2. THE SIGNIFICANCE OF MINERAL RESOURCE EXPLOITATION FOR THE ECONOMY OF THE REPUBLIC OF CROATIA

While mineral resources are exceptionally important for industrial processing with economic and strategic significance, the importance of certain key mineral resources essential to the industry is often overlooked. Minerals such as technical-building stone, construction sand and gravel from non-renewable sources or the seabed, brick clay, architectural-building stone, and metal mineral resources frequently remain in the shadows. Despite their crucial role in infrastructure development and the construction sector, the perception and approach to these key resources are often disproportionately unrecognized compared to their actual contributions to the economy and society. When discussing mining, metals and precious and semi-precious stones, representing only 2.8% of the world's volume of mineral production, are most commonly mentioned. The largest percentage, up to 84% of the produced volume, belongs to developmental mineral resources (Franks, 2020). Research based on published works in the field of mining and life cycle assessments of individual mineral resources has shown that most studies focus on the life cycle of different metals at the global or regional level: copper (Memary et al., 2012; Giurco and Petrie, 2007; Suppen et al., 2004), base metals (Norgate and Haque, 2012), zinc (Suppen et al., 2004; Stewart et al., 2003), coal (Mangena and Brent, 2004), gold (Mudd, 2007). However, Grbeša (2014) emphasizes that such studies in the mineral resource sector usually cover only a part of the life cycle, from raw material extraction to entry into the industrial production process, aiming to illustrate environmental impacts per unit mass of the produced raw material. A common response to mining demands is the rational management of mineral resources within the context of sustainable management of the entire area, where the primary goal of this work is to demonstrate the satisfaction of raw material needs while continually striving for mining activity to be a positive rather than a negative factor considering its overall impact on the environment and other content in space. The development of mining economy is possible while respecting the principles of sustainable development and environmental protection, aiming for the maximum protection of natural resources and other economic resources, nature and cultural heritage protection, energy efficiency, and the rational use of mineral resources (Srpak, 2022). Unfortunately, the Republic of Croatia is not particularly rich in mineral resources, but their exploitation, as the primary activity in the economy of any country, is of great importance for the state. In terms of the quantity of extracted mineral resources and the number of economic entities in the Republic of Croatia, the most significant are the exploitation of architectural-building stone, technical-building stone,

[1] Historically, "energy transition" signifies a change in the structure of primary energy consumption, marking a gradual shift from the existing energy supply system to a new state of the energy system. Undoubtedly, it represents a profound transformation of the global energy sector. This term refers to significant structural changes in the energy system, representing a global transition aimed at replacing the dominance of fossil fuels with renewable energy sources and enhancing energy efficiency.

construction sand and gravel, and brick clay. Mining economic entities are obligated to pay a concession fee for the exploitation of mineral resources in accordance with the provisions of the Mining Act (Official Gazette, No. 56/13, 14/14, 52/18, 115/18, and 98/19) and the provisions of the Regulation on the Fee for the Concession for the Exploitation of Mineral Resources (Official Gazette, No. 31/14 and 57/20). The concession fee for the exploitation of mineral resources consists of the following elements: 1. fixed part – monetary compensation for the surface of the exploitation field, 2. variable part – monetary compensation for the excavated / obtained quantity of mineral resources (Figure 2).

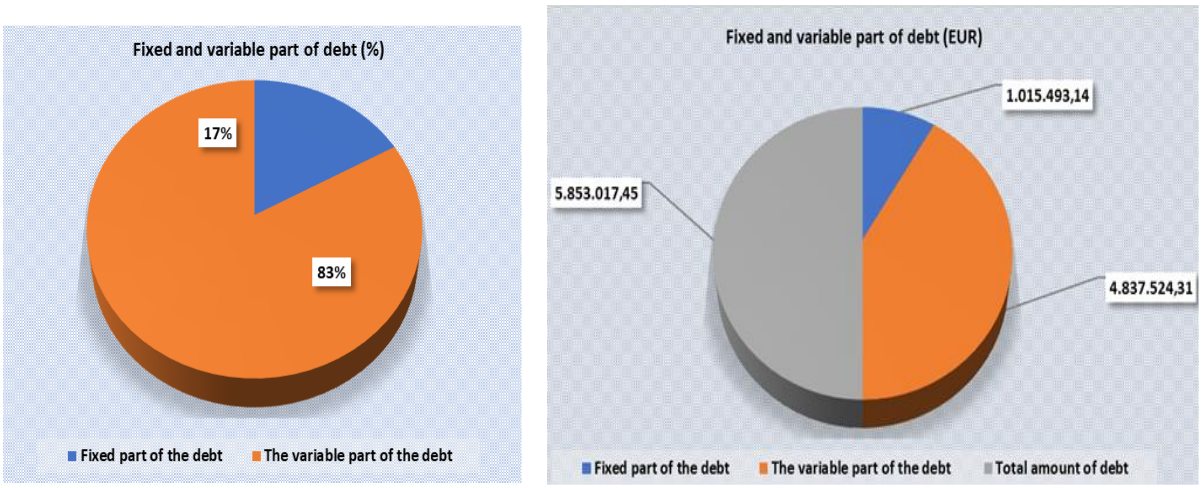

Figure 2: Concession Fee for the Exploitation of Mineral Resources (Source: Ministry of Economy and Sustainable Development, 2024.)

The fixed part of the monetary compensation for the surface of the exploitation field, determined by registration in the register of approved exploitation fields of mineral resources, constitutes revenue for the state budget of the Republic of Croatia. It is entirely transferred to the local self-government unit within whose area the approved exploitation field of mineral resources is located (Figure 3).

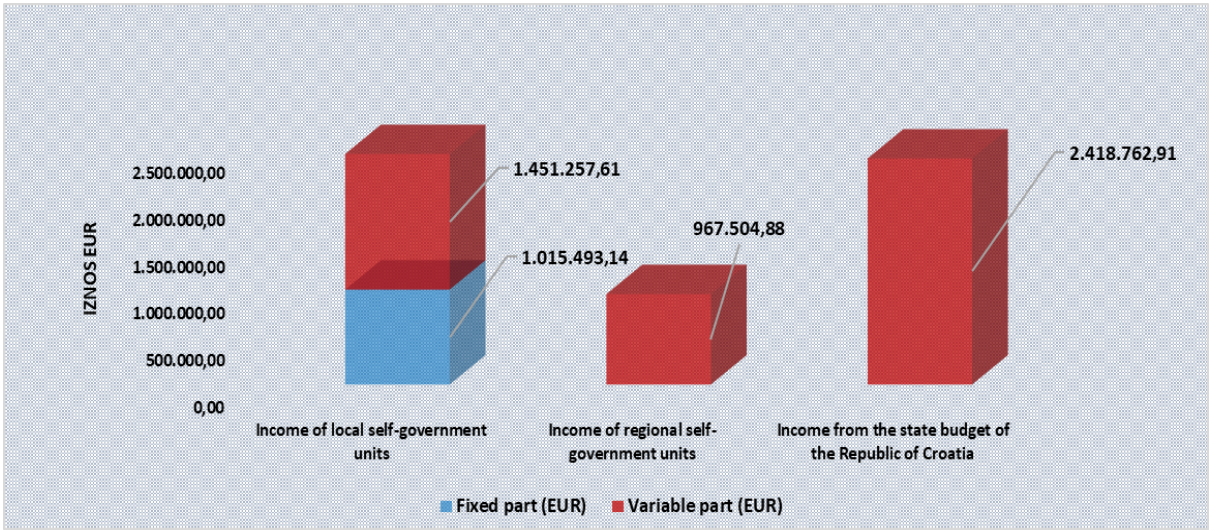

Figure 3: Concession fee for the exploitation of mineral resources in the Republic of Croatia (Source: Ministry of Economy and Sustainable Development, 2024.)

3. CRITICAL RAW MATERIALS AND SUSTAINABLE DEVELOPMENT IN THE EUROPEAN UNION

Lately, we have witnessed significant technological progress marked by innovations in the electric mobility, computer technology, and telecommunications sectors, particularly in the field of energy storage systems. This dynamic advancement has been driven not only by market forces but also by a growing awareness of the environmental implications of using fossil fuels such as oil and coal. Considering the significant ecological challenges associated with these energy sources, the transition to renewable energy sources, such as wind and solar energy, has become imperative. A central aspect of this technological renaissance is the demand for critical mineral resources, which are essential for the production of advanced technologies. Specifically, the period from 2017 to 2022 has been characterized by an impressive tripling of the demand for lithium, while the demand for cobalt has increased by 70%. These statistics are further reflected in the economic aspect, with the critical mineral resources market reaching a value of up to $320 billion in 2022, as documented in the "Critical Minerals Market Review 2023" report (Figure 4).

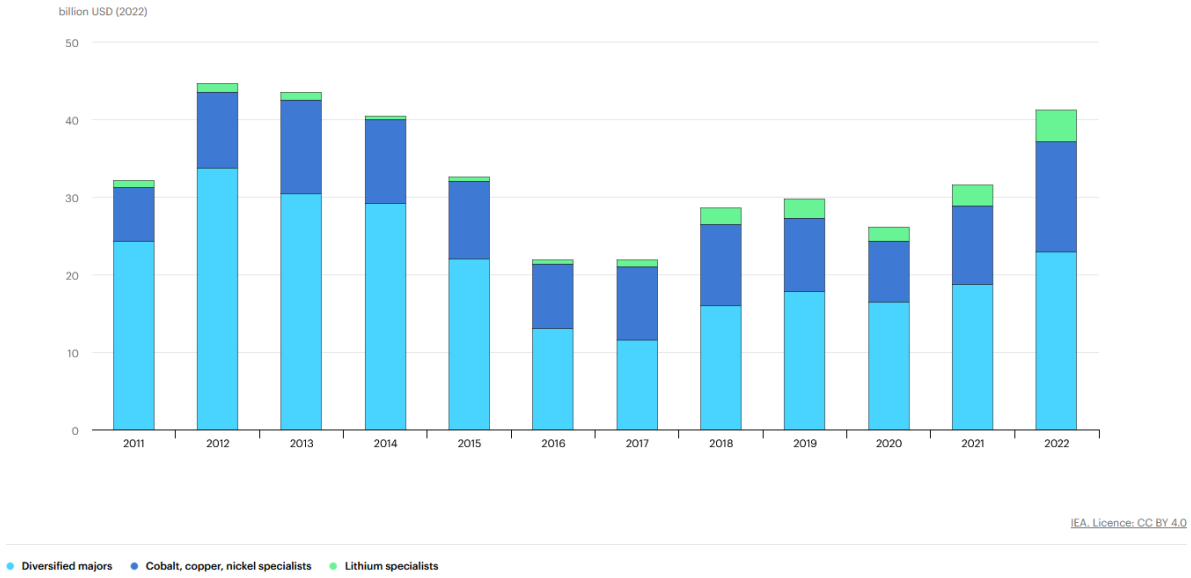

Figure 4: Critical Minerals Market Review 2023." IEA, 2023.
(Source: Critical Minerals Market Review 2023.)

In recent times, we have witnessed significant technological progress marked by innovations in the electric mobility, computer technology, and telecommunications sectors, especially in the field of energy storage systems. This dynamic advancement has been driven not only by market forces but also by a growing awareness of the environmental implications of using fossil fuels such as oil and coal. Given the significant ecological challenges associated with these energy sources, the transition to renewable energy sources, such as wind and solar energy, has become imperative. Beyond economic dynamics, this trend also reflects a strategic shift in the global energy paradigm. Interest in reducing dependence on coal is growing in proportion to the increasing attractiveness of renewable energy sources. As the transition to green energy technologies accelerates, it is crucial to understand and manage the economic, technological, and environmental challenges associated with critical mineral resources, ensuring the sustainability and stability of the future energy landscape. The new European industrial strategy aims to strengthen European autonomy, ensuring that the current dependence on fossil fuels is not replaced by geopolitical dependence on critical mineral resources.

The current energy transition leads to a reduction in the demand for fossil fuels (countries reduce their dependence on imports and improve their supply security). However, global demand for critical mineral resources could increase drastically, creating new dependencies on imports and potentially even greater supply risks, opening up new geopolitical dependencies. The European Union relies on critical mineral resources from various third countries, and dependence on the import of critical resources may pose a risk to the EU as the supply may change due to political, economic, or trade factors in exporting countries. Dependency on the import of critical resources can lead to supply risks, increased prices for critical resources, and negative social consequences, negatively impacting economic growth (Pavlović et al., 2023). The European Union (EU) recognizes the imperative of developing strategic policies for critical resources, aiming to diversify the supply and ensure sustainable access to resources essential for innovation and technological progress. This approach includes strengthening domestic production, technological innovations in recycling and the circular economy, and establishing robust international partnerships. With the broadest network of trade agreements, the EU actively collaborates with key sources of critical resources, such as Chile and Australia, to ensure stable supply, especially in the context of the energy transition. The United States has defined "critical minerals" as essential resources whose supply instability is subject to a wide range of risks, from geopolitical tensions to economic fluctuations. In this context, terms such as "critical raw materials" and "critical mineral resources" are often mentioned, where minerals, due to their importance in production, form the basis of these categories. Mineral resources are crucial for the European economy, constituting a strong industrial base, producing a wide range of goods and applications used in everyday life and modern technologies. Reliable and uninterrupted access to certain raw materials is an increasing issue in the EU and globally (European Commission Communication, 2014, 2011). Blengini et al. (2017) argue that ensuring reliable and sustainable access to mineral resources and their circular use is crucial in the EU economy and globally. Mineral resources form the foundation of the European economy by providing jobs, enhancing competitiveness, and are essential for maintaining and improving the quality of life. The European Commission emphasizes the importance of continuously monitoring and updating the list of critical raw materials, as the lack of certain resources can cause serious disruptions in production chains, resulting in price fluctuations and reduced competition in the global market. Therefore, it is necessary to promote innovative approaches to the management and use of critical resources to ensure the stability and sustainability of the European industrial sector. Critical resources play a key role in many vital sectors of the European industrial economy. Their essential role is explored in various domains:

- Energy and Electronics: Lithium, cobalt, and graphite are critical raw materials for the production of lithium-ion batteries, which are indispensable for storing renewable energy and powering electric vehicles (EVs). Therefore, limited supply or instability of these resources can result in significant challenges in integrating renewable energy sources into the energy grid. On the other hand, metals such as tantalum, tin, tungsten, and gold are crucial for the production of semiconductor devices, memory, and other electronic components. Potential disruptions in their supply chain could potentially jeopardize the supply chain for electronic devices, causing production delays and price increases for devices such as smartphones, tablets, and computer systems.
- Automotive Industry*:* Components such as lithium, cobalt, nickel, and copper are crucial for the production of key parts in electric vehicles, including batteries, electric motors, and emission reduction systems. The shortage of these raw materials can significantly disrupt the production capacity of electric vehicles and compromise the ambitions of achieving CO2 emission reduction targets within the EU.
- Healthcare Technology: Metal raw materials such as platinum, palladium, and europium are vital for the production of advanced medical devices, including pacemakers, implants,

and diagnostic devices based on magnetic resonance imaging (MRI). Inadequate supply of these key resources could result in reduced availability of medical technologies, which could have serious implications for the EU's healthcare system.

Therefore, it is imperative to continuously research and strategically manage these critical raw materials to ensure the stability and sustainability of key sectors in the European industry.
The European Commission has defined:

- The first list of critical raw materials was published in 2011 (with 14 critical raw materials). The list of critical raw materials was established as a priority measure of the EU Raw Materials Initiative in 2008. The Commission committed to updating the list at least every three years to consider developments in production, markets, and technology. The classification was based on criteria that the supply of raw materials is highly risky in terms of potential shortages in the next 10 years and that critical raw materials are extremely important in the value chain of goods and products (European Commission Communication, 2011).
- The first revised list of critical raw materials was in 2014 (with 20 critical raw materials).
- The third list of critical raw materials was in 2017 (with 27 critical raw materials).
- The fourth list of critical raw materials was in 2020 (with 30 critical raw materials) (Tomašić, 2021).

The penultimate and last update of this list considered the aforementioned criteria for a five-year period for EU members (EU 27, excluding the United Kingdom), and a total of 83 raw materials were observed. Bauxite, lithium, titanium, and strontium are added to the list for the first time. Regarding supply concentration, helium continues to raise concerns but is removed from the critical list in 2020 due to a decline in its economic importance.

4. IMPACT OF EXPLOITATION OF CRITICAL MINERAL RESOURCES ON THE ENVIRONMENT

Mining activities encompass the entire process from exploratory work to resource exploitation, transportation, processing of mineral resources, and through the mine closure and reclamation phases. This complex system of interventions can have a long-lasting and profound impact on society and the environment. While mining brings significant economic benefits and contributes to economic development, it inevitably faces criticism and controversy, especially due to potential negative consequences for the environment. The economic contribution of the mining industry is manifested at various spatial levels, from national to local. However, the specific environmental and social challenges arising from these activities are most intensely felt at the local community level, especially in areas directly affected by mining activities. This phenomenon has been confirmed by numerous scientific studies, including those by Kumpula et al. (2011), Meyfroidt et al. (2013), Schaffartzik et al. (2016), and Schilling et al. (2018). Mining activities and the construction of associated infrastructure tend to significantly alter the landscape, have a major impact on the local environment and ecosystems, and affect various forms of land use and human life. This includes physical interventions (deforestation, changes in topography), chemical changes (soil and water pollution), and emissions of various gases and particles. In addition, mining activities often require the development of infrastructure, including the construction of roads, railways, and power plants. Such infrastructure projects can further degrade or fragment natural habitats, which may have implications for animal migration routes, biodiversity reduction, and increased exposure to stressors for remaining populations. Table 1 provides an analysis of the impact of the exploitation of critical mineral resources on different environmental segments.

The categorization of resources in Table 1 is based on the ecological sustainability of their extraction and application, where the spectral color is used as a visual indicator of environmental burden: green symbolizes lower environmental risks, while red implies a higher level of ecological degradation.

	Cobalt	Pine	Graphite	Magnesium	Niobium	Vanadium	Phosphate	Gallium
Carbon footprint								
Energy consumption								
Harm to humans								
Acidification soil								
Freshwater eutrophication								

Table 1: Representation of the level of negative impact on individual environmental aspects (Source: Bachér et al., 2020.)

The results presented in Table 1 indicate that critical mineral resources used in the production of metal alloys, such as magnesium, niobium, and vanadium, and phosphate salts used in fertilizer production, are particularly significant considering their negative ecological impact. However, this impact is not limited to direct exploitation alone. There are many indirect factors contributing to the environmental challenges associated with these processes. One of the key indirect impacts is related to energy consumption and greenhouse gas emissions. For example, when oil is processed to obtain the chemical reagents necessary for the extraction of certain critical mineral resources, the resulting CO_2 emissions represent a significant ecological burden. Additionally, the presence of certain metals in ores containing critical mineral resources can lead to soil acidification, with long-term consequences for biological diversity and soil quality. Therefore, the analysis of this data not only highlights the necessity of sustainable management of resources and technologies used in their exploitation but also calls for an integrated approach to understanding the complex ecological consequences of industrial activities and their impact on the global ecosystem. In light of these challenges, post-mining reclamation and revitalization become imperative strategies. They aim not only to restore the physical features of the affected area but also need to consider complex ecological interactions and attempt to restore or enhance the ecological functionality of the area in a way that supports natural ecosystems and enables a sustainable future for the local community. In terms of impact, mining has a dual role: it is considered crucial for industrial production and regional development, but it is also a significant driver of landscape and environmental change (De Vos et al., 2005; Wirth et al., 2012). The extraction and processing of critical mineral resources represent a complex process involving various risks considering the potential negative environmental impact. These risks can be categorized into three main categories:

1) Mineralogical-geological risks involve risks related to the inherent mineralogical and geological properties of the mining area (e.g., beryllium and thorium). Additionally, elements such as boron, gallium, and cobalt are often found together with heavy metals like lead and cadmium. During the extraction of these minerals, there is a significant risk of environmental contamination, especially of groundwater and surface water.
2) Technological risks relate to specific techniques and processes used during extraction. Mining excavation methods can cause degradation of vegetation and hydrological conditions, leading to long-term ecological changes. Moreover, the use of toxic chemical reagents in extraction processes can result in acute and chronic ecological harm, including soil, water, and air pollution.

3) Physical and geological risks arise from the specific geographical and geological conditions of the deposit sites. Most global reserves of critical mineral resources are located in regions prone to natural disasters such as floods, earthquakes, or landslides. Such events can significantly disrupt mining operations, cause serious damage to infrastructure, and potentially result in injuries or loss of human lives.

Therefore, the approach to the exploitation of critical mineral resources is based on a holistic risk assessment that incorporates all the factors mentioned to ensure sustainable and responsible practices that minimize potential negative environmental impacts. Environmental challenges or risks are a significant concern for the mining industry and represent, after economic activities, the second pillar of sustainable development that encompasses all elements in the natural environment (soil, water, air, waste, seismic activity, noise) (Dubiński, Turek 2006). The EU's new mining policy, the raw materials policy, is a relatively new policy area (Tiess, 2010, 2011). The new European Action Plan for Mineral Raw Materials adopted in 2020, titled "Resilience of Critical Raw Materials: Charting a Path towards Greater Security and Sustainability," includes 10 action points (Table 2) that need to be implemented:

EUROPEAN ACTION PLAN FOR RAW MATERIALS FOR THE PERIOD 2020-2027.		
RB.	**ACTION POINTS**	**DATE OF EXECUTION**
1.	To establish a European Alliance for Raw Materials, initially aimed at building resilience and achieving strategic autonomy in the supply chain of rare earth elements and magnets, before expanding to other areas of raw materials.	**2020-2027**
2.	Develop sustainable finance criteria for the mining, extractive, and processing sectors by the end of 2021.	**2021**
3.	Initiate critical research and innovation in raw materials in 2021, focusing on waste processing, advanced materials, and substitutes.	**2021-2027**
4.	Map the potential of secondary critical raw materials from stocks and waste in the EU to identify sustainable recovery projects by 2022.	**2022**
5.	Identify mining and processing projects, investment needs, and related financing opportunities for critical raw materials in the EU that could be operational by 2025, with a priority for regions where coal is mined.	**2025**
6.	Develop knowledge and skills needed for mining, extraction, and processing processes from 2022 onwards.	**2021-2027**
7.	Introduce Earth observation and remote sensing programs for resource exploration, operations, and post-closure environmental management (Commission, Industry).	**2021-2027**
8.	Develop Horizon Europe R&I projects on processes for the extraction and processing of critical raw materials to reduce environmental impact, starting from 2021.	**2021-2027**
9.	Develop strategic international partnerships and associated financing to ensure diverse and sustainable supply of critical raw materials, including fair trade and investment conditions, starting with pilot partnerships with Canada, interested countries in Africa, and EU neighbors in 2021.	**2021-2027**
10.	Promote responsible mining practices for critical raw materials through the EU regulatory framework (proposals for 2020-2021) and relevant international cooperation (Commission, Member States, industry, civil society organizations).	**2020-2027**

Table 2: European Action Plan for Raw Materials for the period 2020–2027 (Source: European Commission Communication, 2020.)

5. CONCLUSION

Mining, as a fundamental industrial activity, represents a vital link in the global economic chain by providing a wide range of industrial and technological innovations. Each mineral resource, considering its chemical and physical structure, fulfills a crucial role, from the production of electronics to energy technologies. Since the Industrial Revolution, the dynamics of demand for specific minerals have dramatically changed, reflecting the evolution of industrial needs and urbanization trends.

In the contemporary context, this acceleration trend is particularly pronounced in the automotive and Information and Communication Technology (ICT) industries, which lead in innovations and technological advancements. The automotive industry, transformed by the emergence of electric vehicles (EVs), is now seeking new resources, including lithium, cobalt, and graphene, to ensure efficiency and sustainability. Sustainable supply of critical raw materials is crucial for global economic development and technological progress, facing growing risks and challenges. Geopolitical instability, environmental impacts, and social injustices associated with the supply of critical raw materials require coordinated efforts at the global and local levels to ensure sustainable supply and minimize negative impacts on the environment, communities, and society. In parallel with these technological innovations, the increasing dependence on fossil fuels for energy is causing serious environmental and climate implications. Climate change, with the phenomenon of global warming, calls for a transformation of the energy sector toward sustainable and low-emission solutions. Therefore, understanding these complex interactions between industrial needs, technological innovations, and environmental challenges requires a multidisciplinary approach, integrating scientific research, technological development, and policy strategies to ensure a sustainable future for global society. It is essential to emphasize that the development of mining projects typically spans from the discovery phase to the first production phase over a period of 15 to 20 years. Waiting for deficits to emerge before developing new projects can lead to market tightness and significant price volatility. Thus, it is crucial to understand that critical mineral resources play an undeniable role in the transition to clean energy but must not become a "Achilles' heel" in the process of energy transition and the introduction of clean energy.

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APPLICATION OF THE BPM-BES TOOL TO MEASURE THE MATURITY LEVEL OF ENERGY COMPANY

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ABSTRACT

In contemporary times, the efficient use of resources has become one of the biggest challenges for organizations. In the energy sector, proposals to increase operational efficiency with smart grid projects and investments in renewable energy are the main pillars of investments. In addition to technical losses and losses due to energy theft, there are administrative losses or losses in the process, which are responsible for 10% of waste. In this scenario where the search for sustainability and social responsibility, ESG (Environmental, Social and Governance) practices align with the BPM – Business Process Management methodology, to make the entire process and the investments themselves more efficient. Although it contributes to improving efficiency and return rates, process management presents organizational resistance, due to excessive functional thinking, a culture of resistance, lack of governance, lack of internal knowledge about people and the organization itself. To implement the BPM management model, the sponsor must first know the organization's real maturity level. This study was based on the application of the test to know the level of maturity, using the BPM-BES tool - Business Process Management Model in the Brazilian Electricity Sector, a tool developed for the Brazilian electricity sector, where it was applied in one of the largest electricity distributors. energy in Brazil, with approximately 4.5 million customers. In this research, testing tools were built, where the methodology was applied to create a questionnaire based on bibliographical research based on the dimensions of BPM-BES knowledge. A pre-test group was used to validate the questions created and adapt the terminologies and culture of the sector, resulting in the development of a data collection tool applied in strategic sectors, such as: operational, commercial and service, presenting the results found and proving the hypotheses through validation of the results.

Keywords: *administrative loss, BPM-BES, Energy loss, Sustainability, Efficiency operations*

1. INTRODUCTION

Nowadays, concerns about sustainability and rational use of resources are gaining visibility, especially when the world has prioritized the debate on renewable energy. In this sense, the concern with losses in the most diverse production processes stands out. In organizations, losses in production processes and/or waste are present in most work flows, resulting in increased costs and time (SORDI, 2018). The Brazilian electricity sector is also among the sectors that need to face the issue of Losses. According to the Brazilian Association of Electricity Distributors – ABRADEE (2017), losses in the sector reach approximately 14% of the energy produced, which represents an approximate value of 7 Billion Reais per year. The sector has widely debated the concept of Losses and combating and reducing Energy Losses have become the object of the main investments by shareholders for the financial recovery of the sector. Commercial Losses are caused by fraud in the measurement or distribution network, defects in equipment and administrative processes.

It is estimated that 10% of Losses are caused by failures in administrative processes (reading errors in the field, lack of access to the meter, failed registrations, billing errors and non-compliance with regulatory deadlines), in addition to Public Lighting. There are also Administrative Losses that occur in the implementation processes of projects such as smartgrid, telemetering, construction and connection of Photovoltaic plants, which generate financial losses that impact not only the costs, but the expected results and sustainability of the projects.The waste of human and financial resources in combating Losses directly affects investors, society and other stakeholders, who directly interfere in governance. In addition to directly affecting the environment, as they increase dependence on the use of fossil fuels, that is, against the decarbonization and ESG movements. Another important factor is the social one, as the scenario of reduction in the number of employees due to the need to make companies more efficient, agile and lean, a context that is global and which is also seen in the Brazilian electricity sector, which has been experiencing a reduction in the level investment and mergers between companies. This complex scenario exacerbates ESG's adherence to process management and the challenges that need to be overcome. The natural resistance that organizations have in relation to process management, which according to Gonzalez (2015) is due to 4 critical factors: Excessive functional thinking, which leaves no clarity on the true role of the company and its employees , limiting its area of activity; Governance, due to the difficulty of defining the type of structure appropriate to achieving the final result, as the process, although more efficient, has greater managerial complexity; Lack of sponsor for the process vision, because for change to occur, there must be a break with the functional model and if stakeholders and senior management are not supporting, the change is doomed to failure; and finally Change Management, as there is natural resistance due to the discomfort of change, the desire not to lose something of value, beliefs and noise in communication. To implement or improve the level of process management (G.P.), it is necessary to face communication challenges to promote strategic alignment and know how to prepare a diagnosis to correctly define the level of maturity that the sector or company has in process management and be able to plan the best strategy. However, with so many tools available, it was necessary to use one that had greater adherence with Brazilian companies and with a language that was easy for respondents to understand, so that it could be assertive in the diagnosis and assessment of the level of maturity by knowledge dimensions.

2. THEORETICAL REFERENCE

This chapter presents concepts of process management and maturity used to build the electrical sector assessment tool, as well as the dimensions of knowledge found in the BPM-BES tool - Business Process Management Model in the Brazilian Electricity Sector, created by Souza in 2018. In relation to the maturity levels used, it aims to standardize responses to increase adherence between the responses collected and the real situation in which the areas find themselves, aiming to map and measure current performance and evolution after corrective actions aimed at improvement. (DEV-V1.2 -CARNEGIE MELLON UNIVERSITY, 2006)

2.1. Maturity in Process Management

Process management is a set of practices that aim to increase efficiency to reduce waste and misalignment and produce improvements in an organization's organizational processes. In the MBPM-BES tool where the dimensions of Knowledge Management, Governance, Technology, strategic alignment and people management stand out, according to SOUZA (2018) corporate governance stands out. This dimension is considered by many authors to be the cornerstone of ESG, as it provides the necessary structure for responsible business management, as it guides organizations to use increasingly transparent, ethical and sustainable practices that benefit not only shareholders, but the society and environment.

Process Management maturity assessment is a tool to evaluate how an organization manages its processes. Previous research provides evidence that greater BPM maturity leads to better performance of processes and the organization as a whole. The increase in the efficiency of corporations directly reflects on the sustainability of their resources. combating losses in processes means combating the waste of water resources, reducing the consumption of fossil and nuclear fuels in terms of electricity. However, its results according to maturity are not modular and each organization has its level of maturity according to its area of activity and region. The results obtained by maturity are an important part of the results, but they do not have exclusive responsibility. (DIJKMAN, LAMMERS & JONG, 2016). Gabryelczyk (2016) defines BPM maturity as the ability to manage and control processes efficiently and creates a BPM indicator, the Business Process Maturity Indicator (BPMI). Tests a practical application at 2 levels, one being a management level and the other a professional level. It proposes a discussion comparing 6 BPM maturity assessment tools, which are: Business Process Management Maturity Model - BPMMM (Rosemann & de Bruin, 2005), Business Process Orientation Maturity Model - BPOMM (McCormack & Johnson, 2001), Process and Enterprise Maturity Model - PEMM (Hammer, 2007), Business Process Maturity Model - BPMM (OMG,2007), Process Maturity Ladder - PML (Harmon, 2007) and an overview model, based on models developed by Röglinger, Poppelbuss & Becker (2012). Maturity models are a thriving approach to improving a company's capabilities and business process management (BPM) capabilities. It is suggested that the number of corresponding maturity models is so high that professionals and scholars run the risk of losing control (ROGLINGER; POPPELBOß & BECKER; 2012). In the BPM model created by SOUZA (2018), BPM-BES sought to unify the concepts existing in the main market tools, with the aim of facilitating understanding, customizing the tool for the sector and making implementation simpler. A methodology can be developed to assess the level of maturity in companies in the Brazilian electricity sector.

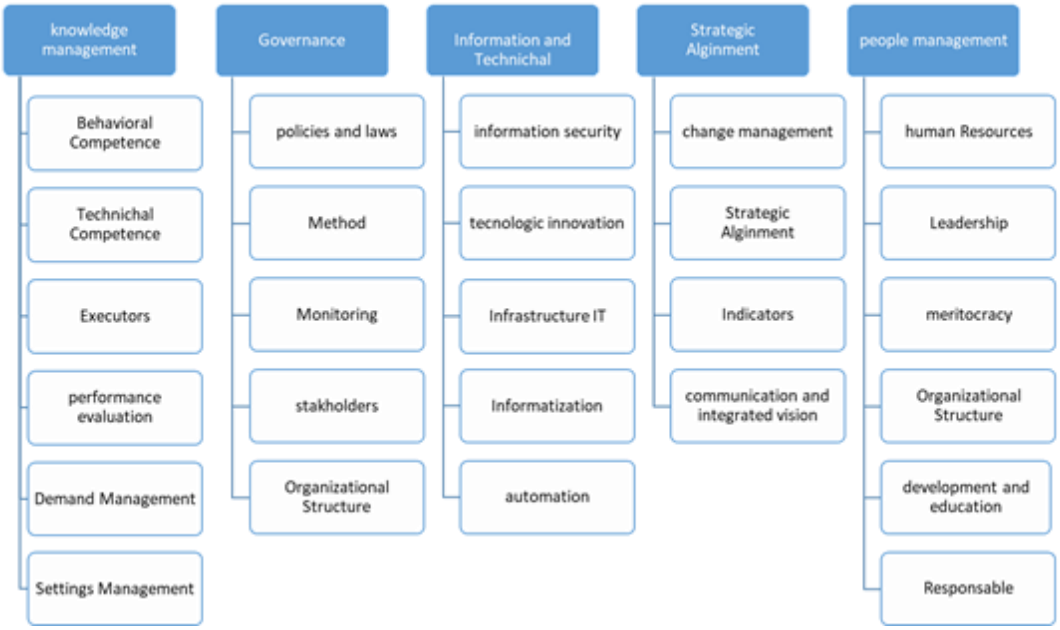


Figure 1: Dimensions of the proposed BPM-BES Assessment Tool (Source: conception Souza, 2018)

There are recognized models to assess the maturity of knowledge on certain topics such as projects, knowledge, training. However, the process theme gained strength with the area of software technology, and still tends to be the area that uses Process Management the most, as the most used tools come from the software model and most maturity models are based in the

CMMI (Capability Maturity Model Integration) which has an assessment on a 5-level scale, developed by the SEI of Carnegie Mellon University-Software Engineering Institute (ARAUJO & RODRIGUEZ, 2011; QUINTELLA, ROCHA & MOTTA, 2010).

	Tools		
Level	**CMMI**	**BPMM**	**BPM-BES**
1	Start	Start	Start
2	Managed	Repetitive	Repetitive
3	Defined	Standardized	Defined
4	Very Managed	Predictable	Managed
5	Optimized	Optimized	Optimized

Table 1: Maturity level Classification
(Source: conception Souza, 2018)

According to table 1, maturity levels generally have a scale with 5 levels aligned with the CMMI. (DEV-V1.2 -CARNEGIE MELLON UNIVERSITY, 2006)

3. METHODOLOGY

Regarding the purpose, this study is classified as descriptive, as it sought to draw a picture of the level of maturity in Process Management (GRAY, 2012). As for the means of data collection, the research was bibliographic, as it relied on secondary sources in the literature review to provide a theoretical basis in the construction of the questionnaire to assess the level of maturity in the model developed by Souza in 2018. The data collection tool was the questionnaire, as it is the most appropriate methodological tool for obtaining data in large-scale research and case studies, and can be associated with other tools. According to Gray (2012), the questionnaire is the best-known data collection tool and considered by many researchers to be easy to design. Furthermore, the strengths of the questionnaire are: low time and financial cost in application, very fast data flow, respondents are more comfortable answering it, data analysis of closed questions is simple and quickly coded, anonymity can be preserved and reduces the influence of subjectivity and the interpersonal relationship between the interviewer and the interviewee, which can alter their answers (GRAY, 2012). The questionnaire to be applied must have as a reference the customized organizational culture, in order to, as pointed out by Gray (2012), write clear instructions, eliminate questions that may be misunderstood, imprecise and that are not part of the daily life of the organization where it will be applied, that is, that they remain only in the theoretical field. The questions were prepared based on bibliographical research on the themes, as shown in table 2, adapted and discussed with the pre-test group.

Table following on the next page

DIMENSIONS	QUESTION	ITEMS	REFERENCE AUTHORS IN CREATING QUESTIONS
Knowledge Management	Q1	Technical Competence	(i) Junior & Scucunglia (2011)
Knowledge Management	Q2	Behavioral Competence	(i) Junior & Scucunglia (2011)
Knowledge Management	Q3	Skills/Executors	(i) Sordi (2018)
Knowledge Management	Q4	Performance Assessment	(i) Paula & Nogueira (2016)
Knowledge Management	Q5	Requirement Management	(i) Chiavenato (2014)
Knowledge Management	Q6	Configuration Management	(i) Pagliuso, Cardoso & Spiegel (2010)
Process Governance	Q7	Policies and Laws	(i) Araújo, Garcia & Martines (2017)
Process Governance	Q8	Methods / DESING	(i) Paim (2009)
Process Governance	Q9	Monitoring	(i) Barbará, Motta & Oliveira (2012)
Process Governance	Q10	Stakeholders	(i) FNQ (2016) ; (ii)Pagliuso, Cardoso & Spiegel (2010)
Process Governance	Q11	Organizational structure	(i) Araujo (2006)
Information Tecnology	Q12	Information security	(i) Silva, Mendonça, Junior, Figueiredo &Santos (2006)
Information Tecnology	Q13	Tecnologic innovation	(i)Hammer (1994) ; (ii)Martines (2008)
Information Tecnology	Q14	IT infrastructure	(i) Martines (2008)
Information Tecnology	Q15	Automation	(i) Barbará, Motta & Oliveira (2012)
Estrategic Alignment	Q16	Change management	(i)FNQ - MEG (2016) ; (ii) Sordi (2018)
Estrategic Alignment	Q17	Strategic Alignment	(i) Skrinjar & Trkman (2013) ; (ii) Paixão (2014)
Estrategic Alignment	Q18	Indicators / Metrics	(i) Mangueira, Gutierrez & Costa (2014)
Estrategic Alignment	Q25	Communication / Integrated Vision	***(i) QUESTION CREATED FROM THE CONTROL GROUP & AUTHOR: SOUZA,R.T.L***
People Management	Q19	Leadership	(i) FNQ - MEG (2016)
People Management	Q20	Resources / HR Infrastructure	(i) Martines (2008)
People Management	Q21	Meritocracy	(i) Junior & Scucuglia (2011)
People Management	Q22	Organizational culture	(i) Pagliuso, Cardoso & Spiegel (2010)
People Management	Q23	Development and Education	(i) Junior & Scucuglia (2011)
People Management	Q24	Responsible / Manager	(i)Mangueira, Gutierrez & Costa (2014) ; (ii) Hammer (1194) ; (iii) Martines (2008)

Table 2: Unification of concepts for constructing questions
(Source: conception Souza, 2018)

3.1. Universe and Sample

For Gray (2012) it is vital to test before applying since "well-done testing reduces the incidence of non-response to the questionnaire". Gillham (2000 apud GRAY 2012, p275) recommends testing at least 50% of the questions, so that confusing questions can be discarded. Therefore, the option was made to create a pre-test group or control group, to customize understanding of language, vocabulary and for testing the instrument. The same configuration as the reference company ANEEL was used in this group, that is, composed of 1 Electrical Engineer (Representative of the Professional position), 1 Technician (Representative of the Technical position), 1 Support Assistant (Representative of the Administrative position), 1 Manager (Representative of the Management Position) and 1 Electrician (Representative of the Operational Position), as the configuration of the pre-test group sample for this study is essential to create an alignment with the company where the research was applied, in addition to making of an energy company. Another very important collaboration made by the pre-test group was the creation of the twenty-fifth question, about organizational communication, as shown in table 2. It was shown that the lack of communication was one of the determining factors in having alignment with good organizational practices, monitoring of indicators and alignment with the company's objectives. In addition to the representativeness of the positions, following the reference company ANEEL, to increase adherence to culture and people's real day-to-day lives, the tool was applied in three sectors of the company ALFA, namely: technology and operations sector, equipment control area and commercial sector. These areas were chosen due to the ease of access for professionals to apply the tests in person and because they have all the levels mentioned in the ANEEL reference company. The assessment tool was applied in the three different sectors of the company ALFA with an average time of 7 minutes. To guarantee the ethics of the research, give greater freedom in responses, avoid deviations from the truth and avoid embarrassment, punishment and even dismissals for responding individuals, without identifying the individuals, thereby preserving their anonymity.

Furthermore, after alignment with the respective managers, aiming to increase the number of respondents, the questionnaire was administered in person in sectors "A", "B" and "C" by a neutral administrative employee, who provided guidance on carrying out and implementing the questionnaire. information security.

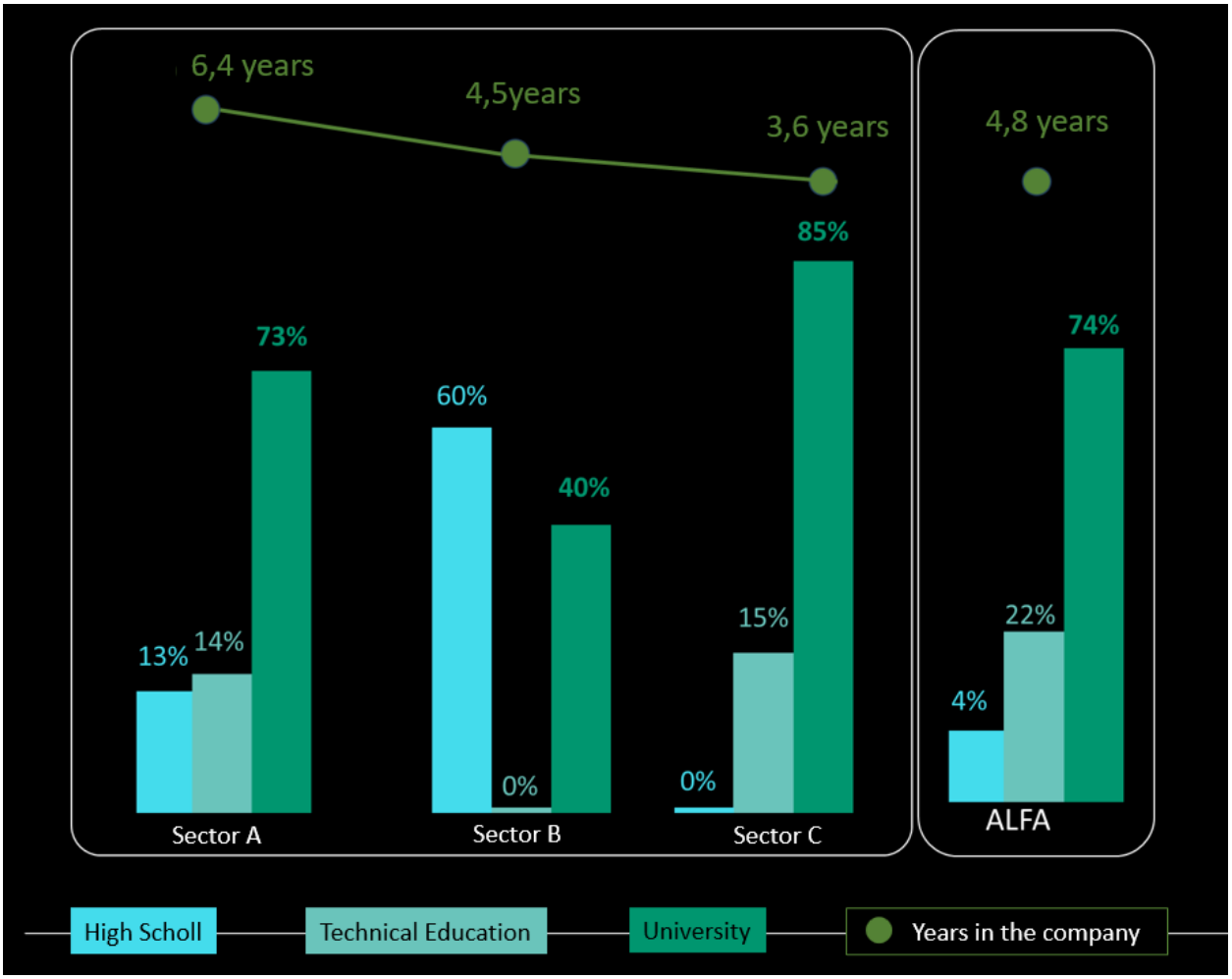
4. ANALYSIS AND DISCUSSIONS OF RESULTS

The results presented here correspond to the application of the test in 3 (three) sectors of the company ALFA, sectors A, B and C. The research was carried out with operational employees without the participation of managers. In sector A, which is in the Operational/Technological area, and has 22 employees, 4 participated in the pre-test group, 15 responded to the final questionnaire and 3 were absent at the time of application, so that 68% of employees in the sector responded to the questionnaire. Sector B, in the material control area, has 8 employees and of these 5 responded, which corresponds to 62%. Sector C, which is part of the Commercial area, has 28 employees and of these, 23 were the respondents, equivalent to 82% of the employees. The results of the questions are expressed in Table 3.

		Sector A		Sector B		Sector C	
Question	Dimensions	average	standard deviation	average	standard deviation	average	standard deviation
Q1	Knowledge Management	4,27	0,33	3,80	0,75	3,40	0,77
Q2	Knowledge Management	4,53	0,38	4,40	0,80	3,33	0,71
Q3	Knowledge Management	4,40	0,37	4,20	0,40	3,87	0,82
Q4	Knowledge Management	4,00	0,40	4,40	0,80	3,07	1,04
Q5	Knowledge Management	4,07	0,20	4,20	0,75	3,33	0,77
Q6	Knowledge Management	3,87	0,65	3,60	1,02	3,33	0,77
Q7	Process Governance	4,07	0,46	3,20	0,40	3,73	0,93
Q8	Process Governance	4,20	0,29	4,40	0,80	3,40	0,83
Q9	Process Governance	4,40	0,64	4,40	0,49	3,20	1,02
Q10	Process Governance	4,20	0,16	4,20	0,75	4,00	0,70
Q11	Process Governance	3,87	0,65	4,40	0,80	3,27	1,02
Q12	Information Tecnology	4,60	0,37	4,60	0,49	3,47	0,90
Q13	Information Tecnology	4,00	0,40	3,00	1,10	2,53	0,94
Q14	Information Tecnology	4,13	0,25	3,00	0,63	2,53	0,92
Q15	Information Tecnology	4,13	0,52	3,80	0,75	2,40	0,92
Q16	Estrategic Alignment	4,13	0,52	3,80	0,75	3,33	1,05
Q17	Estrategic Alignment	4,20	0,43	4,00	0,89	3,13	1,01
Q18	Estrategic Alignment	4,60	0,24	3,80	0,75	3,33	1,06
Q25	Estrategic Alignment	4,00	0,27	4,00	0,89	3,47	0,65
Q19	People Management	4,20	0,43	3,80	0,98	3,20	1,17
Q20	People Management	3,80	0,43	4,00	0,89	2,80	0,85
Q21	People Management	4,07	0,33	3,60	0,49	3,20	0,79
Q22	People Management	4,33	0,49	4,00	0,89	3,80	0,80
Q23	People Management	4,27	0,33	3,20	0,98	3,13	0,98
Q24	People Management	4,00	0,27	3,80	0,75	3,53	0,77

Table 3: questionnaire result
(Source: Author, 2024)

As demonstrated in the graph below, the main characteristics of the sectors in which the test was applied confirm the plurality of training and diverse positions in the organization. This representativeness further confirms how the scope of the tool seeks to democratize at the most diverse hierarchical and training levels.



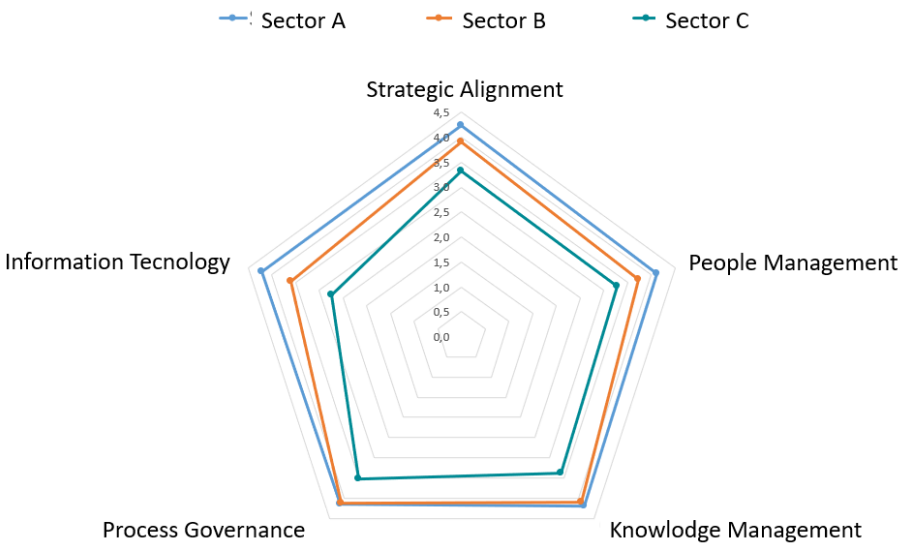
Graph 1: Characteristics of the sectors tested
(Source: Author, 2024)

By applying the test, it was possible to demonstrate the level of maturity in three different sectors and how there is strong adherence in the answers and grades within the same sector. The results were also consolidated by knowledge dimensions, as shown in the table below.

DIMENSIONS	Sector A	Sector A	Sector A	Global average
Knowledge Management	4,2	3,9	3,3	3,7
Process Governance	4,1	3,7	3,3	3,7
Information Tecnology	4,2	4,1	3,4	3,8
Estrategic Alignment	4,1	4,1	3,5	3,8
People Management	4,2	3,6	2,7	3,4
Global	4,2	3,9	3,2	3,7

Table 4: Consolidated Results by Dimensions
(Source: conception Souza, 2018)

Graph 2 demonstrates the results by dimensions through a network graph.



Graph 2: Network by Dimension
(Source: conception Souza, 2018)

Due to the strong regulation (policies and laws) of the electricity sector, in which services are detailed, service deadlines are well defined, consumer rights and duties are described clearly and simply in the resolutions, in addition to the information obligations with the CVM and obligations with IR and internal transparency, which Governance was recognized as the biggest overall result. In second place comes Knowledge Management, this dimension is directly related to the organizational culture of technical and old companies (mostly created in the 40s, 50s and 60s) in which the transmission of knowledge takes place from older employees to younger ones through of knowledge socialization (ROSAL & FIGUEIREDO, 2006). In third and fourth place are People Management and Strategic Alignment, with people management highlighting a strong organizational culture and strategic alignment highlighting metrics and indicators aligned with strategic indicators. Lastly was Technology and Innovation, which is consistent with the characteristics of the electricity sector, since they are public service companies, which have no competition, and are monopolists in their territories of operation, which contributes to a not very innovative profile.

4.1. Knowledge management

The averages obtained in this dimension refer to the answers to questions 1, 2, 3, 4, 5 and 6. In sector A, the average in this dimension was 4.19 (Managed Level) with a Standard Deviation of 0.39. In sector B, the average was 4.10 (Managed Level) for a Standard Deviation of 0.75 and in sector C, an average of 3.39 (Defined Level) for a Standard Deviation of 0.81. This result shows that the highest level of maturity has the lowest standard deviation between responses, approaching 0 (zero), demonstrating less divergence of opinions.

4.2. Governance

The averages obtained in this dimension refer to the answers to questions 7, 8, 9, 10 and 11. In the sector The average in this dimension was 4.15 (Managed Level) with a Standard Deviation of 0.44. In sector B the average was 4.12 (Managed Level) for a Standard Deviation of 0.65 and in sector C an average of 3.52 (Managed Level) for a Standard Deviation of 0.9. This result reinforces the adherence between the concepts and the belief that corporate governance brings BPM closer to ESG, as they are the main foundations in both cases.

4.3. Technology and inovation

The averages obtained in this dimension refer to the answers to questions 12, 13, 14 and 15. In the sector The average in this dimension was 4.22 (Optimized Level) with a Standard Deviation of 0.44 which reflects little variation between the answers . In sector B the average was 3.6 (Managed Level) for a Standard Deviation of 0.74 which reflects high variation between responses and in sector C an average of 2.7 (Repetitive Level) for a Standard Deviation of 0, 92 which reflects high variation between responses. This result reinforces that the highest level of maturity has the lowest standard deviation between the responses, demonstrating less divergence of opinions, which indicates in sectors B and C a lack of alignment between perceptions or even a lack of standardization between actions.

4.4. Strategic Alignment

The averages obtained in this dimension refer to the answers to questions 16, 17, 18 and 25. In sector A, the average in this dimension was 4.23 (Optimized Level) with a Standard Deviation of 0.4 which reflects little variation between the answers. In sector B the average was 3.9 (Managed Level) for a Standard Deviation of 0.82 which reflects high variation between responses and in sector C an average of 3.3 (Repetitive Level) for a Standard Deviation of 0. 94 which reflects high variation between responses. This result reinforces that the highest level of maturity has the lowest standard deviation between the responses, demonstrating less divergence of opinions, which could expose in sectors B and C a lack of alignment between perceptions or even a lack of standardization between actions, which would lower the level of variation.

4.5. People Management

The averages obtained in this dimension refer to the answers to questions 19, 20, 21,22, 23 and 24. In sector A, the average in this dimension was 4.11 (Managed Level) with a Standard Deviation of 0.38 which reflects little variation between responses. In sector B the average was 3.73 (Managed Level) for a Standard Deviation of 0.83 which reflects high variation between responses and in sector C an average of 3.28 (Defined Level) for a Standard Deviation of 0. 89 which reflects high variation between responses. This result once again confirms that the highest level of maturity has the lowest standard deviation between responses, demonstrating less divergence of opinions, which may expose sectors B and C to a lack of alignment between perceptions or even a lack of standardization between actions. which would lower the level of variation.

4.6. Suggestions for improvements

The objective of surveying the maturity level by dimensions is to facilitate and assertiveness in the implementation of process management. However, the consolidation of research, even if well structured in large companies, may present another risk for the failure of PM implementation. That is why the author SOUZA, 2018, proposes the development of an application that, in addition to carrying out research in a digitalized way, carries out cross-knowledge exchange. This type of cross-knowledge aims to automatically consolidate the research results, as the tool maps the best practices for each of the dimensions, through another benchmarking questionnaire and, after completing this new questionnaire, reports are generated. action to correct the areas with the lowest score in the maturity assessment, that is, in an automated way, the organization's best practices are mapped, standardizing and sharing internal solutions between the areas.

5. CONCLUSION

This article aimed to present the practical results of using a process management maturity level assessment tool, based on the BPM-BES tool created by Souza, 2018, to prove the effectiveness of the methodology, demonstrate how the search for efficiency in processes and corporate governance, it brings BPM closer to the pursuit of sustainability and the concept of ESG. The tool was validated in a large company in the Brazilian electricity sector with more than 4 million customers, located in one of the most important metropolises in Brazil, it was validated and tested in 3 different sectors of the same energy concessionaire, in the areas: Commercial , Operation and Technology and one from the Equipment Control area to cover the largest possible number of hierarchical variations, training and corporate functions. The results demonstrated prove that in the same organization there are different levels of maturity in Process Management, proving the need to know to plan improvements in each area, to have the most effective BPM implementation process. Furthermore, the results indicate that the education level did not influence the results, as sector C, which has the highest percentage of graduated professionals, was the sector that obtained the worst grades. This proves that within the same organization, knowledge and use of benchmarking tools are not well disseminated or understood, which confirms the hypothesis of Warrak & Filho, 2013, that the concept of PM - process management may not be understood in practice , which once again ratifies the importance of creating the specific BPM-BES tool for the electricity sector. Another important result demonstrated was the verification that regardless of the different levels of maturity between the sectors, there is coherence in the classification between the dimensions, and it can be said that different levels of maturity in PM within an organization need to be measured assertively to that corrects existing distortions within the organizations themselves. However, it can also be concluded from the good evaluations that the best practices for solving problems, even if they need to be adjusted to increase the maturity level of the entire organization, exist within the organization itself in certain sectors. As a suggestion, the use of these practices already identified and in use would reinforce the appreciation of people, thus avoiding solutions said to be magical outside the culture, in addition to increasing efficiency in not having to start the innovation and hiring process from scratch with the Technology and Information, in addition to using tools already tested and aligned with corporate culture and strategy. Include issues of social and environmental responsibility in the questionnaire in a more objective way, within the governance dimension.

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ESG CULTURE AND MENTAL HEALTH IN ORGANIZATIONS: A LITERATURE REVIEW

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ABSTRACT

The growing interest in ESG culture has led companies to focus on several areas, particularly the mental health of their employees. An organizational culture based on ESG practices not only demonstrates a commitment to sustainability, but also influences the work environment and psychosocial conditions of employees. The aim here is to explore the relationship between ESG culture and mental health in organizations, and to highlight the importance of this corporate practice. This approach is in line with corporate social responsibility policies, which are inextricably linked to well-being at work and the way it is addressed. To this end, a systematic literature review was carried out using two specific databases: Web of Science and Scopus. The search terms included keywords related to the subject under study, without defining a period. The texts were identified, organized, and categorized, with the discussion focused on analyzing the presentation of the themes of ESG culture and mental health, identifying existing gaps. A detailed synthesis of the texts included in the study was provided, highlighting the importance of a solid ESG culture in promoting mental health in organizations and exploring the intersection of these terms. This analysis highlighted the urgency of expanding knowledge in this specific area, providing potential insights for decision makers and guiding future research.

Keywords: *ESG Culture, Organizational Culture, Metal Health, Sustainability*

1. INTRODUCTION

The concept of sustainability is commonly described as the ability to achieve a level of development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Armstrong, 2020). Concerns about environmental, social, and governance (ESG) practices have gained prominence in the corporate world. This growing attention should not be limited to environmental aspects but has been extended to social responsibility and effective governance. It should be noted that the actions taken and disclosed by companies differ significantly depending on their target audience, which affects the activities chosen and their performance (Grigorescu, Maer-Matei, Mocanu, Zamfir, 2020). The choice of CSR activities and their inclusion in sustainability reports is directly related to the intention of organizations to improve their reputation and, consequently, their financial performance. (McWilliams and Siegel, 2000; Hahn and Kühnen, 2013; Morioka and Carvalho, 2016). In this context, since 2020, there has been a significant increase in the discussion about the sustainable growth of organizations and the incorporation of initiatives related to mental health.

The concept has gained more importance with the development of the global pandemic (Barros et al., 2020), which has changed the perspective of companies in terms of the importance of caring for the emotional well-being of their employees. Even before the global health crisis, aspects related to mental illness had already emerged as one of the main causes of long-term sickness absence, despite the improvement in detection rates and the development of more effective interventions (Harvey et al., 2009). In this context, the present exploratory study was constructed. The aim was to analyze the way in which the topic has been presented and to identify studies, texts and articles related to the topic, which allowed us to map the related approaches. The relationship between ESG culture and employee mental health was explored, highlighting the importance of this emerging corporate paradigm. To this end, a literature review was conducted using a systematic approach to collect and analyze the information available in two specific databases: Web of Science and Scopus. The existing content on the subject was collected and synthesized, which also made it possible to point out areas for future research. In the Brazilian context, there is a growing demand for ESG research, given the potential positive impact of social and corporate governance practices in sensitive industries in the country (Miralles-Quirós, Miralles-Quirós, e Gonçalves, 2018). In addition, investment strategies associated with ESG may provide more favorable long-term risk-return evaluations (Jukemura, 2019).

2. LITERATURE REVIEW

Businesses are increasingly adopting practices that are more in line with ESG principles (Carroll, 2015), driven by the growing global interest in sustainability. These practices have guided the formulation of corporate, institutional, and government strategies in search of solutions that go beyond mere profit maximization and aim to achieve competitive advantage (Irigaray and Stocker, 2022; Belinky, 2021; Almeida et al., 2018). In the context of conscious capitalism, which seeks balance and sustainability for all stakeholders, humanized companies stand out for strengthening the relationship between the organization and its stakeholders. By adopting and implementing practices that prioritize the well-being of their employees, organizations could increase their competitiveness in the market. Furthermore, by promoting an organizational culture based on values of social responsibility and sustainability, companies contribute to building a more resilient and sustainable future for all (Macedo, 2022). The relationship between ESG culture and mental health is increasingly recognized as a relevant area for well-being and organizational productivity. In this sense, the World Health Organization (2022) presented guidelines for promoting mental health at work, highlighting the importance of organizational interventions, training for managers and workers, and individual interventions. These recommendations aim to reduce emotional distress, improve work-related outcomes, and strengthen workers' mental health. There are many ways to promote health in the workplace, such as using appropriate ergonomic furniture, implementing exercise and stretching routines, providing adequate lighting, reducing noise, offering flexible working hours, promoting moments of relaxation, establishing direct feedback channels with the team, conducting job satisfaction surveys, and offering benefits to employees who adopt a less sedentary lifestyle, among others (Carzino, Bonin, and Meireles, 2023). It is estimated that more than 300 million people worldwide suffer from depression, with a similar number affected by anxiety disorders. Depressive disorders are classified as the leading cause of disability worldwide (WHO, 2017). However, despite the magnitude of the problem and the growing interest in the topic, there are still significant gaps in understanding the intersection between ESG culture and mental health in organizational contexts. Given this scenario, it is essential to identify social responsibility policies and practices related to well-being at work and to understand how they are implemented and perceived by employees, which is the main objective of this study.

3. METHODOLOGY

A literature review was conducted using various types of documents, such as articles and online texts. This method provides a broad overview of the subject, although it is not exhaustive, as it does not involve a systematic search and analysis of all the data available on the subject. Its importance lies in its ability to quickly update studies on the subject. To this end, an approach based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines was adopted to ensure the transparency and quality of the data collected. The choice of search criteria was based on the relevance of the terms to the scope of the study and the need to properly identify data sources. During the screening process, the abstracts of the studies were examined according to predefined inclusion and exclusion criteria. In addition, a detailed analysis of the included documents was carried out in a systematic way, including data extraction, assessment of methodological aspects and synthesis of results. However, it is recognized that the method may have limitations, such as the possibility of bias in the selection of studies and the lack of access to other specific databases. The search for documents was carried out without defining a period.

The following terms were used: ESG, "environmental, social and governance", "mental health", "employee well-being", "occupational health", "workplace wellness", "companies" and "organizations". The search strategies used the Boolean operators AND and OR and were developed and adapted for the SCOPUS (Elsevier) and Web of Science (Clarivate Analytics) databases. Studies of this type aim to provide a comprehensive analysis of accumulated scientific knowledge and research directions in a specific field. They play a fundamental role in identifying gaps in existing knowledge, advancing the field through constructive criticism, and providing input for professional practices and theoretical proposals (Cavalcante and Oliveira, 2020; Barbosa, Pereira Neto, and Lima, 2023).

Search Strategy	Source	Results
(ALL("ESG") OR TITLE-ABS-KEY ("environmental, social, and governance")) AND (TITLE-ABS-KEY ("mental health" OR "employee well-being" OR "occupational health" OR "workplace wellness")) AND (TITLE-ABS-KEY ("enterprises" OR "organizations"))	SCOPUS (Elsevier)	n= 13 No filters
ALL= (("ESG" OR "environmental, social, and governance") AND ("mental health" OR "employee well-being" OR "occupational health" OR "workplace wellness") AND ("enterprises" OR "organizations")).	Web of Science (Clarivate Analytics)	n= 4 No filters

Table 1: **S**earch Results
(Source: Own elaboration)

4. ANALYSIS AND DISCUSSION OF THE RESULTS

Figure 1 provides an overview of the search process on the Web of Science and Scopus platforms. It summarizes the searches performed using the PRISMA model (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). It provides detailed information about the documents identified, the inclusion and exclusion criteria, and the results found. This summary provides a quick understanding of the document selection aspects of the review conducted.

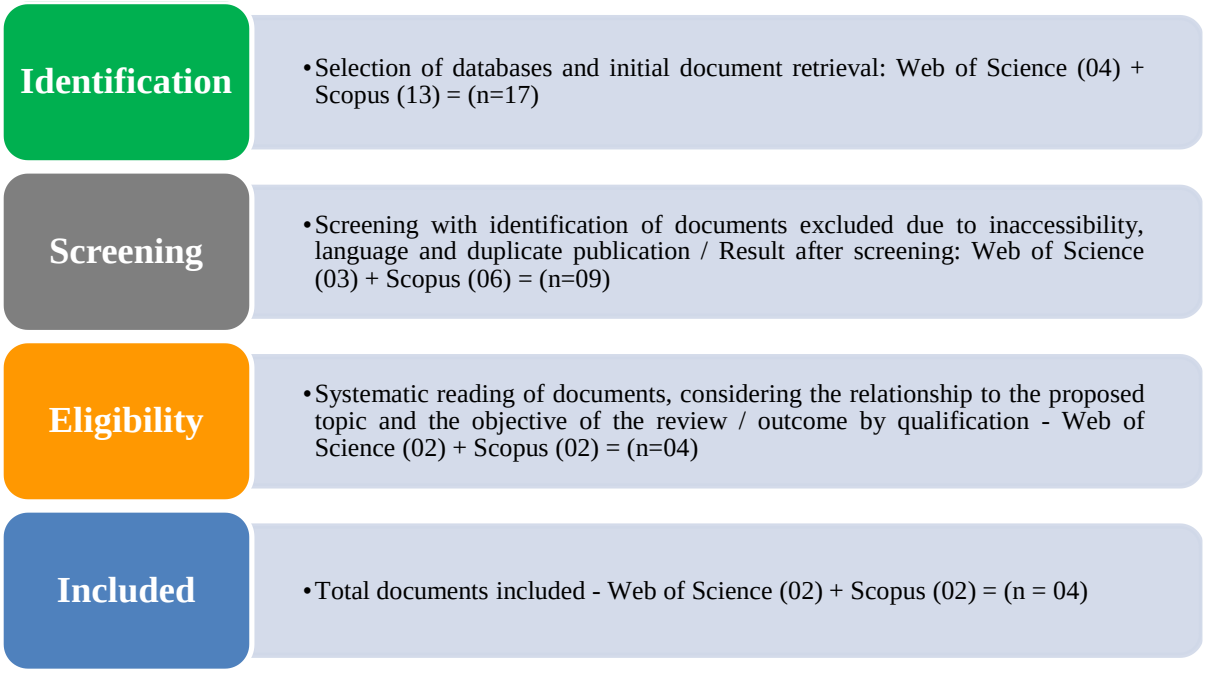

Figure 1: Search Results
(Source: Own elaboration)

In the analysis carried out, the low number of documents initially identified stands out. Another point to consider is the year of publication of the documents, all of which were recent. The approach taken in the four documents analysed also varied, as shown in the table below. It is important to note that issues such as workers' mental health, the impact of mental disorders on work activities, and the influence of organizational culture on workers' well-being are topics that have been widely explored in the literature. However, the relationship between mental health (especially in its social dimension) and ESG issues is still an area that needs to be explored and strengthened, and there is a clear need for further studies in this area.

Table following on the next page

Year	Title	Publishing / Authors	Objectives	Results	Note
2020	Transformation of Corporate Culture in the Aspect of European Green Deal - Polish Raw Materials Industry	Journal of The Polish Mineral Engineering Society Sukiennik, M; Kapusta, M; Bak, P	Presents a vision of the transformation of corporate culture in the context of the European Green Deal. It discusses how companies, particularly those in the mining sector, are being impacted by initiatives such as the European Green Deal, ESG criteria and other regulations related to sustainability and corporate social responsibility. The paper highlights the need for companies to adapt to these changes and the importance of integrating these aspects into the corporate culture to ensure compliance and business success.	The European Green Deal foresees the implementation of a series of regulations that include ESG information and disclosure requirements. The need to adapt to these requirements will force a series of structural, organizational and management changes within the corporate culture. Bringing all these elements together and integrating them into the corporate culture can contribute to the success of these companies. This will require an understanding of occupational health and safety regulations to shape corporate culture and strengthen the integration of ESG criteria into corporate strategy, which can have a positive impact on financial performance, increase competitive advantage, reduce operational risk, and help obtain financing.	The document provided does not specifically mention mental health but refers to aspects related to health and safety at work. It focuses mainly on the transformation of corporate culture in relation to the European Green Deal, ESG and other issues related to sustainability and corporate social responsibility in the Polish extractive industry.
2023	The Mental Health Implications of Corporate Social Responsibility: The Significance of the Sense-Making Process and Prosocial Motivation	Behavioral Science Kim B.-J.; Kim M.-J.; Lee D.-G.	The purpose of this study is to examine how corporate social responsibility (CSR) affects employee depression in South Korean companies. The study considers the importance of prosocial motivation (willingness to act for the benefit of society) and work meaningfulness (perception of the importance and value of the work performed). The study seeks to understand how CSR affects employees' mental health and how pro-social motivation and work meaningfulness may modulate this relationship over time.	The results showed that corporate social responsibility (CSR) can reduce employee depression, mainly through the perception of the meaning of work. In other words, when employees perceive their work as meaningful and valuable, CSR has a positive effect on reducing depression. In addition, pro-social motivation, which is the willingness of employees to act for the benefit of society, was identified as a factor that reinforces this positive relationship between CSR and work meaning. Thus, pro-social motivation reinforces the positive impact of CSR on the meaning of work and contributes to the improvement of employees' mental health.	The text emphasizes that ESG practices can influence employees' mental health by creating a work environment where employees feel valued, which helps to reduce stress and anxiety. The ESG approach not only focuses on environmental and social issues, but also recognizes the importance of employee mental health.
2024	Have companies arisen to the challenge of promoting sustainable work? The role of responsible business practices in the context of evolving employment and working conditions	Safety Science Jain, A; Ripa, D; Torres, L	Assessment of how companies operationalize the link between workplace management and responsible business practices and how this understanding varies along different dimensions. The main discussion focuses on the importance of promoting a safe, healthy, and sustainable working environment, addressing issues such as safety, working conditions, employee well-being and corporate social responsibility practices.	The study analyzed the corporate social responsibility reports of large companies and found that workplace management, including issues such as corporate governance, diversity, equity, inclusion, and occupational health, are key topics in these companies. Materiality and a holistic view of workplace management are key to prioritizing sustainable work and health and safety, reflecting the importance of these issues in corporate sustainability reports.	The text mentions the importance of mental health at work only as part of the promotion of a sustainable working environment. It emphasizes that a healthy and fair working environment provides health benefits, including protection from physical and psychosocial risks, and is essential for workers' health.
2024	Safety culture, safety performance and financial performance. A longitudinal study	Safety Science Bautista-Bernal I.; Quintana-García C.; Marchante-Lara M.	The purpose of this study is to examine the relationship between an organization's safety culture, safety performance, and financial performance, and to highlight the importance of the promotion of a safe and healthy work environment for the improvement of an organization's financial performance. In addition, the study seeks to provide insights into how workplace safety can positively impact financial performance and corporate reputation, offering theoretical and practical implications for managers and decision makers.	The results show that safety culture is positively related to injury reduction and that better safety performance is associated with better financial performance. Companies that invest in safety have better financial performance and reputation, with leadership critical to effective safety management. The implementation of safety practices, such as health and safety team, helps reduce injuries and provides financial and reputational benefits.	The text does not directly address the relationship between ESG and mental health. It focuses on the relationship between safety culture, safety performance and financial performance in organizations.

Table 2: Analysis of the papers
(Source: Own elaboration based on detailed analysis of articles)

5. CONCLUSION

The issue of mental health and its relationship to environmental, social, and governance (ESG) practices is highly relevant, especially considering the challenges posed by the Covid-19 pandemic. Even before this global crisis, mental disorders were among the leading causes of years lived with disability, highlighting the importance of policies that promote healthy work environments (Prince et al., 2007). The pandemic has exacerbated these challenges, underscored the urgency of reforming mental health systems, and addressed the stigma associated with mental illness (WHO, 2022). In this context, the effective integration of ESG practices can play a key role in promoting the mental well-being of workers. While the economic and social value of ESG is widely recognized, there are still significant gaps, particularly in the social dimension (S). Investing in ESG and mental health at work is not just a matter of generosity or marketing strategies, but a key strategic approach for the success of organizations. This practice is a win-win for everyone involved: companies enjoy a more positive, productive, and competitive workplace, while employees benefit from a psychologically safe, healthy, and sustainable environment. By implementing practices that promote employee well-being, companies can increase their competitiveness in the marketplace and build a sustainable future for all. This synergy between social responsibility and strategic intelligence paves the way to prosperity for both organizations and society. To this end, it is essential that in-depth and comprehensive studies and analyses on this topic are conducted and presented to support future practices and policies related to mental well-being at work. However, the literature review conducted in this exploratory study revealed a paucity of articles or documents on the topic, suggesting an urgent need for additional research to fill knowledge gaps and promote a more comprehensive understanding of the issue. This also reveals opportunities for further research and discoveries that could contribute to the advancement of the scientific field.

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SUPPORT FOR CORPORATE ENTREPRENEURSHIP THROUGH EXTERNAL AGENTS OF CHANGE

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ABSTRACT

The paper highlights the importance of corporate entrepreneurship to the competitive and innovative development of large enterprises in the dynamic environment nowadays. It reveals the main preconditions for establishing in-company climate stimulating intrapreneurial initiatives: suitable strategy, structure, organizational culture, and HR policy. The paper focuses on the "agents of change" who could make things happen. The study is based on a survey of the activities of the Bulgarian State Railways company, investigating its main external stakeholders as well. These stakeholders are considered as potential change agents that could support the perspective development of the company through corporate entrepreneurship. The analyses, recommendations and conclusions made in the present research could be applied in other similar business structures.

Keywords: *Agents of Change, Bulgarian State Railways, Corporate Entrepreneurship, State-Owned Enterprises*

1. INTRODUCTION

The innovativeness and sensitivity of large corporations to the external environment are crucial for their sustainable development. The significance of the issue arises from the fact that, due to their failure to adapt to new market realities and the conformity at different levels in their structures, many large companies, especially state-owned ones, miss numerous good opportunities for diversification, development, growth, profit, etc. The market demand dynamics and customer preferences are constantly changing, as is the motivation of employees in these, sometimes bureaucratic, enterprises. Therefore, they must adapt, nevertheless very often there is a resistance to the change and its "agents". Examples of such processes can be found in the state-owned companies in the transport sector of the Bulgarian economy. This paper analyses the activity of the *Bulgarian State Railways* company and provides recommendations for its competitive development. Based on investigating this particular company, the aim is to propose an innovative approach, that would be applicable for increasing the dynamics of other predominantly static enterprises that lag behind environmental requirements. This approach focuses on intensifying corporate entrepreneurship with the support of external agents of change.

2. IMPORTANCE OF CORPORATE ENTREPRENEURSHIP TO THE LARGE COMPANIES' DEVELOPMENT

In recent decades it is already widely believed that large companies (corporations) could and should be entrepreneurial structures – innovative, flexible, treating their employees as one of their most valuable assets. This is necessary because of the ever-changing global environment requiring from the enterprises to monitor the market and their competitors continuously, to follow flexible strategies, to restructure and innovate. Therefore, the highly hierarchal and bureaucratic big companies, implying obsolete management practices, or focusing on efficiency

rather than creativity, sooner or later go out of business. In such an environment, the small, entrepreneurial firms are better able to cope. Their flexibility and speed of response to changing market circumstances are well known. At the same time, the big business is also important for the world and national economies having its advantages – resources, credibility with stakeholders, established markets and brands, capabilities for large-scale initiatives, etc. To survive and benefit from these advantages, however, large companies have to create conditions and encourage corporate entrepreneurship. The most successful large companies behave as small ones, apply "small" business models, all their activities are aiming at creating innovations and hence encourage entrepreneurial initiative of their staff (Vasilska, 2017). As Schumpeter pointed out in his research more than a century ago, entrepreneurship can arise from different settings. Individuals working in large organisations also have the potential for being entrepreneurs in the framework of the company as those acting independently to start their own businesses (Schumpeter, 1911, 2021). Nowadays this is even more valid and according to recent studies on the future of the workforce, companies will increasingly seek to hire employees with the soft skills characteristic of entrepreneurs (Tzvetkova, 2023). The next step for the employer is to create the necessary conditions for revealing their potential, namely: organisational culture that encourages creativity and entrepreneurial spirit; corporate strategy oriented to development and achievement of competitive advantages through innovation; organisational structure, creating preconditions and fostering the intrapreneurial processes' running, etc. (Vasilska, 2013). In case these processes go slowly or face significant barriers due to different reasons, external support and consultancy may be sought. Large organisations that are innovation- and action-oriented and create internal environment for stimulating *corporate entrepreneurship*, are defined as *entrepreneurial organisations* that are able to adapt to a changing external environment. Of course, there are large companies that, at first glance, do not need to change daily because they are owned by the state, fulfil the government policy and (almost) do not have competitors. These are state-owned enterprises (SOEs) through which the state exercises its ownership in the interest of the general public (OECD, 2023). Therefore, SOEs are specific types of large companies that can hardly be defined as entrepreneurial organisations. However, precisely due to the exceptionally dynamic changes in the external environment, their owners (the states) and managers realize the need for these structures to be stirred up, up-to-date, competitive and better serving their clients. This can happen in three ways: through internal efforts, through external efforts, and through combination of both. In all cases the most important factor are the people – the "agents of change" who have to be well trained and adequately supported.

3. PREREQUISITES FOR THE DEVELOPMENT OF CORPORATE ENTREPRENEURSHIP

The main preconditions for the development of corporate entrepreneurship within big companies are largely discussed in the relevant literature. The factors which determine at most the opportunities for internal entrepreneurial initiatives in one organisation are:

- **Company strategy** allowing fast adaptation to the changes in the external environment and fostering innovations at all structural levels. Such a strategy, for example, is the prospector strategy (Miles & Snow, 1978) wherein the discovery and implementation of new opportunities (incl. through risk taking) is a more important task than achieving short-term efficiency. Miles and Snow view their prospector firms as risk takers. The company 3M is given as a typical example of prospector strategy application.
- **Organisational structure** that is slightly hierarchical, decentralised, and flexible, facilitating the unobstructed flow of information and ideas among company units, both horizontally and vertically. This allows for the exchange and combination of good ideas between employees and managers from different departments, as well as their swift

implementation through rapid approval by authorized managers. Conservative and overly bureaucratic organisational structures often have a stifling effect on the internal entrepreneurial efforts by creating an unfavourable for self-initiatives working environment.

- **Organisational culture**, based on values such as perceptivity to new ideas, tolerance to the different points of view, striving for self-development, taking responsibilities and risks, openness in the relationships between employees, team work, taking into account the individual members' contribution (Vasilska, 2013). As R. Hisrich summarizes, the goals of the intrapreneurial culture are oriented towards developing visions, goals, and action plans; rewards for the actions taken; suggestions, trials, experiments; creativity and development regardless of the employee's position (Hisrich, 2004).
- **HR policy** focused on recruiting "agents of change", training and motivating them towards results. Those are managers and employees who are creative individuals, needing achievements, seeking unused opportunities, willing to realise them within the organisation, taking initiatives and ready to risk. To implement their potential, however, intrapreneurs have to work in a favourable innovative internal environment, as well as to get appropriate incentives to „act". Well-working incentives are: active support from ownership and top management, incl. mentoring relationships; sufficient financial, promotional, emotional and other kinds of rewards to their efforts and contributions; allowing them to be involved in their projects not only in the initial phases but till their full completion and even afterwards (Vasilska, 2013) and last but not least – to provide them with consultancy, training and help, sometimes involving external specialists in the intrapreneurial process.

4. AGENTS OF CHANGE IN SUPPORT OF CORPORATE ENTREPRENEURSHIP

Corporate entrepreneurship cannot be carried out without agents of change – individuals whose enthusiasm and actions make the implementation of the best ideas possible. The terms "agent of change" and "change agent" have been extensively explored in global literature for decades. In this paper, we use them as synonyms and focus on the interpretative analyses made by several different authors in the paragraph bellow. According to a literary review presented by Tann, J. (2021), a change agent is a person with "one foot in each of the two worlds" - both inside and outside the organisation, transcending boundaries. This agent works independently, successfully overcoming functional barriers, does not seek recognition for his/her actions, and displays "self-assurance mixed with humility". The various roles of the agent of change include the use of "grace, magic, and wonders" for creative change management, as well as proximity, empathy, and openness to the organisation members. Flexibility, courage, strategic thinking, and creativity are also important for effective agents. The article identifies the role of the change agent as a leader who facilitates changes in the organisation. According Dutch researchers, "change agent" is a neutral term encompassing leadership and entrepreneurial initiatives to help addressing major social challenges (Van Rijnsoever, Sitzler & Baggen, 2023). Social challenges are of particular importance nowadays, when wars, pandemics, political upheavals, scarcity of natural resources, climate change, etc. stalk society from all sides. It is more than important that society has a reliable tool with which to counter the challenges of the environment. In this sense, the concept of "agent of change" is also seen as a mechanism for countering the challenges of the environment. Other authors, such as J. Battilana and T. Casciaro (2012), emphasize that the change agent must have networking skills. They claim that a better understanding of this influential factor of networks can contribute to both research and management practice, especially in the context of institutional reforms in public policy. Change agents can also be management consultants, as pointed out by I. Lapsley & R. Oldfield (2001). In this article, the authors explore the practices of management consultants in the public sector in the United Kingdom and aim to reveal their role as change agents.

In response to challenges, besides the external environment, large companies must address the critical factor of how employees react to organizational changes, as highlighted by P. Endrejat et al (2021). This requires both external and internal approaches, involving the "public agent of change" and the "internal company agent of change". Practical implementation often involves the interaction between these two types of change agents. The article "Roadmapping–agent of change" by A. McMillan (2003) emphasizes the use of a "roadmap" as a tool to facilitate organizational change. This tool serves to clearly outline the interests of all stakeholders and specifies steps to achieve the desired goals. The "roadmap" provides a structured approach to navigating the complexities of change management, ensuring that the interests and perspectives of both internal and external change agents are considered and integrated into the process. The "roadmap" is a tool to help internal and external change agents. It helps to set goals and clearly visualize the required results, thus increasing the effectiveness of the change agent approach. However, there are studies warning that caution should be exercised when implementing change methods in corporations. D'Angelo et al (2023) claim that challenges in a corporation undergoing change include: (i) challenges at the experimentation level; (ii) challenges at the company level; and (iii) challenges at the network level. For this reason, these three issues should be addressed and taken into account when preparing the "roadmap' and using the change agent mechanism. There are theses that entrepreneurial education can compensate for the lack of prior entrepreneurial experience of a person. This is valid also to people who work for large organisations and could become corporate entrepreneurs (Aadland et al, 2024). They may be trained in the skills needed and successfully apply them in their work. Managers, employees, stakeholders can be also trained in good practices of corporate entrepreneurship with the aim to make them be agents of change. The question remains, what should such a training look like? In this sense, Karl E.Weick (2011) suggests a rethinking of change management as the poetics of change, practiced by change poets, as a way to emphasize the specifics of a change, the abstraction of anticipations, and the mutual movement between them, necessary for an effective change. In poetry, images are much more understandable and concrete. In this logic, for changes to be effective, they need to be vividly explained to all parties involved. Just as poets do. There is a belief that the more understood the benefits and effects of a change are, the better it will be accepted by the managers, employees, customers, and all stakeholders. Change agents can take various forms and may be entire organizations or structures. The essence lies in carefully selecting change agents who are aptly attuned to the evolving needs of participants amidst the transformative process. The proper selection of a change agent is crucial for participants in change to have a clear idea of the outcomes of the implemented actions. In summary, change agents can be internal or external to the company. The term is multifaceted. The role of change agents is seen as a mechanism for intrapreneurship in large corporations. K. Todorov (2015) stated that change agents are tasked with countering the so-called "anti-innovation culture" – bureaucracy, hindering information flows, and resistance to change. This is the view that the present study adopts.

5. OBJECT AND METHODS OF RESEARCH

The object of research is the state-owned holding group *Bulgarian State Railways* (BSR), which carries out activities in the field of railway transport and provides passenger and freight services in the Bulgarian and international railway networks. The group's structure is formed by *Holding BSR* and subsidiary companies. Its core activities are carried out through the main subsidiaries *BSR Passenger Transport* and *BSR Cargo Freights*. The holding has also other divisions such as *Bases for staff holidays, Centre for professional training* and *Bulvagon*. *Holding BSR* owns minority shares in three other companies operating in this sector. Through the holding group, its owner - the Bulgarian state, represented by the Minister of Transport and Communications, conducts the national policy in the field of railway transport.

The passenger transportation company provides services in the country and abroad. The company's vision is oriented to complying with the EU goals for building a single European transport space, providing a safe and environmentally friendly service for passenger rail transport, maintaining interoperable rolling stock, modernization and introduction of new technologies and the company's competitiveness on the internal EU transport market. The freight company strives to provide high-quality, safe and environmentally friendly rail transportation of goods on the territory of the country and in individual cases in countries of the Balkan region, Türkiye and the countries of the Black Sea basin. The company's development vision is in the context of the European Commission's policy to build a single railway community based on an integrated infrastructure network, interoperability and free competition to ensure efficient, safe and sustainable freight transport services in the EU and trade partner countries of the union. Over the past 30 years, the holding group *Bulgarian State Railways* has faced a number of challenges, such as: debt crisis in the holding; restructuring and liberalization of the railway services market in the Republic of Bulgaria; increased intensity of the competitive struggle in the railway transport market; depreciation of locomotives and wagons; increasing the age of personnel; great pressure from road carriers, which proved to be more competitive than the national rail operator; the COVID pandemic; the war in the region; the political instability in Bulgaria in the last few years. All these have led to a significant decline in the company market share – from an almost full monopoly in the freight traffic 30 years ago, to about 39.8% share in 2017 (Tzvetkova & Savova, 2019) and as of the beginning of 2024 it is continuing to decrease. Objectively, the company needs to consider its actions and development strategy to overcome the difficulties of the new market reality and to stand on a course leading to sustainable economic development. In the course of preparing the present analysis and recommendations, the opinions of representatives of groups interested in the success of *Holding BSR* were studied, by researching data from publicly available sources and conducting structured interviews with experts from the following groups:

- State institutions related to the economic success of the holding;
- Business customers and people using the services of the holding company;
- Leaders of local communities interested in the social and economic contributions of the holding;
- NGOs researching the railway sector;
- Researchers from the academia investigating the issues addressed in this paper.

By summarizing the opinions of the groups studied, possible options for using the "agent of change" method, adequate to the environment and to the benefit of the holding, were indicated.

6. BSR AND THEIR EXTERNAL AGENTS OF CHANGE

Based on the analysis conducted, the above-listed five external stakeholder groups interested in the activities of *Holding BSR* have been identified. These groups could potentially support the internal change agents or play the role of external change agents, aiming towards sustainable and competitive development of the company. Summarized analyses of the perspectives of these groups regarding the main issues in BSR are presented below, a significant portion of which could potentially be addressed through mechanisms of corporate entrepreneurship.

6.1. Government institutions

According to publicly available analyses and the opinions of state experts who participated in the study, the vision, mission, and goals of the company are deemed acceptable and do not imply a need for change. They highlight the political uncertainty, both at national and regional levels, as a significant challenge to the company's effective management. Financial difficulties from the recent past, the COVID pandemic, and military conflicts are underscored as major

barriers to the company's development. In their reports, the state administrations note infrastructural problems and weak connectivity of key logistic terminals in the country. Legislative issues hindering sector development are also identified. It is observed that the companies in *Holding BSR* group operate in conditions of intense competition and lag in their modernization efforts. There is a conviction that the national transporter should align with local, regional, continental, and global trends.

6.2. Business and customers

According to them, the pricing and quality of services provided by BSR are not adequately positioned within the market. Bureaucracy, depreciation of locomotives and wagons, lack of flexibility in service, lack of convenience from a business process perspective, conservatism in understanding the market and development processes by the company's leadership are highlighted as issues of primary concern. The two main subsidiaries of *Holding BSR* have different functions and respective clients. *BSR Cargo Freights* works with the industry and provides business services to its clients. *BSR Passenger Transport* has a more social role, assigned by the state, and receives support from the state budget each year. In the opinion of entrepreneurs and managers using the services of the two subsidiaries within the *Holding BSR*, the companies still achieve positive outcomes in the services provided. The large domestic business clients prefer BSR due to the reliability of the service, appreciating it despite being slow and sluggish, considering it convenient and acceptable. The same is not observed with small and medium-sized companies and the transit traffic. The latter represents a significant opportunity for BSR. A positive attitude is noted regarding business travels and sleeper carriages of *BSR Passenger Transport*. Entrepreneurs and managers participating in the study insist on evaluating the competitiveness of the two main companies within *Holding BSR* and implementing measures to enhance it. The fact that, according to business research data, the company's market share in freight transport is around 37% for the year 2023, is not well-accepted.

6.3. Local leaders

The views of mayors, municipal councillors, leaders of locally significant informal groups, and opinion leaders in municipalities and settlements related to the activities of Holding BSR, have been investigated. Conclusions from the analysis indicate that the passenger services of BSR are not at the necessary level of quality, with old and depreciated carriages. Often, the train stations are significantly remote from populated areas, making access unattractive and highly challenging. It is frequently recommended to change the transport schemes in the respective regions to improve the accessibility of the transportation service. Regarding freight transport, participants emphasize that it is an excellent means of diverting heavy industrial traffic outside urban areas. The favorable effect of a well-developed railway and logistic network is highlighted as an opportunity to attract investors. We recommend considering a scenario in which *Holding BSR* and its management could serve as effective intermediaries in these processes by ensuring a reliable "logistics chain" for potential investors. By "logistics chain" we mean the connection between the sender, receiver, and the point of delivery of goods and services. This concept has been explained to the respondents during the survey.

6.4. NGO sector

According to this group of stakeholders, the dialogue and the accountability are the biggest challenges that BSR needs to address. Transportation and logistics experts propose the introduction of a controlling concept for reporting on the activities of the companies. Approaches for reporting and expanding the railway transport market are suggested through the development of intermodal and multimodal transport in the country.

6.5. Scientific and academic community

According to Bulgarian specialists in logistics, transportation, and entrepreneurship, the prevailing understanding is that there are problems in *Holding BSR*, and they are rooted mainly in the corporate culture of the company, as well as in the lack of awareness among stakeholders about what is truly happening within the holding. However, the experts involved in the study are unequivocal that the chance for BSR lies in implying good practices of corporate entrepreneurship, particularly the "change agent" approach, presented to them in details by the authors of this paper. There is a debate among respondents on whether the actions should solely focus on strategic entrepreneurship or on venture actions. There is no consensus on which method – external or internal change agent – is more suitable in this case. Instead, the suggested approach is the one that finds a balance between all methods listed. Regarding increasing the knowledge about corporate entrepreneurship across all groups, interested in the success of *Holding BSR*, the experts strongly believe it would be beneficial.

7. RECOMMENDATIONS AND CONCLUSIONS

Based on the literature and empirical research conducted for this paper, several basic recommendations to the owner and managers of *Holding BSR* could be made. Their implementation will help the company to survive and to better fulfil its economic and social mission and goals. What is important but also completely possible to be done:

- Recognition of the need for and initiation of a change in the company's corporate culture, vision, and goals. This is necessary because these three foundations of the holding are currently more abstract, distant, and not fully understood by some external stakeholders. All interested parties should have a clear understanding of the BSR's vision and goals, as this will contribute to building trust in the company.
- Preparing a "Roadmap" for the development of the holding, considering the interests of all parties. Change should be implemented in accordance with this roadmap, in harmony with the paradigm of the "poetry of change", rather than change management. The change must be vivid, precise, clear, specific, smooth, and rhythmic.
- Taking steps to change the perception towards Holding BSR in society by encouraging political dialogue on the topic. External consultants and acknowledged researchers in corporate entrepreneurship can be valuable advisors and mentors to politicians from all spectrums, interested in the well-being of the holding. Creating an ecosystem around the company, involving customers, the nonprofit sector, local communities, academic circles, and politicians related to the sector, could be a highly effective way to change public attitudes towards the holding.
- Signing agreements with universities and institutions to enhance the qualifications and competences of managers and employees in corporate entrepreneurship. These agreements can be directed towards joint trainings among personnel of the holding, government administration, the nonprofit sector, local communities, and businesses, by conducting creative workshops on the problems and sustainability of the holding.

All of these could be used as an idea and even a model for "mobilizing' other state-owned companies in Bulgaria, such as Bulgarian Posts Ltd, National Company Railway Infrastructure, State Enterprise Port Infrastructure, enterprises in the energy and banking sectors, etc.

The analyses done within this paper could serve for making some overall conclusions:

- Corporate entrepreneurship is up-to-date scientific field that could be exceptionally important for the development of large companies, including those owned and managed by government authorities.

- In challenging innovation processes within companies, corporate entrepreneurship can be stimulated and supported through external change agents.
- The strong state-owned enterprises are a stable foundation for robust national economies, and they should be developed in a manner, adequate to the external environment.
- The business environment changes much faster than people's understandings, beliefs and actions. This creates challenges for economic development and undesirable outcomes for some enterprises. The changes within companies should be navigated and supported. The change agents – internal and external – are the people who could do this. Therefore, there is a need for considering how they could be trained and motivated to fulfil their role.

Since the subject of sustainable economic development becomes increasingly interesting worldwide, the ideas presented in this paper can serve as a starting point in elaborating strategies, oriented towards such a development, of companies that are important for other national economies. The environment will continue to demand approaches for change that can ensure prosperity and sustainability of the positive outcomes.

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EU ENERGY EFFICIENCY POLICY FOR SMES WITH THE EXAMPLE OF CROATIA

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ABSTRACT

Energy efficiency is one of the most important decarbonisation actions in the European Union and one of the leading aspects of the European Energy Union. The benefits of energy efficiency, beyond energy consumption and greenhouse gas emission reduction, are numerous, especially in commercial sector and SMEs and policies are one of the key drivers of energy efficiency in the EU. This paper presents the overview of energy efficiency policies in the EU, with the focus on SMEs. It also shows the status of energy consumption and efficiency in SMEs, barriers for further implementation and possible solutions. The case study of Croatia is presented.

Paper is based on literature review and data collected through the projects author is working on (H2020 DEESME, LIFE CET ENSMOV+, LIFE CET DEESME 2050, LIFE CET Audit2measure, H2020 MICAT).

Keywords: *Croatia, energy efficiency, European Union, policy, SMEs*

1. INTRODUCTION

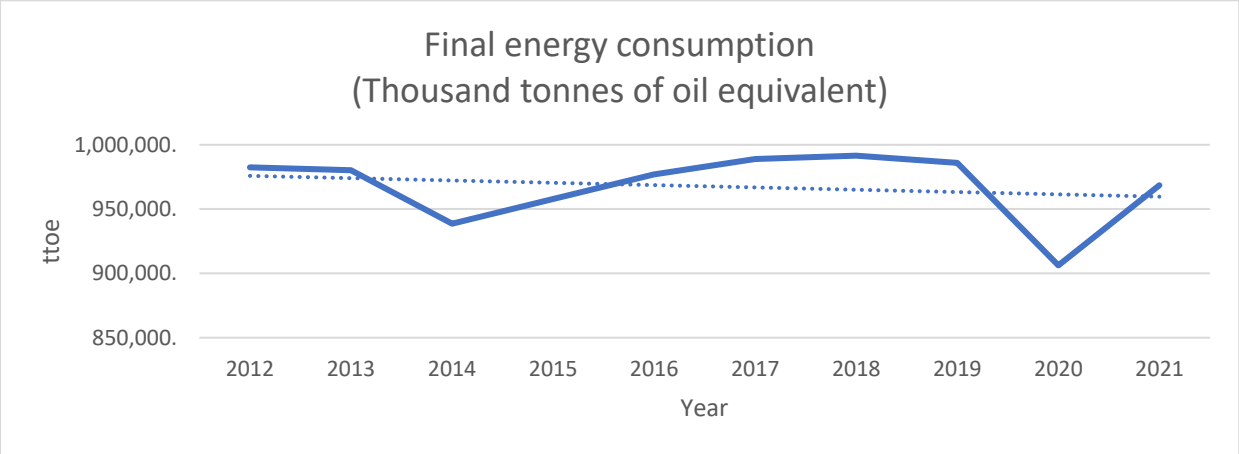
Broadly speaking, energy efficiency is perceived as the effective output in any required form of work/energy compared to the input of physical energy. Although it is physical measure, it could be shown easily using economic indicators, like expenditure (cost) of energy for produced output. Forty-plus years of research on the topic have focused on many aspects of energy efficiency, showing its micro-level influences on households' disposable income, but also multiple-countries scenarios and technological developments changing courses of energy consumption. Enhancements in energy efficiency typically result in heightened economic well-being. Thoughtfully crafted policy interventions, as well as energy efficiency measures, consistently appear to contribute positively to economic welfare, regardless of non-energy factors (Saunders et al., 2021). On the other side, greenhouse gas (GHG) emissions, which include CO_2 emissions, are primarily responsible for climate change. Given the growing issue of climate change, environmental degradation, and the resulting inequalities (Schot & Kanger, 2018), the European Union through its European Green Deal (EGD), proposed a set of objectives, measures, and mechanisms to promote a just, efficient, and competitive transition to a climate-neutral European Union by 2050. The established mandatory objective of a 55% reduction in greenhouse gas emissions is part of the Climate Law (OJ L 243/1), a component of the legislative package named "Fit for 55," put forward in July 2021. This package revises the framework of climate and energy directives in response to higher climate objectives.

2. ENERGY EFFICIENCY IN THE EUROPEAN UNION

Energy efficiency stands as the most important aspect of decarbonization and energy strategy of the European Union, not only for its impact on reducing CO2-eq emissions but also for its various non-energy (multiple, additional) benefits. It is considered a pathway to enhanced energy security in developed countries and a response to energy shortages and crisis.

At the beginning of research and implementation, due to energy crisis, energy efficiency was a kind of synonym for energy conservation, reduction in consumption. However, ongoing energy efficiency discussion revolves around decoupling energy consumption and carbon emissions from economic growth. Achieving successful decoupling serves as proof that efficiency measures can maintain economic sustainability (Moreau, Neves, Amarante & Vuille, 2019). As example, a study has shown that between 2010 and 2019, the GDP of EU Member States saw a notable increase of 27.6%, while their energy consumption simultaneously decreased by 6.5%. This observed decoupling of these two factors during the study period was a result of the positive growth rate in EU GDP alongside a negative trend in energy consumption from 2010 to 2019 (Laszlo, 2023). Final energy consumption is decreasing from 2006, with the percentage of 5.1 until 2021, however this is not aligned with the EU's decarbonisation objectives or EU Energy Union goals. **Error! Reference source not found.** shows the evolution of energy consumption in EU27 (countries included in the EU in 2020) from 2012 to 2021. From the graph, as seen above, although there are major falls in consumption (like in COVID period), the trendline is showing mild constant decrease.

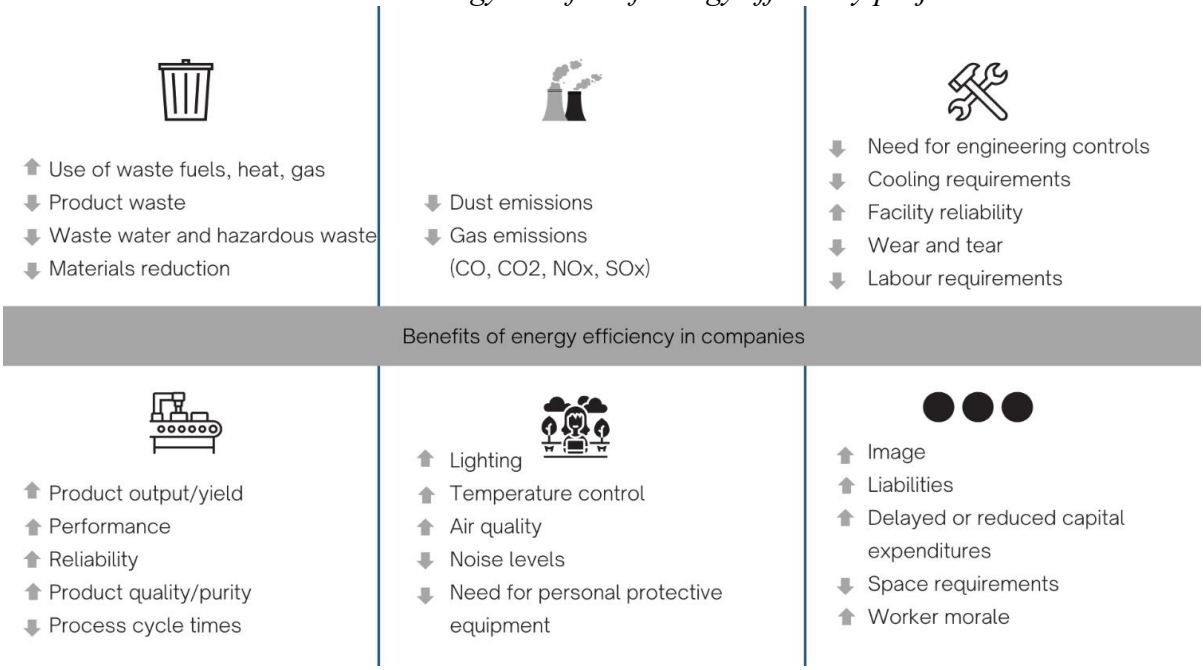
Graph 1: Final energy consumption in the European Union from 2012 to 2021



Source: Eurostat, 2023

A lot of focus has been given to energy policies in buildings and transport, along with the focus on energy intensive industries. SMEs, due to their low consumption per subject and disproportional effort needed, have not been prioritised in the EU energy efficiency policy as such. On an EU and national level, energy efficiency reduces import dependencies, a fact that became utterly important during the past two years. Unstable price of energy and unstable sources of import have shown the burden the companies endure if they are energy intensive, with that the burden to countries trying to keep the economy stable. For example, the new European Social Climate Fund, for the first time, considers the poverty of the small enterprises in the same manner as energy poverty of households, due to risk imposed to the economy (European Commission, 2023:b). When looking at the European energy efficiency, it is important to take into account the broader scope, not only the perspective of the energy savings, but of all the aspects that come with the consumption reduction using technical and behavioural changes. Companies, and mainly SMEs, do not have enough workforce, technical or financial capacity to focus on energy audits or energy efficiency. Looking at things from a companies' management perspective, it is often hard to see the strategic value of energy efficiency for the company versus society, if there is no clear financial benefit. Therefore, it is important to accentuate the additional benefits deriving from the implementation of energy efficiency upgrades.

Table 1: Non-energy benefits of energy efficiency projects



Source: Worrell et al., 2003

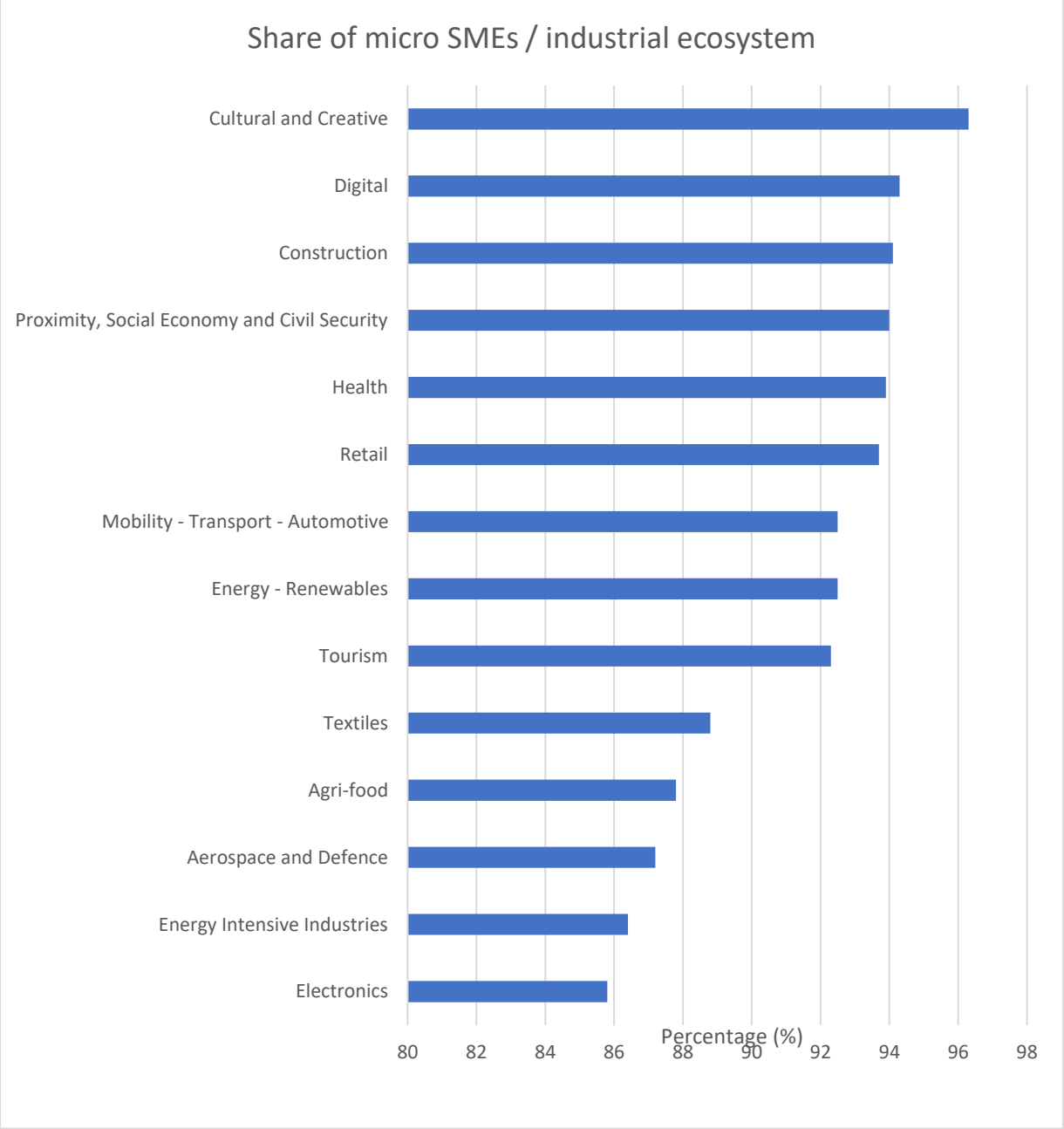
The table above shows the non-exhaustive list of additional (non-energy) benefits coming from energy efficiency in industry and companies, classified in groups: waste, emissions, operations & maintenance, productivity, working environment and others. In general, when taking into consideration the whole society, non-energy benefits of energy efficiency are classified into three groups: environmental (e.g., energy savings, emissions), economic (e.g., GDP, employment), and social (health, energy poverty) aspects.

3. SMES IN THE EU AND THEIR ENERGY CONSUMPTION

SMEs in Europe are companies with less than 250 employees, less than 50mill EUR turnover or 43 million on the balance sheet for a year. About 24.3 million SMEs (*99.8% of the total number of enterprises*) are there and working in the EU with almost 85 million employees (*64.4% of total employees in all sectors*) (Di Bella et al., 2023). Number of SMEs is in disproportion to their energy consumption, which is one of the reasons why they have not yet been a priority for energy efficiency measures (Reuter, Lackner, & Brandl, 2021).There are no available exact percentages of energy consumption in SMEs as opposed to other companies' sizes, as that is not the methodology Eurostat or other statistics are showing. There are available estimates for several EU countries, applicable to whole Europe, and they are between 9 and 20%. On a global scale, according to the International Energy Agency, they consume more than 13% of energy, so the findings from the EU countries are aligned with the global consumption. And finally, related to energy efficiency, in 2014, Eurochambres approximated that, within its 20 million members in the European Union, there existed a potential for short-term reduction in energy consumption, which could span from 10% to 20% (EuroChambers, 2014). Meanwhile, this number has probably not changed a lot.

The importance of SMEs is shown on Graph 2, developed by JRC from the Eurostat data, where it is obvious that most European industries' ecosystems and value chains rely on the work and productivity of SMEs.

Graph 2: Share of micro SMEs in the number of enterprises in each of the 14 industrial ecosystems



Source: Di Bella et al., 2023

However, there are many reasons why SMEs do not thrive in the energy field. Lack of personnel is the first one repeated, where there is no employed person dealing with the issues of energy consumption, due to their educational, awareness or time restrictions. Other issue is the above-mentioned prioritisation. If a company has low energy consumption in comparison to other expenses and are not aware of the additional benefits of energy efficiency, of course such investments will not be the priority. But, the most important obstacle is the lack of financial capacity for capital investment and the availability of financing on the market, especially for micro and small enterprises. Experience and all ongoing projects show that the barriers have not changed to 2023. Below introduced table is a result of seven different EU projects analysis identifying barriers and confirming them through literature review.

Table 2: Barriers to implementation of energy efficiency projects in SMEs

Detailed barriers	References
LOW CAPITAL AND DIFFICULTY TO ACCESS FINANCING	
Large capital investment requirement for energy efficiency upgrades and small funds available with SMEs to invest; longer payback period for some of the potential energy saving investment opportunity; difficulties for securing loans from banks.	Catarino et al. (2015); Thiede et al. (2013); Prasad Painuly (2009); Nigohosyan et al. (2021); Viesi et al. (2017); Lee (2015); Meath et al. (2016)
LACK OF HUMAN RESOURCES, KNOWLEDGE and AWARENESS	
The absence of internal knowledge to recognize and execute energy-saving measures, insufficient information regarding (a) energy expenses, (b) the significance and advantages of energy efficiency, and (c) outreach by technology providers to SMEs, presents a notable deficiency.	Fuchs et al. (2020); Rohdin et al. (2007); O'Keeffe et al. (2016); Kostka et al. (2013)
Small businesses do not have the resources to designate energy management responsibilities to any team member, let alone create a dedicated department or office for this purpose.	Eurochambres (2010); Sorrell et al. (2000); Henriques and Catarino (2016)
A lack of knowledge and awareness prevents SMEs from accessing any available financial schemes that support investments in energy efficiency.	Prashar (2017a); Hrovatin et al. (2021); Trianni et al. (2013); Fresner et al. (2017)
A shortage of time or an excess of other responsibilities among SME employees diminishes the priority placed on energy efficiency.	Paramonova and Thollander (2016); Henriques and Catarino (2016); Rohdin et al. (2007); Johansson (2015)

Source: Agrawal et al., 2023

The above research overview shows only internal capacities and lack of such in companies to start with the energy audit or energy efficiency investment. However, there are multiple external issues, like administrative burden of public support towards energy efficiency, need for monitoring, lack of support or informational contact points, lack of financial de-risking tools or financial products applicable in SMEs. It is, therefore, important to focus on the surrounding and policies enabling energy efficiency actions implementation in companies.

4. ENERGY EFFICIENCY POLICIES IN THE EU

4.1. General information

Starting from 2019, with the introduction of the European Green Deal (EGD) by the European Commission, there has been rapid progress in the policy landscape concerning the reduction of greenhouse gas (GHG) emissions. This evolution is even more evident due to the release of the Intergovernmental Panel on Climate Change (IPCC) report in August 2021, which underscored the complexity and hurry of the issue. The imperative now is to take all possible actions to limit global warming to 1.5 degrees Celsius. Enhancing energy efficiency across all sectors stands out as a crucial strategy for cutting down GHG emissions.

In line with these developments, the European Commission unveiled the "Fit for 55" package in July 2021, which encompasses a proposal to revise the Energy Efficiency Directive. This revision aims to fortify measures that promote energy efficiency specifically in SMEs. Additionally, the Energy Efficiency Financial Institutions Group (EEFIG), established by DG ENER (Directorate-General for Energy) and UNEP FI (United Nations Environment Program Finance Initiative), actively supports investment initiatives for enhancing energy efficiency in SMEs. EEFIG released its recommended actions in this regard. Taken together, all of these actions focus on the critical need for increased efforts towards industries, particularly SMEs, in order to achieve Europe's climate and energy objectives. Improving energy efficiency stands out as the most economically viable approach for reduction of energy-related emissions, strengthening economic competitiveness, and reinforcing energy security. Within the European Union, various legislative measures are in place to guide both nations and companies of all sizes in advancing their energy efficiency. One such measure is the Energy Efficiency Directive, which establishes a standardized framework of measures with the objective of reducing barriers in the market and encouraging more effective energy consumption in both supply and demand. It is left to the national authorities to incentivise the adoption of the recommendations and obligations defined in the national framework. Due to the above-mentioned lack of prioritisation of energy efficiency in SMEs, there are also challenges in how existing policy targets SMEs. Research shows that there is substantial gap in energy efficiency policies targeting SMEs, lacking data on their energy use, as well as assessment of the opportunities and understanding how they make energy efficiency related decisions. (Fawcett & Hampton, 2020). The following highlights existing policies that partially and rarely specifically targets smaller companies. Besides *4.2. Energy efficiency obligation* **scheme** and *4.3. Audits and energy management* **system**, there are not many policies that address energy efficiency in SMEs. Some do partially also include SMEs, like NZIA. The purpose of *Net zero industry act*, which is part of the Green Deal industry plan framework, is to develop adequate surrounding for the production of net - zero technologies in the EU (European Commission, 2023:c). This includes SMEs also. By enabling conditions, NZIA includes for example facilitation of access to market of the produced technologies, fostering innovation and working on enhancing skills.

4.2. Energy efficiency obligation scheme

By Energy efficiency obligation scheme, it should be referred to Articles 8, 9, 10 and Annex V of the Energy Efficiency Directive. On July 11, 2023, the European Parliament formally endorsed the new EED, which was subsequently ratified by the Council on July 25. Already since the first version of the Directive in 2012(2012/27/EU), these articles stipulated that every Member State is mandated to achieve a yearly decrease of their national energy sales for each year from 2014 to 2020 inclusive. In the new version of the Directive, the objectives are as follows: *required rate of new annual savings will rise gradually from the current 0.8% of final energy consumption (FEC) in 2021-2023 to 1.3% in 2024 and 2025, 1.5% in 2026 and 2027, and 1.9% from 2028 to the post 2030 period* (Thomas, Santini & Sofia, 2023). To facilitate the accomplishment of these objectives, Article 8 of the Energy Efficiency Directive (EED) obliges Member States to achieve annual energy savings through the implementation of an Energy Efficiency Obligation Scheme (EEOS) or other viable approaches. To fulfil this target, energy suppliers are required to execute actions that assist end consumers in enhancing energy efficiency. This might mean enhancing heating systems in residential properties, installing double-glazed windows, or enhancing roof insulation to reduce energy usage, or to implement alternative policy measures. These measures might involve: CO2 or energy taxes, incentives, regulation and voluntary agreements, labelling or certification and training/awareness raising.

Twelve countries use both these alternatives plus EEOS, France uses only EEOS and other countries use only alternative measures. Figure 1 shows which countries are using both (light blue), as opposed to only alternative measures (green).

Figure 1: Measures from the EED (Art 8)

Source: LIFE CET ENSMOV PLUS project, 2023

The process of savings implementation, measurement, verification and monitoring is rather complex as companies are obliged to achieve additionality and materiality, avoid double-counting of savings, all of what needs to be properly proven. In many legislative frameworks, eligible investments also include interventions in SMEs. For example, in Ireland, industrial and SME networks operate in tandem with the EEOS, forming a mutually beneficial relationship. These networks play a crucial role in pinpointing prospect measures, establishing connections with the energy efficiency sector, and enabling end-users to tap into Operational Programme (OP) funds. As for alternative measures, many countries include funding programmes and fiscal measures for SMEs. In many countries, there is an interaction between this framework and the one mentioned below, audits and energy management systems, where national authorities use auditing results to choose the pipeline of measures to finance.

4.3. Audits and energy management system

Energy audits are an evaluation of the energy needs and energy efficiency of a company, production line, building etc. This process involves a thorough examination and analysis of energy consumption, with the goal of pinpointing areas for enhancement to help energy efficiency. EMS (Energy management systems), on the other hand, are an organised tangible steps and methods (including monitoring and control) designed for buildings or companies to attain optimal standards in terms of energy efficiency, utilization, and consumption. This is achieved by establishing and achieving specific energy related, or better said efficiency related, objectives. The energy management procedure initiates with an energy assessment aimed at uncovering avenues for enhancing efficiency, so in that part is linked or similar to energy auditing. Subsequently, these findings are put into effect through a variety of strategies, and the advancements resulting from these changes are continuously tracked.

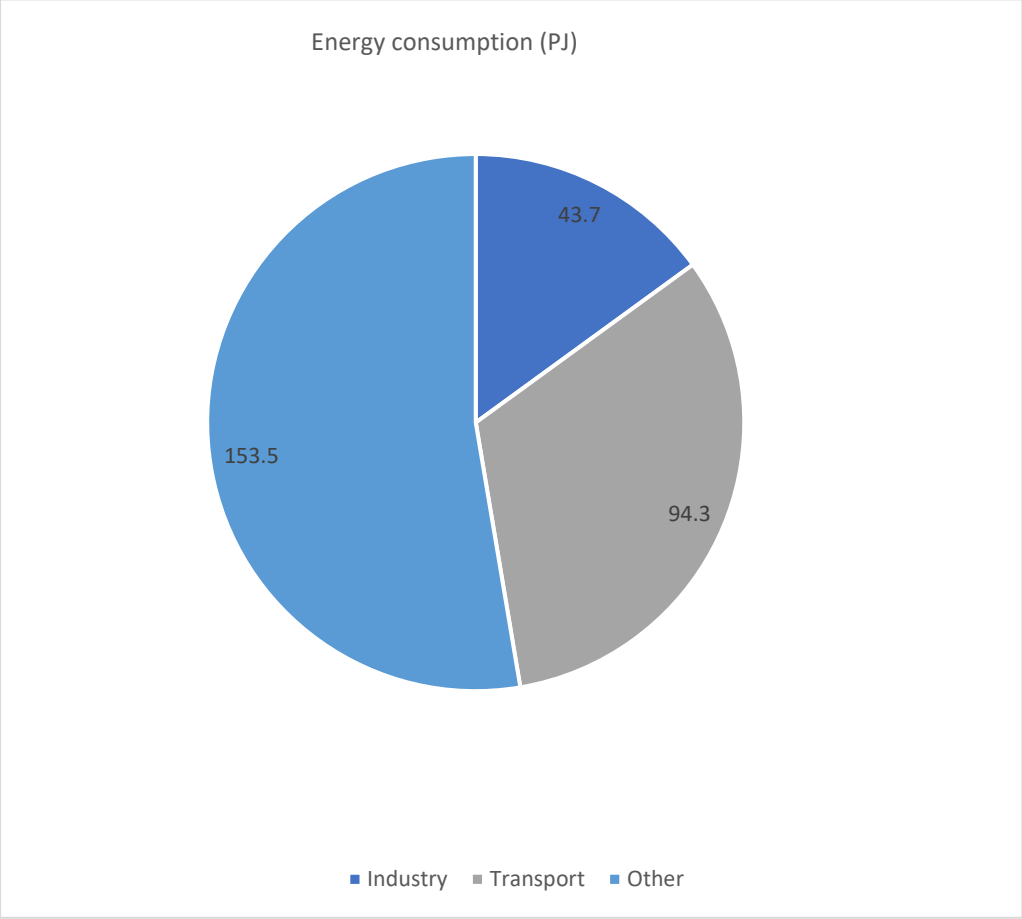
Typically, this Energy Management System (EMS) is harmonized with ISO 50001, providing a way to authenticate an approach grounded in best practices and acknowledging an organization's dedication to managing and enhancing energy performance (H2020 DEESME project, 2023). Policy background includes Article 11 of the Energy Efficiency Directive (European Commission, 2023:a). It prescribes that the Member States ensure companies with yearly consumption higher than 100TJ implement an energy management system. This will probably not affect any of the SMEs. However, companies with an average annual consumption higher than 10TJ are subject to an energy audit and the results of the energy audits, including the recommendations from these audits, must be transmitted to the management of the companies. How is this transposed to Member States is still a question, due the fact that there are certain challenges in audits implementation. These include limited resources of national authorities, problems with identification of obliged parties, compliance challenges, low quality of audits, too much administration and monitoring and lack of follow-up enhancement of measures (H2020 DEESME project, 2023).

5. CASE STUDY OF CROATIA

5.1. Energy consumption in SMEs in Croatia

Final energy consumption in Croatia in 2021, which is the latest available data, amounted to 291.5 PJ and increased by 7.9% compared to the previous year (270.3 PJ). In the final energy consumption structure, industry participated with 15.0% (43.7 PJ), transport with 32.3% (94.3 PJ), and other sectors with 52.7% (153.5 PJ), cf. graph 3.

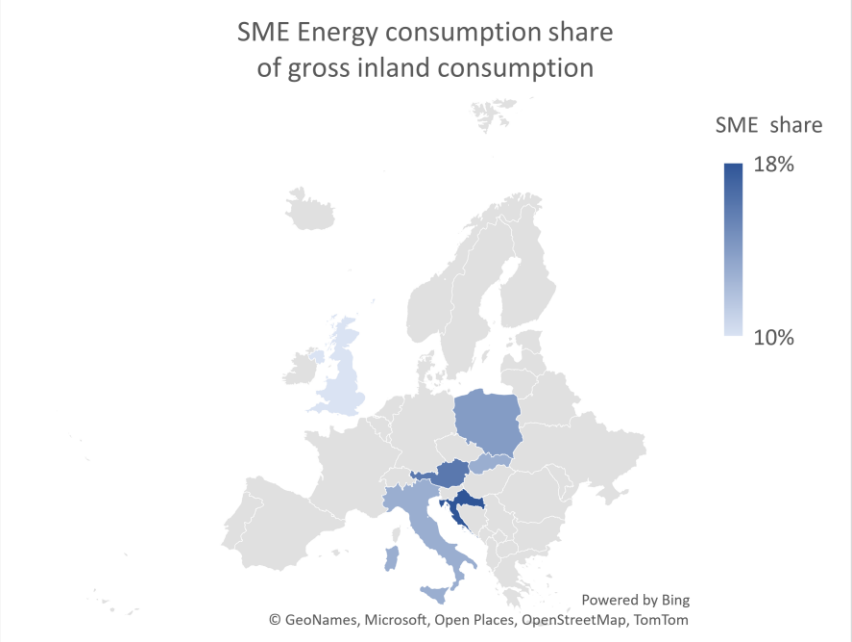
Graph 3: Final energy consumption in Croatia by sector, 2021



Source: Energy Institute Hrvoje Požar, 2021

Based on the available information, Croatia has around 150 000 SMEs, employing almost 720 000 people (European Commission, 2019). Using the methodology developed in the LEAP4SME project, the consumption of energy in SMEs can be seen in the figure 2.

Figure 2: Share of final energy consumption in SMEs in Croatia and other countries



Source: Reuter, Lackner & Brandl, 2021

Counting on the precision of the calculation, it can be concluded that the percentage of final energy consumption in Croatian SMEs is higher than above defined consumption in industry (66PJ for SMEs in comparison to 44 PJ for industry) and that policies targeting SMEs are rather important.

5.2. Energy efficiency policies in Croatia targeting SMEs

In Croatia, the Energy Efficiency Act (OG 127/14, 116/18, 25/20, 32/21, 41/21) oversees the efficient use of energy; local, regional, and national plans; responsibilities; the duties of the energy regulatory body, TSO, DSO; etc. The primary objective of this legislation is sustainable energy development, by promoting energy efficiency measures across all energy consumption sectors. In adherence to this Act, the Ministry implements a National Energy Efficiency Action Plan (NEEAP) spanning the period from 2022 to 2024. The NEEAP is aligned with the Integrated National Energy and Climate Plan (NECP) for the period from 2021 to 2030, which is at the moment the umbrella document for the energy and climate related targets.

Croatia implements energy efficiency obligations with a combination of obligations of the suppliers and alternative measures. Both in one part include SMEs, with obligation starting from 2019. Obliged parties are free to choose measures they will use to fulfil their obligation, including measures in industrial and commercial SMEs. As for alternative measures, NECP measures below are directly targeting the sector:

- ENU-10 Systematic energy management in the business (service & production) sector
- ENU-11 Information on energy efficiency
- ENU-17 Increasing energy efficiency and use of RES in manufacturing industries

These measures are linked to eligible financing (calls for EU funding), for example, a call for funding the *"Increasing energy efficiency and the use of renewable energy sources in manufacturing industries"* (ESIF, 2023).

Since there still is a legislative framework aligned with the ongoing EED, as opposed to new, the obligation for energy audits does not exist for SMEs. However, Croatia implements some screening measures to motivate SMEs, like financing audits and EMS. Although Croatia, thanks to its Chamber of Commerce has a good register of companies, major challenge for the country is that the National Authority does not have data on the implemented ISO 50001 certificates and therefore does not have data on total implementation of the obligation, so it seems as if there are a lot of obligatory companies without audits.

6. DISCUSSION AND CONCLUSIONS

European Union has recognised the significance of SMEs' energy consumption and energy efficiency, together with the knowledge that it was not targeted or prioritised in the previous period. The importance of the sector is clear and unquestionable from the fact that the EU established several new frameworks and action boards to enable the implementation of energy efficiency in SMEs, including the EU Covenant of Companies. But there are some very visible challenges in targeting SMEs and the first one refers to their dispersion in comparison to larger companies. This means that for the same contacting and administrative efforts, when targeting large companies more savings and general results are achieved. Several projects and research worked on the objective to better target and easier implement energy efficiency in SMEs and resulted with different recommendation. International energy agency recognises the importance of development of specific programmes for SMEs in consultation and collaboration with relevant sectoral stakeholders, aligned with available financing. Programmes should also build capacities of financial institutions and experts, so they are sustainable. Regarding financing, EU Commission encourages alignment of financing with national policies and plans. It is at this stage of research it is obvious there are many information on the importance and the challenges plus the possible opportunities in the sectoral energy efficiency. However, there is not a lot of information on the solutions, besides the guidelines deriving from knowledge exchange among countries. Therefore, for the future research, the important would be to focus on preparation of toolboxes and guides, and most of all preparation of the portfolio of bankable energy efficiency investments in SMEs. Collaborating with small businesses has revealed that addressing internal barriers can be quite challenging, and there remains a significant need for further research in this field. A significant impact is anticipated from the supply chain, with the most compelling motivation potentially arising from large companies' expectations that their smaller suppliers adopt sustainability and efficiency practices.

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MANAGERS' DECISION-MAKING SUPPORTED BY PROPER DATA ANALYSIS AND MODELLING

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ABSTRACT

Supporting their decisions by the available data and their analysis using statistical procedures is nowadays a necessity for the organizations' managers. This applies to commercial businesses as well as to other types of organizations, e.g., those operating in the public administration, education, or sports. For this to be possible, the managers need to know the options even the open-source statistical software offers. Plus, these need to be combined with the knowledge of at least the most widely applicable statistical procedures, so that the analysis performed is sound, achieving correct results. The aim of this article is to provide the managers of organizations with the information from both areas. The statistical procedures are presented in Gretl, which is an open-source statistical software with a user-friendly interface. This is important because this way the software does not increase the organization's costs, staying available for any organization, regardless of its budget. The fact that the statistical procedures are explained on the example with the quality of coffee is beneficial because this variable is easy to understand. Coffee is also a pleasant topic for many people, which supports the learning experience intended. Based on the data selected and the variables defined, the individual steps of the statistical analysis are presented and explained. This includes the method of linear regression, creation of a statistical model, as well as its statistical and economic verification. Understanding these steps, the organizations' managers will be able to set their own variables that are important for organizations' success. The article presents the recommendations for all the main phases so that the managers can come up with viable analytical solutions. Thus, they can support their future decisions by appropriate data models.

Keywords: *data analysis, decision-making, knowledge, modelling*

1. INTRODUCTION

Current state in the field of knowledge-based decision support and data analysis includes approaches such as the use of AI and probabilistic modelling. In the area of using network modelling, there were limits mainly in the past that made this modelling difficult to handle a wide range of situations (Wellman et al., 2009). Today's possibilities of using AI tools by ordinary people, including managers, overcome the original limits. It is basically possible for everyone to apply AI support to the preparation of the decision-making process. Numerous scientists around the world, such as Borah et al. (2011), are devoted to modelling with the application of artificial neural networks and various algorithms based on which such networks can be built.

The basis for any data analysis and application of modelling approaches is the data itself. Lai and Schildkamp (2012) discuss what can be considered data and what diverse types of data are available to today's organizations. To support the organizations' managers' decision-making, the managers themselves must first realize that not all data that is available is also necessary and vice versa. Schildkamp et al. (2015) further draw attention to the need to achieve efficiency in this activity when trying to use data to support decision-making (in any organizational environment). Therefore, they describe the conditions for achieving an effective application of data analysis in support of the decision-making process. The authors categorized factors that can either become supporting for using data in decision-making or, on the contrary, barriers preventing the efficiency of the entire process. They distinguish these three basic groups: factors related to the organization, factors related to the data itself, and factors related to users. The first group of factors includes vision, leadership, and collaboration; the second group includes accessibility, usability, and data quality; and in the third group includes the users' skills and knowledge as well as the dispositions for using analysed data for the decision support. Although linear regression models have been known for a long time, they are still not widely used by managers to support their managerial decisions. The essence of modelling using linear regression is to minimize the deviations between the observed data and the predicted development based on the constructed model (Diskin, 1970). As pointed out by Lavis et al. (2003), during research efforts it is important to pay sufficient attention to the transfer of acquired knowledge to subjects responsible for decision-making in a specific area. It is necessary that the results of empirical studies with their appropriate and sufficient interpretation are distributed to those who will make decisions affecting a certain organization or even larger units. This article then fits exactly into this effort. With a deliberately chosen example (coffee and its quality), it tries to support the interest of managers of diverse organizations in applying scientific knowledge in the field of data analysis and decision support. The applicability of the data analysis approach using linear regression for managerial decision-making is also supported by the results obtained by Balasubramanian and Justus (2024), who focused on the link between customer reviews and the product price.

2. METHODOLOGY

The aim of this article is to provide the managers of organizations with the information from the area of fundamental methods of statistical data analysis and the area of applicable open-source software which they can use while not increasing the costs of the decision-making process. The fulfilment of the aim is put into the environment of a specific consumer product – coffee, and relevant variables related to its quality as it is perceived by the customers. The data used were collected from two main data sources. The first was a professional blog about coffee available on the Internet (Blog about coffee, 2024). The second source of data was represented by the internal statistics obtained from the owner of a local roastery and café (Habesh, 2024). Applied methods included the basic activities of preparing the necessary datasets, selecting relevant variables (endogenous and exogenous ones), creating the models based on the ordinary least squares method, assessing the models from the perspective of relevant tests, economic and econometric verification of results, and interpretation of findings obtained by data modelling. Mathematical-statistical operations were deliberately performed in the open-source software Gretl, which meets two basic requirements for the applicability of the described procedure in a wide range of organizations. The first is the availability of the tool for free, and the second is the friendly user interface, which does not require entering commands in the form of code, as is the case with other open-source tools (for example, R and R Studio). This supports the possibility of using the described data analysis and modelling by managers in different environments.

This applies to the sports environment, where the clubs' budgets are really very limited, and it is critically important not to increase costs in the managerial decision-making process. Thus, the basic cost is represented only by the time of the managers themselves, which they must invest in acquiring the necessary knowledge. This article will serve them in this effort.

3. RESULTS

The fundamental defined problem for the presented example of data analysis is the low level of awareness of Slovak coffee consumers about high quality coffee and its individual variables. The result is a low demand for the products of local roasteries and cafés. Traditional consumers in Slovakia drink and prefer over-roasted, burnt coffee, which often does not provide them with a more complex taste experience. An example of data analysis is therefore grasped from the perspective of a specific organization – a local roastery and coffee shop. However, it offers an application of statistical analysis using the open-source software Gretl, after understanding which the procedure can be replicated by managers of various other organizations in connection with adaptation to their own conditions and the studied variables.

3.1. Professional public – data obtained from a publicly accessible blog about coffee

As it was already mentioned in the methodology section, at the beginning, it is important for organizations and their managers to identify which types of data are relevant and freely available for them from the perspective of their own decision-making. For the selected example of data analysis in the area of coffee purchased by customers and its quality, such data are those obtained from a professional blog. The "Blog about coffee blog" is run by coffee enthusiasts who want to show the beauty that coffee has to offer. They mainly focus on promoting Slovak coffee roasters. They educate Slovak coffee lovers how coffee should or could taste.

3.1.1. Data selection

The data obtained from the Blog about coffee (2024) were processed into a dataset using Excel. The total number of observations, or of coffees evaluated by the professional public, is n = 52. The dataset contains the following variables:

- TotalPoints – the dependent variable that we estimate using analysis and modelling (0 – 50 points),
- Price – the price for which coffee can be bought (the package is about 200 g) (values are in euros),
- Aroma – evaluation of aroma pleasantness, coffee notes, expressiveness (0 – 5),
- Acidity – fruitiness, coffee acidity, how much flavour remained in the beans during coffee roasting (0 – 5),
- Body – what notes can be felt on the tongue, whether they are pleasant, fruity, nutty, chocolatey, or whether the bitterness of over-roasted coffee kills the original taste (0 – 5),
- Aftertaste –the taste remaining on the tongue after drinking coffee, whether it is pleasant or, on the contrary, bitter, burnt, and unpleasant (0 – 5),
- Transparency – whether there is information on the coffee packaging about its origin, the farm where it was grown, possibly the name of the farmer, altitude, flavours, whether the coffee comes from a fair trade – all of this is assessed with this variable (0 – 5),
- PointsCustomer – in this case, the customer is Ladislav Király, who defines himself as a great coffee lover, but is not quite an expert, so he is closely related to the customer's perception of coffee (0 – 10),
- PriceQuality – price-quality ratio, assessment of whether the coffee has sufficient perceived quality for how much it costs (0 – 5),
- PackageDesign – the packaging is evaluated by people via the Instagram social network, the appearance, design, and the special coffee storing technique are all evaluated (0 – 5).

3.1.2. Linear regression

For the linear regression and the data modelling, the initial model has the following form:

$$TotalPoints = b_0 + b_1*Price + b_2*Aroma + b_3*Acidity + b_4*Body + b_5*Aftertaste + b_6*Transparency + b_7*PointsCustomer + b_8*PriceQuality + b_9*PackageDesign + u_t$$

It is the specification of the basic formula for modelling by means of linear regression with the chosen studied variables, with the inclusion of a random component (u_t). Parameters' values are rounded to two decimal places, while the estimated model is as follows:

$$\hat{}TotalPoints = -1.00 + 0.10*Price + 0.74*Aroma + 0.74*Acidity + 0.77*Body + 0.74*Aftertaste + 10.5*Transparency + 1.65*PointsCustomer + 1{,}45*PriceQuality + 0{,}97*PackageDesign + u_t$$

(^ – the symbol representing the predicted values)

It can be concluded that the model is statistically significant because the p-value for the F statistic (2.55e-56) is lower than the established significance level of a = 0.05. The model explains 99.82% of the variability of the data, because the value of the corrected coefficient (adjusted R-squared) is 0.998180. At the selected level of significance, all variables are significant, and there is no need to modify the model even in terms of low p value and high value of the corrected coefficient of determination. It follows from this model that the most significant variable in assessing the quality of coffee is the "PointsCustomer" variable. This variable does not say which factor affects the taste of the coffee. However, it is possible to consider whether this variable influences the thinking of customers when buying coffee. The second most important variable is the PriceQuality (ratio of price and quality) of coffee. When examining which component of a coffee's flavour profile most influences its quality, it was found to be the "Body" variable with a coefficient of 0.77. Each one-unit increase in the "Body" value is reflected in an increase in the estimated value of TotalPoints by 0.77 units, assuming other values staying unchanged.

3.1.3. Model's verification

There were errors in the obtained model (violations of assumptions preventing its use for the interpretation of results) such as multicollinearity and heteroscedasticity, which need to be removed. Only then it is possible to obtain a model that is suitable for predicting or forecasting the future state of the variables studied. For testing the presence of multicollinearity, Gretl provides a method called *variance inflation factors*. After its application, the user is shown the results with basic instructions for their evaluation. To detect heteroskedasticity, the *Breusch-Pagan* test can be used in this software. To eliminate multicollinearity, the elimination of variables causing it was used. Other ways to eliminate multicollinearity that can be used are the following ones: PCA – method of principal components, dummy variable method, or data differentiation. To remove heteroskedasticity, a function in Gretl called *heteroskedasticity corrected* was applied.

3.1.4. Interpretation

Figure 1 shows a comparison of the actual (green dots) and predicted (orange line) values. The predicted values of the regression model are shown on the x-axis and the actual values on the y-axis. Points close to this 45° line indicate accurate predictions, while points far away may signal deviations.

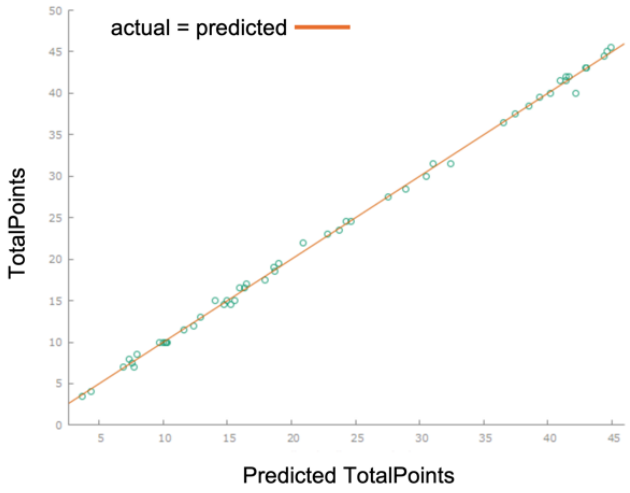

Figure 1: Comparison of actual and predicted values – total points
(Source: own elaboration in Gretl)

Figure 2 depicts the predicted data, where the orange colour represents the prediction, the green colour represents the actual data, and the purple colour represents the 95% confidence interval.

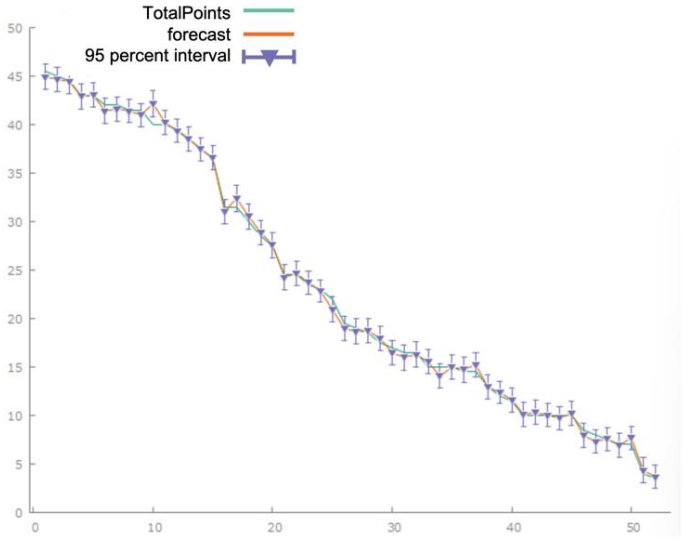

Figure 2: Predicted values, actual data, and the confidence interval– total points
(Source: own elaboration in Gretl)

3.2. Local coffee shop

The local coffee shop Habesh from Žilina was chosen as a specific example of a relevant organization. The founder of the café is Martin Vavrík, who sees coffee as part of rituals, business meetings, and family gatherings. He buys the coffee he sells in his café directly from Ethiopia from their long-term business partners. In business, they try to offer high quality coffee based on the values of sustainability and locality. This is also why they have their coffee roasted in Liptovský Mikuláš, at the Karma Coffee roastery. The owner of the company recognizes the value that coffee brings together, so he tries not to divide the coffee world, but rather to unite and not judge his customers for their specific tastes. Therefore, the portfolio includes light roasted coffees, with a more acidic and fresh taste, but also bitterer coffees with a caramel, chocolate, or nutty flavour.

3.2.1. Data selection

In this case, the data was obtained directly from the owner of Habesh Coffee, Martin Vavrík. The data was processed using Excel again. The number of observations is rather low, n = 13, because this café is small and local.

The dataset contains the following variables:

- QualityGrade – dependent variable that is being predicted,
- KilosSold – the number of kilos sold of a given type of coffee during one year,
- Price – price for a 250 g package of coffee (€6.99 – €19.99),
- Body – degree of roasting (1 – 3, where 1 = dark, 2 = medium, 3 = light),
- Acidity – degree of acidity and fruity notes in coffee (1 – 3, where 1 = low, 2 = medium, 3 = high).

Based on the nature of the individual variables, it can be assumed that their parameters will be positive. This means, e.g. rating the coffee's body with a higher number of points will ultimately increase the number of points of the dependent variable QualityGrade. It was assumed that the variable that will influence the dependent variable the most is the Body variable.

3.2.2. Linear regression

The linear regression was based on the following model:

$$QualityGrade = b_0 + b_1*KilosSlold + b_2*Price + b_3*Body + b_4*Acidity + u_t$$

The best model achieved via the linear regression was this one:

$$\hat{}QualityGrade = -0.42 + 0.05*Price + 0,62*Body + 0.27*Acidity + u_t$$

For the model to be accepted and subsequently applied, it is also necessary to test whether it meets the necessary statistical assumptions.

3.2.3. Model's verification

The assumptions for the mathematical signs were fulfilled for all the parameters. The model expresses that if any variable is higher, the quality score variable (QalityGrade) will also increase. The model is statistically significant because the p-value is low (0.004) and the corrected coefficient of determination indicates that the model accounts for 66.37% of the data variability. Although none of the variables are statistically significant, this may not indicate a serious problem. This is because the model was created with a small number of data points, which affects the significance of the variables. Thus, the model represents a valuable starting point and once more data is collected over time, the modelling can be expanded. In the econometric verification of cross-sectional data, it is necessary to re-examine multicollinearity, heteroskedasticity, and normality of residuals. Errors such as multicollinearity and heteroskedasticity were not identified in the model (the same tests available in Gretl as for the first model were applied here).

3.2.4. Interpretation

Figure 3 shows a comparison of the actual (green) and predicted (orange) lines. The predicted values of the regression model are shown on the x-axis and the actual values on the y-axis. Points close to this 45° line indicate accurate predictions, while points far away may signal deviations.

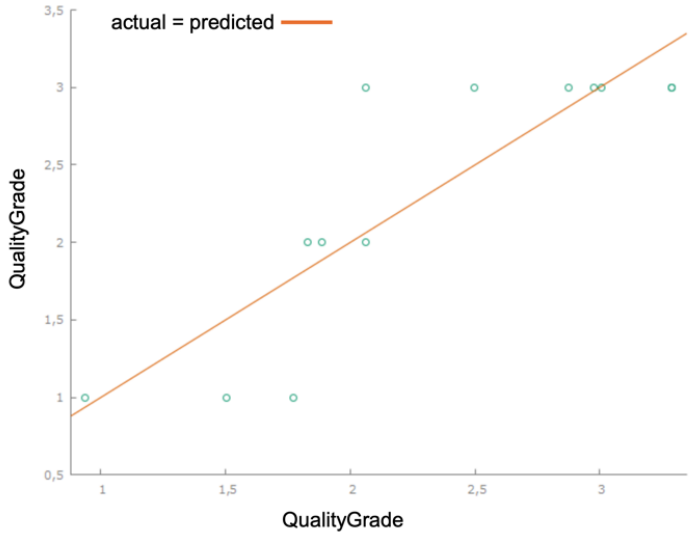

Figure 3: Comparison of actual and predicted values – quality grade (Source: own elaboration in Gretl)

The problem with smaller companies and other organizations can be that there is not enough relevant data to make the prediction more accurate for the future. In Figure 4, the predictions are included, where the orange colour represents the prediction, the green colour represents the actual data, and the purple colour represents the 95% confidence interval.

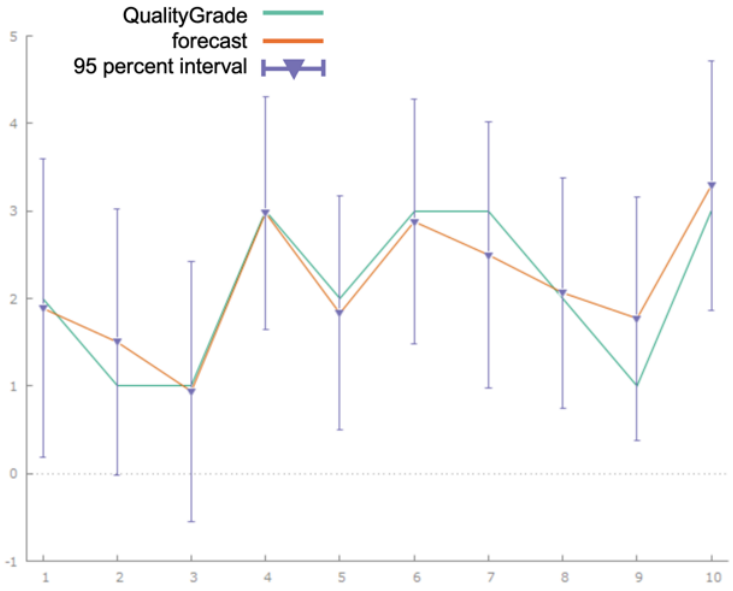

Figure 4: Predicted values, actual data, and the confidence interval – quality grade (Source: own elaboration in Gretl)

In connection with the analysed variables and their influence on the explained variable, it is possible to reach the following conclusion. Current managerial decision-making related to understanding customer preferences and increasing their awareness of the various properties of coffee can be based on the results of data analysis available from the professional portal.

In the case of own data collected by the manager (owner) of the local café, it is first necessary to continue collecting the data in the future. Only then will it be possible to obtain accurate analysis and modelling results based on them. By combining the findings from both models while respecting their limits, future marketing activities and activities to support the sale of locally roasted and prepared coffee can be set to achieve better economic results and higher satisfaction of the customers (coffee lovers) themselves.

4. DISCUSSION

Methods of statistical analysis, including linear regression, are still a useful basic tool for supporting decision-making by managers in the field of business and other organizations. Xie et al. (2024), in this context, investigated the relationship between digital infrastructure and the organization's ability to create innovations. Decision-making supported by appropriate data analysis is equally important in the field of human resources and human capital (Hitka and Stípalová, 2011; Stacho et al. 2022; Štaffenová and Kucharčíková, 2023). Within the business environment, such decision-making is performed, e.g., in connection with investments (Malichová et al., 2016) or possibilities of cooperation with other entities (Holubčík and Soviar, 2021). In public administration, data analysis is important in connection with transport and the concept of smart cities (Koman et al., 2022; Koman et al., 2024). In addition to the area of need for greater use of data analysis in sports organizations (Adámik et al., 2017), which was already mentioned in this article, there is the same need for decision-making support in the educational environment (Dado et al., 2013). All these arguments support the importance of research results in this area with the dimension of education possibilities for the competent managers of various types of organizations, responsible for decision-making processes being performed in related areas.

5. CONCLUSIONS

Since the aim of the article was to show the organizations' managers how to use available tools of statistical analysis and modelling to support their decision-making processes, this section summarizes the recommendations focused on this. The article shows how to focus on the collection of already available data. This is always more efficient and cheaper than starting to set new data collection processes immediately. However, it requires the imagination of managers, as well as their knowledge of data analysis, statistical methods, and applicable software tools. If the managers of the organization appropriately adjust their approach to the application of statistical analysis and construct their models, after the verification, they can continuously collect current data and insert it into the prepared models. This way, the initial significant investment in the form of the education time in the field of data analysis and modelling will be returned over time via the effects of their better decisions.

The basic steps of the recommendations resulting from the content of this article can be formulated into the following points:

- identification of data relevant for important decisions of the managers,
- determination of data that is already available (historical data – collected in the organization, but not yet used for the purposes of data analysis and modelling for decision support), secondary available data (not yet collected by the organization, but available in publicly accessible databases, on web portals of professional or research organizations or at the request from scientists or various institutions),
- setting the collection of primary data necessary for statistical analysis and modelling,
- definition of relevant variables for supporting selected managerial decisions,
- creation of a statistical model,

- control of violations of the basic assumptions for the correctness of the created model and the possibility of interpreting its results,
- correction of detected violations of basic assumptions,
- model's verification,
- application of the model for a specific decision-making process,
- monitoring the impact of decisions based on data analysis,
- ongoing collection of current data of defined types,
- repeating the modelling process with current data,
- application of new results in the upcoming management decision-making process.

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TECHNOLOGY TRANSFER, TRADE AND FOREIGN DIRECT INVESTMENT IN ALGERIA: AN EMPIRICAL STUDY

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ABSTRACT

Technology transfer (TT) via FDI (Foreign Direct Investment) is considered to be a catch-up and economic growth process for imitator countries (the South), in the same way as international trade. However, the process is not as simple and does not occur automatically (exogenously). According to a theoretical support submitted for analysis, a problem of endogeneity has been detected at the level of technology transfer from MNCs to domestic firms. This work proposes to analyse the dynamics of Technology Transfer (TT) through FDI in the case of the Algerian economy for the period (1970 and 2012). The methodology adopted consists firstly of using the growth accounting technique to identify the technological level or Total Factor Productivity (TFP). Empirical analyses were then carried out using the VAR and VECM models. The results show that FDI contributes negatively and significantly to TT, while the long-run dynamics of TT are explained by economic openness. The introduction of interactive terms shows that human capital does not contribute to TT in the case of FDI, but its impact is significantly positive in the case of openness. To take advantage of technological spillovers from Multinational Firms (MNFs), Algeria must improve its absorption capacity and the environment in which MNFs and domestic firms interact.

Keywords: *Technology transfer, Foreign Direct Investment, Multinational Firms, Domestic Firms, Total Factor Productivity, Absorption Capacity, International Trade*

1. INTRODUCTION

One of the most remarkable developments of recent years has been the globalisation of production[1] and the growing interdependence of economies. Taking off from the 1980s onwards, this pace has been stimulated by the expansion of technological progress, particularly Information and Communication Technologies (ICTs), the continuing fall in transport costs, and the deregulation, privatisation and liberalisation of economies. The interaction between the New Economy of Geography (NEG), the New Theory of International Trade (NTIT) and the Endogenous Growth Theory (EGT) in a Centre-Periphery model indicates that the process of economic integration is a process that extends beyond the reduction of transport costs and the development of international trade. It is a process of diffusion of innovations, R&D, ideas, know-how and, consequently, the development and stimulation of the process of technology

[1] This involves a fragmentation of the production process: sourcing of raw materials, production of intermediate goods, management and marketing.

transfer (TT)[2]. In this sense, technology transfer via FDI has been highlighted in economic theory through several channels of diffusion, in particular: labour turnover from MNFs to domestic firms, demonstration effects, vertical linkages and sub-contracting relationships, technical assistance or insertion into a competitive market characterised by incentives to invest in R&D and to learn by doing. This work is situated within the framework of the dynamics of technological change in an economy open to capital movements. The source of this change is stimulated by two main factors: innovation and TT (imitation) (KRUGMAN, 1979, p. 259). This work is based on the methodology of some previous empirical studies such as CAVES (1974), GLOBERMAN (1979), WANG (1988), BLOMSTRÖM AND WANG (1989), BLOMSTRÖM AND WOLFF (1989), AITKEN AND HARRISON (1991), HADDAD AND HARRISON (1993), BLOMSTRÖM AND KOKKO (1993), DRIFFIELD (2001), LIU (2002), BOUOIYOUR AND TOUFIK, (2002), LEE (2006), BELAZREG (2007), LIU (2008), WEI AND GRAZIA (2010), HALE AND LONG (2011) and WEI (2012). We are thus interested in the model of technological change through the effect of imitation (TT) via FDI. To determine the effect of FDI on TT in Algeria, we will conduct an analysis using time series econometrics in which we will try to find a correlation between the variable to be explained (TFP) and the explanatory variables (FDI, OUV and KH). To identify TT, we use the TFP variable as an indirect measure (a proxy) of a country's technological level. To this end, to carry out econometric analyses, we propose: i) firstly, estimation using the vector autoregression (VAR) model and causal relationships between variables by the Granger causality test; ii) secondly, the Johansen co-integration test followed by estimation by the error correction model (VECM).

2. LITERATURE REVIEW

The most visible manifestation of FDI flows is illustrated by the contribution to the accumulation of physical capital, TT and know-how. According to the terminology of BLOMSTRÖM and PERSON (1983), BLOMSTRÖM and WOLFF (1989) and BLOMSTRÖM (1989), TT is a process where foreign technology is conveyed by MNFs through positive externalities or "technological spillovers"[3]. The evaluation of the TT process and the presence of technological spillovers is confirmed by the positive correlation between the presence of MNFs and the improvement in total factor productivity (TFP) according to several empirical studies: BLOMSTRÖM and WOLFF (1989), DRIFFIELD (2001), LIU (2002), JAVORCIK (2004), LEE (2006), TODO (2006), LIU (2008), WEI and GRAZIA (2010) and HALE and LONG (2011). However, other empirical studies add that FDI contributes to TT as well as improving the productivity of domestic firms when the technological gap between them and MNFs is limited and when the absorption capacity[4] of domestic firms is high (KOKKO, 1994; SJÖHOLM, 1997; KINOSHITA AND LU, 2006). TT occurs in the FDI model when MNFs do not have the internalisation capacity (the "I" advantage of the OLI paradigm) for their production processes or when they are at a disadvantage in the host market compared with domestic firms (BLOMSTRÖM AND KOKKO, 1998). In the literature on TT via FDI, we distinguish two main models representing the mechanism of transmission and diffusion of foreign technologies to domestic firms. In 1978, RONALD FINDLAY developed an exogenous model of TT using the backwardness effect hypothesis of VEBLEN (1915) and GERSCHENKRO (1962) and the contagious diseases hypothesis of MANSFLIED (1961). The TT mechanism in this model is stimulated by the effect of the technological lag and gap between MNFs and domestic firms, which are exogenous factors.

[2] However, TT remains an ancient process between civilisations, such as the transfer of certain agricultural production techniques from ancient Egypt, maritime transport from the Chinese Empire, and the transfer of several sciences (medicine, mathematics, etc.) by the Muslim civilisation.

[3] This concept is generally used to designate technological externalities in the broad sense, which may be associated with the geographical proximity of activities (agglomerations), labour mobility, R&D, etc.

[4] At the macroeconomic level, we speak of the social absorption capacity according to the terminology of Abramovitz (1986).

This means that TT does not depend on the behaviour of domestic firms, but is an automatic process stimulated by the level of foreign technologies and the force of contagion. Moreover, recent models, in particular that of WANG (1988), have challenged the first model by attempting to endogenize technology transfer through FDI carried by MNFs. Similarly, WANG AND BLOMSTRÖM (1989) develop a model in which technology transfer is an endogenous process stimulated by the interaction between the strategies of foreign firms and domestic firms in a set of costs (R&D expenditure, costs of transferring new technologies from MNCs to their sectors, learning costs for domestic firms, particularly human capital formation). The stationarity of this process is determined by the Nash equilibrium. In short, BLOMSTRÖM AND WOLFF (1989) conclude that the presence of MNFs through FDI in the host country contributes to the geographical diffusion of technology and they play the role of a "bridge" between developed and underdeveloped countries. DRIFFIELD (2001) shows that the productivity growth of domestic firms is caused by the productivity of foreign firms. LIU (2002), in a panel study of Chinese manufacturing industries, points out that FDI has a significant impact on productivity in the manufacturing sector. According to JAVORCIK (2004), foreign firms have a positive upstream effect on the productivity of local companies in Lithuania. LEE (2006) indicates that the international externalities of knowledge conveyed by FDI have a positive and significant impact on productivity. TODO (2006) considers technological spillovers from MNFs to domestic firms via FDI as a source of technological progress and productivity in the host country. LIU (2008) highlights two effects of FDI on the economy of the host country, the first being that FDI facilitates the transfer of technology, the second being that technological spillovers lower the productivity level of domestic firms in the short term, but are followed by an inverse effect in the long term. WEI AND GRAZIA (2010), in a study of large and medium-sized Chinese companies, state that international technology transfer[5] has a positive and significant effect on the productivity of CLMIE (China's Large and Medium-sized Industrial Enterprises). HALE AND LONG (2011) also emphasise the positive effect of technological spillovers from FDI on productivity in China, adding that this impact is correlated with two factors: institutional factors and the development of human capital, in particular the ability of workers in domestic firms to assimilate new technologies from foreign firms during an apprenticeship and training contact or during rotation. However, other studies show that FDI contributes to improving the productivity of domestic firms where the technological gap between the latter and MNFs is not wide, and where the absorption capacity of domestic firms is very high (KOKKO, 1994; SJÖHOLM, 1997; KINOSHITA AND LU, 2006). HADDAD AND HARRISON (1993), for their part, highlight a negative correlation between total factor productivity and the presence of FDI in Moroccan manufacturing industries between 1985-1989, while AITKEN AND HARRISON (1999) find the same result in Venezuela between 1976-1989. HANSON (2001) indicates that there is a weak argument that FDI generates positive spillover effects in the host country. WEI (2012) points to a negative impact of FDI on productivity, in a study of the impact of TT in 28 Chinese provinces between 2001-2008[6]. Market conditions have also been considered as an influential factor in the theory of foreign direct investment and technology transfer. They influence firms (in the case of a highly competitive market) to innovate and develop their capabilities (CHUNG, 2001), in other words, the motivation of firms to invest in R&D is correlated with the level of competition in

[5] The authors examined four channels of international knowledge transfer: IDE ; Importation ; Exportation et TT : WEI Z. ET GRAZIA C. : "Knowledge transfer, own technological efforts and productivity : The experience of China's Large and Medium-sized Industrial Enterprises", Université Paris Sud 11, Faculté Jean Monnet, ADIS, 54, Bl Desgranges, 92331 Sceaux, France, 25 février 2010.

[6] WEI (2012) argues that the negative impact of FDI on productivity in China can be explained as the result of competition between foreign and domestic firms or the existence of a large technological gap. Conversely, his results show that technology imports have a considerable impact on the productivity of Chinese provinces, along with the internal R&D efforts of domestic firms.

the market in which the firm carries out its production and marketing. Thus, CHUNG (2001) points out that TT through FDI is linked to the level of technological capacity of MNFs, where the latter can use only the capabilities of channels in the host market or transfer new technologies developed in the home market. This dichotomy between $FDI_{exploiting}$ and $FDI_{sourcing}$is the result of market conditions that are summed up in competition.

3. MODEL OF TECHNOLOGY TRANSFER VIA FDI IN ALGERIA

The primary objective of our empirical study is to investigate technology transfer through foreign direct investment for the Algerian economy. Neoclassical growth models of the COBB-DOUGLAS type (SOLOW, 1956) recommend the use of total factor productivity (TFP) as an explanatory variable for volume and technological change (BOUOIYOUR AND TOUFIK, 2002; BELAZREG, 2007; WEI AND GRAZIA, 2010; WEI, 2012). To this end, we will estimate the impact of FDI and other control variables[7] on TFP, whose overall model can be written in the following form:

$$A_t = TFP_t = F(FDI_t, OPEN_t, HC_t)$$

Where, A_t represents the technological level of the economy in year "t" expressed by TFP. While, FDI, OPEN and HC are respectively foreign direct investment, economic openness rate and human capital expressed by the secondary school enrolment ratio. μ is the time-varying random error term. The variable to be explained (endogenous variable) is total factor productivity. The explanatory variables (exogenous variables) are foreign direct investment, economic openness, human capital and the constant.

3.1. Data and proxies

The data used in our empirical study come from the World Bank database, with the exception of the human capital indicator variable (KH) relating to secondary school enrolment, which comes from the World Outlook database (UNESCO/WB). The availability of data for each year enabled us to cover a study period from 1970 to 2022, which is suitable for 53 observations. This period was chosen for several reasons: firstly, to capture the technology transfer (TT) process adopted in the industrialising industries model and its long-term effects. On the other hand, it is prudent for this study period to cover simultaneously the interaction between TT and FDI, for each period of development that the Algerian economy has undergone. In other words, it is a question of capturing the period of industrialisation, that of reforms, the period of application of the structural adjustment plan in 1994, then the period corresponding to the free trade agreements signed in 2001 and that of the return of the State to major public investment.
We determined the time series of technological progress expressed by total factor productivity (TFP), using the growth accounting method, based on the SOLOW (1956) model, through the impact of productivity on economic growth with a neoclassical production function of the COBB-DOUGLAS type. The TFP for the Algerian economy has been calculated for the period (1970-2012). Our calculation approach is based on the series of real GDP, capital (K) and labour power (L), based on the results of SENHADJI (2000) in his estimation of the sources of growth for 88 countries. The results for Algeria are as follows: (α=0.7 and β=0.3), where α andβ are the elasticities of the production factors, capital and labour respectively. The introduction of foreign direct investment in our model constitutes the first objective to estimate its impact on technology transfer. We use the time series of FDI inflows to the Algerian economy.

[7] The use of other control variables, such as economic openness and the level of human capital, is crucial for analysing the interaction between technological progress and FDI.

The degree of openness of the imitator country to the world economy (OUV) represents the share of international trade in relation to the volume of GDP. The choice of this indicator is in line with several empirical studies (BOUOIYOUR AND TOUFIK, 2002; BELAZREG, 2007) which find a positive link between openness and economic growth via externalities and technology transfer, as countries most open to international trade are more likely to accumulate and benefit from technology produced abroad. Theoretical arguments indicate that a high rate of trade openness increases absorption capacity[8]. GROSSMAN AND HELPMAN (1991) point out that, in the model of endogenous growth with technological progress, economies in contact with the rest of the world increase their possibilities of access to foreign innovations and technologies. After this theoretical support of human capital (KH), we use as a measurement indicator the enrolment rate at education level (secondary) according to the method used in particular by BARRO AND LEE (2000). The choice of this indicator is linked to the position of the Algerian economy on the world technological frontier, following the theoretical recommendations of the work of: ACEMOGLU D., AGHION P. AND FABRIZIO Z, 2002 ; AGHION. P & COHEN. E, 2004 ; AG-HION P ET HOWITT P, 2000 (arbitration between primary, secondary and higher education), i.e. it is considered to be an appropriate indicator for the process of imitation and technological catch-up. The choice of this indicator is explained by the difficulty of finding available data on other measures, in particular on the training of a qualified workforce (number of engineers, senior technicians, number of full-time researchers, etc.). The table below contains statistical information on the various variables in our empirical study, in their raw form. These are GDP at constant prices for the base year 2005 in US dollars, gross fixed capital formation (GFCF), the volume of capital (K) in US dollars, labour force (L), total factor productivity (TFP), FDI, the openness ratio (OPEN) and human capital (HC).

Table 1: Statistical description of variables

	GDP	TFP	OPEN	FDI	CAPITAL	LABOR	HC
Mean	6.99E+10	31.82853	0.581371	5.65E+08	2.47E+10	8319578.	54.02821
Median	6.60E+10	32.25493	0.587062	1.35E+08	2.28E+10	7375639.	60.08000
Maximum	1.24E+11	38.57893	0.766845	3.05E+09	4.83E+10	15584947	105.2900
Minimum	2.52E+10	24.72511	0.326846	-53569193	8.14E+09	3448997.	9.582960
Std. Dev.	2.64E+10	3.954556	0.113531	8.46E+08	9.62E+09	4009628.	26.03115
Skewness	0.372974	-0.046566	-0.226137	1.637851	0.757554	0.421377	-0.036004
Kurtosis	2.333591	1.731370	2.200261	4.544789	3.421421	1.754570	2.196795
Jarque-Bera	1.792632	2.899090	1.512407	23.50056	4.431053	4.051550	1.165163
Probability	0.408070	0.234677	0.469445	0.000008	0.109096	0.131892	0.558455
Sum	3.01E+12	1368.627	24.99897	2.43E+10	1.06E+12	3.58E+08	2323.213
Sum Sq. Dev.	2.92E+22	656.8176	0.541351	3.01E+19	3.89E+21	6.75E+14	28460.07
Observations	53	53	53	53	53	53	53

Source: Compiled by the authors from Eviews 12

Before moving on to estimating the model using the macroeconomic series, it is essential to study stationarity. From the analysis of the correlograms for each series, we find that there is a sign of non-stationarity, observed in the relatively slow decay of the autocorrelation function. To this end, we applied the Augmented Dickey-Fuller (ADF) unit root tests.

[8] The increase in absorption capacity is explained by the fact that the increase in international trade increases the stock of knowledge and the technological base of the imitating country, as well as stimulating investment in human capital.

We started by determining the number of lags, as well as testing the null hypothesis of unit root on each series at level, if the null hypothesis is rejected, we test the null hypothesis of unit root on the series in first difference noted ($dsérie = série_t - série_{t-1}$). In order to cover the effect of non-stationarity, we used logarithmic series, which offer the following advantages: i) minimisation of the influence of the time variable on the series[9]; ii) minimisation of the steps in the stationarity process. Comparing the graphs of the raw series and the graphs of the logarithmic series, we note that the logarithm has no effect on the PTF, OUV and KH series, but the introduction of the logarithm on the EDI has an effect on its evolution, due to the presence of a negative value in the series. For the EDI series, we will work on the raw series. We note from the study of the stationarity of the four logarithmic series and the analysis of the graphs of the differentiated series DLPTF, DIDE, DLOUV and DLKH and their correlograms that the differentiated series are stationary at level, while the logarithmic series are integrated of order 1 I(1) with the exception of the LKH series, which is stationary at level I(0).

3.2. VAR model estimates and results

Our basic approach to estimating technological progress by the FDI, the OUV and the KH is based on a VAR model[10], the first condition, which consists of working with stationary series, is verified. The work consists of examining the effects of the past of each variable on itself and on the other variables. The following series are used: DLPTF, DLIDE, DLOUV and LKH are stationary. The results of the estimated model are presented below.

Table 2: Estimation results for the VAR(1) model

Variables	DLTFP	DFDI	DLOPEN	LHC
Constant	-0,07 [-1,129]	-412401,9 [-0,001]	0,0658 [0,545]	0,2868* [5,334]
DLTFP (-1)	-0,278** [-1,992]	1.31E+09 [1,613]	-0,057 [-0,212]	-0,085 [-0,704]
DFDI (-1)	-1.00E-10* [-3,239]	-0,272 [-1,514]	-2.16E-12 [0,036]	9.35E-12 [0,350]
DLOPEN(-1)	-0,2391* [-2,828]	1.03E+09** [2,104]	0,270*** [1,654]	-0,069 [-0,947]
LHC (-1)	0,0195 [1,217]	14653898 [0,156]	-0,0154 [-0,496]	0,939* [67,676]
N	51	51	51	51
R^2	0,339	0,198	0,09	0,99
F-statistic	4,62	2,22	0,89	1216,33

Source: Carried out by the authors on the basis of VAR(1) estimates using Eviews. n: number of observations after adjustments. R^2: Coefficient of determination indicates the goodness of fit of the model. The figures in square brackets are the empirical Student's t (calculated). (*) Significant at the 1% level; (**) significant at the 5% level; (***) significant at the 10% level. F-statistic: Fisher calculated.

According to the results of the causality test in the Granger sense (Table 3), all null hypotheses "H_0" are accepted at 5% with the exception of the causality of FDI and economic openness towards total factor productivity (TFP), at 5%. We find that, FDI causes in the Granger sense total factor productivity (TFP) at the 5% threshold, because the probability of the null hypothesis is rejected at 5% ($Pro_{H_0} = 0{,}0105 < 0{,}05$).

[9] In these time series models, it is important to consider the time factor as an independent variable and not as a causal factor: I Gusti Ngurah Agung "Time Series, Data Analysis, Using Eviews", WILEY, 2009, p. 25.
[10] Determining the number of lags (p) in the VAR model is based on selecting one that has the minimum of the values of the two Akaike and Schwarz criteria

Thus, we reject the hypothesis "H_0" according to which economic openness does not cause TFP in the Granger sense, because the probability of accepting "H_0" is less than 5% ($Pro(\mathrm{H}_0) = 0{,}0203 < 0{,}05$), whereas, we accept the alternative hypothesis "H_1" according to which economic openness causes total factor productivity in the Granger sense. Thus, economic openness causes FDI in the Granger sense when the null hypothesis is rejected at 10%, because ($Pro_{H_0} = 0{,}0984 < 0{,}1$).

Table 3: Results of the Granger causality test

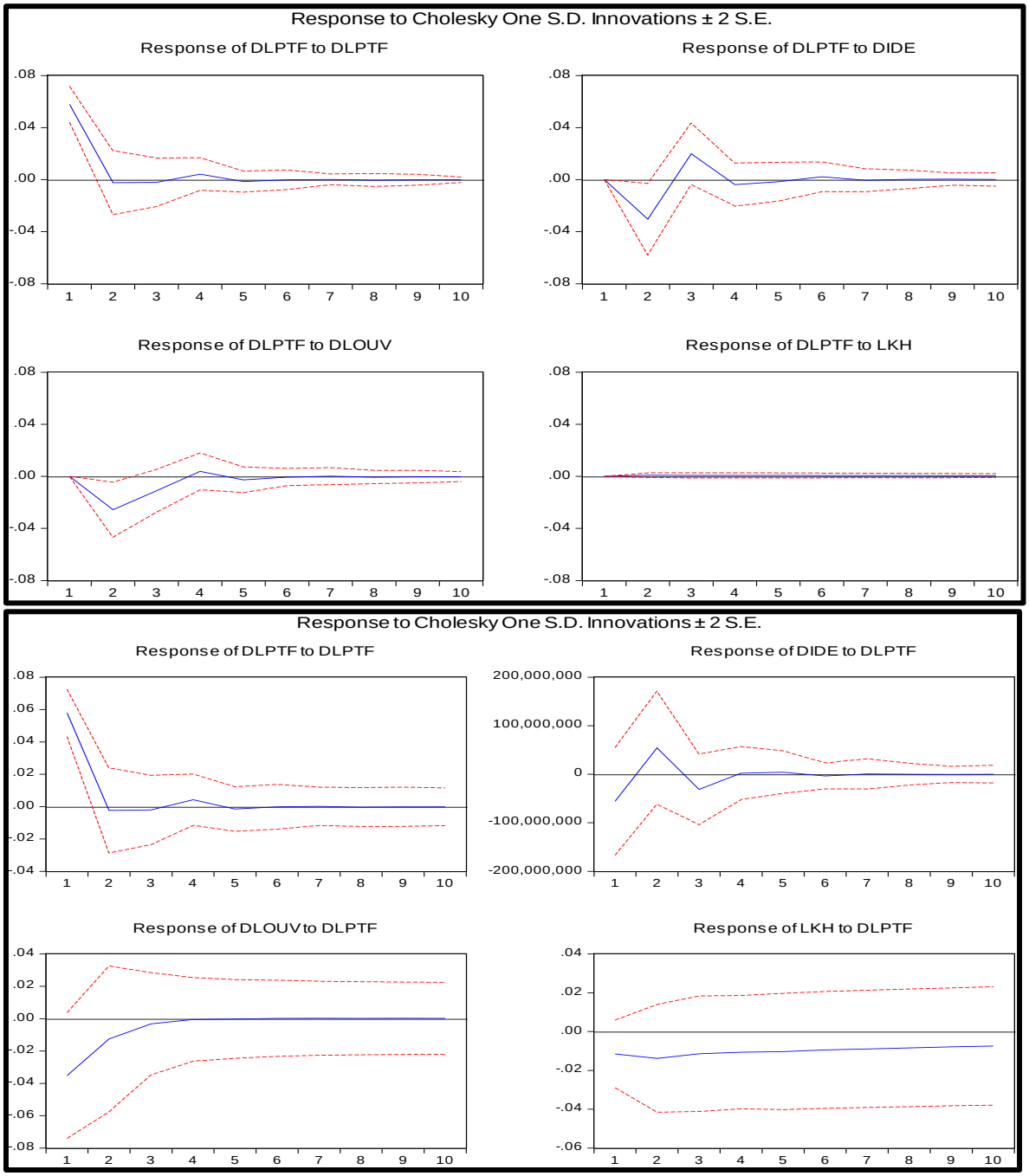
Hypotheses "H_0"	**N**	**Fisher Statistic**	**Probability Threshold (5%)**	**Test "H_0"**
$DFDI$ does not cause in Granger's sense $DLTFP$	51	7,24954	**0,0105**	**Rejected**
$DLTFP$ does not cause in Granger's sense $DFDI$	51	1,00038	0,2846	Accepted
$DLOPEN$ does not cause in Granger's sense $DLTFP$	51	5,86336	**0,0203**	**Rejected**
$DLTFP$ does not cause in Granger's sense $DLOPEN$	51	0,08288	0,7750	Accepted
LHC does not cause in Granger's sense $DLTFP$	51	0,23231	0,6326	Accepted
$DLTFP$ does not cause in Granger's sense LHC	51	0,29366	0,5910	Accepted
$DLOPEN$ does not cause in Granger's sense $DFDI$	51	2,87008	0,0984	**Rejected 10%**
$DFDI$ does not cause in Granger's sense $DLOPEN$	51	0,00933	0,9236	Accepted
LHC does not cause in Granger's sense $DFDI$	51	0,12492	0,7257	Accepted
$DFDi$ does not cause in Granger's sense LHC	51	0,44057	0,6317	Accepted
LHC does not cause in Granger's sense $DLOPEN$	51	0,31549	0,5776	Accepted
$DLOPEN$ does not cause in Granger's sens	51	0,63083	0,4320	Accepted

Source: Compiled by the authors from Eviews 12.

One of the objectives of VAR modelling is to construct a dynamic model that can be used to analyse and measure the effect of an innovation (shock) on other variables, using impulse response functions.

Figure following on the next page

Figure 1: TFP response for a shock to TFP, FDI, OPEN and HC and TFP, FDI, OPEN, HC response for a shock to TFP



The aim is to show the impact of a shock to one variable in the system on the other variables in the system through the effect of the dynamic structure in the composition of the VAR model. Economically, the interest of this analysis consists in playing the best economic policies for the absorption of a shock, as well as the return to equilibrium. We will study the effect of an innovation in each variable on the others for ten periods[11]. Generally speaking, we find that the shocks to the FDI, the OVU and the KH are transitory, in other words they return to equilibrium in the long term. Thus, all the impulse response functions tend towards zero, which is compatible with the stationarity (stability) of the VAR model.

[11] We limit our analysis to the impact of TFP, FDI, OPEN and HC innovations on TFP, and vice versa (TFP impulse on FDI, OUV and HC.

The results of these functions lead to the following analyses:
The effect of an innovation on total factor productivity (TFP) has an immediate and positive impact on itself, where the relative TFP curve does not start from the origin, and then becomes relatively weak and insignificant from the second (2nd) period onwards. A shock to the FDI and the OUV has no instantaneous effect on TFP, as the TFP curve starts from the origin in both cases. However, it is not until the second period that innovations (shocks) to FDI and OOE have a negative impact on TFP. In the third period, an FDI shock has a positive effect on TFP. From the fourth period onwards, the effect of these shocks becomes weak and insignificant. The TFP curve returns to its equilibrium level. For human capital, the impulse response function shows that an innovation in KH has no significant effect on TFP. Indeed, the TFP curve remains on its equilibrium path. For foreign direct investment (FDI), a shock to the technological level (TFP) has a negative and instantaneous impact, given that this effect is relatively weak and transitory, with the FDI response curve finding its equilibrium from the 4th period onwards. This is consistent with the context of TT and FDI in Algeria, where the technological level of the host economy is not an attractive factor for multi-national firms. Thus, this result confirms the direction of causality between FDI and TFP, where TFP does not cause FDI. The impulse response function of OUV shows that the effect of a positive shock on TFP translates into a negative and instantaneous effect from the first period on the level of openness. However, the effect of such a shock is absorbed by the 4th period. The response of the KH to a shock to TFP is negatively fixed from the first period until the last period. However, the trend in the KH response curve shows the possibility of convergence to the long-run equilibrium path. This analysis of impulse response functions can be completed by analysing the variance decomposition of the forecast error. The aim of this study is to explain the contribution of the innovation of the variable under consideration (studied) and the innovations of the other variables. In other words, we need to know the contribution of each innovation to the total variance of the forecast error. However, the analysis of the forecast error variance decomposition requires recourse to the notion of exogeneity of the variables. It is important to order the variables from the most exogenous to the most endogenous, because the Cholesky decomposition approach indicates that the first variable is a function of its own innovations, while the second variable is a function of its innovations and the innovations of the first variable, etc. To this end, we consider a variable to be exogenous if its behaviour depends solely on its own in-formations, in other words, it is independent of other disturbances. We distinguish two types of exogeneity: weak exogeneity, where the variable is influenced by its past, and can be modelled by its perturbations and information; whereas we speak of strong exogeneity, if the variable is both weakly exogenous and if no other variable causes it in Granger's sense. For TFP, the largest source of variation in the forecast error comes from the variable itself from the first period onwards, i.e. 79.04% compared with 52.18% in the 10th period. From the second to the third period, FDI and OOV contribute more to the decomposition of TFP, while the contribution of KH decreases. In fact, the contribution of FDI is 24.71% in the 10th period compared with 1.19% in the first period, OUV is 16.27% in the 10th period compared with 9.84% in the first period, while the contribution of KH is estimated at 9.91% in the first period compared with 6.82% in the 10th period. The innovations in the FDI variable come from the variable itself (94.31%) and a small contribution from the variables: OUV and TFP. From the second period onwards, their contributions increase to reach 7.009% and 4.41% respectively. On the other hand, the contribution of FDI falls to 82.69%. The contribution of the KH variable to the variation in the forecast error is relatively fixed over the entire period under consideration, at around 5.87%. For the opening rate, we note the predominance of the variable itself in the variation in the forecast error. This strong contribution is observed from the first period, where it is 100%, and it is close to 99.88% throughout the period under consideration. This result confirms the exogeneity of this variable and its dependence on its own information. For the first

period, the variation in KH is due to its own innovation (94.22%) and to a smaller contribution from the OUV, while the contribution from TFP and FDI is zero. Despite the increase in the OUV's contribution to the variation in the KH to a degree of 10.84%, the largest source of variation in the forecast error comes from the variable itself, i.e. 88.29%. This result underlines the qualification of KH as a weakly exogenous variable.

3.3. Estimating convergence relationships: cointegration and VECM

The notion of convergence between economic variables in the long term is very important for understanding future interaction and the adjustments required to achieve long-term equilibrium. To this end, the study or analysis of cointegration developed by GRANGER (1983) and GRANGER AND ENGLE (1987) is considered, together with the Error Correction Model (ECM), to be an innovation in the field of time series modelling. Our cointegration study is based on the method of JOHANSEN (1988) and JOHANSEN AND JUSELIUS (1990)[12]. This method is the most widely used and the most interesting because it gives us the number of cointegrating relationships. The approach is based on estimation by the trace test, under the following hypothesis: "H_0": $r = q$ versus "H_1": $r > q$ where (r) is the number of cointegrating relationships. We accept the null hypothesis in the case if the calculated trace value is less than the critical table value ($Tr_{cal} < Tr_{tal}$), otherwise we accept the alternative hypothesis. The Johansen cointegration test is very sensitive to the choice of the number of lags in the VAR model. In our study, all the series are integrated of the same order, i.e. of order 1, so there is a risk of a cointegration relationship. We try to verify this relationship using the Johansen trace test. The results of the test are presented in the following table below.

Table 4: Results of the cointegration study using the trace method

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.438678	54.39885	54.07904	0.0468
At most 1	0.297108	30.72300	35.19275	0.1402
At most 2	0.214176	16.26839	20.26184	0.1622
At most 3	0.144242	6.386472	9.164546	0.1629

Source: Compiled by the authors from Eviews 12.

From the results of the trace test, we observe, that the null hypothesis H_0, de $r = 0$ is rejected because $Tr_{cal} = 54{,}39 > Tr_{tal} = 54{,}07$ at the 5% threshold, while we accept the alternative hypothesis H_1 which means that there is at least one cointegrating relationship. To this end, we accept the null hypothesis that, there is at least one cointegrating relationship r=1 because, $r = 1$ car, $Tr_{cal} = 30{,}72 < Tr_{tal} = 35{,}19$ at the 5% threshold. Therefore, there is a cointegrating relationship between the variables. The objective of this study is to determine the unique cointegrating vector that takes into account the long-term evolution of TFP, FDI, OPEN and HC. In the case where all the series are non-stationary and cointegrated, estimating their relationships using the error correction model is considered to be the most appropriate method. The VECM (Vector Error Correction Model) is a model that allows us to model the adaptations (adjustments) that lead to a situation of long-term equilibrium. It is therefore a model that incorporates both short-term and long-term trends. To globally test the significance of the vector of restoring force towards equilibrium, we introduce the following statistic: $T = (T\lambda_1)^2 + (T\lambda_2)^2 + (T\lambda_3)^2 + (T\lambda_4)^2$and then we test it with the Engel and Granger tabulated statistic.

[12] For the cointegration test, we distinguish two methods: cointegration in the sense of Engle and Granger, in which, two variables are cointegrated if and only if the residuals of the regression are stationary, in other words, the series of residuals must be I(0). Cointegration in the sense of Johansen.

In our example, the value of the statistic $T = 14{,}05 > T_{tab}$,, so we accept the alternative hypothesis H_1according to which, the restoring force vector towards equilibrium is globally significant. Theoretically, for there to be a return to the equilibrium path, the coefficient of recall must be significantly negative. This is what we are checking here. From the visual results of the VECM model, we find that, PTF and FDI have negative recall coefficients towards equilibrium ($\lambda_1 = -0{,}001304$ and $\lambda_2 = -40241054$) respectively, but not significant at 5%, as the calculated t-Student values are lower than the table value at 5%($|t_{\lambda_1}| = 0{,}15 < 1{,}96$ et $|t_{\lambda_2}| = 0{,}87 < 1{,}96$). Therefore, equilibrium in the long run exists but is not significant. However, OPEN and HC have negative and significant recall coefficients towards equilibrium at 5% where ($\lambda_3 = -0{,}020174$ and $\lambda_2 = -1{,}298226$), respectively, while $|t_{\lambda_3}| = 2{,}60 > 1{,}96$ and $|t_{\lambda_3}| = 2{,}60 > 1{,}96$. Therefore, OPEN and HC have a long-term equilibrium return phenomenon.

Table 5: Estimation results for the VECM model

Error Correction:	D(LTFP)	D(FDI)	D(OPEN)	D(HC)
CointEq1	-0.001304	-40241054	-0.020174	-1.298226
	(0.00842)	(4.6E+07)	(0.00775)	(0.50974)
	[-0.15485]	[-0.87481]	[-2.60281]	[-2.54685]
D(LTFP(-1))	-0.254383	1.01E+09	-0.110373	2.553104
	(0.14538)	(7.9E+08)	(0.13379)	(8.79876)
	[-1.74978]	[1.27487]	[-0.82499]	[0.29017]
D(FDI(-1))	-8.52E-11	-0.200441	-1.70E-11	4.91E-10
	(3.2E-11)	(0.17576)	(3.0E-11)	(1.9E-09)
	[-2.64628]	[-1.14040]	[-0.57322]	[0.25214]
D(OPEN(-1))	-0.445538	2.10E+09	0.293458	10.29220
	(0.17021)	(9.3E+08)	(0.15663)	(10.3013)
	[-2.61763]	[2.25517]	[1.87352]	[0.99912]
D(HC(-1))	-0.001073	-26919384	-0.004711	0.174850
	(0.00301)	(1.6E+07)	(0.00277)	(0.18234)
	[-0.35604]	[-1.63598]	[-1.69928]	[0.95893]

Source: Compiled by the authors from Eviews 12.

4. DISCUSSION AND RECOMMENDATIONS

In the estimation using the VAR model, we found that FDI and OVW delayed by one period have a negative and significant impact on TFP. Thus, openness contributes positively and significantly to FDI inflows, which is consistent with theoretical predictions, where openness is a positive determinant of foreign capital flows. However, capital and openness are impacted by their pasts and are variables that depend on their accumulations. The negative impact of FDI on TT can be explained by three arguments: i) the first relates to competition effects between domestic firms and MNCs. This result obtained, relating to FDI and TFP, is similar to the result of HADDAD AND HARRISON (1993) in the case of Moroccan manufacturing industries between (1985-1989). AITKEN AND HARRISON (1999) arrived at the same result in Venezuela between (1976-1989) and WEI (2012) in the case of 28 Chinese provinces between 2001-2008; ii) the second argument relates to the effect of the technology gap, as highlighted by several empirical studies, KOKKO (1994); BORESZTEIN ET AL (1998); GLASS ET SAGGI (1998); KINOSHITA (2000); GÖRG ET GREENA-WAYA (2004), etc.

It should be noted, however, that the impact of FDI on TFP is significantly negative and weak in the short term; iii) the third argument lies in the weak cooperation between domestic firms and MNFs, particularly in terms of the type of industrial cooperation and attractiveness, following the example of Asian countries in terms of public policy through the promotion of J&V and the inclusion of MNFs in national TT strategies (LALL, 1995; BELAZREG WALID, 2007). Openness also seems to have a negative and significant impact on TFP. This contribution is relatively the result of the context of openness of the Algerian economy, according to which openness in Algeria is largely linked to fluctuations in oil prices on the international market (DAHMANI M. AND NIZIGIYIMANA Y.). This negative impact of the rate of openness on the TT can be explained by the absence of a diversification of the economy of the exported products on the one hand and an under-absorption of the imported technologies. Our result relating to the context of openness in Algeria is not similar to the theoretical recommendations of the link between economic openness and technology transfer (TT) in the short term. Taking into account human capital (HC) individually has a positive effect on TFP but is not significant. In the estimation of long-term relationships using the vector error correction model (VECM), we find that the coefficients that designate the strength of the return to equilibrium are all negative. However, the long-run equilibrium for TFP and FDI exists but is not significant, whereas OPEN and HC have a significant phenomenon of return to equilibrium in the long run. Thus, we find that openness and human capital positively impact TFP in the long run, in other words, openness to international trade contributes positively and significantly to TT in Algeria.

Table 6: Writing the long-term relationship

LPTF	IDE	OUV	KH	C
1.000000	-1.81E-09	11.16687	0.033113	-11.83342
	(5.9E-10)	(2.84299)	(0.01542)	(2.00102)

Source: Compiled by the authors from Eviews 12.

In accordance with economic theory, it is interesting to compare our results with those found by COE AND AL (1997); GROSSMAN AND HELPMAN (1990 AND 1991) according to which technological spillovers have more effect on the TT of a country if the latter develops its absorption capacity, measured by human capital. In order to know whether the TT conveyed by FDI can be reinforced by the training and quality of human capital or via openness, we introduce the two cross or interactive variables: (OUV*KH) and (FDI*KH). The different results are expressed in regressions 2, 3 and 4 (appendix 4). After introducing the interactive terms in regressions 2, 3 and 4, we can conclude that when we take into account the role of absorptive capacity measured by the level of human capital (expressed by the secondary school enrolment rate) and the degree of openness, the contribution of FDI to TT in the case of Algeria remains low. Human capital does not appear to be sufficient to benefit from technological spillovers via FDI. This result may be linked to the theoretical explanation according to which the labour market is not sufficiently dynamic for the rotation of local labour in favour of technology transfer (AGHION AND HO-WITT, 2000). However, human capital is a stimulus to the TT process via openness, but it remains modest with a contribution of 0.16 according to regression 4. Thus, our results suggest that the dynamics of TT depend on the absorptive capacity of the host economy, particularly human capital. In our study, we can say that the effect of human capital is not sufficiently developed to absorb the foreign technology conveyed by the MNCs, whereas the TT holds its long-term dynamics by the opening to the inter-national trade. The choice of technology transferred is a crucial parameter in the success or failure of the TT

process, and there may be an effect similar to that of general-purpose technologies[13] when they first arrived in developed countries. Such a context can lead to a situation where technology generates unemployment (AGHION AND HOWITT, 2000) and a reduction in per capita production via the innovation effect of a set of complementary technologies (HELP-MAN AND TRAJTENBERG, 1998) in the case of developed countries, whereas the same is true for the effect of under-absorption (lack of mastery, highly sophisticated technology, etc.) in the case of TT in developing countries. To this end, countries that are catching up technologically (such as Algeria) must first study the needs and usefulness of the technology before implementing any TT policy (particularly via FDI), in order to avoid a technological gap between domestic firms and MNCs. The various recent experiences of TT policies show the determining impact of the local capacity to assimilate foreign technology. To attract industrial firms (MNFs) from the North and benefit from their technologies, the authorities (the various institutions) of the host country (Algeria) must strengthen this parameter: "by developing the country's capacity to assimilate technologies disseminated at international level, they would contribute to improving the entrepreneurial environment of firms located in the South"[14]. The aim is therefore to develop indigenous capabilities. The process of learning by doing, particularly in the form of the assimilation of tacit knowledge and inter-firm learning, has largely influenced the theory of TT. In terms of commercial and industrial policies, this concept is closely linked to infant industry strategies, according to which it is necessary to protect domestic (infant) firms from foreign competition in order to give domestic firms time to absorb the costs of learning and to increase their technological potential (RIEBER ARSENE AND TRAN THI ANH-DAO, 2001). Thus, the learning-by-doing process is more effective in an environment where there are incentives for the mobility of production factors and subsidies for domestic companies (as in the case of Singapore)[15]. LALL (1990) has explained that the success and performance of TT policy in the Asian NICs, notably South Korea and Taiwan, is the result of their ability to create an economic and social environment (a social absorption capacity), facilitating the accumulation of knowledge and skills through experience and training in enterprises (Learning by doing) on the one hand, and through scientific and technical education on the other. Our empirical study confirms the thesis that the success of TT lies in the development of the host country's human capital. The public authorities must develop the education and training system, with the aim of improving the social absorption capacity, by promoting the sciences of technology, mathematics, physics, chemistry, biology, among other..

5. CONCLUSION

Overall, the various results of our study show that the impact of FDI on TT in Algeria is significantly negative in the short term, with a low contribution. Thus, the opening up of the Algerian economy to the rest of the world does not lead to TT in the short term, but its long-term impact becomes significantly positive. Human capital, on the other hand, makes a positive and significant contribution to TT. The introduction of in-terms indicates that human capital does not have a positive effect on TT in the case of FDI, but its contribution remains positive

[13] This concept of general-purpose technologies (GPTs) is of great interest in the theory of endogenous growth, since it refers to technologies used throughout the economy. In fact, the arrival of TP in developed countries (transferred technology plays almost the same role in developing countries), can (often) have the effect of reducing economic growth in the short term, which causes the economy to undergo a long and costly period of adjustment: HOWITT P. Endogenous growth, productivity and economic policy: a status report", INTERNATIONAL PRODUCTIVITY OBSERVATORY, NUMBER 8, SPRING 2004.

[14] RIEBER Arsène and TRAN Thi Anh-Dao: "Diffusion technologique internationale et politique de développement", Revue Région et Développement n°13-2001, p. 59.

[15] Singapore is a country that still wants to build strong industries, which will become the keys to its economic success, thanks to its desire to create added value based on innovation. To achieve this objective, the government has launched a policy whereby each institute involved in research must have its own technology transfer department, and some even several, such as A*STAR (Government Agency for Science, Technology and Research) and NUS (National University of Singapore): BARBI Anne-Prune, BERTOLLY Charges, GERVASONI Christelle and NGUYEN Cybelle : " le transfert de technologie à Singapour " , Ambassade de France à Singapour, Juin2011.

in the case of openness. These results allow us to say that the human capital adopted in the case of Algeria is not sufficiently developed to absorb foreign technology via FDI. The weakness of TT via FDI lies in the technological gap between domestic firms and MNCs, the nature of localisation and the context of Algerian firms in terms of TT policy. The positive impact of international trade on long-term TT is linked to the adaptation and assimilation of imported technologies by human capital, according to which the TT process is a long-term process, which requires a period of diffusion / assimilation / adaptation / and absorption. To this end, a country like Algeria can benefit from TT in the context of the globalisation of production and trade, provided that it develops its indigenous capacities and the interactive environment between domestic firms and MNCs, by applying strategic commercial and industrial policies to this purpose.

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YOUTH IS AN ASSET FOR THE WORLD OF ENTREPRENEURSHIP IN MOROCCO

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ABSTRACT
Entrepreneurship in Morocco is at the heart of recommendations for a new development model for equal opportunities, and although very small businesses constitute an essential number of the Moroccan entrepreneurial fabric. The entrepreneurship appears as one of the most promising channels for the optimal integration of young people in the development process, but here, I will also say, that the entrepreneur cannot solve everything, the economy creates many more jobs in general. Entrepreneurship as a promoter is an idea that will help young people to develop their potential and contribute to the development of their country.
Keywords: *Entrepreneurship, economy, development model, business, Moroccan entrepreneurial fabric, development process*

1. INTRODUCTION

Entrepreneurship in Morocco is at the heart of recommendations for a new development model for equal opportunities, and although very small businesses constitute an essential number of the Moroccan entrepreneurial fabric, so why public policies for entrepreneurship do not achieve their goals? A viable and reliable alternative for employment (MOQAWALATI – "meaning my business" -; INTILAQA – "meaning beginning" -; FORSA – "meaning opportunity"), what are the shortcomings of these programs? How to capitalize on their mistakes, to work out future approaches? And where does education fit into all of this? Why inculcate the entrepreneurial mindset that is not included in the curriculum, from an early age, although this ambition has been displayed by many governments?When can we hope to be champions of entrepreneurship? When the fact is unequivocal that small Moroccan businesses have a tiny margin of labor to survive?

2. SOME KEY FIGURES IN MOROCCO

Young people aged between 15 to 24 years, that universities will welcome them in these coming years, but it does not matter because it gives an idea of the environment of this population, so young people aged between 15 and 24 represent 16,2 % of the global population, it means, 5,9 million people, this Moroccan youth is a major asset, and an invaluable resource for our country that we must develop to achieve ambitious goals for the entire development model. Morocco thus has a real opportunity, which is not, of course, eternal, is a potential increase in the demographic dependency rate which is currently 60%, and therefore this demographic window will be closed around 2040, demographic dependency rate, who has 60% of the bracket above 15 years of age above 60, so there are 60 people who depend for the 100 people who work who are in the bracket from 15 to 60 years old. This trend is dust, and therefore this demographic window that we have which in fact means that we have young people today, who can participate in active life, and therefore more the population is active, more we can hope for significant

economic development, then this window will be closed on the horizon of 2040 and this explains why the Germans, for example, have decided to welcome so many people on their territory given the siren of the old age of their population. So, unfortunately, the worrying statistics on the integration of young people into the labor market, witnesses of a recurring reality, that of insufficient recognition, otherwise, if we have resources, and we do not use them, then what opportunities are given to this youth. So the unemployment rate for young people between the ages of 15 and 24 today is 35.3% (these are the latest figures released by the HCP – "Haut-Commissariat au Plan"); and when we talk about urban areas, this figure rises to 49,6%, that is to say, one out of two young people aged 15 to 24 in cities, is unemployed, it is really something that is quite worrying, so when we look at the unemployment rate among people who have a baccalaureate, it is four times higher than that of people without a diploma. This is why we find that there are people who say that it is better not to have a baccalaureate and to have a job. So faced with this situation, what should be done? So clearly that entrepreneurship appears as one of the most promising channels for the optimal integration of young people in the development process, but here, I will also say, that the entrepreneur cannot solve everything, the economy creates many more jobs in general. The idea that entrepreneurship appears as a promoter is an idea that will be increasingly shared, not only by young people, but also by public authorities, and therefore it is our duty to support entrepreneurship in general, and student entrepreneurship, particularly in Morocco, is an essential way to create jobs and wealth, while helping young people to develop their potential and contribute to the development of their country. The Moroccan government has already put in place several programs to encourage business creation, and the promotion of entrepreneur status, and the establishment of funding programs dedicated to innovative entrepreneurship and start-ups (PROGRAMME INTILAKA – "which means departure or beginning" -), as well as solutions dedicated to innovative entrepreneurship and start-ups (PROGRAM FORSA - "which means opportunity" -), in addition to CDG Invest - "CDG means: Caisse Deposit and Management » -. So there are indeed a lot of tools, which are put in place, and which can just promote innovative entrepreneurship.
Many support structures have also emerged, we can mention: co-working spaces, incubators such as: Impact lab, the Factory... So young people have to go and see what needs to be done on websites that give extraordinary solutions in Morocco, and in several other countries in the world. Really it is a very beautiful adventure that led us, and which gives very good results. At the international level, virtual incubation programs: Google for startup accelerator which also offers remote support to entrepreneurs via sites and webinars and discussion forums and project management software, it is also important to highlight the existence of major players such as: Bail combinateur, as well as the Moroccan start-up of E-Commerce B to B, so we can have very good ideas in Morocco, and which are accompanied by the best accelerators in the world. We mention that combiner lease, many of the startups that they accelerate, and that they support, but what is remarkable is that of the ten entrepreneurs they supported in 2021 and 2022, eight of them did not could see the light of day in Morocco because of Moroccan regulations. So these are things that there needs to be more work on.

3. ENTREPRENEURSHIP AND TRAINING INSTITUTIONS

Universities and higher education institutions have also adopted this trend by creating co-working spaces, incubators and entrepreneurship programs to stimulate job creation and the transfer of know-how through mentoring, training courses and "pitch-competition" workshops. UM 6P - "Mohammed 6 Polydisciplinary University" - is also part of this dynamic as a major player in student entrepreneurship, with the creation of the innovation-hub in 2020. The latter offers quality support for African entrepreneurs. The private sector is also very active in the field, since it offers students the opportunity to work on entrepreneurial projects with other students, mentors, experts, with an emphasis on creating a prototype, or a minimum viable

product (MVP). Despite these initiatives, it is important to emphasize that all this remains insufficient to reverse a real entrepreneurial shock, and in particular among young students, the figures of the entrepreneur in Morocco, confirm what I said, barely 9, 6% of active young people are moving towards self-employment, entrepreneurship the remaining majority, is divided into salaried work then non-regenerated work especially for young women in addition to young people aged 15 to 24 represent only 15.6% of auto-entrepreneur startup owners. And what is important and interesting to take away is that it is not the desire to be an entrepreneur that is lacking according to the indicators of the Global Entrepreneur-ship Monitor, there has even been an improvement in the perception of the entrepreneur in Morocco between 2015-2021, since the percentage of those who consider entrepreneurship as a good career choice has increased from 71% to 85%, at the same time there is a decrease in the fear and failure of 41% to 35.5%. So what can be the obstacles that hinder the development of entrepreneurship among young people given that the ten years that we want to do it, and in particular among young students, two aspects seem to me to be essential:

- The first is the qualifications and skills of entrepreneurs which can hinder the creation and development of the business, affecting the quality of the projects and the financing file presented to the banks. We find for example Mark Zuckerberg, Bill Gates, Michael Dave, the sign so we can start the business from our dormitory, and do just extraordinary things.
- The second decisive aspect lies in the quality of the environment that welcomes potential student-entrepreneurs, corruption, the languor of payment terms, the lack of trust between the entrepreneur and the tax administration, the heaviness and complexity administrative procedures, the digitalization process, the lack of support, unfair competition from the informal sector, and barriers to market entry are all elements that constitute real obstacles for young entrepreneurs both in the creation phase and size development thereafter.

4. THE BENEFITS FOR YOUTH ENTREPRENEURSHIP

Starting a business has never been easier. Indeed, young people are much more proficient with digital tools than other generations, which greatly facilitates their tasks. Since the 1990s, wage labor has ceased to be attractive, new generations are less and less willing to do work that they don't like, it's this phenomenon that is pushing more and more people to get started and create a business, the idea by their passion and their motivation significantly increases their chances, and success thereafter:

4.1. 1st advantage: No Constraints

When you're young, you have nothing to lose, you don't have big responsibilities, in fact most people between 17 and 25 years old, and who don't have children, and very rarely loans to charge, for the most part, it is still within the parental home, so the fact of not having financial charges and a valuable advantage, which does not have the need to have to pay something at the end of the month. If someone is earning money at the start of the project, it will be less impactful than if they had a family and a home to support.

4.2. 2nd advantage: financial help:

Young people have the possibility of being helped financially the aid to the creators of the company allows to benefit from a reduction of the rates during the first years of creation of the company, as a young graduate, there is possibility of acquire the status of student-entrepreneur, and to have support from dedicated structures.

4.3. 3rd advantage: Ease of learning

Young people, for the most part, have an ease of use of instinctive digital tools, which allows them to be much more efficient and effective quickly, nowadays, young people have almost all

the time access to the Internet, whether either on your phone or on a computer, he therefore has an ease of access to information incomparable to that of older generations, at the same age, he thus has access to the information necessary for training and the discovery of information and evolution in all possible fields.

4.4. th advantage: Ease fo reorientation in case of failure:

Young people and the current generation are more likely to resume their studies later. Indeed, nowadays, it is much easier for someone to reorient and resume their studies, it is better accepted by society, if ever the entrepreneurial project were to fail, they can be reinserted and integrate training faster.

4.5. 5th advantage: More time

Young people have fewer obligations and constraints, so they have more time for themselves, but also for learning, they don't have to take care of the children or the house, so they can put to work on their entrepreneurial project, while a parent has more difficulty freeing up time, so they can use this time to learn new things, and acquire new skills instead of looking at empty trivialities and waste of time.

5. LOVING WHAT WE DO, LOVING OUR WORK

Enthusiasm is already dropping at the six-month goal. There are some after an hour, but after six months most studies show that there is a loss of enthusiasm which results in an erosion of enthusiasm at work. It's true that we can easily fall into the daily routine, in our business, our career..., and that repeating actions can eventually create dullness, but it is not impossible to find joy in his work. In this sense, and to fight against this disillusionment and to find pleasure during the exercise of our activity in our life, we ask the famous question how to do it since most people when they get up in the morning, consider their work as a chore?

- Try to make sure you remember why you chose this job? and in the worst case, where you consider that it's only a bridge and no longer a work of stability, you have to like what you do, so that you can then manage to do what 'WE love.
- We must try to learn something new, we work and try to learn new things while using a little effort to get us out of our routine zone, which has caused us weariness.
- you have to align yourself with a goal, having a result and a goal is a completely different level, happiness is not going to support you in the most difficult moments at work, but the goal, the objective, the results achieved from your work will do it…….

6. HOW TO FIND YOUR IKIGAI

For the Japanese, it's what makes you want to get up in the morning. It is a circle which is composed by four signs which signify:

- The life;
- What is worth;
- The priorities;
- The beauty;

The principle of IKIGAI, mixes two important concepts of life which are: the joy of living, and the reason for being. To find your IKIGAI, you have to start thinking about yourself, while taking a sheet and a pen, and drawing a rosette, made up of several intertwined circles. We draw four large circles to first answer the main questions that condition the person you are on a daily basis.

Figure 1: IKIGAI Items

Briefly, this illustration is commented as follows:

1) What I like: that is, what are my favorite tastes? what inspired me? so what are my passions?
2) What I am good at: what are my skills? my skills? for which areas am I complementing myself?
3) What I am paid for: what makes me live on a daily basis? Why would a company be willing to pay me?
4) What the world needs: how could I contribute to a better world? what would be my added value?

So by answering these questions, and at the crossroads of these circles, come the passions, the missions, the profession and the vocations, then at the heart, the IKIGAI, which gives meaning to your life, which makes you happy every day, what why you are strong, what gives you a course that guides you and allows you to identify your talents, your potentials, your life missions and your motivations, and the most important thing what evolves throughout of life.

7. CONCLUSION

Although entrepreneurship is considered a desirable alternative to wage employment, it is first necessary to prepare the fertile ground for it to grow, to have built a generation with an entrepreneurial mindset, a bouncy mentality that likes to work. and self-work, thus an investment in training and continuous training, to develop the margin of knowledge and skills, which can subsequently be a lever of differentiation, and the latter in turn will be a real source for the job creation, and wealth for the nation.

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INTERNATIONAL STRATEGIES OF COMPANIES OPERATING IN BULGARIA

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ABSTRACT

Globalization continuously reshapes the business environment with context-related challenges and opportunities for internationally oriented companies. This paper sheds light on the international activities of companies in a Southeast European market. It investigates strategies employed by businesses operating in the dynamic business landscape of Bulgaria - the strategic choices made for target markets and internationalization modes. This research contributes to extant knowledge of firm internationalization by offering insights into companies' strategic decision-making in the Bulgarian context. Drawing on empirical data and practical illustrations, the study analyzes different international strategies, highlighting their development. The findings aim to inform and assist business leaders, academics, and practitioners in better understanding and crafting strategies in a dynamic context by providing a foundation for future research and facilitating the elaboration of efficient strategies for achieving sustainable success in the evolving competitive landscape.

Keywords: *International strategies, Internationalization, International Entrepreneurship, International modes, Practical examples, Globalization*

1. INTRODUCTION

The global business landscape is becoming increasingly dynamic due to three distinguished reasons. These are the global pandemics affecting trade flows and companies' strategies, regional conflicts evoking geopolitical tensions, and new technologies with the flagman artificial intelligence provoking change and the need to modify and better adapt business models to face the new realities. In addition to external influences, the international strategy choice depends on the firm size, resources, and capabilities. The significance of the study can be argued with the notion that in the era of globalization, the internationalization of companies has become a strategic imperative for achieving and maintaining sustained growth and competitiveness in the global market. This paper investigates the nuanced landscape of strategic choices employed by companies operating in Bulgaria, a dynamic and emerging Southeast European market. The study rationale is that understanding strategic decisions and motivations of companies in the chosen geographical context is crucial in an evolving and increasingly competitive global economy. The importance of crafting a strategy suited for the company and the external market is undeniable. A good strategy combined with developed dynamic capabilities helps generate and sustain superior performance in the fast-moving global environment (Al-Aali & Teece, 2014). The study builds on a conceptual research model where internationalization strategies include the selected entry mode and pathway explaining the choice made by the firms among two main strategic dimensions – traditional and born global (Knapp & Kronenberg, 2013). It also attempts to follow the suggestion of some researchers to apply a process lens to the established sub-field of international business, namely the process of firm internationalization (Welch & Paavilainen-Mäntymäki, 2013). A gap in the current research is that few studies on the region of Central and Eastern Europe have focused on internationalization strategies used by firms from transition economies (Kiss, Danis, & Cavusgil, 2012). The current state of knowledge regarding SME foreign market entry mode choice is defined as equivocal, and most researchers choose a mixture of theories or refrain from drawing on theoretical frameworks (Laufs & Schwens, 2014).

This research contributes valuable insights to the broader field of the theory of firm internationalization, drawing from existing models explaining firm internationalization while offering some implications for practitioners, educators, and researchers. Furthermore, the study delves into the key factors influencing international market entry decisions and strategies of companies in various industries. The study begins by examining the main theories of firm internationalization, contrasting the processual view to the international entrepreneurship perspective. In addition, the paper investigates the strategic choices by companies regarding market entry modes. It then delves into the reasons influencing companies' decisions to internationalize. With the development of international activities, the strategies expand, involving more complex modes and, in many cases, mixed modes of internationalization. Those are illustrated in the final section by combining representative empirical data and evidence of SMEs and large companies, statistical data, and some practical illustrations. Example approaches for the internationalization of companies in Bulgaria trace the evolution of international business activities in the country and overseas from inception.

2. LITERATURE REVIEW

This section presents a summarized overview of the external forces influencing the international strategies of companies and a selected bouquet of theories and strategies relevant to the context of Eastern Europe. Their applicability is illustrated in the final section with some empirical data and concise practical illustrations of companies following the processual view. It is beneficial to have in mind that many synonyms for 'process' are found to be used in the extant research: internationalization, stage model, foreign expansion, stages, expansion, dynamic, sequence, development, behavior, pattern, path, strategy, incremental, mechanism, route, progression (Welch & Paavilainen-Mäntymäki, 2013).

2.1. External forces influencing international strategies

The global business landscape is becoming increasingly dynamic due to three distinguished reasons. First, the global pandemics provoked forced modifications in the international behavior of companies to compensate for disruptions in value chains. Second, regional conflicts harm the world value chains and cause disruptions in trade flows when located near significant transport corridors. Third come the opportunities and threats emerging from new technologies, with artificial intelligence, in the first place. These forces strongly affect traditional planning and strategies by forcing companies to consider new models and pathways to remain competitive. From a historical perspective, major globalization drivers are the lower cost and faster communications technologies, lowering of trade and investment barriers, industry deregulations, and advances in transportation with cheaper and more efficient means (Mcdougall-Covin, Jones, & Serapio, 2014). Those forces accelerated the development of the global economy into today's dynamic and complex marketplace. Unexpected external factors might trigger unpredictable rapid changes and a negative response from firms - shrinking costs, reducing resources for internationalization, and termination of operations that affect their performance (Ivanova & Kolarov, 2020). One of the relevant questions of our time asked by policymakers, researchers, and practitioners is whether we will witness a reversing trend in globalization with its transformation to regionalization and a global division in opposing regional blocks due to the above factors, mainly the first two. This question is discussed in a series of reports on the state of globalization. Comparing the Covid-19 pandemic and the worst setback for the world trade flows in decades – the global financial and economic crisis of 2008-2009, the second was more destructive, while the pandemic was not expected to have such a negative effect on globalization, based on data of the DHL Global Connectedness Index (Altman & Bastian, 2021). These data are confirmed in the following report.

Despite global crises and escalating geopolitical tensions as well as US-China decoupling, according to Altman and Bastian, available data disprove the statement that the world has become more regionalized recently; there is no reverse trend in the cross-border trade, and globalization is still not giving way to regionalization (Altman & Bastian, 2023).

2.2. Theoretical frameworks for firm internationalization

There are two distinctive types of internationalization according to the internationalization pattern and the development of the process over time – traditional following several incremental steps (also defined as gradual or step-by-step) and non-traditional (instant, dynamic). The first type is associated with companies slowly internationalizing, penetrating, and growing in the global (regional) market. It is typical for some of these companies to operate for many years on the domestic market, gaining resources, knowledge, and experience and subsequently making their first attempts on a foreign market. The second type is linked to the behavior and strategies of born globals (BGs) and international new ventures (INVs) discussed in the international entrepreneurship literature. International entrepreneurship, by definition, draws on the entrepreneurship literature and is determined as distinct from SME internationalization research (Coviello, McDougall, & Oviatt, 2011). International entrepreneurship is at the interface of the mother disciplines of international business and entrepreneurship and emerged as a field with the study of the early and rapid internationalization of new ventures (Servantie, Cabrol, Guieu, & Boissin, 2016). INVs are often represented as BGs (Mcdougall-Covin et al., 2014). Born globals internationalize within three years of inception, have at least 25% of total sales from international markets, and are independent. i.e., starting companies or spin-offs, but not subsidiaries (Gerschewski, Rose, & Lindsay, 2015). The distinguishing characteristic of INV and BGs is that they quickly expand their foreign sales from the outset, arguably due to their business model offering distinctive niche products to spatially dispersed customers using low-cost communication, delivery, and adaptation methods (Hennart, 2014). Studies of INVs or BGs should target new and young firms with firm age as a defining characteristic – how early and quickly a firm internationalizes, and not the firm's size or scope of foreign operations that are typically of great interest to researchers (Coviello et al., 2011). The theoretical framework may include, among others, the institutional theory, network theory, internationalization theory (Uppsala, OLI, stage-based), motivation theory, resource-based view, capabilities/ resource dependence, international new venture framework, export literature (push and pull factors), Hofstede's cultural dimensions, knowledge-based view/ organizational learning, and other frameworks (effectuation, behavioral theory, stakeholder theory; etc.) (Kiss et al., 2012). Capabilities have been identified as entrepreneurial orientation, international orientation, international marketing skills, international innovativeness, international learning, international networking capability, and international experience (Hennart, 2014). Due to specific characteristics of SMEs - lack of resources, greater sensitivity to external challenges, ownership structure, and management team characteristics, alternative theoretical perspectives are suggested to study foreign market entry mode choices such as resource-based view, learning theory, and effectuation (Laufs & Schwens, 2014). The seminal 'stage models' of gradual internationalization date back to the 1970s with the dominant theories of innovation-related internationalization (or I-Model) and the Uppsala Model (U-Model) (Welch & Paavilainen-Mäntymäki, 2013). The early literature on internationalization behavior mostly concludes that companies were well established in the domestic market before developing international strategies as a series of incremental 'stages' where firms become gradually involved in export and other forms of international activities (Bell, Crick, & Young, 2004). This is illustrated in the assumptions of the original Uppsala model (Johanson & Vahlne, 1977). The concept of psychic distance refers to factors that make it difficult to understand foreign environments, and knowledge facilitates access to foreign markets with opportunity identification regarded as one

of the most significant elements for internationalization in a network (Johanson & Vahlne, 2009). A conceptual model for strategic analysis of firm internationalization includes three phases: 1) Internationalization drivers (proactive-reactive forces) influencing the decision to internationalize; 2) Internationalization triggers - internal change agents that motivate, initiate and maintain the internationalization process; in the case of decision-makers (entrepreneurs and management-teams) - main characteristics that help to perceive the driving forces; 3) Internationalization strategies – the choice adopted by the firms in two main strategic dimensions (traditional-born global pathway and entry mode) (Knapp & Kronenberg, 2013). This paper focuses mainly on the third phase – international strategies of companies. International strategy and the associated entry mode choice are regarded as 'soft' (non-quantifiable, qualitative) performance measures by the proposed dynamic model (Ivanova & Todorov, 2019).

3. METHOD

The methodological framework applied in this paper allowed for a comprehensive exploration of the international strategies of companies operating in the dynamic business environment of Bulgaria. Thus, it contributed to a balanced and nuanced understanding of the business internationalization process in Southeast Europe and the Balkans.

3.1. Research Design

The research strategy is associated with the adopted approach, whereas the data collection methods encompass operational and methodological decisions (Neergaard & Ulhøi, 2007). The study employs a mixed-method approach to capture the multifaceted nature of international business activities of companies operating in Bulgaria. It combines qualitative and quantitative analyses to explore the diverse strategies of companies from various industries. Qualitative methods were utilized to gain in-depth insights into strategic decision-making about strategy development. Quantitative methods contributed to a broader trend analysis of more frequently used international strategies and underlying motives. The diverse data set involving primary and secondary data contributed to a thorough study of the object–strategies of companies from different perspectives. Thus, it helps draw a more holistic picture of internationalization by adding a dimension – development in various foreign markets over time.

3.2. Data Collection of Primary and Secondary Data

In-depth interviews were conducted with key stakeholders, including respondents from top-level management, entrepreneurs, and key experts from a diverse range of companies operating in Bulgaria. The questionnaire developed as part of fundamental scientific research is extensive, and this study uses only relevant questions. The semi-structured interviews focused, among others, on market entry strategies, motivations, and targeted countries. A targeted literature review was conducted to consult the existing body of knowledge on international strategies and international activities of companies in Bulgaria, providing a solid foundation for the study. Additionally, relevant statistical data, specialized industry reports, and company publications were analyzed to supplement primary findings.

3.3. Data Sampling and Analysis Methods

A representative sampling technique helped to select companies representing various industries, sizes, and internationalization behaviors and experiences. This approach aimed to ensure a well-rounded and summarized understanding of the international strategies of different types of companies. Statistical techniques were employed to quantify and analyze empirical data, offering a broader perspective on the business trends regarding companies' international strategies in the studied context. Examples of research strategies include case studies and

grounded theory, where the grounded theory study may be a case study and vice versa, as well as ethnography and action research (Neergaard & Ulhøi, 2007). The selected approach is closer to a mixture of mini-cases and thematic analysis reproduced in and represented by brief practical illustrations. Thematic analysis is instrumental in categorizing and interpreting patterns emerging from qualitative data. The identified themes contribute to drawing meaningful insights into the international strategies of companies operating in Bulgaria.

4. INTERNATIONAL STRATEGIES – DATA AND PRACTICAL ILLUSTRATIONS

4.1. International motives and strategies of companies – empirical and statistical data

The representative study on a sample of 500 companies operating in Bulgaria shows that the three most important countries in which companies carry out international activities are mainly in Western Europe, Central, and Eastern Europe, followed by Asia and North America, and Africa and Australia at the bottom. The most important three countries - Germany, Greece, and Italy, are followed by England, Serbia, and Romania. The geographical scope of the international activity of the surveyed enterprises is determined by the orientation towards EU countries - primarily older member states. Physical distance is relatively less important, as geographically close countries such as Turkey, Albania, and Macedonia are less frequently cited as a target country for international activity. At the same time, geographically distant countries, such as the USA and Canada, are among the commonly indicated answers, tending a global orientation of some of the surveyed companies.

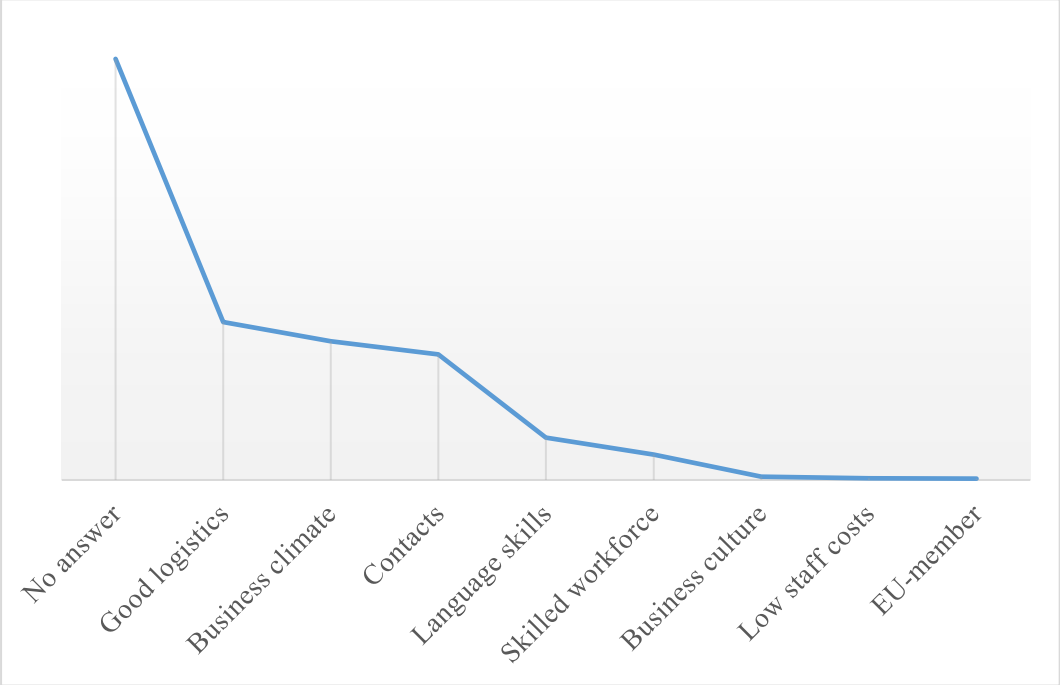

Figure 1: Reasons (motives) for choosing the main target countries/ markets
Source: Representative empirical study, n=500

Among the reasons determining the choice of the most important countries, three main ones stand out: good logistics, the business climate provided by the target country's government, and contacts with consumers and markets. Language skills and a skilled workforce were identified as supplementary reasons for choosing the top three markets. Counterintuitively, similar business cultures, low staff costs, and EU membership were neglected as reasons for choosing target countries.

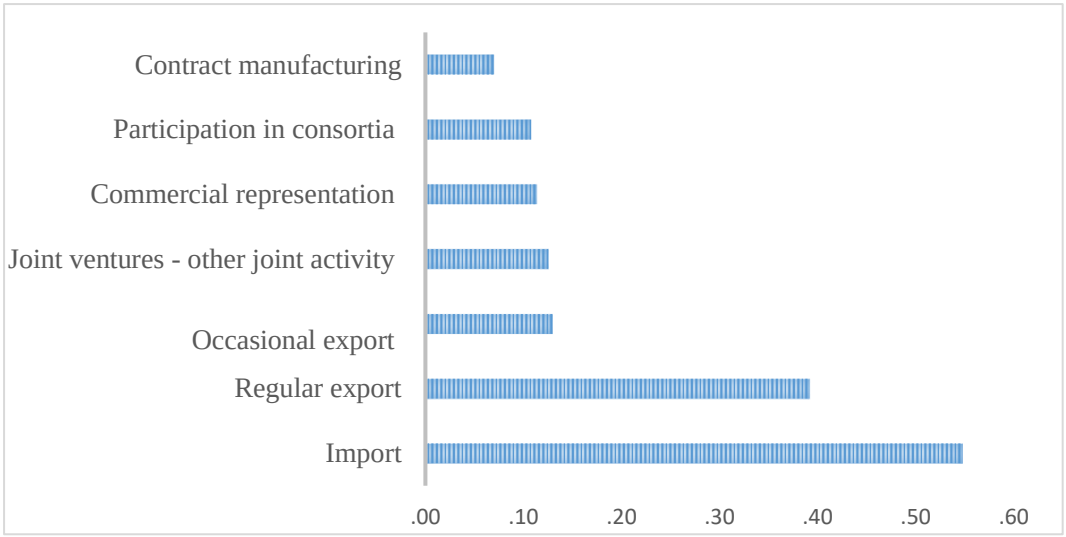

Figure 2: International strategies of companies operating in Bulgaria
Source: Representative empirical study, n=500

Regarding the choice of strategy - import and export (regular or occasional) are mostly adopted, and therefore, the findings confirm results from previous studies. The typical international involvement of Bulgarian SMEs is by less complex and resource-intensive modes following both reactive and proactive motives (K. Kolarov, Ivanova, Yordanov, Shindarova, & Nestorov, 2021). The least common choice of international strategy is associated with the following options: re-export, outsourcing, franchising, know-how contract, barter agreements, licensing agreements, joint ventures - joint production, participation in holding structures, management contract, and production abroad. An earlier study of Bulgarian SMEs found that import is a starting point for the development of internationalization, and export is the most common last step for most respondents (Ivanova, 2016). The remaining strategic options (including international licensing, franchising, subcontracting, outsourcing, and joint venture) are relatively less common as an initial entry mode. The study targeted mainly family SMEs, and this distinctive type of company ownership, management, and control influences the decision-making regarding international strategy. Overall, family businesses in the Bulgarian context were found to internationalize slowly, in fewer countries, and to generate lower revenues from the overseas market (Ivanova, 2017).

4.2. Target markets and leading trade partners of Bulgaria

The main target markets can be summarized by combining statistical data on the main trade partners of Bulgaria and empirical data on the countries targeted by the companies operating in Bulgaria. The statistical data reveal that the preferred target market for exports is Germany, followed by the neighboring Romania, the western market of Italy, and the non-EU member state Turkey (Figure 1). The leader position of Germany can be attributed to the presence of big retail store chains contributing to both inward and outward internationalization and some traditions in foreign business relations such as subcontracting partnerships. A study of Bulgarian SMEs exhibits a diverse picture of targeted countries (Kostadin Kolarov, Ivanova, & Todorov, 2018). Turkey is the first chosen country, followed by Germany, Greece, Italy, Romania, Russia, and Serbia. The first five targeted countries somewhat overlap with the traditional trade partners of Bulgaria. The choice of the first country is dependent on the previous management experience. Those who have it are directed at traditional foreign trade partners of Bulgaria, regardless of geographic and cultural differences, and those who do not have it are geared more towards geographically and culturally proximate countries.

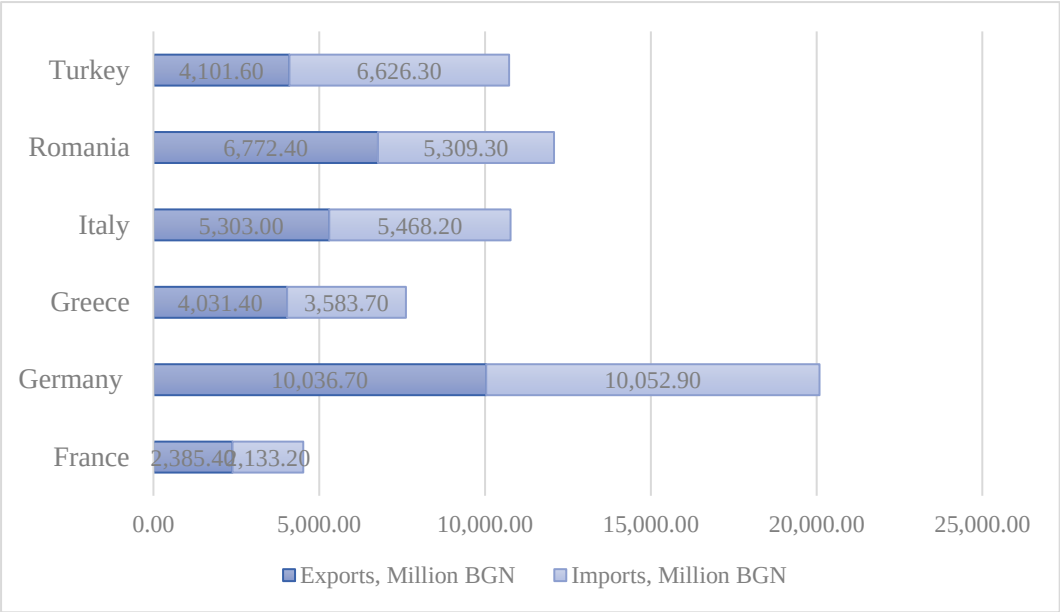

Figure 3: Main trade partners of Bulgaria for 2023
Source: (National Statistical Institute, 2023)

4.3. International strategies of companies operating in Southeast Europe – practical illustrations

- Illustration of a stepwise internationalization model – Olympus and Hellenic Diaries

Throughout its many years of successful presence in the industry, Hellenic Dairies S.A. remained a family-owned business. Hellenic Diary Group is presented in 47 countries and has 11 subsidiaries ("Sustainability Report," 2020). The business evolved from a company focused on dairy products to a company in the food industry, with a broad product range (including dairy products, juices, tea, and desserts). A local distributor for Bulgaria is the company 'Tyrbul' EAD – branch in Sofia.

Business Development stages	Location/ Brand/ Branch	Year
Start of activity	Greece	1950
First production site	Greece	1986
Start of production abroad	Romania (geographically proximate)	1999
New production branch	Sliven (neighboring country)	2004
Overseas commercial activities	Romania, Bulgaria (cross-border)	2007
Foreign acquisition	Brand 'Rodopi' (dairy products)	2008
New production site - Balkan peninsula	Brasov	2011
Own branch in Western Europe	Milan (Olympus Dairy Italy Srl.)	2013
Representation in the Scandinavian peninsula	Stockholm (Hellenic Dairies Nordic AB)	2015
Own UK branch	Birmingham (Olympus Dairy UK Ltd.)	2016
Own branch on the Balkan Peninsula for non-EU countries – 'Olympus Foods'	Belgrade, Skopje, Tirana	2018
Foreign Sales Department	Nicosia	2018
Expansion of market presence in Western Europe - own branch in France	Paris	2019

Table 1: Business development and international strategy of the company
Source: the secondary data for describing the strategy are sourced from public company data ("Olympus - history," 2024)

The company participates in the market with its brands - Olympus, Rodopi, and others. The logo and the brand name Olympus are borrowed from the highest mountain in Greece, making the products recognizable in the market (similar to the Rodopi brand triggering associations with high-quality dairy products from Bulgarian mountainous regions). Stages of business development exhibit strategic decision-making choices oriented to gradual expansion from geographically proximate, neighboring, and cross-border markets to more distant non-EU markets. This is in line with the Uppsala model of internationalization.

- *Illustration of stepwise internationalization model – Bg Line*

The main activity - trade of sugar products (import and distribution) started in 1995 in Sofia, Bulgaria. The company has several production bases, a developed distribution and partnership network, and more than 500 employees. Initially, it operated under the name "Sweetlife". After a decade of operation, in 2007, the idea matured that to develop internationally, in addition to trade, the company must also produce Bulgarian products. Subsequently, their brands were launched - Heli, Pina De, Blue Summer, Forest World, etc. About five years later, in 2013, the management set a new business goal - to become recognizable in Europe. The business was renamed to Bg Line to mainly emphasize the Bulgarian line of products launched successfully on the international market. It built long-term partnerships with companies in Europe, the Middle East, and Africa – from Iraq, Syria, Libya, Yemen, Morocco, Palestine, etc.

Business Development Stages	**Activity**	**Year**
1) Inception	Start of activity	1995
2) Passive internationalization	Import and distribution of sugar products	
3) Expansion of imports	Own distribution network throughout the country: wholesalers and retailers Launch of own brands Strategic goal - recognition in the European market	 2007 2013
4) Active internationalization	Export to European countries (greater physical distance)	
5) Subcontracting Strategy	Contracting foreign manufacturer from the EU => national distributor for Bulgaria	
6) Expansion of geographical scope to distant markets	Long-term partnerships with Asian companies Export to Middle Eastern countries (greater psychic distance) Participation in the world's leading exhibitions of confectionery	

Table 2: Business development and international strategy of the company
Source: the secondary data for describing the strategy are sourced from public company data ("Bg Line - About Us," 2024)

Table 2 demonstrates the gradual development of international activities of Bg Line, starting with passive forms and gradually continuing to active forms of internationalization. Starting with trade and import, passing through partnerships with European countries, it managed to get to the phase of development and export of its own branded products to physically distant countries. This case corresponds to research findings for the import and export used by Bulgarian companies as the most common first and last step (Ivanova, 2016). Studies reviewed in previous research suggest that in contrast to their counterparts in advanced economies, international entrepreneurs in emerging economies are less likely to adopt sophisticated strategies requiring high initial resource commitments and are more likely to focus on

geographically proximate markets (Kiss et al., 2012). While mainly choosing export and import modes, companies operating in Bulgaria also adopt more sophisticated strategies, as shown by some empirical data from the conducted representative study and provided practical examples. About the geographic scope, there is no distinct preference for proximate markets among respondents, with two of the three most important being the physically distant Germany and Italy.

5. CONCLUSION

Several implications stem from this paper targeted at entrepreneurs and managers or management teams of companies crafting their international strategies, business consultants, experts, educators, and researchers. First, the nuanced understanding of the employed strategies and challenges and opportunities for their practical implementation can be helpful for companies seeking to establish and expand their market presence in Bulgaria and South-Eastern Europe and from there to other markets. In addition, companies operating in Bulgaria seeking to market their business or products abroad could also benefit from knowing more about international strategies and their development illustrated with concise practical examples. Companies are strongly advised not to abandon their global strategies due to an expectation of de-globalization and regionalization that may put their competitive position at risk, but rather to make necessary and appropriate adjustments in their international strategies to face the external challenges (Altman & Bastian, 2023). In a limited domestic market, de-internationalization could be a riskier pathway than tuning international strategy to respond adequately to the contemporary changes happening in the global marketplace. Second, business consultants and mentors, experts, and educators in international strategies and models of companies could benefit from the enriched understanding of strategies relevant to the Southeast European market. They should incorporate in their training, mentoring, and consulting programs appropriate illustrations of different strategies following the processual view as a gradual development of international activities over time (be it a shorter or longer period) and other theoretical perspectives exhibited and explained in practical terms. Third, researchers could suggest and use different research methodologies and theoretical models to further investigate the international strategies in the South Eastern European context. A proposed research avenue is international entrepreneurship development in emerging economies, which is somewhat fragmented and highly skewed in geographic coverage, focusing on less technologically intensive industries with lower product development costs (Kiss et al., 2012). A possible avenue in this regard is to focus on high-tech sectors with higher costs for product development and innovations. Researchers could also find it interesting to explore the factors that enable entrepreneurs (and entrepreneurial managers) to internationalize and build entrepreneurial organizations capable of maintaining a sustained competitive advantage (Al-Aali & Teece, 2014). Comparative studies of international strategies can be done involving empirical data from multiple countries (e.g., located in the East and the West of Europe) or between EU member states and other European countries or third countries outside the EU, e.g., located in the so-called "4As" - Asia, Africa, America, and Australia.

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INSTITUTIONAL DETERMINANTS OF DISCRETIONARY TRANSACTION COSTS OF BUREAUCRATIC PROCEDURES AND MEASURES FOR THEIR REDUCTION

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ABSTRACT

The purpose of this article is to determine the institutional factors that increase the level of discretionary transaction costs of bureaucratic procedures and find measures to limit them. It is shown that the main factors of the transactional inefficiency of formal rules are: a large number of bureaucratic procedures provided for by the relevant formal rules; inconsistency and contradiction of individual provisions of these formal rules, or these rules with other formal rules; the presence of gaps, i.e. individual issues that remain unsettled by these formal rules. It is also found that transaction costs of bureaucratic procedures can be represented as a combination of operational transaction costs of bureaucratic procedures and discretionary transaction costs of bureaucratic procedures. At the same time, the reason for the operational transaction costs of bureaucratic procedures is a large number of redundant bureaucratic procedures provided for by formal rules. While the discretionary transaction costs of bureaucratic procedures arise from inconsistencies and gaps in the relevant formal rules. It is proven that the choice of measures to reduce the level of total transaction costs of bureaucratic procedures should be determined by the ratio of operational and discretionary transaction costs of bureaucratic procedures. In case of dominance of operational transaction costs of bureaucratic procedures, the main efforts should be concentrated on improving technical or organizational aspects of working with clients. Instead, in the case of the dominance of discretionary transaction costs of bureaucratic procedures, the main efforts should be aimed at reducing the discretionary powers of officials, by eliminating inconsistencies and gaps in formal rules. It is also shown that in the case of formal rules with a high level of discretionary transaction costs of bureaucratic procedures, an additional condition for the expediency of their reform can be highlighted: the fundamental possibility of preserving the functionality of formal rules in the absence of the official's ability to make decisions at his own discretion.

Keywords: *transaction costs, bureaucratic procedures, formal rules, institutional framework, efficiency*

1. INTRODUCTION

Any institutional reforms will be successful only when the new formal rules introduced during the reforms not only allow to achieve the set goal, but also do not cause resistance in the society. For this, formal rules must meet a number of requirements, the most important of which is the ability of formal rules to ensure an acceptable level of transaction costs of bureaucratic procedures that the client faces during the relevant procedures. After all, regardless of the purpose for which certain formal rules were introduced (in order to create a favorable institutional environment for certain types of business, or to force a business to properly fulfill its duties), a high level of transaction costs of bureaucratic procedures can lead to an increase in the number of cases of evasion of the requirements of these formal rules, as well as the occurrence of other unforeseen negative consequences of the introduction of formal rules. In the latter case, formal rules will be characterized by a certain level of transactional inefficiency (Abramov, 2011). Since the level of future transaction costs of bureaucratic procedures that clients will face is determined at the stage of development of the relevant formal rules, the problem of determining institutional factors that affect the effectiveness of formal rules and contribute to the future increase in the level of transaction costs of bureaucratic procedures and the search for measures to minimizing their negative impact, becomes especially relevant. For the effective solution of the mentioned problem, the most promising is the application of the tools of the theory of transaction costs. The theory of transaction costs is constantly in the center of attention of many researchers. After all, since its appearance, this theory has already managed to prove its practical value and the possibility of application for the analysis of a wide range of economic and social problems. Researchers pay particular attention to the study of such problems as: the methodology for measuring transaction costs (Collins & Fabozzi 1991; McCann, Colby, Easter, Kasterine & Kuperan, 2005; Wang, 2003), the definition of the main determinants of transaction costs (Li, Arditi & Wang 2015) and the search for ways to reduce transaction costs (Skutsch 2005; Dyer, 1997). The result of theoretical research was a large number of works in which the tools of the theory of transaction costs is successfully applied to the study of various problems: healthcare (Jiménez & Afonso 2023; Stiles & So 2003), environmental policy (Coggan, Whitten, Bennett, 2010; McCann , 2013), unemployment (Howitt, 1985), government transfer policy (Forteza, 1999), problems of transformation (Swaan, 1996; Pejovich, 2003) and many other problems (McDonough, 2005; Belze, Larmande & Schneider, 2020; Fichtner, Graehl & Rentz, 2003; Wen-Chih, Ming-Hsun & Chun-Chang, 2018). However, despite the large number of studies devoted to transaction costs, the problem of the influence of wide discretionary powers of an official on the level of transaction costs of bureaucratic procedures remains insufficiently researched. The purpose of this article is to determine the institutional factors that increase the level of discretionary transaction costs of bureaucratic procedures and find measures to limit them.

2. INSTITUTIONAL DETERMINANTS OF DISCRETIONARY TRANSACTION COSTS OF BUREAUCRATIC PROCEDURES

The ability of formal rules with transaction-type inefficiencies to achieve their goals will directly depend on the level of transaction costs of bureaucratic procedures. It is obvious that the higher the level of transaction costs of bureaucratic procedures, the stronger is the desire of clients (entrepreneurs, ordinary citizens and other persons whose activities are subject to this formal rule) to reduce it. One of the methods of reducing the level of transaction costs of bureaucratic procedures, which can be resorted to by clients, is evasion of compliance with the requirements of the existing formal rules. Regardless of which option the client chooses to evade compliance with the requirements of the current formal rules (concluding a corruption agreement with an official, moving to the shadow sector or simply ignoring certain norms of the formal rules), this will allow him to reduce by a certain amount his costs associated with

passing bureaucratic procedures. However, avoiding compliance with the requirements of the current formal rules, the client, in case of exposure of the violation, risks encountering the penalties provided for this. Therefore, at an unchanged level of fines, the client's decision to evade compliance with the requirements of the current formal rules will primarily be determined by the level of transaction costs of bureaucratic procedures. In the case of a low level of transaction costs of bureaucratic procedures, for the client, the expected benefits of evading compliance with the requirements of the current formal rules will be significantly less than the likely sanctions that will be imposed on him in the event of the discovery of the fact of violation of the formal rules, which will deter him from violating their requirements. This case can be considered as acceptable for society, since it does not pose any threat to the functioning of the country's institutional framework, because, after all, no formal rule can be accompanied by zero transaction costs of bureaucratic procedures. Much more dangerous is the case of a high level of transaction costs of bureaucratic procedures — a level at which the sanctions provided for violating the requirements of formal rules are much smaller than the potential benefits from evading compliance with the requirements of the corresponding formal rules. Under these circumstances, the higher the level of transaction costs of bureaucratic procedures, the smaller the proportion of clients will comply with their requirements and the lower the transaction efficiency of these formal rules will be. In the worst case, a too high level of transaction costs of bureaucratic procedures can negatively affect the overall efficiency of the country's institutional framework, because the high level of these costs not only makes it unlikely to achieve the goal for which these formal rules were introduced, but also creates conditions for the conditional ineffectiveness of other formal rules (Abramov, 2015). Thus, at a high level of transaction costs of bureaucratic procedures, the negative consequences of the transactional inefficiency of formal rules coincide with the negative consequences of target inefficiency — the inability of these formal rules to achieve the goal for which they were introduced. However, in contrast to formal rules characterized by target inefficiency, formal rules with significant transactional inefficiency still allow to achieve the set goal, provided stricter control mechanisms and enforcement of their requirements are applied. It is obvious that this approach to restoring the functionality of the current formal rules has a number of disadvantages, the main ones of which are:

- maintaining a high level of transaction costs of bureaucratic procedures, which negatively affects business activity and;
- the growth of society's expenses for the maintenance of officials authorized to exercise appropriate control.

Therefore, in order to restore the functionality of formal rules with significant transaction inefficiency, it will be more appropriate not to create additional enforcement mechanisms for their implementation, but to reduce the level of relevant transaction costs of bureaucratic procedures by reforming these formal rules or completely replacing them with more effective alternative formal rules. For further analysis, the transaction costs of bureaucratic procedures can be conveniently divided into two main groups:

- operational transaction costs of bureaucratic procedures and;
- discretionary transaction costs of bureaucratic procedures.

Operational transaction costs of bureaucratic procedures are transaction costs related to the technical or organizational aspects of the clients' passage of bureaucratic procedures, such as: the need for a personal visit to a state institution or the possibility of submitting documents through an electronic cabinet; presence or absence of an electronic queue; the possibility of timely obtaining a comprehensive consultation regarding the passage of the bureaucratic procedure; convenient location and work schedule of the state institution and many other

aspects. The main feature of operational transaction costs of bureaucratic procedures is that their level can be relatively easily reduced, due to revision of technical or organizational aspects of working with clients, without the need to revise the key norms of the relevant formal rules.
In contrast, the reason for the emergence of discretionary transaction costs of bureaucratic procedures is the presence of an official with wide discretionary powers, which give him the opportunity to determine at his own discretion the necessary degree of compliance by the client with the requirements of the current formal rules. Regardless of how perfect the technical and organizational aspects of the clients' passage of bureaucratic procedures are, the official's wide discretionary powers allow him to easily increase the level of transaction costs of bureaucratic procedures (both for all and selectively for individual clients), delaying the consideration of the case, requiring additional documents , unjustifiably refusing to consider the case, etc. At the same time, the same discretionary powers allow the official to turn a blind eye to frank violations by individual clients of certain requirements of the current formal rules, which creates favorable conditions not only for the increase in the level of transaction costs of bureaucratic procedures, but also for the spread of a number of other negative phenomena, such as: corruption , shadow economy, semi-formal rules and other phenomena, the spread of which makes the country's institutional framework even less efficient. Accordingly, in order to reduce the level of discretionary transaction costs of bureaucratic procedures, radical steps are needed, namely: the reform of those norms and provisions of the relevant formal rules that give the official too wide discretionary powers. The main factors leading to the transactional inefficiency of certain formal rules are:

- a large number of bureaucratic procedures (often redundant), provided for by the relevant formal rules;
- inconsistency and contradiction of individual provisions of these formal rules, or these rules with other formal rules;
- the presence of gaps, i.e. individual issues that remain unsettled by these formal rules.

Of the above factors, the most favorable for the growth of discriminatory transaction costs of bureaucratic procedures, and therefore the most dangerous for the efficiency of the country's institutional framework, are the last two factors: the inconsistency of formal rules and the presence of gaps in formal rules. Indeed, no matter how large the number of bureaucratic procedures provided for by certain formal rules is, the transaction costs of their passage can always be reduced to an acceptable level thanks to the improvement of technical or organizational aspects of the organization of interaction between officials and clients, even if a significant share of bureaucratic procedures will be redundant. That is, the number of bureaucratic procedures stipulated by the relevant formal rules is a factor that mainly determines the level of operational transaction costs of bureaucratic procedures of these formal rules. It is also equally important that in the absence of inconsistencies and gaps in the formal rules, the criteria for the client's compliance with the requirements of the formal rules are contained in the formal rules themselves. The role of the official, who is authorized to monitor the clients' compliance with the requirements of these formal rules, is reduced exclusively to the fixation of the client's compliance with the specified criteria and the detection of possible violations. So, for example, if the current formal rules specify that an applicant for social benefits must have an income of less than a certain amount, then the official authorized to exercise control over this procedure remains only to receive the appropriate certificate from the client and attach it to the case, if the income is specified in it is less than prescribed by the formal rules, or deny the client social benefits, otherwise. At the same time, the official's personal opinion regarding the expediency of providing assistance, in one case or another, does not affect the decision-making process in any way.

The consequences of the inconsistency of the current formal rules and the presence of issues that remained unsettled by these formal rules will be completely different. Despite certain differences in the mechanisms of action of these factors, their common feature is the granting of wide discretionary powers to the official authorized to control the degree of compliance by clients with the requirements of the relevant formal rules, which negatively affects both the level of transaction costs of bureaucratic procedures and the effectiveness of formal rules. Thus, in case of inconsistency and contradiction of the valid formal rules, individual norms of this formal rule may contradict each other, or contradict the norms of other formal rules. Under these circumstances, the client's attempt to comply with the requirements of one of the norms of the formal rule will mean an automatic violation of other norms that contradict this norm. The main consequence of this will be that during the bureaucratic procedures stipulated by these formal rules, the client will necessarily violate some norms of the formal rules, which will be the basis for refusing to consider his case or imposing the prescribed fines. If the requirements of such formal rules are followed literally, the passage of the bureaucratic procedures stipulated by them will be completely blocked, which, obviously, will not suit either the clients or the administration of the institutions, whose activities will be completely paralyzed. Therefore, in most such cases, the official, with the tacit consent of society, gets the opportunity to interpret conflicting norms of formal rules and at his own discretion decide which norms of formal rules should be applied in one or another case. From the client's point of view, even in the absence of corruption (that is, the need to pay a bribe to an official), such a situation leads to an increase in the level of transaction costs of bureaucratic procedures, because when starting the relevant bureaucratic procedures, the client cannot know in advance which norms of formal rules will be applied in his case. In the case of issues that remain unsettled by these formal rules, the official also receives broad discretionary powers. However, the nature of these powers is somewhat different. In contrast to the previous case, the official receives the authority not to choose one or another norm of formal rules that should be used in a certain case, but to independently determine the decision-making procedure in a situation of institutional uncertainty. At the same time, the level of transaction costs of bureaucratic procedures, which the client will face during the bureaucratic procedure, will depend on how consistently the official follows the decision-making procedure defined by him. So, if an official, having established a decision-making procedure at his own discretion, consistently follows it, then over time the information about it spreads among the majority of clients, or even becomes common knowledge. Under these conditions, the client can properly prepare for going through bureaucratic procedures supplemented by new requirements, which makes the increase in the level of transaction costs of bureaucratic procedures relatively small. The situation will be much worse if the official does not follow the decision-making procedure established by him, or constantly changes it. Even if the official does not pursue any selfish goal in his actions, the consequence of such inconsistency will be a significant increase in the level of transaction costs of bureaucratic procedures. After all, in this case, the client has no opportunity to prepare for passing the relevant bureaucratic procedures and even assess his chances of successfully passing them. The most common example of institutional gaps in formal rules is the establishment of qualitative criteria for compliance with the requirements of formal rules instead of quantitative ones. So, for example, if the current formal rules governing the procedure for assigning social benefits state that the applicant for social benefits must not only be in a difficult situation, but also make sufficient efforts to improve his financial situation, then the official has sole discretion the determination of the applicant's eligibility is transferred to two criteria at once: firstly, whether the applicant is in a difficult situation, and secondly, whether he makes sufficient efforts to improve his financial condition. In such cases, the decision to assign social benefits to one or another applicant will, at best, be based on established practice and previous precedents of providing social benefits, and, in the worst case, on personal

preferences and financial interest of the official. It is obvious that in both cases considered above, no attempts to improve the technical or organizational aspects of the organization of interaction between officials and clients will be able to affect the overall level of transaction costs of bureaucratic procedures, and therefore the considered factors will lead to an increase in the level of transaction costs of bureaucratic procedures exclusively due to discretionary transaction costs of bureaucratic procedures.

3. MEASURES TO REDUCE DISCRETIONARY TRANSACTION COSTS OF BUREAUCRATIC PROCEDURES AND APPROPRIATENESS OF THEIR APPLICATION

From the above, it is obvious that the only way to reduce the level of discretionary transaction costs of bureaucratic procedures is to reform the relevant formal rules in order to reduce the discretionary powers of the official who is authorized to monitor their compliance. At the same time, the main efforts during the reformation of formal rules should be aimed at eliminating those defects of formal rules that open the official to act at his own discretion, namely: at identifying and eliminating possible inconsistencies and contradictions contained in these formal rules, as well as identifying and filling all gaps in formal rules. However, the complete elimination of the official's discretionary powers is impossible. After all, if the identification and elimination of all existing inconsistencies of formal rules is, although extremely difficult and costly, but still an accomplished task, then the identification and filling of all gaps in formal rules, in addition to the technical complexity of the task, is complicated by the requirement to preserve the operability of the corresponding formal rules. The latter is explained by the fact that in order to effectively limit the official's discretionary powers, formal rules must provide for all possible cases that the official may face and clearly regulate the procedure for his actions in each of these cases. However, the limitation of the official's discretionary powers is also hindered by the fact that there are a large number of formal rules whose effectiveness directly depends on the official's having sufficient discretionary powers to be able to act in new unforeseen circumstances. One of the examples of such formal rules is the formal rules of financial monitoring and financial investigations. The formal rules of financial monitoring and financial investigations are inherent in giving officials of the financial monitoring system broad discretionary powers (Serzhanov, Maksymenko, Abramov, 2022). The fact that officials have wide discretionary powers leads to a number of negative consequences: from an increase in the level of transaction costs of bureaucratic procedures to the spread of such dangerous phenomena as corruption in the financial monitoring system (Volosnikova, Serzhanov, Abramov, 2023) and semi-formal rules (Volosnikova, Maksimenko , Serzhanov, Abramov, 2023). With this in mind, limiting the available discretionary powers of officials of the financial monitoring system is desirable from the point of view of many members of society. However, the key feature of these formal rules is that a significant limitation of discretionary powers is impossible without the formal rules of financial monitoring and financial investigations losing their functionality. The latter is due to the fact that, due to a number of reasons, the schemes for laundering dirty money faced by the officials of the financial monitoring system are not stable, but on the contrary, change rapidly over time (Diachenko, Serzhanov, Abramov, 2023). Therefore, if the official's discretionary powers are reduced to a minimum by the formal rules of financial monitoring and financial investigations, his functions will be reduced only to the formal verification of compliance of financial transactions with the criteria of dubiousness defined by the formal rules. It is obvious that under such circumstances, the financial monitoring system will be able to detect only those schemes for laundering dirty money, which have already been well investigated at one time and whose signs have been fixed in the formal rules of financial monitoring and financial investigations.

Qualitatively new money laundering schemes will remain unnoticed by the financial monitoring system. Moreover, the financial monitoring system will remain helpless even in cases where the official checking the relevant financial transactions is clearly suspicious of such transactions, because he simply lacks the authority to block these transactions. That is, limiting the discretionary powers of officials of the financial monitoring system, although it can reduce the level of transaction costs of bureaucratic procedures, it leads to the target ineffectiveness of formal rules of financial monitoring and financial investigations. Thus, the broad discretionary powers of officials of the financial monitoring system act as the main mechanism for adapting the financial monitoring system to the emergence of new schemes for laundering dirty money, the loss of which will lead to the rapid reorientation of persons involved in the process of laundering dirty money to new schemes, the characteristics of which have not yet been established in formal rules of financial monitoring and, accordingly, cannot be detected by it. Thus, the structure of measures aimed at increasing the transaction efficiency of any formal rules will depend, first of all, on the ratio of operational and discretionary transaction costs of the bureaucratic procedures of the corresponding formal rules. Thus, in the case of the dominance of operational transaction costs of bureaucratic procedures, the basis of measures to increase the transaction efficiency of formal rules will be measures aimed at improving the technical or organizational aspects of working with clients, i.e. aimed at reducing the time that must be spent by the client during each stage bureaucratic procedure. In the case of the dominance of discretionary transaction costs of bureaucratic procedures, increasing the transaction efficiency of formal rules should be carried out, mainly, with the help of measures aimed at eliminating inconsistencies and filling gaps in the relevant formal rules, i.e. aimed at reducing the discretionary powers of officials. However, in the latter case, the reformation of formal rules with significant transaction inefficiency, like any other formal rules, should take into account the main criteria for the feasibility of reforming formal rules, namely: «acceptability for society of the goal, the achievement of which ineffective formal rules should contribute; low level of transaction costs of replacing formal rules, compared to the expected benefit from their change; lack of direct asymmetry of alternative formal rules» (Abramov, 2016). In addition, an additional condition for the feasibility of reforming formal rules with a high level of discretionary transaction costs of bureaucratic procedures can be highlighted: the fundamental possibility of preserving the functionality of these formal rules in the absence of the official's ability to make decisions at his own discretion.

4. CONCLUSION

Thus, the following conclusions can be drawn. First, the increase in the level of transaction costs of bureaucratic procedures can occur both due to the increase in operational transaction costs of bureaucratic procedures and due to the increase in discretionary transaction costs of bureaucratic procedures. The level of operational transaction costs of bureaucratic procedures directly depends on the number of bureaucratic procedures provided for by these formal rules. The main factors behind the growth of discretionary transaction costs of bureaucratic procedures are the inconsistency and the presence of gaps in the relevant formal rules. Secondly, if for these formal rules the high level of total transaction costs of bureaucratic procedures is mainly due to high operational transaction costs of bureaucratic procedures, then the measures to reduce the level of total transaction costs of bureaucratic procedures should consist in improving the technical or organizational aspects of working with clients during their passing of relevant bureaucratic procedures. Instead, with the dominance of discretionary transaction costs of bureaucratic procedures, measures to reduce the level of total transaction costs of bureaucratic procedures should consist in eliminating inconsistencies and gaps in formal rules.

Thirdly, the reformation of transactionally ineffective formal rules in order to limit the discretionary powers of officials is expedient only in cases where there is a fundamental possibility of preserving the functionality of these formal rules in the absence of the official's ability to make decisions at his own discretion.

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DIGITAL PUBLIC LAW AND FUNDAMENTAL RIGHTS: RETHINKING CONSTITUTIONAL LAW IN THE ERA OF AI AND DIGITAL TRANSFORMATION

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ABSTRACT
The digital revolution is profoundly transforming the processes of production of law, influencing the theoretical and legal frameworks of standards. Digital processes are redefining constitutional debates and could become essential in the adoption of constitutional texts. Digital law, emerging from private law, poses challenges in public law, particularly in the protection of personal data and digital sovereignty in the face of transnational actors. Global regulation is necessary to reconcile technological innovation with the preservation of fundamental rights. The digital revolution imposes unprecedented challenges on constitutional law, requiring deep reflection on how we conceptualize and apply legal principles. This article explores the need for an overhaul of constitutional law to respond to the changing dynamics of digital technology in our societies, highlighting key aspects related to data protection, individual rights and fundamental rights or national sovereignty.
Keywords: *Artificial Intelligence, Public digital law, Digital law, Fundamental freedom law, Constitutional law*

1. INTRODUCTION

The digital revolution is fundamentally redefining the processes of law production, influencing the theoretical and legal framework of the characteristics of the norm. The most obvious impact lies in the new registers of legitimacy of the norm resulting from the use of digital technology. Digital technology as a whole is not a world without any regulation or legal constraints. In fact, digital technology in general and AI systems more specifically exist on a spectrum with blurred contours, (Castelluccia C. and Metayer D., 2019) and there is not yet a significant category for such recognition. In the same vein, Frank Easterbrooke defends the idea that there is no specific digital law "in the same way that there is no special law for horses, why would a law 'of' the digital emerge? Thus, even if "many disputes concern the sale of horses; others concern the victims of horse kicks; others concern licensing agreements for horse racing, or the care that veterinarians give to horses, or the prices of horse shows", no specific horse law exists. Constitutional law, as the science of the organization of political power and the protection of rights, is confronted with the challenges of the development of artificial intelligence (AI). As the digital revolution transforms society, the old national conception of constitutional law appears inadequate to this emerging global reality. The principles of state sovereignty are losing their legitimacy in the face of transnational digital actors. Digital law has been the subject of much reflection in private law before becoming a field of reflection and research in public law. The respect of constitutional principles of the use of digital technology in public administrations raises several problems. The protection of personal data varies according to country and context. Indeed, the divergent approaches to AI and algorithms underline the need for global regulation, while preserving fundamental rights. Digital sovereignty becomes crucial, with states competing with private and international entities for control of cyberspace.

2. CONCEPTUAL AND THEORETICAL BACKGROUND OF IA LAW

2.1. Private law and AI

AI systems are becoming more sophisticated and playing a more significant role in society. Private law jurists were the first to address issues related to digital technology or AI. As a result, research in this branch of law has been much more focused on the question of liability, personality, e-commerce, and the protection of intellectual property. Indeed, in private law, there are two distinct reasons for recognizing AI as persons before the law. The first is to establish liability in the event of a failure, thus filling potential gaps related to their speed, autonomy, and/or opacity. The second reason is to ensure recognition in the event of success, particularly regarding intellectual property created by these systems. Concrete applications of AI, such as drone delivery and self-driving cars, are transforming various sectors, including retail, improving customer experience and overall efficiency. However, this revolution raises legal and social challenges, such as privacy protection in the face of technological "pervasiveness," the risks of cognitive bias in the decisions of intelligent systems, the concentration of Big Data, and the risk of extreme profiling that alters freedom of choice. Consequently, the need to regulate AI becomes apparent in specific areas such as the liability of intelligent machines and the applicability of intellectual property laws. Currently, there is no specific legislation, and some problems remain unresolved using existing legal categories and principles. The protection of rights related to the design and use of AI is based on copyright and industrial property laws. However, in comparative law, we can note that the United Kingdom has granted copyright protection to works created by artificial intelligence if no natural person can be considered the author of the work since 1988. The United States applies the "human authorship policy" which does not allow copyright protection for works not created by humans. The principle of human authorship is adopted by several countries. Indeed, the European Patent Office (EPO) has also confirmed that under the European Patent Convention, only a human inventor can be designated in a European patent application. On the one hand, the debate centers on whether personality is granted for instrumental or inherent reasons, often compared to the legal personality of companies. However, some argue that AI systems, when approaching human indistinguishability, should have a status comparable to that of natural persons. Theories of legal personality, such as the contractual, fictional, and realist approaches used for companies, fuel the debate on extending this status to AI systems. Ultimately, the decision to grant legal personality to an AI should be guided by the rights and duties associated with such recognition (Chesterman S., 2020). The lack of specific legislation governing the use of artificial intelligence systems, the civil and criminal consequences, or harmful events or offenses related to their use raises a number of questions and challenges for legislators. The legal effects and legal problems related to the design, production, and use of these new technologies must therefore be integrated into the framework of current legislation and resolved based on existing legal categories and principles. While new issues related to intellectual property can be governed by texts on the protection of intellectual and industrial property, it remains that certain areas are not governed by law and raises the incompleteness or inadequacy of certain legislations. However, AI and intellectual property disputes are not limited to a single jurisdiction but are deployed internationally, each with its own challenges and approaches to resolving these complex issues (Patocki-Tomas E. and Monnet C., 2023). For the foreseeable future, it is preferable to rely on existing categories, with liability for wrongdoing linked to users, owners, or manufacturers rather than the AI systems themselves. It should be noted that "even if cyberspace has differences with territorial spaces, state authorities continue to exercise significant normative activity there. In many ways, it is naive to believe that the advent of cyberspace puts an end to the ability of states to regulate." (Lepage A., 2005).

2.2. Public law of digital sphere

The evolution of powers held by private companies in the information society raises the question of the risk of power concentration in private actors such as Google and Facebook. These private actors, by exploiting algorithmic technologies, can wield power that rivals, or even surpasses, that of public authorities. This concentration of power raises concerns about democracy and the rule of law, highlighting the need for reflection on the role of the State and its sovereignty in the context of the algorithmic society. On the other hand, the increasing use of digital technology in public administrations, the process of computerization of administration that began with the widespread use of computers or the further digitalization as observed today, or e-government, resulting from a transformation and modernization of the State, are all elements that have piqued the interest of legal scholars. In essence, a new field of public law has begun to emerge, namely digital public law. Accordingly, Lucie Cluzel-Métayer defines digital public law as "the law applicable to all information and communication technologies based on the coding of data in binary language used by public authorities". However, research in public law has focused on limited issues such as the dematerialization of exchanges (...), the protection of personal data, the relationship between freedom and surveillance, open data, and data protection (Cluzel-Metayer L., 2023). In the same vein, Johan Wolswinkel in 2022, in his study on AI and administrative law in European countries, emphasizes the need for adaptations of legal systems to accompany the technological changes observed in the socio-economic environment. Indeed, the impact of AI systems on the principles of administrative law is significant (Rahoui K., 2023). As Lemaire points out in this regard, in the past, scholars have questioned whether the digital environment could be regulated, with different approaches highlighting the role of network architecture, technology, and communication networks as sources of regulation (Lemaire V., 2019). While states were initially considered the main regulators, the landscape has evolved. States are no longer the sole powerful regulators; they coexist within a complex network of fragmented regulatory entities. Indeed, artificial intelligence technologies in the information society illustrate this dual nature of technology, offering opportunities for innovation while posing risks when implemented without adequate safeguards. Moreover, the use of AI has continued to impact the public sector in several states, ranging from the use of generative AI or experimentation with AI-assisted video surveillance within the framework of the 2024 Olympic and Paralympic Games law.

3. RESEARCH METHODOLOGY

The methodology employed in this paper encompasses a multifaceted approach to explore the complex dynamics of digital sovereignty, digital constitutionalism, and the regulation of artificial intelligence (AI). The methodology can be delineated into several key components: literature analysis, comparative study, conceptual analysis, examination of public policies, and expert consultations. Firstly, a thorough literature analysis is conducted to gather a wide array of scholarly resources, including academic articles, government reports, and legislative texts. This allows us to understand the historical context, current debates, and emerging trends surrounding the topics under investigation. Secondly, a comparative study of constitutional practices across different countries is undertaken to elucidate variations in regulatory approaches and governance structures. Thirdly, conceptual analysis is employed to clarify key terms and concepts, such as digital sovereignty and digital constitutionalism. By deconstructing these notions and exploring their implications within the context of the digital age, a nuanced understanding of their significance in shaping legal frameworks and policy responses is achieved. By integrating these methodological approaches, this paper aims to offer a rigorous analysis of the legal and political implications of digital sovereignty, digital constitutionalism, and AI regulation.

Through a systematic examination of relevant literature, comparative case studies, conceptual frameworks, policy assessments, and expert insights, this study seeks to contribute to the ongoing discourse on governance in the digital age and inform future policy development efforts

4. ANALYSIS AND RESULTS: CONSTITUTIONAL LAW AND AI

Constitutional law, as the science of organizing political power and guaranteeing rights and freedoms, has been confronted for several decades with the effects of the development of AI. Indeed, constitutional law does not merely undergo or adapt to the effects of the digital revolution: for some years now, it has been trying to seize upon the phenomenon in order to encourage, protect, use, supervise or regulate it (Bonnet J. and Turk P., 2017). The disruptions and transformations induced by digital technology necessarily require an adaptation of the law (Rarhoui K., 2023). In this sense, constitutional law should accompany these changes and integrate them. Historically centered on the State and its sovereign prerogatives, constitutional law now extends to encompass society as a whole, and this is accelerated by the process of digital transformation of the State, society and the economy. New digital actors threaten national sovereignty, state control over the economy and/or society. However, the traditional national form of constitutional law now appears inadequate to this emerging global reality. The old principles of state sovereignty and citizenship are losing their legitimacy. The national form of law, including family, labor, commercial, tax, health and constitutional law, is proving to be inadequate to this new global reality. In essence, the absence of strict regulation of personal data protection does not imply a lack of norms, and respect for constitutional principles should not be neglected (Rousseau D., 2017).

4.1. Data protection, sovergeignty and AI

4.1.1. Data protection

Personal data protection differs considerably between the European Union and the United States. Europe, with the GDPR, offers the highest level of protection in the world, anchored in fundamental rights and extraterritorial rules. In contrast, the United States focuses on the free flow of data, without general regulation. Protection relies on sectoral practices and a liberal approach, limited to the actions of the federal government. The differences have led to tensions, with the EU often considering the US level of protection as inadequate. As for algorithms, the United States favors a light-touch approach that promotes innovation, while the EU imposes limitations on algorithmic decision-making, framing automated profiling and guaranteeing individual rights. As a result, the experiences of using and regulating AI differ from one context to another. In the United States, the increasing use of big data and predictive analytics, particularly through tools such as Compstat, PredPol, HunchLab and Palantir, has transformed peacekeeping and police force management methods. "Predictive policing" aims to anticipate crimes by drawing on past data. However, legislative differences in data protection have favored these developments. In France, for example, the law prohibits automated decisions in police matters, only allowing decision-making support tools. In the United States, the Fourth Amendment provides protection against unreasonable searches and seizures, but violations have been found. Downstream, the use of algorithms raises questions about transparency and defense rights, as illustrated by court cases in the United States. In response, the European Union (EU) is seeking to frame AI by adopting ethical standards. It emphasizes the need for transparency, non-discrimination, respect for human rights, and accountability of developers.

The need for national regulation is juxtaposed with a global need to define the contours of AI regulation, placing much more emphasis on its ethical dimensions. As noted by Yannick Meneceur, a magistrate at the Council of Europe, intergovernmental organizations are preparing or even already proposing legal frameworks to regulate the application of this technology

(Castets-Renard C., 2019).While the European Commission's regulation proposal has garnered attention for its legally binding nature, the juxtaposition with initiatives from the Council of Europe, the OECD, and UNESCO reveals the outline of a mechanism for global governance of this technology, even in the absence of formal coordination. Indeed, the intervention of international regulators aims to create a framework of trust for the development of AI applications (Meneceur Y., 2021).

4.1.2. Challenged sovereignty

The issue of digital sovereignty constitutes a central challenge in the context of the digital revolution, where the ubiquitous development of the internet has profoundly disrupted the sovereign authority of states (Turk P., 2013). The advent of cyberspace, being immaterial, a-territorial, and transnational by nature, has overturned the traditional and hierarchical structure of the state legal system. States now find themselves in competition with other entities producing norms, such as private economic operators or international bodies, challenging their monopoly on the enunciation and application of legal rules. This redistribution of power induced by the development of the internet invites a rethinking of the classical concept of state sovereignty. The traditional pyramidal structure gives way to a horizontal and tangled game in cyberspace. Deterritorialization accelerates the questioning of physical borders that delimited the traditional exercise of state sovereignty, challenging the national mode of legal production (Cassar B., 2020). The emergence of AI redefines the contours of state sovereignty and democratic processes, generating both opportunities and concerns. Internationally, this transformation sparks diverse perspectives and palpable tensions. At the national level, digital innovations are already perceptible, although their outcomes still raise questions (Benhamou B., 2011). Indeed, the shortcomings of the governance system of digital spaces raise questions about the possibility of transposing constitutionalism principles to international bodies. The idea of an "Internet Constitution" is raised, envisioning the constitutionalization of principles, rights, and duties related to digital communication. "In fact, the shortcomings of the governance system of digital spaces, highlighted by recent scandals, lead to questioning the perspective of transposing constitutionalism principles (legitimacy, representativeness, responsibility, transparency) to international regulatory bodies. Reflection on a potential 'Internet Constitution', for example, hypothesizes the 'constitutionalization' of principles, rights, and duties attached to digital communication (principle of neutrality, openness, internet freedom), to which the unified community of designers and users would agree to submit (Bonnet J. and Turk P., 2017). In essence, digital sovereignty emerges as a key concept in this era of deterritorialization. States find themselves in competition with private actors and international bodies for control of cyberspace. Attempts by certain states to regain control of their digital sovereignty bear witness to the inherent tensions in this new power configuration.

4.2. Fundamental rights and freedoms: towards digital constitutionalism

New technologies, particularly artificial intelligence (AI) and algorithms, have ushered in a new era of power dynamics, challenging constitutional freedoms. These technologies, driven by machine learning and big data, not only enhance information retrieval but also reshape decision-making processes previously exclusive to humans. They facilitate autonomous decision-making, raising concerns about mass surveillance and erosion of personal liberties in what is termed the Algorithmic Society. However, while promising efficiency and error reduction, they also pose significant challenges regarding accountability and transparency. This shift in power dynamics parallels historical transitions in constitutional theory, from monarchic prerogatives to legislative states, and now to the digital era. The rise of platform capitalism further blurs the lines between public and private authority, necessitating a reevaluation of constitutional safeguards in the face of cybernetic power and the dominance of algorithms in governance.

Individual freedoms are under severe threat, with individuals compelled to expose themselves to the State, presumed guilty in the name of public safety, echoing dystopian scenarios. In fact in France, Legislation like the Olympic Games law and Justice 2023-2027 bill further erode privacy rights. For instance, the former enables extensive techno-police surveillance, including real-time analysis of video footage, with minimal oversight. The law's broad provisions extend beyond the Games' duration, facilitating intrusive surveillance practices. Concurrently, European lawmakers aim to curtail discriminatory AI applications, highlighting the disconnect between legislation and technological advancements. Despite facial recognition's use during the Covid19 pandemic, its normalization raises concerns about absolute state control over public spaces. Additionally, the use of drones for policing, enabled by legal loopholes, poses further threats to privacy. Overall, the erosion of fundamental liberties through intrusive technologies underscores the urgent need for legal safeguards to protect individual freedoms. Fundamental freedoms apply not only to the administration but to all state authorities, whether exercising legislative, executive, or judicial power. In this context, fundamental freedoms are enshrined in constitutional texts and conventions that hold higher value than laws, which are obligated to respect them (Harviel J., 2018). Issues raised in the realm of fundamental freedoms law are at the heart of major societal transformations and debates. Consequently, the constitutionalization of online spaces, where platforms unilaterally establish norms and procedures, thus assuming a role similar to that of public authorities, is a current topic of debate (Denizeau-Lahaye C., 2019). This privatization of fundamental rights protection, particularly freedom of expression, poses democratic challenges, as these platforms act without democratic control mechanisms. From this perspective, the issues related to artificial intelligence and human rights in Morocco have been at the forefront of concerns for national and international experts gathered during the seminar organized by the National Human Rights Council (CNDH) in Rabat on December 3, 2021. Participants emphasized the crucial importance of discussing issues related to freedom of opinion, expression, and press in the digital space. A central point of agreement concerns the urgent need to engage in public dialogue on the protection of human rights in the context of technology and artificial intelligence. In the Rabat Declaration, the importance of considering the protection of rights to privacy, personal data protection, and security in the design of applications and algorithms related to artificial intelligence was emphasized, following the principle of "Human Rights Design" from the 2020 annual report. At the African Union level, freedoms are defended by the African Charter on Human and Peoples' Rights of 1981. Globally, the Universal Declaration of Human Rights of the UN in 1948 protects these rights. The use of artificial intelligence must be balanced with the protection of freedoms, requiring regulatory adaptation to ensure inclusive, sustainable, and controlled development. This implies the definition of new digital-specific rights. Constitutional law must adapt to address these challenges, protecting fundamental rights and limiting the emergence of unchecked powers. Digital constitutionalism requires a redefinition of the role of constitutional law in algorithmic society to address these new challenges of consolidating power by transnational private entities. The protection of individual rights and democratic values remains crucial in this rapidly evolving environment. According to De Gregorio, digital constitutionalism provides a democratic constitutional narrative for the digital age, establishing a theoretical and practical framework based on how digital technologies influence the evolution of constitutionalism (De Georgio G., 2020). A prominent feature of digital constitutionalism in the European Union is its adoption of a constitutional approach to regulate private actors operating online. Unlike the United States, which follows a more liberal approach focused on First Amendment protection, the EU has chosen a constitutional path to deal with transnational companies exercising quasi-public functions on a global scale. This approach highlights the Union's transition from a liberal to a constitutional perspective in the field of digital technologies. Human dignity, enshrined in the Charter of Fundamental Rights of the European Union, is presented as the foundation of

European democratic values and plays a crucial role in resisting online private powers. The article argues that digital constitutionalism can be a means of restoring constitutional balance and protecting democratic values in the face of the digital revolution. In fact, the relationship between constitutional principles and the burgeoning influence of artificial intelligence (AI) and algorithmic decision-making is complicated. While acknowledging the practical conveniences offered by algorithms, it underscores their potential encroachment on fundamental rights and freedoms. There are concerns about the opacity of algorithmic processes, the risk of biased outcomes, and the erosion of accountability in administrative procedures. Many scholars advocate for robust legal frameworks and ethical guidelines to safeguard constitutional rights amidst the increasing integration of AI technologies. They stress the importance of maintaining human-centric approaches and upholding due process principles to mitigate the unchecked expansion of algorithmic power in governance and law enforcement. Additionally, discussions revolve around the need for predictive policing to adhere to fundamental rights, addressing concerns about discriminatory practices and the erosion of legal protections. Overall, there is an imperative need for balancing between technological advancement and the preservation of constitutional values to ensure a just and equitable society in the age of AI (Simoncini A. and Longo E. 2021). The comparison between European and American approaches to digital constitutionalism emphasizes the diversity of these phenomena depending on specific constitutional frameworks. While the European Union [1]adopts a constitutional approach to regulate private powers, the United States prefers a more liberal approach focused on freedom of expression. Despite these differences, Europe maintains a cautious approach, highlighting concerns related to fundamental rights vis-à-vis tools deployed in the United States. The increasing use of predictive tools in law enforcement raises concerns about fundamental rights, both upstream and downstream of police intervention. Upstream, risks of rights infringement include the right to physical integrity, freedom, privacy, data protection, freedom of association, equality, and nondiscrimination. These risks increase if the tools target individuals rather than places. Protecting fundamental rights and democratic values is no longer optional in a context where the information society generates private power that dictates norms without accountability. In other words, the adaptation of the state to the digital society is crucial for upholding fundamental rights and preserving constitutional values. In this context, protecting individual freedoms while balancing them with general interests becomes paramount. Legal frameworks must be established to ensure that any encroachments on these freedoms are clearly defined by law and serve a legitimate purpose. Examining the protection and regulation of liberties in the digital environment reveals the need for both general and specific laws tailored to address contemporary challenges. This includes safeguarding against potential infringements on freedoms arising from individual surveillance, whether driven by commercial interests or state security objectives. Additionally, it is important to advance democratic principles amidst the rapid evolution of digital society and recognize the necessity of legislative or regulatory adaptations to effectively respond to emerging technologies and changing societal dynamics. Ultimately, ensuring the protection of fundamental rights within the framework of the constitution requires proactive measures to address the challenges and opportunities presented by the digital age (Nemitz P. 2018).

5. CONCLUSION

Digital technologies enable constant comparison of constitutional systems and political practices. These advancements could promote convergence and standardization of practices, contributing to an internationalization and globalization of constitutional law. Consequently, the constitutional autonomy of states, which is the classic sovereignty of the state, is being put to the test.

[1] https://www.coe.int/fr/web/artificial-intelligence/cai

The traditional conception, associated with supreme command power within defined borders, is being disrupted by the consequences of the digital revolution and the emergence of networks. The hierarchy of state power clashes with the modes of regulation of digital spaces, characterized by collaboration between technicians, state authorities, the private sector, civil society, and users, largely based on soft law. This evolution leads to claims of "digital sovereignty" by some states, presented as necessary to defend their fundamental interests and sovereign powers. However, reflection on "digital sovereignty" remains enigmatic and controversial, encompassing control not only by states but also by companies, user communities, and even individuals, over their digital destiny. Thinking about the regulation of AI and considering specific rules, especially regarding algorithmic decision-making, imposes requirements that may either hinder or encourage its deployment. Thus, if we consider the regulation of personal data, the low level of protection in the United States has facilitated the development of predictive tools applied in policing and justice missions. In a democratic era, deliberation, discussion, and argumentation become crucial to determine what is just. The law provides the necessary framework to anchor rules of common life. Traditional principles are being questioned, but law, as a regulatory tool, can guide this transition towards an era of global digital democracy respecting the principles of free access and equal access to digital space. The question of digital constitutionalism emerges, aiming to redefine the role of constitutional law in the algorithmic society. Faced with the privatization of fundamental rights protection by online platforms, digital constitutionalism offers a theoretical and practical framework to regulate transnational private actors operating in the digital environment. In Europe, this approach stands out for its adoption of a constitutional perspective to deal with transnational companies, emphasizing human dignity as the foundation of democratic values. In conclusion, constitutional law must adapt to the disruptions induced by the digital realm. The regulation of AI, data protection, and digital sovereignty are major issues. Digital constitutionalism provides a response to the challenges posed by transnational private actors, placing the protection of fundamental rights at the heart of this evolution towards a digital society.

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THE ROLE OF GOVERNANCE QUALITY ON ECONOMIC GROWTH AND CITIZENS' WELL-BEING, A COMPARATIVE ANALYSIS FOR THE BALKAN COUNTRIES

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ABSTRACT

The quality of governance is of particular importance, especially in developing countries, because it significantly affects economic growth and the well-being of citizens. The Balkan countries have experienced a long and difficult process of transformation from a centralized economy to a market economy. These countries have undertaken and implemented substantial economic, political and institutional reforms in the direction of good governance. These reforms have aimed at increasing the effectiveness of the government, the performance of the public administration, and the best functioning of the public institutions. The quality of government and its impact on economic growth has become more important in recent years, especially in these transition countries that need to reform their institutions to meet the conditions for EU membership. Governance is considered a very important component of economic growth and the well-being of the citizens of a country. Several studies have analyzed the relationship between good governance and economic growth, and show a positive relationship between the quality of governance, economic growth and the well-being of citizens. The quality of governance promotes transparency, accountability, efficiency and the rule of law at all levels of public institutions. It is an important instrument for sustainable economic development, ensuring a fair and efficient management of human, capital and financial resources in the country. The purpose of this study is to examine the role and relationship between the quality of government, economic growth and citizens'well-being in the Balkan countries. In this context, the six World Governance Indicators (WGIs) have been examined, respectively: Voice and Accountability (VA), Political Stability and Absence of Violence (PSAV), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC), during the period 2000 - 2022. The findings and results show that the quality of governance has a positive impact on economic growth and the well-being of the citizens of a country.

Keywords: *Governance quality, economic growth, well-being, relationship, impact, effectiveness*

1. INTRODUCTION

The quality of governance and its impact on economic growth has become more important in recent years, especially in Balkan countries that need to reform their institutions to meet the conditions for EU membership. Several studies have argued that the quality of government institutions significantly affects the economic growth of a country. The effectiveness of political and economic institutions is a vital determinant of long-term economic growth. According to the World Bank, good governance is evaluated by the implementation capacity of governance principles of a country, providing a framework for development and economic growth.

It includes the processes of selecting, monitoring and replacing governments, as well as the government's capacity to formulate and implement policies effectively and sustainably. Good governance contributes positively to economic development, through the provision of supporting strategies and policies for economic growth, promotion and encouragement of the private sector, efficient use of public resources, and macroeconomic stability through sustainable fiscal policies. In the World Bank report, (1994), the need for good governance was emphasized and identified as the existence of transparent processes, a government that takes responsibility for its actions, and a strong civil society engaged in public affairs acting under the rule of law. World Bank economists have had a prominent role in developing a concept covering all governance components. They describe governance as a combination of traditions and institutions practised by governments within any nation. The broad concept of governance consists of three parts, namely a procedure for selecting, monitoring and replacing systems; the ability of governments to manage and execute specified effective policies and the social and economic connection between the state and its citizens that ensures laws and institutions are respected (Kaufmann, et al., 2010). This concept includes the ability of the authorities to adequately identify and implement effective policies and procedures in selecting, monitoring and changing the governments, alongside respect for state and citizens for economic and community interaction institutions. Therefore, good governance in this paper, refers to the processes and behaviours that serve decision-making and the exercise of power in a country, which is accessible and understandable to the general public, transparent, effective, coherent, easy to understand and ensures broad participation of citizens in it the entire set of decision-making policies. Since 1996, the World Bank has published six indicators measuring governance in different countries as part of the governance indicators project, namely the Worldwide Governance Indicators (WGI). These indicators are Voice and Accountability (VA), Political Stability and Absence of Violence (PSAV), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC). According to the OECD (2020), good governance is critical to long-term economic, social and environmental development. The ability of governments to operate effectively and efficiently depends in part on their management policies and practices. Furthermore, as societies reach higher development levels, expectations of quality public services tend to increase, while their objectives become more complex. It can be explained as participation, transparency and accountability, effective, equity promoting rule of law. International organisations face various challenges, notable among which are challenges to legitimacy, on account of a lack of democracy and inclusiveness of their processes; lack of transparency; and insufficient consideration given to human rights (Cooker, 2022). Income inequality and unemployment have played a major role in contributing to poor welfare in developing countries, other factors such as political instability, lack of good investment opportunities and living conditions. Beleiu, et al. (2015), analyzed the impact of governance on economic growth and found a highly positive correlation, between the rule of law, regulatory quality and economic growth. The challenges addressed for good governance in Albania and other Balkan countries, are the rule of law, macroeconomic stability, economic growth, efficient use of public resources, quality of public services, and increasing well-being for citizens. In the long term, the policies of developing countries aim to achieve high levels of development in many of its dimensions. At the institutional level, states are governed by groups of elected officials and appointed administrators. Credibility and managerial capacity are two attributes that should characterize the leadership of an organization in the public sector. Monitoring the performance of public institutions, continuity and the will to implement reforms, the involvement of citizens and civil society in decision-making, control over corruption, and the implementation of the law, are elements that show that the governance of a country plays an important role in economic development of the country.

There is a positive relationship between the quality of public institutions and economic growth. (Kaufmann and Kraay, 2002). Good governance requires an open and developmental policy, a professional administration, decision-makers who are willing to act for the public good and a strong civil society. The quality of governance is one of the prerequisites for sustainable and faster economic development of the Balkan countries, given their historical background, the specific economic circumstances during the transition after the 1990s, the slow economic recovery, the strong impact of the global financial crisis and economic and the long and complicated road to accession to the European Union (Djurovic & Bojaj, 2020). The implementation of good governance policies in the Balkan countries can promote economic development and ensure convergence towards the level of developed economies. In this regard, these countries must focus more on reforms that improve governance if they want to achieve sustainable development in the future. The quality of governance is one of the prerequisites for the sustainable and faster economic development of the Balkan countries, given their historical background, the specific economic circumstances during the transition after the 1990s, the slow economic recovery, the strong impact of the global financial crisis and economic and the long and complicated road to accession to the European Union. The purpose of this paper is to examine the role and relationship between the quality of government, economic growth and the well-being of citizens in the Balkan countries. To achieve this goal, the objectives are: 1) What relationship exists between the quality of governance, economic growth and citizens'well-being in the Balkan countries? 2) To examine the indicators that have an impact on the quality of good governance, and 3) What are the challenges in the future for better governance in the Balkan countries? The paper is designed as follows: In section 2, presents the theoretical background and literature review. In section 3, we introduce the research methodology. Section 4 presents, discussions and empirical results. In the last section, we present conclusions and recommendations.

2. LITERATURE REVIEW

The efficiency and quality of the government reflect citizens' perceptions of the quality of public services, the quality of policy formulation and implementation, as well as the credibility of the government's commitment to such policies, which explains the differences in economic growth in different countries. The quality of governance is an important instrument for stimulating sustainable development in the country. In this regard, the impact of governance, the quality of public administration, on economic development has been investigated theoretically and empirically in many studies. This concept has many definitions provided by academics, researchers and policymakers. After the 1990s, considerable literature has empirically examined the impact of governance on economic growth and development, particularly by analyzing governance indicators. The World Bank (1994), defined governance as "how power is exercised in the management of a country's economic and social resources for development". The United Nations Development Program (1997), characterized governance as "the activity of monetary, political and administrative authority to deal with a nation's issues at all levels. It involves the systems, procedures and institutions, through which citizens and gatherings express their interests, practice their legitimate rights, meet their commitments and intervene in their disparities". The United States Agency for International Development (2002), describes governance "as a complex interaction system between the structures, features and processes characterized by transparency, responsibility and involvement". This concept includes the ability of the authorities to adequately identify and implement effective policies and procedures in selecting, monitoring and changing the governments, alongside respect for state and citizens for economic and community interaction institutions. The World Bank (1994), identified four main areas of good governance; public sector management, accountability, transparency, and legal framework.

Governance is defined as the process of the selection, monitoring and replacement of governments, the power of the government to effectively establish and perform sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them (Kaufmann, et al., 2010). Good governance is, among other things, transparent and accountable, effective and equitable, and promotes and ensures the rule of law. It ensures that political, social and economic priorities are based on broad consensus in society and the participation of citizens in decision-making. (Elisa & Sara, 2011), in their study examined the effect of good governance on economic growth and found that governance positively affects economic growth for both developing and developed countries. Economic growth is currently associated with GDP per capita, a useful tool to approximate growth trends easily comparable among countries. For these reasons, it has been accepted as an indicator of citizens' well-being and economic development. Durguti et al. (2020), in their study, show that remittances, exports and imports, have a significant impact on economic growth. Economists increasingly agree that a country's governance and the quality of its institutions have a significantly positive influence on economic growth performance (Lopes, et al., 2023). According to the OECD (2022), good public governance is key to achieving economic growth, competitiveness and a better quality of life. Democratic governance and the rule of law require capable, accountable and effective public administrations. Through the analysis of the World Governance Indicators (WGI), most studies have concluded that good governance has a positive impact on growth and economic development. Raczkowska, et al. (2023), in their study, confirm that there is a significant relationship between good governance and economic growth in EU countries. Good governance requires open and developmental politics, professional administration, decision-making processes, transparency and accountability, and a strong civil society. According, to Mira & Hammadache (2017), good governance is the capacity of management and institutional reforms conducted by state policy that improves coordination and delivery of effective public services, and accountability of political actors and individual citizens in the driving of development policies. Since 1996, the World Bank has published six indicators measuring governance for more than 200 countries around the world namely the Worldwide Governance Indicators (WGI). Kaufmann et al. (2010) have developed these six indicators (WGI), corresponding to basic governance concepts, which, according to their study, show a strong causal relationship between good governance and improved development economic. Bayar (2016), argues that all public governance indicators except regulatory quality had a statistically positive impact on economic growth. In the analysis of the World Governance Indicators, it turns out that the rule of law and the control of corruption significantly affect the economic development of a country (Fawaz at.al, 2021; Samarasinghe, 2018). Countries with better public governance use public expenditures more effectively, which positively affects economic growth. AlBassam (2013), investigated the relationship between governance and economic growth during times of crisis and found the existence of a significant, positive correlation between each governance indicator and gross domestic product (GDP). Tarek & Ahmed (2013), argue that the institutional failure that characterizes developing countries inevitably leads to the destabilization of their long-term economic growth and an improvement in governance would greatly contribute to their economic growth. Governance is considered to be a very important component of good economic growth and well-being (Kambo et al., 2022). In developing countries, public governance has the potential to affect economic growth through many direct and indirect instruments because it is the main determinant of the economic environment and institutions that have a significant impact on the decision-making process of key economic actors. Acemoglu & Robinson (2010), consider public institutions as a key factor of economic growth that causes uneven development across a country. Government institutions can stimulate or reduce economic growth and development.

Fraj et al. (2018) argued that governance is not connected to economic growth unless there is an interaction between governance and other effective economic channels in the country. The legal and administrative frameworks within which individuals, businesses, and government interact to generate revenue and ensure economic prosperity define the institutional environment (Radulović, 2020). The improvement of the business climate is one of the main factors that attracts domestic and international investors to the country, which will lead to economic growth. Numerous studies have shown that economic growth depends on the capacity of human capital, the organization and functioning of the private and public sectors, access to modern technologies, government efficiency and the performance of public institutions. Zhuo et al. (2021), argue in terms of the positive impact of governance indicators on economic growth. In the long term, economic growth could be positively or negatively affected by government policy (Al-Naser & Hamdan, 2021). The efforts of international institutions and public authorities on sustainable development can also support the process of reducing poverty and increasing the well-being of the population, in developing countries (Mansi, et al., 2020). Governments worldwide are still seeking solutions that support sustainable development, and good governance is identified as a crucial tool for achieving this goal (Güney, 2017). The development of the role of public administration has led to the decentralization of public services to allow better access for citizens to the services provided by the government. Petreski (2014), examined the impact of institutional quality on economic growth in transition economies and concluded that regulatory environments with good governance had a positive impact on economic growth. The quality of governance has gained importance in recent years, both in developed and developing countries, as a way to promote effective and sustainable development, as well as to reduce corruption and increase trust in government. In Albania, important reforms in the economic infrastructure sectors have been undertaken in the last two decades, to improve the performance of service delivery to citizens by the government (Tomorri & Keco, 2023). Better governance also has the potential to positively affect economic growth by contributing to the development of domestic financial sectors and attracting more foreign direct investment. The economic growth of the countries of the Western Balkans must be based mainly on the accelerated construction of efficient public institutions (Kostić et al., 2019). Good governance of a nation results in a strong economic performance, and for a particular nation to effectively achieve its economic growth, the government has to explore the factors that can either reduce or increase the economic growth of a country. Pere (2015), based on World Bank data, examined the impact of good governance on the economic development of Western Balkan countries and found that some aspects of good governance have a greater impact on economic growth than others. Government or policymakers should widen their focus to include political and economic variables that affect economic growth. They should make every effort to achieve good governance and enhance economic growth (Mahran, 2023). The implementation of good governance policies in the Balkan countries can promote economic development and ensure convergence towards the level of developed economies. The focus of our study is the examination of the relationship and the impact of governance quality on economic growth in Balkan countries, which is based on the analysis of the six Worldwide Governance Indicators.

3. DATA AND METHODOLOGY

The methodology used consists of the review of literature, data, macroeconomic indicators, and comparative analysis, examining how the quality of governance affects economic growth and citizens'well-being in the Balkan countries. The literature reviewed above reveals essential aspects regarding the relationship between governance quality and economic growth, using statistical methodology and analysis. Based on the objectives of this study, regarding the evaluation of the impact of the quality of governance on the development and economic growth

in the Balkan countries, as well as the examination of the indicators that have an impact on good governance, we have used a descriptive and analytical approach in accordance with the purpose of the study. The methodology used for this study includes three phases:

- The first phase included a systematic literature review related to the purpose of the paper, such as; research articles, papers, reports, and books from domestic and foreign authors;
- The second phase includes the collection of data published by national and international institutions, such as; (Institute of Statistics, Bank of Albania, World Bank, UNDP, OECD, etc.);
- The last phase consists of data analysis, which is structured on the logic of the available resources, related to the indicators that evaluate the quality of good governance.

The study is based on the use of the analysis method, through the collection, processing and interpretation of data and statistical indicators, focusing on the impact of governance quality on economic growth and citizens'well-being, challenges faced by these countries, and conclusions and recommendations for the future.

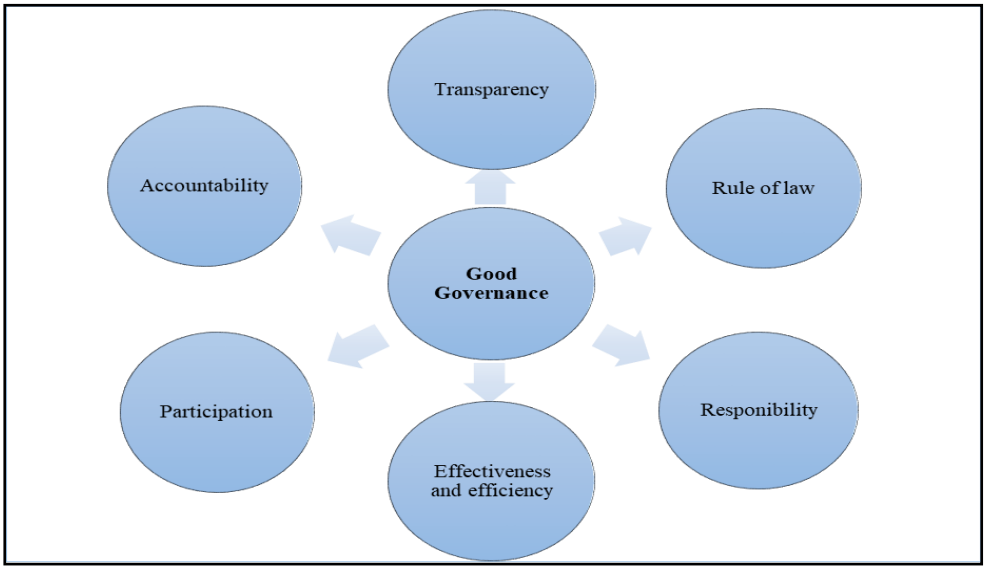

Figure 1: Good governance components
Source: Authors'composition, 2024

Characteristics	Description
Transparency	Processes, institutions and information are directly accessible to all actors and citizens by providing sufficient information.
Participation	Involvement of citizens, stakeholders and government agencies in policy-making and decision-making processes.
Accountability	Responsibility of government institutions and organizations to citizens for their decisions and activities.
Rule of law	Drafting policies and implementing the activities of government organizations and institutions in compliance with laws and regulations.
Effectiveness and efficiency	The activity and competencies of government organizations in performing their functions and providing public services with efficiency and effectiveness.
Responsibility	Accountability in the provision of services and exchange of information by organizations, government institutions to citizens and other actors.

Table 1: The characteristics of good governance
Source: Authors'composition, 2024

The six Worldwide Governance Indicators have been published since 1996 by the World Bank. These indicators are defined as follows:

1) **"Voice and accountability":** Reflects perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media.
2) **"Political Stability and Absence of Violence":** measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.
3) **"Government effectiveness":** Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
4) **"Regulatory Quality"**: Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
5) **"Rule of Law":** Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
6) **"Control of corruption":** Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of the state by elites and private interests.

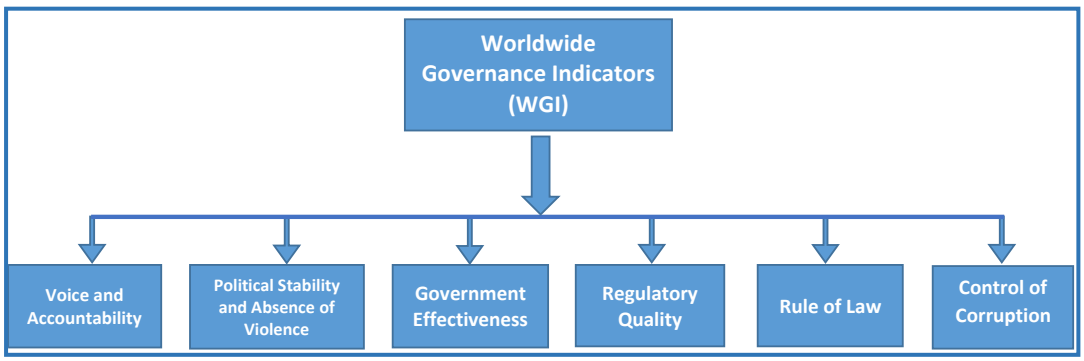

Figure 2: The Worldwide Governance Indicators
Source: Authors' composition, 2024

The indexes of each governance indicator vary between -2.5 (weak) and 2.5 (strong), for governance performance (World Bank, 2023). The variables used in the statistical analysis, their symbols and data sources are presented in Table 2.

Table following on the next page

Indicators	Symbol	Unit of measure	Source
GDP growth (annual %)	GDP	(in %)	World Bank Indicators, 2023
GDP per capita/$	GDP	(in $)	World Bank Indicators, 2023
Voice and Accountability	VA	(-2.5 to +2.5)	World Bank Indicators, 2023
Political Stability and Absence of Violence	PSAV	(-2.5 to +2.5)	World Bank Indicators, 2023
Government Effectiveness	GE	(-2.5 to +2.5)	World Bank Indicators, 2023
Regulatory Quality	RQ	(-2.5 to +2.5)	World Bank Indicators, 2023
Rule of Law	RL	(-2.5 to +2.5)	World Bank Indicators, 2023
Control of Corruption	CC	(-2.5 to +2.5)	World Bank Indicators, 2023

Table 2: Indicators used in the statistical analysis
Source: Authors'composition, 2024

4. RESULTS AND DISCUSSIONS

Referring to the review of the literature and the methodology used, this paper focuses on the impact of the quality of governance on economic growth and the well-being of citizens in the Balkan countries. The quality of governance is one of the prerequisites for sustainable and faster economic development of the Balkan countries, given their historical background, the specific economic circumstances during the transition after the 1990s, the slow economic recovery, the strong impact of the global financial crisis and economic and the long and complicated road to accession to the European Union. Factors such as governance and the investment environment also have an impact on economic growth and poverty reduction. Good governance affects better economic policies and better harmony in the well-being of citizens. Because there is a large gap between economic development due to the various factors that contribute to its growth and well-being, it appears that the poverty rate is higher in the Western Balkans region than when we compare it to the European Union. Addressing reforms in the area of rule of law, fundamental rights and good governance remains the most pressing issue for the Balkans countries. Some of the challenges that must be addressed for good governance in these countries are the drafting and implementation of legal and institutional policies; law enforcement; macroeconomic stability; quality of public services, efficient use of public resources, transparency and accountability of public institutions. The implementation of good governance policies in the Balkan countries can promote economic development and ensure convergence towards the level of developed economies. The economic and political development of the Balkans has had a significant impact on the European Union (EU) and other neighbouring countries. The results show that there is a long-term relationship between government quality and economic growth for indicators analysed; government effectiveness, voice and accountability, political stability and absence of violence, regulatory quality, rule of law and control of corruption. In this regard, these countries must focus more on reforms that improve governance if they want to achieve sustainable development in the future. Referring to the data of the World Bank, we will analyze below the main macroeconomic indicators in Balkan Countries.

No	Country	GDP /mln_$	GDP per capita/$	GDP growth in %	Inflation in %	Unemployment in %	FDI in % of GDP
1	Albania	18,882	6,803	4.84	6.73	11.81	7.63
2	Bosnia and Herzegovina	24,528	7,585	3.90	14.02	14.05	2.63
3	North Macedonia	13,563	6,591	2.15	14.20	15.08	6.42
4	Montenegro	6,096	9,894	6.09	13.04	15.40	14.31
5	Serbia	63,502	9,394	2.25	11.98	9.47	7.23
6	Kosovo	9,429	5,351	3.51	11.58	n/a	8.61

Table 3: The main macroeconomic indicators in Balkan Countries_2022
Source: Authors'composition based on data from World Bank, 2023

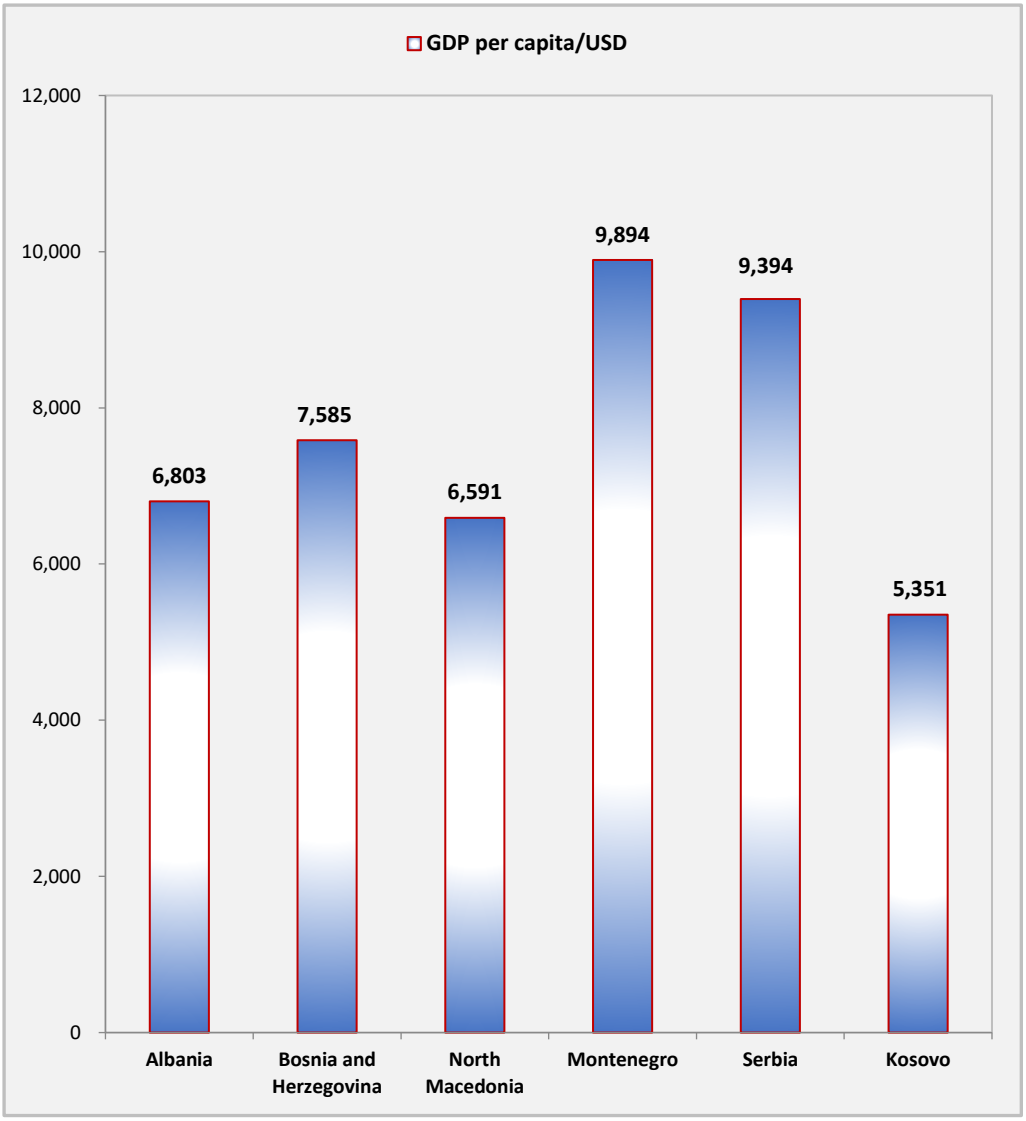

Figure 3: Gross Domestic Product (GDP) per capita/$_Balkan Countries
Source: Authors'composition based on data from World Bank, 2023

Referring to Gross Domestic Product (GDP) per capita for 2022, it turns out that, Montenegro and Serbia have the highest levels, respectively (9,894 $ and 9,394 $) while Kosovo, North Macedonia and Albania have the lowest levels, respectively (5,351 $; 6,591 $ and 6,803 $).

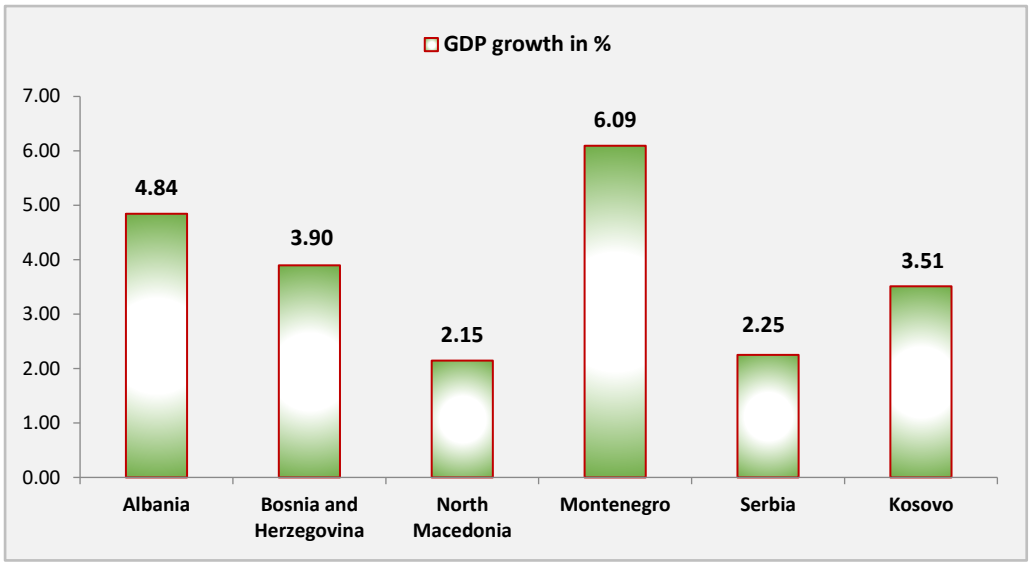

Figure 4: Annual growth in % of GDP_Balkan Countries
Source: Authors'composition based on data from World Bank, 2023

Referring to the data, on the economic growth, in % of the Gross Domestic Product for the year 2022, it results that, Montenegro and Albania have the greatest growth, respectively (6.09% and 4.84%) compared to other Balkan countries. North Macedonia and Serbia have the lowest growth, respectively (2.15% and 2.25%).

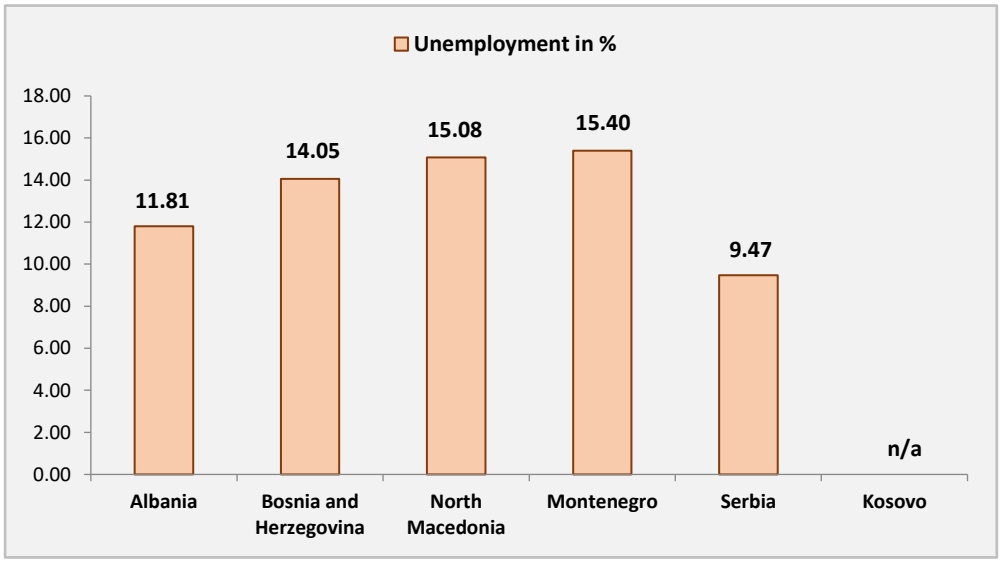

Figure 5: Unemployment in %_Balkan Countries
Source: Authors'composition based on data from World Bank, 2023

Referring to the data, on the unemployment rate for 2022, it results that, Montenegro, North Macedonia and Bosnia and Herzegovina are the countries with the highest unemployment rates, respectively (15.40%; 15.08% and 14.05%), while Serbia and Albania have the lowest unemployment rate with (9.47% and 11.81%).

Evaluation of the indicators of governance. Researchers, policymakers, international institutions, etc., in recent years, have analyzed and examined the impact of governance quality on the sustainable development of a country.

Determination of governance quality. Based on the data of the World Bank, the quality of governance is evaluated with six governance indicators. The Quality of Government Index is a summary of these sub-indicators. According to different theoretical perspectives and supported by empirical studies, good governance significantly affects the economic growth and the well-being of the citizens of a country. The quality of governance and public institutions significantly affects economic development and shows the differences between different countries. The table below, presents the values of six indicators that evaluate the quality of governance in Balkan Countries. The ranking of the values of the indicators is done from the lowest to the highest, which means that the higher the value of the indicator, the more positively it affects the quality of governance.

Country	Voice and Accountability	Political Stability	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Albania	0.14	0.11	0.07	0.16	-0.17	-0.41
Bosnia and Herzegovina	-0.33	-0.44	-1.06	-0.16	-0.31	-0.68
North Macedonia	0.16	0.12	-0.08	0.45	-0.10	-0.32
Montenegro	0.27	-0.06	-0.03	0.54	-0.13	-0.12
Serbia	-0.10	-0.17	0.07	0.14	-0.11	-0.46
Kosovo	-0.06	-0.25	-0.19	-0.39	-0.37	-0.26

Table 4: Values of six governance indicators (WGI) for Balkan Countries_2022
Source: Authors'composition based on data from World Bank, 2023

- **Voice and Accountability.** Referring to the data for the year 2022, it results that this indicator has positive values for Albania, North Macedonia and Montenegro, respectively (0.14; 0.16; 0.27), and negative values for Bosnia and Herzegovina, Serbia and Kosovo, respectively (- 0.33; - 0.10; - 0.06).
- **Political Stability and Absence of Violence.** This indicator for the year 2022, results have positive values for Albania and North Macedonia, respectively (0.11; 0.12), and negative values for Bosnia and Herzegovina, Montenegro, Serbia and Kosovo, respectively (- 0.44; - 0.06; - 0.17; - 0.25). This indicator has a positive impact on the quality of governance in these countries.
- **Government Effectiveness** This indicator for the year 2022, results that have positive values for Albania and Serbia, respectively (0.07; 0.07), and negative values for Bosnia and Herzegovina, North Macedonia, Montenegro, and Kosovo, respectively (-1.06; - 0.08; - 0.03; - 0.19). The values of this indicator show the efforts made by the governments of these countries to increase the quality of public services.
- **Regulatory Quality**. This indicator has positive values for Albania, North Macedonia, Montenegro and Serbia, respectively (0.16; 0.45; 0.54; 0.14), and negative values for Bosnia and Herzegovina and Kosovo, respectively (-0.16; - 0.39). This indicator has an impact on the quality of governance, in terms of the drafting and implementation of sound policies and regulations that promote and support the development of the private sector.
- **Rule of Law and Control of Corruption** are the two indicators that have negative values for 2022 for all Balkan countries. This means that although the laws and rules are well drafted by the governments of these countries with the assistance of international institutions, their implementation remains a problem. Law enforcement and corruption control continues to be one of the main challenges for the Balkan countries.

Based on the above data analysis, we conclude with some key findings:

- Voice and accountability and political stability, have a positive impact on the country's economic growth. When citizens of a country believe in government institutions and that they receive public services and sufficient income, then their willingness to contribute to their country increases. Moreover, freedom of expression, freedom of organization and a free media contribute to economic growth by influencing the performance of public administration.
- The quality of governance can affect economic development through the promotion of private investments, which affect the level of economic growth and well-being of citizens.
- Government effectiveness, reflects the quality of public services, government decision-making and civil servants. In our findings, this indicator shows that it has a positive impact on economic growth, confirming these theoretical considerations.
- Rule of Law and Control of Corruption, are two indicators that negatively affect the quality of governance.
- Rule of law is considered a key indicator of good governance, as it is important for maintaining public order and security, providing public goods and services, effectively controlling corruption, and promoting economic development.
- The control of corruption has a negative impact on the main indicators for the economic growth of a country, such as the effectiveness of public institutions, domestic and foreign investments, tax collection and the management of public expenses and resources.

Good governance is an important component, especially in Balkan countries, because it significantly affects economic development and identifies differences between different countries. The largest gap between the Balkans countries and the OECD-EU countries is in the area of rule of law. Corruption is also a systemic and pervasive problem, and equality before the law has yet to be achieved (OECD, 2020). Political stability and the rule of law have an important impact on the implementation of political and economic reforms for these countries, to become a member of the European Union. Continued progress in public governance in the Balkans countries depends on more professional, competent, accountable and sustainable management of civil services. Greater managerial accountability is needed, not only to reduce trust risk but also to strengthen trust in public administration. Over the past few years, governments and institutions of these countries have implemented reforms and initiatives to modernize and meet the growing demands of citizens. They are also preparing for future membership in the European Union (EU), to be competitive, to be on equal terms in the internal market and to uphold the standards of good administration, democratic governance and the rule of law. According to the recommendations of the EU, World Bank, OECD and other international institutions, the main challenges that must be addressed for good governance in the Balkan countries are:

- drafting of healthy and stimulating policies by policymakers, to promote growth and economic development,
- transparency, responsibility, and accountability by government and public institutions,
- participation of citizens in the decision-making processes of public institutions
- encouraging and supporting the private sector and business, through a stable tax and fiscal system,
- efficient use of resources and management of public expenditures by public institutions,
- sustainability and consolidation of macroeconomic stability.
- creating a positive, attractive and competitive business climate for attracting foreign investors.

5. CONCLUSION

The study examined the role of governance quality in economic growth and citizens' well-being, for the Balkan countries, measured through six world governance indicators. The quality of governance is an important component, especially in developing countries, because it significantly affects economic development and identifies differences between different countries. The Balkan countries have experienced a long and difficult process of transformation from a centralized economy to a market economy. These countries have undertaken and implemented substantial economic, political and institutional reforms in the direction of good governance. These reforms have aimed at increasing the effectiveness of the government, the performance of the public administration, and the best functioning of the public institutions. The quality of governance and its impact on economic growth has become more important in recent years, especially in Balkan countries that need to reform their institutions to meet the conditions for EU membership. Continued progress in public governance in the Balkans countries depends on more professional, competent, accountable and sustainable management of civil services. Over the past few years, governments and institutions of these countries have implemented reforms and initiatives to modernize and meet the growing demands of citizens. Some of the challenges that must be addressed for good governance in these countries are the drafting and implementation of legal and institutional policies; law enforcement; macroeconomic stability; quality of public services, efficient use of public resources, transparency and accountability of public institutions. Good Governance is represented and analyzed by six world governance indicators (WGIs): voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The results show that there is a long-term relationship between government quality and economic growth for the indicators analyzed in this study. In this regard, these countries must focus more on reforms that improve governance if they want to achieve sustainable development in the future. Political stability and the rule of law have an important impact on the implementation of political and economic reforms for these countries, to become a member of the European Union. The main findings of this study show that government effectiveness is crucial in macroeconomic stability and sustainable economic growth in the Balkan countries. The implementation of good governance policies in the Balkan countries can promote economic development and ensure convergence towards the level of developed economies. The governments in these countries must ensure the rule of law, to minimize corruption and increase the trust of citizens in public institutions. The performance of economic development in these countries is closely related to the quality of governance. Policymakers must formulate and implement sound policies and strategies that encourage and support private sector development which is important for sustainable economic growth. The governments should focus on the implementation of policies and strategies that promote sustainable economic growth, reduce poverty and inequality, and increase citizens' well-being. Strengthening public institutions, increasing the performance of public administration, transparency, accountability, and participation of citizens in decision-making processes, are essential for good governance.

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GENERATION Z – DIGITAL EDUCATION AND SOCIAL MEDIA

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ABSTRACT

This creates the conditions for the development of research in this direction, which will define and define these processes as essential and defining for a particular generation. All of this occurs with certain contingencies and assumptions but ultimately defines them as such. The cyclical nature of the processes taking place over a certain interval of historical time and the changes that are occurring leads many researchers to try to analyse the changes taking place and to explain them through their theoretical developments. The present study attempts to summarize information on the explanation of the term "Generation Z" by describing its characteristics. A brief retrospective analysis and study of the new habits formed in this generation was made.

Keywords: *Generation Z, Digital Education, Social Media, Social Development*

1. INTRODUCTION

The study of generational processes as part of social development has aroused particular interest in various works and studies by different scholars. It is a challenge to describe new theories or regularities to explain or represent the processes taking place. This creates the conditions for the development of research in this direction, which will define and define these processes as essential and defining for a particular generation. All of this occurs with certain contingencies and assumptions but ultimately defines them as such. The cyclical nature of the processes taking place over a certain interval of historical time and the changes that are occurring leads many researchers to try to analyse the changes taking place and to explain them through their theoretical developments.

2. DEFINING THE TERM "GENERATION"

The term "generation" can be explained and defined in many different ways. The true popularity of the generational theory came with the book Generations: a History of America's Future, 1584 to 2069, published in 1991. In it, the authors – economist Neil Howe and writer William Strauss – identify four types of modern active generations – baby boomers (people born between 1946 and 1963), the "hip" generation (those born between 1964 and 1980), generation Y (those born between 1981 and 1996) and generation Z (those born between 1997 and 2012). In their bold theory, the two American researchers argue that each generation belongs to one of four types and that these types repeat themselves consistently in a fixed pattern. Howe and Strauss describe the characteristics of different generations and conclude that the value system and orientation of different generations differ significantly. In their work, they examine these differences and the reasons that give rise to them (political and social situation, level of technical development, significant events, etc.). Scientists conclude that being born in a certain period predetermines people's skills, thinking, values and behaviour, and argue that every fifth generation has similar values, which in turn allows long-term predictions to be made (Niyl Haui, 2000).

Two other scholars, Ron Eyerman and Bryan Turner, in their work Outline of a theory of generations, define the concept of "generations" as a group of people who share a common collective memory, share a similar culture, and whose purpose is to provide them with a collective consciousness that seeks to integrate the generation into a predetermined time frame (Eyerman, 1998). Dr. Jane Pilcher, Associate Professor of Sociology at Nottingham Trent University's School of Social Sciences and Senior Fellow of the Higher Education Academy, defines the term "generation" as people within a particular group who experience the same significant events within a particular time period (Pilcher, 1994). We could go on describing the interpretations of the term "generation" by different scholars, but as different as these theories are, one thing undeniably unites them. And that is the conclusion that every twenty years a new generation of students arrives in school classrooms with their expectations, behaviors, and values shaped by the unique circumstances of the times. In the field of education with these children come new challenges and a new perspective for education to be adequate to their needs and to prepare them for the future. The generational vision allows us to map out the recurring cycles and be prepared for the challenges of working with children whose generational manifestations and behaviours we need to get to know, as well as to "adapt" ourselves and the education system so that they are ready for their real entry into life.

3. GENERATION Z – CHARACTERISTICS AND BEHAVIOUR. ARE GENERATION Z PEOPLE UNDERVALUED OR OVERVALUED?

Born and raised in a time of constant economic and social transformations, which also determine change in social processes, those born under the sign of Generation Z attach the greatest importance to the dynamics and the speed with which changes take place in every aspect – social, political, economic, cultural, etc. These are people for whom both local and global socio-economic, environmental, sporting and cultural events are of particular importance and significance. As previously mentioned, the name "Generation Z" was given by American writer and historian William Strauss and consultant Neil Howe in their book Generations: a History of America's Future, 1584-1991. The term "Generation Z" is also found in literature under other names, such as "millennial children", "digital generation", "digital natives", "miscellaneous" etc. And accordingly, different time periods in which they were born can be found in different literatures. Some point to the period 1993-2001, others (including Strauss and Howe's) point to 1997 – 2012, and the latest study by Jeff Desjardins, an editor and visionary author of business analysis quoted by a number of economic publications, sets 1997-2010 as the years between which Generation Z people were born. Generally speaking, Generation Z – these are people from 13 to 30 years of age, who, according to various studies, today account for between 15 and 25 percent of the earth's population. Or to use Jeff Desjardins' words, "You may already have Gen Zers in your workplace – but if you don't, you will soon." (Desjardins, 2019). Although there is no definite consensus on the period covered by the people referred to as Generation Z, it is undeniable to all researchers that they are the ones who are currently finishing high school, studying or have recently graduated from university and an increasing number of their representatives are looking for or have already found their first real job. Therefore, all those working and involved in the field of education have the not unimportant task of adapting teaching so as to give learners those skills and competences that will turn them into adequate and well-prepared people on the labour market. Generation Z people don't remember a time when the internet didn't exist – and as such, it's not surprising to learn that 50% of them spend 10 hours a day connected online, and 70% watch more than two hours a day of YouTube. Setting aside this ultra-connectivity, Generation Z has some unique and perhaps unexpected traits. Among them is their preference for face-to-face interaction in the workplace or classroom and also an expectation to study or work harder than previous groups. Generation Z is also the most racially and ethnically diverse generation and values racial

equality as a core issue for their rights. Unlike their predecessors, Generation Y, also known as Millennials and Echo Boomers, members of Generation Z tend to take a more pragmatic approach to both their education and their careers. Finally, Gen Z is probably one of the most practical generations, valuing things like saving money and finding stable employment as extremely important (Verghese, 2022c). Within the Project № BG05M9OP001-1. 051-0006-C01 "Joint actions of the social partners for adaptation of the working environment to the specific age needs of different generations in order to promote longer working life and ability to work", implemented within the European Social Fund through the Operational Programme "Human Resources Development" (2014 – 2020) with the beneficiary Bulgarian Industrial Association – Union of Bulgarian Business (BIA), in partnership with the Confederation of Independent Trade Unions in Bulgaria (CICSB) and associate partners Association of Industrial Capital in Bulgaria (AICB) and Bulgarian Chamber of Commerce and Industry (BCCI), the generational characteristics of generations T, X, Y and Z are studied and presented. (Generational Profiles: Generation Z Profile, 2020a). The document recognizes that "...in Bulgaria, the representatives of this generation are maturing in a time of constant economic and social change and therefore attach the greatest importance to the dynamics and speed of change in all its aspects – political, economic, cultural." The key events that influenced their formation and development are Bulgaria's accession to the EU, free movement and the right to work, the financial and economic crisis of 2008 and its consequences, corruption, crime and war on the roads. The period of their earliest childhood and maturation is associated with deepening socio-economic inequality in Bulgarian society, fuelled by differences in ethnic origin, in the social status and income of parents, by differences in the state of regional economies, by differences in the quality of the education system (private and state, elite and mediocre, language, general and vocational, regional and peripheral schools). Generation Z tend to be pragmatists and don't compromise the present for hypothetical ideas. Which doesn't stop them from getting involved in public causes, including volunteering, but it is precisely because of their pragmatism that they only give up some of their free time and energy when they see it making sense to do so.
They don't accept the "status quo", they don't trust falsity. They do not blindly believe and are suspicious of familiar faces "preaching" new ideas. They have a strong intuition as well as a flair for the "new and progressive". Another characteristic of Generation Z, which the authors of the study draw attention to, is their disregard for "official sources" of information and "authorities". They "develop their own critical thinking and cognitive expertise by defending their point of view based on facts found on the World Wide Web. They think and share everything publicly." (Generational Profiles: A Profile of Generation Z, 2020a). As a generation born at the transition between the analogue and the digital world, the representatives of Generation Z create their own new spaces: art, literature, new theatre, cinema. And it's all connected to new computer and digital technologies. A sense of uniqueness is also at the heart of their heightened sense of belonging to a group. It is this affiliation that on the one hand encourages them to form communities of interest and follow on social networks, and on the other hand this grouping is at the root of ageism and the unfair treatment of adults, considering them unfit and inadequate for the modern digital world. All these characteristics of Generation Z make it important for those working in education, including lifelong learning, to know this generation. Education, which has a social role as well as an educational one, is committed to imparting knowledge to people who think and act differently from the majority of those working in the field. In order to be 'captured' by learners, learners need to know and use a learning toolkit that is adequate to the expectations of the new generation, while at the same time remembering that it is up to them to build a solid foundation on which current pupils and students can then succeed in the labour market and in life in general. Because not only are the representatives of Generation Z already with us, in our workplace, but they predominate. Some of them have even already left the education system and form the face of the primary labour market.

And here come those startling data that about 20% of young people are representatives of the so-called group of NEETs – neither studying nor working, which puts Bulgaria in the top three in Europe – after Italy and Greece. And we, teachers and lecturers, are not required to overestimate or underestimate their qualities, but to turn the system around so that it is open to them, to accept them and to give them the best. They are the product that will henceforth look after us and if we have not been engaged with them and underestimate them, then we cannot expect them to respond to us with a positive attitude. Therefore, I believe that we should neither underestimate them nor underestimate them, but we should properly and timely appreciate their qualities and give them the best as messages for their future.

4. FORMATION OF TRAINING HABITS

The development of the "knowledge society" implies a social transformation in which community members need not only knowledge but also new skills and competences, some of them unpredictable. Generation Z pupils and students are authentic digital people, a hyper-cognitive generation with profiles that differ in many ways from those of students of previous generations. They are not waiting, but creating change themselves, which is a prerequisite for the growing competition between schools and universities for human talent and the demand for qualified graduates to do jobs that do not yet exist. Even the very development of technology, which is accessible to many, motivates educational institutions, both public and private, to develop innovative programs and new ideas to accelerate and improve the processes of teaching and learning and the acquisition of knowledge and competencies. One of the most important actions to achieve this is investment in technological resources. Technology adds value to the teaching and learning experience that students use extensively to enhance or accelerate the educational process, but technology can certainly also promote or develop additional skills and competencies. This also forms a new, visual way of perceiving information, while at the same time being a prerequisite for not having enough time to make sense of and sift the credibility of anything that is offered as information. The availability of multiple channels of access to knowledge turns out to be a double-edged sword – an opportunity, but also a threat. An opportunity to access hard-to-find sources of knowledge, but also a threat of not always being provided with correct and verified information. And this is where the role of teachers and educators comes in, to build these teachings so that each successive generation can "stand" on the shoulders of their predecessors and build on their achievements. Generation Z is inquisitive and curious, focused on constant learning and development, but not in the conservative, classical way. The traditional understanding of the role of education in success in life is gradually cracking. Members of Generation Z accept standard, formal education as mandatory but meaningless. Realising that employers are placing increasing importance on competencies rather than diplomas, disillusioned with the quality of formal education in Bulgaria, Zs do not want to waste years on something that cannot guarantee them a secure future. Generation Z realises the alternatives in education that the digital world offers them. They are successfully and very resourcefully combining various short-term or distance courses, online certification programs offering and gaining real practical experience. Z are a digital generation that is constantly "surfing" and searching the web for new information, but one that is pragmatically focused, related to a specific problem and its solution. Generation Z people tend to predominantly read only what they find interesting. They read hurriedly, breathlessly, carelessly. They prefer images to move and engage their senses in multiple ways. They find it difficult to focus – precisely because of the alternatives that the digital world offers them. The bouncing image increasingly displaces the absorbed solitude of reading, which in turn leads to an unsatisfactory level of comprehension. They read as they live – waiting for someone to take care of them.

Proponents of group learning through the tools of social media, members of Generation Z, possess a photographic memory and remember much more and more persistently through hearing, movement, and picture than they do through reading. Generation Z's attitude towards reading books is a prerequisite for conflict with the education system, which mainly emphasizes theory and books as a foundation of knowledge. In a survey conducted by the Bulgarian Center for Not-for-Profit Law "Generation Z – a generation with an opinion", when asked how they think they should learn, the most common answer was "not that way". High school students unanimously say that there are much easier and more enjoyable ways to gain the same knowledge on the internet, but at the same time report that "in the context of learning sites and online platforms, they increasingly feel insecure about having to follow a process that they do not understand, that stresses them out and makes them feel uncomfortable." (Haralan Alexandrov, 2020b). The authors of the study summarize that "the rebellion of Generation Z is not against learning, but against an educational model that was created in the past precisely to be a stage. The imposition of a systemic structure tailored to eras of difficult access to information that forces them to receive uninteresting information in an unpleasant way leads to a sense of acute invasion of personal space, which is perceived as aggression by many members of the generation because it is contrary to fundamental values" (Haralan Alexandrov, 2020b).
The majority of respondents "define education as a value and think it is very important to be educated." However, the majority say that the encounter with secondary education brings or has brought them discomfort, confusion and uncertainty. These feelings are still present, regardless of their age and the level they are at in the education system. Although education is a value, this educational model frustrates them, but they cannot understand why. When I work with high school students (17 – 19 years old), I take into account the fact that I work with big people, people with opinions that you can't just say "Do this!" to. You have to be very involved in the subject matter and be able to present it to them in a way of expression as close to them as possible to motivate them to take it on board. And at the same time give the necessary background knowledge, whether you are training future IT specialists or farmers. For any profession, for any job from now on, it will be necessary for people to be able to read and understand what is contained in the instructions for their job or for the specific task they have to perform, to be able to work in a team, to communicate and to understand the responding party. And it is extremely important for that responding party to be able to explain what needs to be done. Only then can the processes be meaningful and workable. This is why coaching and mentoring are the preferred form of training for young people in Generation Z, but given that for Generation Z, training and recommendations from a peer are much easier to accept than from a direct supervisor or older colleague. They are looking for their leader, not a teacher, someone to ignite the spark in them and guide them, not just teach them. And although they like e-learning, members of Generation Z prefer face-to-face learning with the proviso that it be autonomous, based on the use and application of new media and on gaining access to multiple information sources, acquiring knowledge and gaining experience through their own actions. Generation Z wants to choose for itself what to learn, where to learn it and when to learn it, i.e. to autonomously manage the learning process rather than being its object. The predominant learning style is experiential. It follows that effective learning should involve more application of knowledge and skills, participation and trial, experiential activities and reaching conclusions independently, more visual demonstration and less theory, explanation and passive observation. All of this transforms the traditional classroom from a place to learn new knowledge into a meeting place for a group of like-minded people (3 Generation Z traits today's teachers need to adapt to, 2022a).

5. THE GENERATION Z CLASSROOM

In order to understand how teachers can approach teaching Generation Z students, we need to consider their characteristics and learning habits. First of all, we are talking about people who tend to be immersed in digital technology. Generation Z is the first generation that does not know life without technology. For them, Google, Instagram and smartphones aren't just handy tools – they're necessary parts of life. Generation Z expects to be connected to the world and have access to information at all times, including when it comes to education. Their 24-hour connectivity and social media presence makes them people who expect instant feedback on tasks at hand, just as they do on social media. Unlike the previous generation of Millennials, for Generation Z, digital games and technical devices are an important part of life, most likely because they grew up with digital technology and have never known any other way of life (Giray, 2022b). They also crave autonomy in their education. Students want to make decisions about what they learn and how to demonstrate their knowledge. How can teachers adapt to these new requirements? Rather than trying to distract students from technology, it is much more appropriate to consider how they themselves can use these same technologies to provide information and engage students' attention. Educational software has long been neither new nor exceptional, yet its implementation in practice has proven insufficient and ineffective. Applying technology purely formally is insufficient in the first place, and furthermore in no way replaces the qualitative presence of the teacher to guide the overall process. Technology is nothing more than a tool to facilitate the work of the teacher and the teacher's work to attract and hold the student's attention (What is 21st century learning? Preparing today's students for tomorrow's workforce, 2022d). But if there is no content, that attention will very quickly be shifted to something else. Pragmatism, as one of the main characteristics of the representatives of Generation Z, is one of the prerequisites for the necessity of teaching grounded learning material. What would this mean? Generation Z students have come to expect only the most relevant information, with the selection made by someone else. For this reason, teachers are advised to look for the practical side of any theoretical issue beforehand, so as to give students not just the knowledge, but the real answer to why a lesson is important and how it applies to the real world.

6. CONCLUSION

Teachers should teach students, not teach the subject, goes a popular saying in education. In reality, learning begins when teachers first understand what learners need. To successfully engage this new generation of learners, schools must take into account their obvious differences, not only in terms of education, but also in terms of their overall learning experiences. Generation Z's uniqueness in personalities, learning styles and preferences, and use of the internet, digital and social media, can help them perform more effectively. Representatives of Generation Z differ from previous generations. As a result, their treatment may not be the same as their predecessors. This is a new group of students – each with their own interests, needs and expectations. Teachers are responsible for learning about this issue and putting it into practice in the classroom so that the necessary steps can be taken to help students, especially in the areas of education and classroom management. In order to be adequate to the demands of the representatives of this new generation, all those involved in education – teachers, administration, public, private and non-governmental entities – must be aware of these particularities in order to strategically adjust their approaches on how to guide students. Generation Z can realize their goals and dreams with the help of education. Teachers and the school as a whole are responsible for this. But it takes those in charge to identify and grasp their uniqueness. Schools can connect with them in a way that not only motivates individual progress, but also ensures students develop into the critical and creative thinkers the world expects in the twenty-first century by creating curricula and learning experiences

personalized to their individuality. And it is precisely because of the uniqueness of each member of this generation that research needs to be used responsibly, judiciously, and insightfully (2023).

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CLIMATIC CAPITAL ASSET PRICING MODEL: A THEORETICAL PROPOSITION

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ABSTRACT
Capital Asset Pricing Model (CAPM) has been recognized as the cornerstone of the finance literature with an entire lineage of asset pricing model (APM) deriving genesis from the former. Interestingly, CAPM – in the absence of few discernible alternatives – remains equally popular amongst practitioners in the areas of financial modelling, valuation, and risk-appraisal. As debates surrounding climate action and sustainability have gained traction, models mimicking conventional CAPM to suit the latter are garnering attention from academics, businesses, and policymakers. Sustainability CAPM or S-CAPM is one of the significant models entering the lexicon of APM recently. Even then, the literature is relatively sparse in respect of modelling required return in respect of firms susceptible to climate action. An appreciation to gauge the climate risk sensitivity of such firms through an appropriate APM would significantly ameliorate risks confronting investors, owners, and the management. In this paper, we present a climatic CAPM to capture both market-wide and firm-wide risks with particular attention accorded to climate risks.
Keywords: *Capital Asset Pricing Model (CAPM), Climate risks, Energy corporations, Sustainability, Econometric modelling*

1. INTRODUCTION

In recent times, unfavourable extreme climatic changes have proved catastrophic posing a significant threat to the financial stability and asset valuation world over. Over time, the capital asset pricing model (CAPM) has been recognized as an important tool for evaluating risky securities priced at an ex-ante cost to generate required returns. Environmental investments are complex and uncertain with the cost-benefit timeframe ranging from 50 to 100 years in comparison to 15 to 20 accruing on normal investments. This results in an inappropriate and skewed cost of capital. (Sharpe, 1964) and (Lintner, 1965) (Alessi, 2019) developed the seminal CAPM, which is an efficient portfolio of financial assets and its related return on assets. The asset pricing model simply explains that forward-looking risk-averse investors are concerned about events that are high in severity but with low probability and consequently demand higher premiums due to the volatility of the market (Bingler, Senni, & Monnin, 2021); (Bolton & Kacperczyk, 2021). It becomes more relevant when the climate change risks are not incorporated in the pricing of the asset, and management employs historical data to draw inferences from the time when climate change did not have such a consequential impact on the financial stability (Bank of England, 2015). (Sandsmark & Vennemo, 2006) argue if risk reduction benefits can be accounted whilst evaluating the cost-benefit of environmental investments in the form of climate change, mitigation could easily be justified for a lower expected return. This resonates with the fact that an increase in environmental assets reduces the chances of environmental hazards requiring a lower rate of return.

Traditional models of risk management envision risks to be exogenous. However, (Friend, Landskroner, & Losq, 1976) called the endogenous risk a moral hazard of recent times. In their paper, (Fisher & Narain, 2003) state that the risk of environmental damage is endogenous and depends on the stock of greenhouse gases. (Breeden, 1979) developed the consumption-based CAPM by drawing a distinction between the intertemporally nature of savings and consumption. Despite the model's ingenuous appeal, it does not offer any superior alternative to the conventional CAPM. On the other, (Weitzman, 2001) argues for lower rate of return on long-term investments. He states that when uncertainty shrouds the future discount factors, a planner should use caution and use the weighted average of various discount factors which should combine themselves to form the weights. His model addresses uncertainty regarding the future market interest rates. As per (Irene, 2020) market participants worry due to two variants of climate-related risk: Physical and Transition risk. Physical risk relates to the physical damage to assets which could be chronic and caused due to long-term shifts in climate that would affect rising sea levels and changing weather patterns. Alternatively, it could be acute such as wildfires, floods, droughts, and storms. While chronic risk is gradual but results in uncertain environmental events, acute climate risks provide infrequent shocks to the economy. On the other hand, transition risk is inclusive of stringent environmental policies that affect the return of brown assets (assets that emit the highest greenhouse and carbon). Such policies can be introduced unexpectedly when the public is affected by severe natural calamities (Bretschger & Soretz, 2021). Another important aspect of CAPM is the sustainable capital asset pricing model. As seen in recent times sustainable investment occupies a significant place in the overall percentage of total assets under management (AUM). It should be noted here that sustainable investment is also referred as socially responsible investing, ethical investing, and responsible investing. As of December 2019, 57% of the 453 mutual funds in the US that were given a green certificate by Bloomberg were categorized as "Socially responsible" This shows that investors consider environmental and social criteria to be one. In recent times it is imperative for companies to remain competitive as well as to limit their impact on the environment. As the dependency on fossil fuels is becoming more unstable, investors need to make an ecological transition that would be profitable for the environment and business in the long run. However, an energy transition of this magnitude will require large investments up to 3.5 trillion US dollars (International Energy Agency and International Renewable Energy Agency) in the energy sector alone till 2050. (Muhamet & Arbana, 2016) state that as dependency on Bank loans may not be sufficient a paradigm shift from the present shareholder wealth maximization approach to a more sustainable value creation framework encompassing the environmental and social costs and benefits have been accounted for. Keeping the environment in mind, the focus has moved to new debt instruments that help issuers to change the course of finance that contribute positively to the environment eg green bonds. (Ziegler, Busch, & Hoffmann, 2011) believe that there are several mechanisms that link better environmental performance to higher profits. (Telle, 2006) says that it will be easy for a company to improve its energy efficiency if it has a better environmental profile as it positively impacts the productivity and motivation of its employees and improves market share.

2. THEORETICAL CONSTRUCT

In its basic altar, CAPM derives its utility from the so-called capital market line (CML) commonly understood as the straight line through the intercept (risk-free asset as in G-bonds) comprising of different combinations of risk-free (R_f) and risky (R_m viz. market portfolio) assets. An underpinning assumption following the CML is the ability of an investor to initially invest in R_f and the remaining in R_m and later to borrow at R_f and invest in R_m. Consequently, the investor traverses journey from risk-sensitive to risk-loving on the risk-return frontier.

Theoretically, investor's interest is maximized on the intersection of the CML with the efficient frontier (defined as locus of all plausible combination of risky assets) at point 'M' represented as the market portfolio. It is therefore argued, the investor reaches an optimal point at M with any further movement (upward or downward) deemed inefficient relatable in loss of utility. Mathematically, CML may be expressed as:

$$CML = \frac{R_f + \left[\left(R_m - R_f\right)\sigma_p\right]}{\sigma_m}$$

Eq. 1

σ_p = Square-root of the variance of the portfolio (p)
σ_m = Square-root of the variance of the market (m)

As CML is theoretically hypothesized as an 'imaginary attribute', investors in real-world are confronted with the security market line (SML), which directly derives its utility from CML. To arrive at SML, we define beta, which is the measurement of security's return (R_i) with the return on market (R_m) (also implied as the sensitivity risk).

Beta, in this instance, is expressed as the ratio of covariance between the return of the portfolio (R_p) and R_m over the variance of the market. Therefore,

$$\beta_p = \frac{\sigma_{pm}}{\sigma_m^2}$$

Eq. 2

As investors desire to mimic real-world portfolio to 'M' (viz market portfolio) would lead to beta (β) being simply trickled to the ratio of σ_m over σ_p. That is,

$$\beta_p = \frac{\sigma_p}{\sigma_m}$$

Eq. 3

Substituting Eq. 3 in Eq.1, we derive the mathematical expression of SML.

$$SML = R_f + \left[\beta_p \left(R_m - R_f\right)\right]$$

Eq. 4

To accommodate the climate risk, we rewrite the above Eq. 4 as

$$SML = R_f + \left[\beta_p \left(R_m - R_f\right)\right] + \varphi_c$$

given that, $\varphi_c \neq 0$

Eq. 5

where:
ψ_c = climate risks not attributable to market risks (here, we assume white noise or errors being unequal to 0).

3. REVIEW OF LITERATURE

(Zerbib, 2022) apply S-CAPM by incorporating "taste premia" intended to measure the inclusion of environmental, social and governance (ESG) variables on stock performance and excluding "sin stocks" from the portfolio. Applied on US stock markets, the author observes taste premia varying from -1.12% to +0.14% over the time from 2007 through 2019.

In an interesting study, (Sandsmark & Vennemo, 2007) argue mitigation of climate risks through sustainable investment do not necessarily exhibit in the form of 'better returns' as economic and environmental risks are jointly associated with the latter turning up as an endogeneity problem. The authors articulate the need for self-protection and self-insurance as optimal measures against environmental risks. In a relatable study, (Zeigler, Busch, & Hoffmann, 2011) analyse the performance of international stocks with those disclosing corporate responses to climate change against those refraining from disclosure. In reference to US stocks, the authors find positive relationship between corporate disclosure to climate change as opposed to those stocks where no disclosures were made. They employ risk-adjusted variant of the conventional CAPM as a performance measure. In an influential study by (Karydas & Xepapadeas, 2022) firstly assert that loading of 'brown assets' decreases as the climate policy risks increases and secondly, attribute higher risk-premia to climate risks in the presence of extreme climate changes with concomitant increase in tail risks. The authors argue the difficulty in marking clear demarcation between economic and environmental risks. (Weitzman, 2013) look at the conundrum surrounding discount rates in respect of investments related to climate change with discount rates dependent on the nature of investment as well from classification from a diversification perspective as idiosyncratic and systematic. Idiosyncratic risks are found to carry lower discount rates.

4. SAMPLE & METHODOLOGY

In keeping with the theoretical formulation of the paper, we construct a simple price-index weighted by market capitalization of the top five energy corporation listed on NYSE. The ticker symbols are as follows: XOM; SHEL; TSLA; CVX; and BP. Following (citation), the price-weighted index is estimated using the following notation:

$$I_t = \sum_{t=1}^{n} W_t \, P_t$$

Eq. 6

where:
I_t = Index of energy corporations on day t
W_t = Weight represented by market capitalization of each energy corporation on day t
P_t = Price associated with each energy corporation on day t

The above sample is selectively chosen to represent the diverse portfolio of energy supplied by each of the five corporations with the exception of TSLA, which has distinctive attributes of both automobile and energy sectors. Moreover, each of these corporations command significant market capitalization totalling USD 1.883 trillion, which is listed below.

Table 1: Portfolio of Energy Corporations

Stock ticker	Corporation	Market cap (billion of USD)	Weight
XOM	Exxon Mobil Corporation	435.41	0.2312
SHEL	Shell PLC	223.21	0.1185
TSLA	Tesla INC	797.05	0.4232
CVX	Chevron Corporation	312.96	0.1662
BP	BP PLC	113.91	0.0605

(Source: http://www.finance.yahoo.com)

Next, we select daily stock price data over the last one-year for each of the five corporations along with NYSE Composite (ticker: NYA) daily data over similar time horizon with the latter representing the market index. After estimating the weighted price of the energy portfolio using the procedure above, we estimate the returns of portfolio and market index by resorting to natural logarithmic (ln)[1] transformation. R_{it} (return on portfolio) is estimated as follows:

$$R_{it} = \ln\left[\frac{I_1}{I_0}\right]$$

Eq. 7

Similarly, R_{mt} (return on market index) is estimated using the following expression:

$$R_{it} = \ln\left[\frac{M_1}{M_0}\right]$$

Eq. 8

Lastly, we employ the standard OLS Market Model to estimate the line of good-fit as also to derive the coefficient associated with the market index to gauge the SML surrounding the portfolio of energy corporations.

$$R_{it} = \alpha + [\beta * R_{mt}]$$

Eq. 9

We discuss the results below.

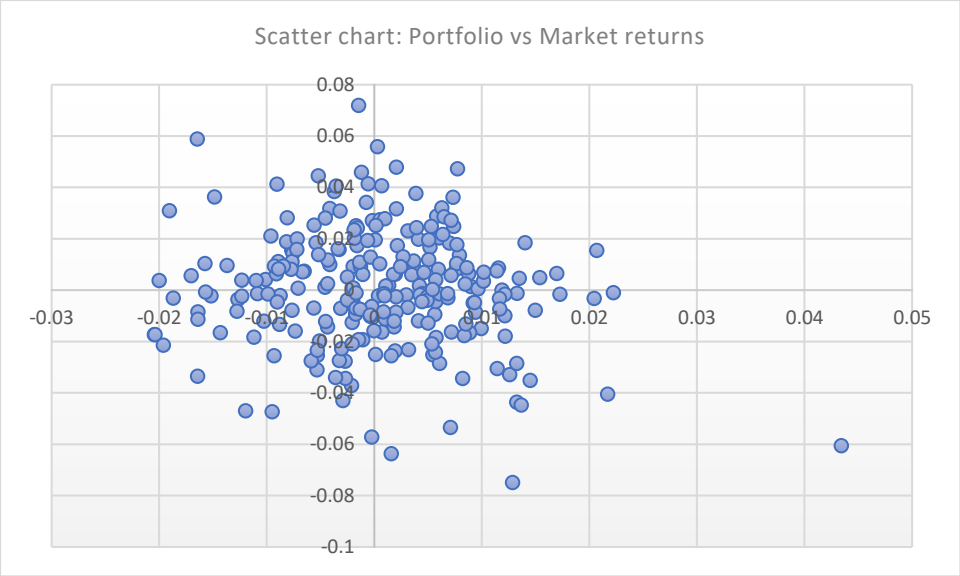
5. DISCUSSION OF RESULTS

The scatter chart surrounding the portfolio and market returns is depicted below. As may be observed, the relationship appears to be poor with plots scattered in non-linear framework implying; (1) non-impact of the market in explaining the returns of the portfolio firms due to idiosyncratic risks, and (2) possibly lower stock synchronicity implying greater portfolio-level firm-information in the context of uniqueness of firms operating in the energy sector. The latter point needs further examination, which is currently beyond the remit of the present study.

Figure Following on the next page

[1] Natural logarithmic transformation offers an incremental benefit of smoothing the data.

Exhibit 1: Scatter chart of Portfolio vs Market returns



(Source: Excel analysis)

Next, it is crucial to describe the data characteristics evident in the descriptive statistics, which is presented below.

Table 2: Descriptive statistics

Parameters of descriptives	R_{it}	R_{mt}
Mean	0.0518%	0.0385%
Median	-0.0891%	0.0280%
Standard error	0.1413%	0.0562%
Skewness	-0.1438	0.2974
Kurtosis	0.7913	1.7177
Min	-0.07492	-0.0204
Max	0.07195	0.04339
Range	0.14686	0.06385

(Source: Excel analysis)

A cursory glance reveals greater dispersion associated with the portfolio returns (plausibly due to limited sample size!) as opposed to market returns, which is observed to be spread more tightly from standard error (0.0562<0.1413) and range (0.0639<0.1469). Interestingly, the excess kurtosis, which measures the peaked nature of dispersive data is higher for market at 1.7177 implying greater data outliers in comparison to portfolio returns at 0.7913. However, both data point towards non-normality further satisfied by skewness measures. The degree of divergence should motivate us towards examining a robust measure of relatedness by examining the results of the OLS Market Model, which are presented below.

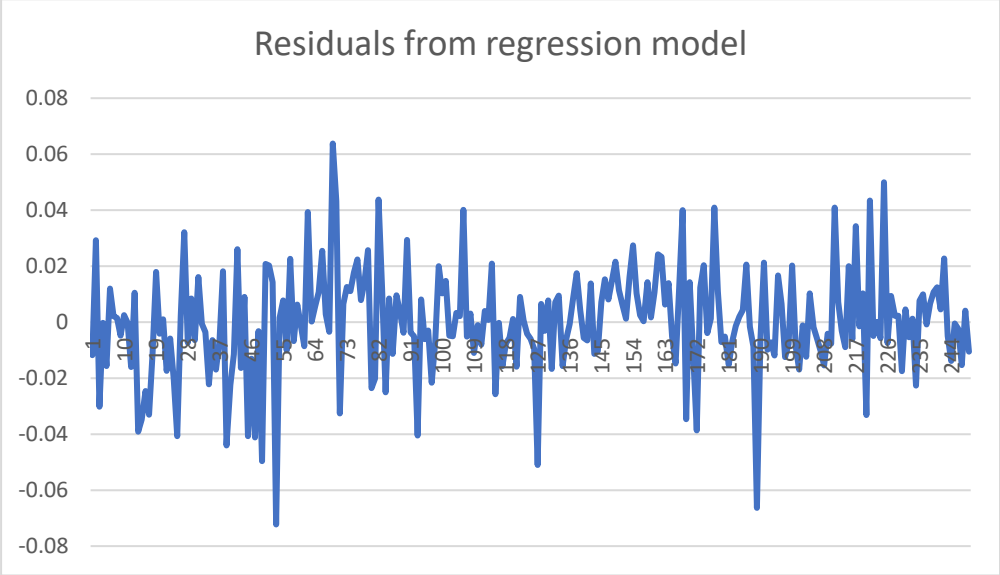
Table 3: OLS Regression Output

	Summary output	R_{mt}
R-squared	0.2860	
Adjusted R-squared	0.2832	
Standard error	0.0188	
F-statistic	98.9595***	
Intercept	0.0000	
Beta coefficient		1.3448*** (9.9478)

(Source: Excel analysis)

Adjusted R-squared and F-statistic (significant at 1%) values posit towards reasonable strength of the model. Most significantly, the beta coefficient is observed to be 1.3448 which is statistically significant at 1% implying the ability of the market returns to estimate the portfolio returns at a sensitivity of 1.3448. The previous observations carry several implications. First, the portfolio of returns making up the five energy corporations depict a systematic risk in excess of the market risk. Given the volatility associated with energy prices (including natural gas etc.,), the result is unsurprising paving the way for greater degree of climate-related risks from portfolio managers' perspective. Second, as climate risks get intertwined with market risks, greater emphasis on isolating the idiosyncratic risks to reveal firm-level climate impact assumes significance. Lastly, there is significant scope for further embellishing the model particularly in light of the time series data, which tend to exhibit heteroscedastic behaviour seen from the residuals derived from the regression model.

Exhibit 2: Residuals from the regression model



(Source: Excel analysis)

6. SUMMARY & CONCLUSIONS

Based on the above thesis, it is evident there has been no attempt to systematically model climate risks into the conventional CAPM. Our paper, therefore, closes this important research gap by modelling Climatic CAPM through the lens of portfolio of energy firms as independent variable against the broader NYA. In doing so, we are able to retrieve "climatic risk premia" after controlling for firm-specific variables. The paper offers novelty by modelling CAPM specific to energy firms based on the conventional CAPM. We observe based on portfolio of energy corporations; the systematic risk attributable is grater than the market implying higher systemic risks associated with corporations with most significant impact on climate change. In retrospect, we also find greater firm-level utility specific to energy corporations potentially opening new vistas of research into further dwelling on the research area to enrich the theoretical model proposed here.

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