

**Varazdin Development and Entrepreneurship Agency and University North**  
in cooperation with  
**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**  
**HAZU - Institute for Scientific Work in Varazdin**



## **Economic and Social Development**

103<sup>rd</sup> International Scientific Conference on Economic and Social Development –  
"Digital entrepreneurship in the context of the UN Sustainable Development Goals"

### **Book of Proceedings**

Editors:

**Romana Korez Vide, Vesna Sesar, Ivica Zdrilic**

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Varazdin, 21-22 November, 2023

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# SEMICONDUCTORS COMPETITION BETWEEN CHINA AND TAIWAN

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## **ABSTRACT**

*In this paper, we touched on the relationship between China and Taiwan in the field of the semiconductor industry. The research also dealt with talking about the current state of the industry between the two countries, the competitive advantages of each of them, as well as the strategies used by each country to gain a competitive advantage. The research concluded the most important effects of this Competition on the global semiconductor industry, the effective and structuring factors for competition between the two parties, and the best of conflict. This paper concludes by discussing the possibility of cooperation between the two countries to create a more competitive and efficient semiconductor industry.*

**Keywords:** *China, Taiwan, semiconductor, competition, challenges*

## **1. INTRODUCTION**

The semiconductor industry is a real field of competition between China and Taiwan, as both countries are competing for a larger share of the global semiconductor market, which is estimated to be worth more than \$400 billion. While China is investing heavily in the industry, Taiwan is focusing on research and development, at a time when both are enjoying The two countries have varying strengths and weaknesses, and it is likely that the competition between the two countries will continue in the foreseeable future. China is the world's largest semiconductor market, and its government has invested heavily in the industry, providing subsidies and incentives to local companies, while Taiwan is the world's second largest semiconductor market and is home to some of the world's largest semiconductor companies, such as TSMC and UMC. United State. The semiconductor war between China and Taiwan is largely coupled with competition for market share in the global semiconductor industry, and this has led to a trade war between the two countries, as China imposed tariffs on semiconductor imports from Taiwan, while Taiwan responded with a tariff of its own. As a result of the semiconductor war with China, both countries have invested heavily in the semiconductor industry, China has invested heavily in the semiconductor industry in order to become a major player in the global semiconductor market, while Taiwan has invested heavily in the semiconductor industry, but It was slower to catch up with China in terms of investment. It was the result of the semiconductor war between China and Taiwan. Based on this path of introductions, the following problem is raised:

What are the most important bets and repercussions of the Sino-Taiwanese competition?

Sub-questions:

- What is meant by semiconductors and how important is it?
- What are the challenges of the Sino-Taiwanese semiconductor competition?
- What are the results of the Sino-Taiwanese competition over semiconductors?

In order to answer the main problem and its sub-questions, the following hypotheses are put forward. The semiconductor competition between China and Taiwan is driven by the need to secure a competitive advantage in the global semiconductor market. China is investing heavily in semiconductor technology and production capabilities in order to gain a competitive advantage over Taiwan, while Taiwan is leveraging its field experience in the semiconductor

industry to maintain its competitive advantage. Both countries are also investing in research and development to stay ahead of the competition. Foreign dependence and American interference in the Sino-Taiwanese competition fueled the conflict between the two parties. To achieve the academic purpose of the study, the approach of information security or information analysis of the Copenhagen School was employed, headed by the theorist "Barry Buzan", which analyzes the solid and intelligent side of the information. The epistemological perspective and the composite analysis were employed to understand the dynamics of competition between the two parties and their implications. The statistical approach was also employed. Because the digital language is of great importance to understand the structure of the conflict and investment between the two parties in the field of electronic chips in an accurate digital language. It should be noted the extreme difficulty that we faced in this research, which is represented in the lack of references, given the novelty of the subject, which required us to rely on analysis based on real-time data, and its global implications. The topic was presented in a systematic form, where the following elements were addressed.

## **2. CONCEPTUAL FRAMEWORK**

### **2.1. Definition of Semiconductors**

Semiconductors are materials that have electrical properties between those of conductors and insulators. They are used in a wide variety of electronic devices, including transistors, diodes, and integrated circuits. Semiconductors are composed of a variety of elements, including silicon, germanium, and gallium arsenide. They are used in a variety of applications, including computers, cell phones, and solar cells. Advanced chips are also used to power supercomputers, artificial intelligence equipment, and military equipment<sup>1</sup>.

### **2.2. Electronic chips**

Silicon chips are found in every device these days, and this includes phones, computers, kitchen appliances, and even cars, and all these technologies are witnessing rapid development, which made advanced processors used in all devices, and electronic chip technology occupies a leading position in many industries, and it is micro chips, But it is indispensable in the field of manufacturing electronic products, and in bulk, these chips are packages with electronic connections embedded in chips of silicon, the element extracted from Among the most important international companies in the manufacture of American Intel semiconductors, and Taiwan Semiconductor Manufacturing Company Limited, known as TSMC, in addition to the American companies Qualcomm and Micron. It usually takes about three months to manufacture a chip, and this industry requires huge funds and complex equipment that is monopolized by limited companies. Among the most important international companies in the manufacture of American Intel semiconductors, and Taiwan Semiconductor Manufacturing Company Limited, known as TSMC, in addition to the American companies Qualcomm and Micron. It usually takes about three months to manufacture a chip, and this industry requires huge funds and complex equipment that is monopolized by limited companies<sup>2</sup>.

### **2.3. QUANTUM COMPUTING**

Quantum computing uses quantum mechanical effects to perform computations, which in some cases provides huge performance gains over, say, conventional supercomputing environments. For some problem classes, a quantum computer can be trillions of times faster than a conventional computer. For other classes of problems, a quantum computer is not faster than a classical computer. A quantum computer can easily solve the integer factor problem, which is used by RSA, and the discrete logarithm problem, which is used by ECC, but it is unable to solve quantum-safe algorithms such as the network-based. or code-based, or parity-based encryption, etc., f. RSA and ECC are both public key encryption algorithms that are used to



secure the Internet and wireless networks today. In sum, it can be said that quantum secure encryption solves problems that cannot be easily solved by a quantum computer or a conventional computer<sup>3</sup>.

#### **2.4. Encryption and Key Systems**

The primary difficulty is not in the cryptographic aspect, but in designing and implementing new solutions that will enable government and industry users to migrate to quantum secure cryptography in a robust and cost-effective manner. For example, a government may have millions of users in its public key infrastructure, and this is not an environment that can be easily upgraded in a weekend. Traditional upgrade and replacement techniques take years in such cases, which is why much of the work of the ETSI QSC working group is directed at towards the areas of security upgrade, migration, and cryptographic speed, which will allow a crypto-agile solution to perform fairly quick upgrades to the parts of the network environment with the highest security requirements first, followed by all other solutions if the solution is backward compatible. The most widely used public key technologies are RSA and ECC, both of which are outdated cryptographic systems, they have both been hacked and attacked over years of continuous improvement in traditional computing, along with improvements in attack techniques that threaten these methods more and more over time, that's why we can think of Quantum Secure Encryption is called "next-generation cryptography" because it also handles advanced traditional attacks, knowing that the Public Key Infrastructure, or PKI, is most vulnerable<sup>4</sup>.

#### **2.5. Governmental Policies**

Government policies in both China and Taiwan have a significant impact on the semiconductor competition between the two countries. The Chinese government has invested heavily in the semiconductor industry and provided subsidies and other incentives to encourage the development of the sector. This is the case in Taiwan, where the government has also invested in the semiconductor industry, but focused more on research and development rather than production.

#### **2.6. Price competition**

China and Taiwan are major semiconductor producers and are in direct competition with each other in terms of pricing. This has led to a race to offer more services at lower price points, which could hurt the semiconductor industries of both countries.

#### **2.7. Intellectual property rights**

Both China and Taiwan have strong intellectual property laws, but there is a lack of enforcement of these laws in both countries, and this has stagnated some companies.

#### **2.8. Semiconductor industry**

It is a very competitive and rapidly developing sector, and the competition between China and Taiwan is no exception, but they are among the countries that pump a lot of money and provide all facilities in this sector. Both countries have invested heavily in the industry, and both have made great progress in developing semiconductor technology in recent years, until China has become a major player in the semiconductor industry, with a number of large companies such as Huawei, SMIC and Tsinghua Unigroup investing heavily in the sector, and China has also made significant investments in scientific research.

### **3. THE FACTORS DRIVING AND STRUCTURING THE SINO-TAIWANESE COMPETITION OVER SEMICONDUCTORS**

#### **3.1. Economic and strategic importance**

Semiconductors are a critical component of many modern technologies, and are used in a wide range of industries, such as consumer electronics, automobiles, and communications, and as such, are seen as essential to economic growth and national security.

#### **3.2. Market size and growth**

The semiconductor market is witnessing a great and rapid growth, given that it is one of the most attractive global products for consumers all over the world, with different cultures, and therefore the industry is an important source of revenue and job creation for these two countries.

#### **3.3. Government support**

China and Taiwan have provided significant government support for the development of domestic semiconductor industries, including research and development funding, tax incentives, and subsidies.

#### **3.4. Competitiveness**

Both countries want to be competitive players in the global semiconductor industry and see the other as a major competitor.

#### **3.5. Political Relations**

The political relationship between China and Taiwan is very complex, as Taiwan is officially considered part of China by the Chinese government, but Taiwan considers itself an independent country. Competition in the semiconductor industry between these two countries is also affected by their political relationship.

#### **3.6. Technology transfer**

Both China and Taiwan want to develop their own advanced semiconductor technologies, but they are currently highly dependent on foreign technology, and this has led to efforts to acquire technology through various means, such as licensing agreements, joint ventures, and corporate acquisitions. In general, the competition between China and Taiwan in the semiconductor industry is driven by a set of economic, strategic and political factors, given the common vision of both countries in the fact that the industry is an essential source in achieving future growth and competitiveness, which requires them to invest heavily in the development of local semiconductor industries. One of the driving forces behind the Sino-Taiwanese conflict is the policy of the United States of America, which supports Taiwan on the one hand and transfers its technological products to it, at the expense of China, which imposes strict restrictions and a strict blockade on its cans, as well as obliges other countries not to deal with Chinese products.

### **4. THE STAKES OF THE SINO-TAIWANESE CONFLICT OVER SEMICONDUCTORS**

The semiconductor industry is a very competitive field, and the competition between China and Taiwan is intense, and it also includes some of the challenges that both countries face:

- Intellectual property concerns: Both China and Taiwan have been accused of stealing intellectual property from foreign companies, which has led to increased scrutiny and tighter regulations.
- Dependence on foreign technology: Both countries depend heavily on foreign technology, especially from the United States, which makes them vulnerable to trade restrictions and tariffs.

- High costs of capital and research and development: The development and production of advanced semiconductors require large investments in research and development and equipment, which can be an obstacle to the income of small companies.
- Talent shortage: The semiconductor industry requires a highly skilled workforce, and both China and Taiwan face talent shortages in areas such as chip design and manufacturing.
- Environmental and safety regulations: The production of semiconductors requires the use of hazardous materials and may have negative environmental effects, which makes the two countries in a state of constant fear that strict regulations will be imposed in this regard by local and international organizations.

In addition to these challenges, China and Taiwan also face special challenges that are unique to their individual situations. China, for example, has a large domestic market but lacks a strong ecosystem for suppliers and customers, while Taiwan has a strong ecosystem but a small domestic market. Despite these challenges, China and Taiwan continue to invest heavily in the semiconductor industry, and both countries are expected to play an important role in the global semiconductor market in the coming years.

## **5. THE UNITED STATES OF AMERICA'S POLICY TOWARDS CHINA IN THE FIELD OF SEMICONDUCTORS**

The United States has intensified its efforts and endeavors to impede China's progress in the manufacture of electronic chips, which are an essential component of everything from electronic devices such as smart phones to weapons and military equipment. And in October 2022, Washington announced export restrictions so that companies intending to export chips to China are obliged to obtain export licenses, and the restrictions included chips that are produced using American equipment or computer programs, regardless of where they are made in the world. The restrictions also prevent American citizens and green residence card holders from working in some Chinese chip companies, despite the fact that green card holders are permanent residents of the United States and have the right to work in the country, and thus they block the way for China to access American capabilities, which affects its ability to develop advanced semiconductors<sup>5</sup>. The Biden administration added 36 Chinese companies, including the major chip maker YMTC, to the "entity list" that Washington banned exports to without obtaining the approval of the US government, which is not easy. Technology Because of the new controls established by both the United States and the United Kingdom, and China filed a complaint against the United States to the World Trade Organization regarding export controls for semiconductors and other related technology, this is the first complaint that Beijing has filed against the United States before the World Trade Organization since President Joe Biden took office in early 2021<sup>6</sup>. China said in its complaint that the United States was misusing export controls to maintain its "leadership in the science, technology, engineering and manufacturing sectors," adding that the US actions threatened "the stability of global industrial supply chains." The US stated in response that the trade body (the World Trade Organization) was "not the appropriate place" to address national security concerns. "The national security interests of the United States require that we act decisively to deny access to advanced technologies," said Assistant Secretary of Commerce for Export Management Thea Kindler. Among these commodities, under international trade rules, the United States has 60 days to try to resolve the issue, or China will be allowed to request a committee to consider its complaint. Earlier this month, the World Trade Organization ruled that the US tariffs on steel and aluminum imposed by the United States under former President Donald Trump violated global trade rules, and one-third of the goods sold by China to the United States are subject to tariffs.

The United States said it "strongly rejects" the government's ruling and its inability to overturn such measures, at a time when electronic chip makers are also under pressure to make more advanced chips needed by new products. near 50,000 to 100,000 nanometers. Analysts believe that the US controls could put China behind other chip-producing countries, while Beijing has said explicitly that it wants to prioritize semiconductor manufacturing and become a superpower in this field<sup>7</sup>.

## **6. THE RESULTS OF THE SINO-TAIWANESE COMPETITION FOR ELECTRONIC CHIPS**

The competition between China and Taiwan in the semiconductor industry has led to a number of important developments and results, which are as follows:

- Increased investment and development: China and Taiwan have invested heavily in domestic semiconductor industries, resulting in the development of advanced technologies and increased production capabilities.
- Government support: Both countries provided significant government support for the development of semiconductor industries, including research and development funding, tax incentives, and subsidies.
- Market share: China and Taiwan have achieved significant gains in the global semiconductor market, as China has become the largest semiconductor market in the world and Taiwan remains one of the largest semiconductor producing countries.
- Intellectual property concerns: Both China and Taiwan have been accused of stealing intellectual property from foreign companies, which has led to increased scrutiny and tighter regulations.
- Dependence on foreign technology: Both countries are still dependent on foreign technology, especially from the United States, which makes them vulnerable to trade restrictions and tariffs<sup>8</sup>.
- Talent shortage: Both countries face a talent shortage in chip design and manufacturing.
- Environmental and safety regulations: The production of semiconductors requires the use of hazardous materials and can have negative environmental effects, and strict regulations are imposed in this regard by local and international organizations.

Overall, competition between China and Taiwan in the semiconductor industry has led to increased investment and development, as well as gains in market share, however it has also led to increased competition, concerns over intellectual property, and dependence on foreign technology. The American intervention in the game of competition, support for Taiwan, imposition of sanctions on China and playing on the chord of sovereignty has exacerbated the conflict between the two parties, and may lead to a military clash with dire repercussions on the global economy, as Taiwan alone produces 60% of the electronic chips in the world. Thus, any conflict affecting this island will paralyze the entire global economy.

## **7. CONCLUSION**

At the conclusion of this research paper, we reach several conclusions:

The semiconductor industry is a major driver of economic growth and technological progress in both China and Taiwan, and with the increasing competition between the two countries in the global semiconductor market, intense competition has emerged between them, and this rivalry has been driven by the rapid growth of the Chinese semiconductor industry, which was supported by government investments and subsidies, as well as the emergence of Taiwanese companies as major players in the global market. The competition between China and Taiwan in the semiconductor industry is likely to continue for the foreseeable future, as both countries have invested heavily in the field of industry and achieved great progress in technology and

production capabilities, and as the demand for semiconductors continues to grow, both countries will continue to compete for market share and technological superiority. The competition between the two countries is likely to benefit the global semiconductor industry, as it will lead to innovation and lower prices.

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## **SITUATED POVERTY, UTILITARISM AND CAPABILITIES APPROACH: THE SHORTCOMINGS OF 'MARGIN CALCULATION' IN THE FIGHT AGAINST DEPRIVATION**

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### **ABSTRACT**

*The nature of real existence has always been of interest to social thinkers over the centuries. If the current criteria of economic progress, reflected by a swarm of “turnkey” statistics, focused on growth of inanimate “comfort objects” (such as GNP and GDP at the heart of innumerable economic studies on development), this focus can only be justified, if at all, by the impact of the said objects on human lives that they directly or indirectly affect.. The interest of replacing them by direct indicators of the quality of life, wellness and freedom that human lives enjoy is more and more recognized. Even inventors of quantitative estimation of national income which attracted much attention and adherence tried to make it clear that the ultimate interest was the richness of human existence, although it is their indices, rather than their motivations which had a great impact. William Petty, for example, the pioneer of the measure of national income in 17th Century (He suggested means to assess it so much through the ‘income’ method as through that of expenses, as is said today) formulated his intention as follows: to examine whether « the subjects of the kind » lived « in as bad a condition as that of discontented people ». Based on this, he explained the different determinants of people’s conditions, including « common safety» and « the particular happiness of every man»<sup>1</sup>.*

**Keywords:** Deprivation, Poverty, Utilitarianism

### **1. INTRODUCTION**

This underlying motivation was often ignored in economic analysis where means of existence were the centre and fruit of research. It is, however, important not to confuse the means and ends. Therefore, one should not focus on the intrinsic importance of income, but rather assess it depending on what it builds, particularly lives that are worthy of living. Having a decent income helps to avoid early death. Such an enterprise depends also on other characteristics, namely the organization of society, including public health, medical care, the nature of education and educational system, the scope of social cohesion and harmony, etc. Considering only means of existence or directly observing the type of life people lead constitutes a real difference. These observations and findings reveal a contrast between the approaches based on utility and resources and the approach based on capabilities, of which the initiator is Amartya Sen (Nobel Prize of economics in 1998). In his work entitled « *A New Economic Model* », Sen suggests that focus on means of existence should be abandoned in favor of concrete possibilities to live. This also results in a change with regard to means-oriented assessment methods, namely those laying emphasis on what John Rawls refers to as the « *primary goods* », which are general means, such as income, wealth, powers and prerogatives of functions, social bases for self-respect., etc.

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<sup>1</sup>HUL C.H. (1899), *The Economic Writings of Sir William Petty*, Cambridge, Cambridge University Press,

The capabilities approach, therefore, attempts to put things right by focusing on the possibility of effective ends and on concrete freedom of attaining reasoned ends, rather than focusing on means. Thus, the present paper is divided into two parts. The first part will try to highlight the imperfection of traditional monetary indicators as well as the difficulties to measure the different dimensions of poverty, particularly in emerging countries, such as Morocco. We argue that poverty is not merely an idea of inadequacy of economic means of an individual, but rather a fundamental shortage that deprivation entails\_ minimum adequate capability. The second part deals with a reorientation towards capabilities in order to explain the extent to which the latter (the capabilities approach) could serve as a basis for the assessment of the level of deprivation and not that of resources, which focuses on income and wealth.

## 2. ANTINOMIES OF TRADITIONAL INDICATORS

After World War II, economic growth was the centre in the fight against poverty. In fact, growth was considered as a means to achieve development. Thus, the growth of the GDP per capita became the only measure of poverty. Pigou was the first to rely on income to measure prosperity and welfare. He described economic prosperity as the measurable part of human wellness, the part that can be compared to money standard or benchmark. However, the production and distribution process impacts the income of individuals and households. Income is, then, is also an indicator of economic activity. Income nationwide, GNP, as it was referred to, was transformed into a measure of the activity of the total mass of produced goods and services, weighted by their respective quantities and prices, rather than a measure of individual welfare. GNP per capita is obtained by dividing GNP by the country's number of inhabitants. Consequently, a country's GNP may increase from one year to another, and its GNP per capita may decrease if the population of this country increases more rapidly than its production. For OECD (Organisation for Economic Cooperation and Development) countries, international trade relations are such that it was necessary to replace GNP by GDP, which is the sum of added values created within the borders, whatever the nationality of the people who create them. It is the criteria of residence that is prioritized. It should be noted that GNP or GDP indicate a « *production* » and not « *a living standard* ». According to certain stakeholders, in order to obtain a country's standard of living depending on its GNP, it is necessary to apply coefficients ranging from minus three to five as per the weight of capital accumulated in the past, the country's political and economic systems, its geographical and climatic elements, the value of the currency and the weight of the informal sector. In any event, there exists a certain correlation between poverty and low income. Income is the source of purchasing or spending power, access to consumption and saving. In societies where market values are dominant, « *a low income restricts access to the market and can determine a less valorized social status; it is a factor of a more or less marked exclusion* »<sup>2</sup>. Nevertheless, one cannot put forward that there exists a high causality between a low GNP per capita and poverty. One cannot claim that a person dependent on a low income is automatically considered poor. On the one hand, income is but the monetary element of the allocation of each individual's resources. Various elements can intensify or attenuate the consequences of low income: self-subsistence, reciprocal counter-services, existence of property, constitution of family or extra-family solidarity networks, etc. On the other hand, income is not a necessarily determining component of a poverty condition. From the « *resources* », point of view, income level at a given time has no indication as to prospects of future income, which would undoubtedly be more legitimate. Moreover, as Amartya Sen, in his book « *A New Economic Model* » shows, the same income can have different meanings depending on age, status, aspirations, etc.

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<sup>2</sup> MILANO S. (1988), *La pauvreté absolue*, Paris, Hachette.

The calculation of GNP per capita is subject to many statistical difficulties. In his work *«Towards a new measuring system»*, elaborated jointly with Sen and Jean Paul Fitoussi, Joseph Stiglitz raises the following question: *« What significance does the calculation of the importance of a physical production flow take on if account is taken of the conditions of its production and distribution between the concerned persons?»*<sup>3</sup>. It is, thus, necessary to underline the problem of distribution of national wealth poses major difficulties. In fact, a growth rate of the GNP per capita can give a flattering image on effective development and ultimately on the poverty combatting strategies. Added to this is the fact that the contradiction between national health and human wellness is very striking. It is apparent in countries where income arising from exports increased significantly due to the rise in oil prices since 2003. For many Arab countries, GNP abruptly increases to levels superior to those of the richest of Western States. However, these same countries sometimes have the poorest communities worldwide. For Joan Robinson, *« Economic growth, when it occurred, rarely solved urgent social problems and, most often, did not cover mass population of emerging countries. By making economic inequalities worse and not solving problems, such as unemployment, malnutrition, diseases and housing deficiency, economic growth always exacerbated social problems and tensions»*<sup>4</sup>. In their work, *« Ruins of development »* Wolfgang Sachs and Gustavo Esteva support the same point of view. According to them, *« Since the rise of proletariat and, later in the welfare state, poverty was interpreted as lack in purchasing power, which should be eliminated by economic growth. Under the banner of combatting poverty, forcible transformation into money economies can be conducted as a moral crusade, which could give way to a so justified appeal to economic expansion»*<sup>5</sup>. Besides inequalities concealed by measuring poverty based on GNP per capita, the latter includes all the goods and services produced and marketed, including harmful and noxious products that pollute the atmosphere and affect health. GNP per capita measures production, but provides little information on populations. If deterioration of the environment causes diseases, thus leading to an increase in health expenses and, subsequently, in GNP, such a GNP decrease will be interpreted as a sign of growth and, therefore a drop in poverty, when in fact the population's real conditions and their environment have deteriorated. According to the 2010 world report on human development, there were many attempts to recalculate the figures of national income taking into account the natural capital depreciation. One of the first studies carried out to this effect, in Costa Rica, shows that from 1970 to 1990, cumulative depreciation of its forests and oil reserves amounted to over \$ 5 billion, i.e., about 6% of Costa Rica's total GNP for that period. In the case of Indonesia, the same report shows that during the period between 1971 and 1984, cumulative depreciation of forests, soils and oil resources amounted to \$96 billion, i.e., 9% of its GNP for the same period. It is, therefore, commonly accepted that the income-based monetary approach to poverty rests on a narrow idea of welfare or wellness and, because it is indirect, limits our understanding of this phenomenon to what individuals have and what they do not have. Poverty is a larger phenomenon that is apparent in different domains as various forms of deprivation and unsatisfied needs that prevent individuals from leading a normal and decent life or take part in the ordinary activities of society. (Dickes, 1989 ; Alcock, 2006 ; UNDP, 1997). For this reason, it was concluded that adopting multidimensional and direct approaches can prove more satisfactory as to how to perceive poverty, for they have a much broader objective. At this level, it is necessary to distinguish two approaches. First, the approach of situated poverty, which focuses on the prevalence of social construction of poverty since, contrary to what utilitarians pretend, we cannot isolate a phenomenon, such as deprivation, of the environment in which it occurred and developed.

<sup>3</sup> STIGLITZ J., SEN A., FITOUSSI J-P. (2009), *Vers un nouveau système de mesure*, Paris, Odile Jacob.

<sup>4</sup> ROBINSON J. (1980), *Development and underdevelopment* Paris, Economica.

<sup>5</sup> WOLFGANG S. and GUSTAVO E. (1996), *Ruins of development*, Montréal, Ecosociété.



This broader concept, which is applied, as a priority, to developing countries, makes it possible to integrate certain dimensions that are not used by Townsend (1979) in the assessment of poverty, such as culture, beliefs and social capital. The second trend derives from the works of Amartya Sen (1980) on the capabilities approach, and which served as the basis for the elaboration by the UNDP of concepts of human development and human poverty. In this case, poverty is defined as a shortfall or deficiency in terms of basic capabilities likely to make it possible for a person to reach what Sen has called fulfilment or achievements. Amartya Sen's aim is to question the relevance of the « *income* » variable in the assessment of poverty. This critical examination holds true for all the different measures which, sharing this vision, perceive poverty in terms of weak or low income.

### 3. SITUATED POVERTY

In order to better understand situations like that of deprivation, we have tried to better understand situations like that of deprivation, we started with the following questions. Can we limit ourselves to the standard market model to understand the underlying nature of poverty? Several times, the determinism of Bretton-Wood's strategies of institutions met with the complexity of the studied fields and facts, a fact which translates into wide poverty in the poorest countries of the globe. Suffice it to remember that Amartya Sen's works confirm the reductionism of the utilitarian idea of the market as to the way of dealing with the nature and causes of the prosperity of nations. Initially, all development policies had as slogan the following slogan: « *in the name of combatting poverty as slogan* »<sup>6</sup>. For Hassan Zaoual, poverty is understood in a simplistic way. For experts of Bretton-Woods' institutions, the concern is a simple « *economic category* » that can be calculated from the « *income* » parameter ». However, in an investigation we conducted in the region of Sefrou (Morocco), we came up with the conclusion that poverty is multidimensional by its very nature. The assessment and analysis of poverty requires adaptation to the diversity of the studied individuals and populations. This is incidentally the reason why we have introduced the concept of « *situated poverty* ». Amartya Sen paid special attention to the principle of diversity, as is clear from its recurrence in his arguments. He began his work « *Rethinking Inequality* » by the following formula: « *Human beings are different from each other. We are distinguished from each other by characteristics that are not only external (inherited wealth, the natural and social environment where we live), but also personal (age, gender, vulnerability to diseases, physical and intellectual aptitudes). To determine what equality requires, it is necessary to take into account this human diversity* »<sup>7</sup>. The remarks of Ibn Khaldoun, « *the father of history* », clarify this point. This great historian of the 14th century, through a comparative analysis between the eating habits of the populations of Hijaz (Saudi Arabia) and those of Shanhajjas, veiled people of the South of the Maghreb, puts forward that hamine is a blessing for the life of the former so much from the physical as on the mental point of view. According to Majid Rahnema « *In general, Ibn Khaldoun argues, people who lack grains and condiments and live in the deserts are in better health than the inhabitants of the plains and heights who lead an easy life : their complexions are purer, their bodies healthier, their human types better proportioned and more beautiful, their behaviour not disproportionate, their faculties more receptive and more perceptive in knowledge. It is a remark that has been confirmed for generations* »<sup>8</sup>. This justifies the point of view of the sitology approach to poverty, according to which, poverty cannot come down to a general and universal formula where only the « *income* » variable intervenes, to be later interpreted as a sign of deprivation. It is the individual's life and environment that should be taken into consideration.

<sup>6</sup> ZAOUAL H. (2000), « La pensée économique plurielle : une révolution scientifique en marche », *Séminaire de culture de développement*, DEA Changement social, Université des Sciences et Technologies de Lille.

<sup>7</sup> SEN A. (2000), *Repenser l'inégalité*, Paris, Seuil.

<sup>8</sup> RAHNEMA M. (1991), La pauvreté globale: Une invention qui s'en prend aux pauvres, *Revue Interculture*, Volume XXIV, N°2.

It is, therefore, necessary to adapt economic analysis of poverty to the context of each location. According to its « *soft relativism*» principle, the situated poverty approach states that each location or site, while open to changes, exhibits peculiarities that impregnate people's individual and collective behavior within a given location.. « *Development policies made numerous « site errors» in so far as they tend to be dropped on from the summit to the base instead of favouring listening to and free participation of concerned populations »*<sup>9</sup>. The 2010 world report on human development stresses that: « *the sectors of media, information and leisure, which, thanks to their considerable means, are present worldwide, can powerfully help eradicate or, at least, reduce poverty. They shape not only information, but also new culture and values. We need values that tolerate cultural diversity and respect dignity of the poor so as to reinforce their solidarity and mobilize individuals and communities, companies and others against poverty*»<sup>10</sup>. It equally stipulates that « *Well-focused strategies are necessary so that the growth model could be beneficial for the poor and so that generated resources could be invested in human potentials. Growth is not enough. La croissance ne suffit pas. On its own, it can be without regards (the losers find themselves in grinding poverty), without jobs (almost no job is created), without participation (individuals are not associated to decision-making processes), with no future (the environment of future generations is destroyed) and without roots (history and cultural traditions die out »*. Like Amartya Sen, Hassan Zaoual assumes that it is necessary that the poor have an area of freedom so that they can better act, since the crowding out (l'effet d'éviction) will sooner or later end up recurring in the form of non participation which is detrimental to economic performance and local accumulation of skills through economic projects meant to respond to the causes of poverty. According to the same author, the assumed skills of « *experts* » sustain the site stakeholders' unskilfulness. The poor, thus, are not citizens, but rather customers of institutions and social security. The latter use their expertise without solving the problems that justify their existence. Therefore, there is a new tendency based on the awareness of the role that local cultures and beliefs can play in combatting poverty, a fact which proves to be a first step towards a new concept of combatting poverty and which claims to *situated* and therefore open on new anthropological and cultural dimensions of the concerned location. This confirms the contributions of the capabilities for which a better analysis of deprivation assumes a better understanding of the area and populations studied.

#### 4. CAPABILITIES APPROACH

During the last few years, there has emerged a growing interest in the idea of « *capabilities* » introduced by Amartya Sen (1980, 1985, 2000, and 2003). If the Nobel Prize that Sen obtained in 1998 is a symbolic proof, it is certainly the more and more widespread use of this approach among researchers and institutions in their understanding of questions related to wellness, poverty and inequalities that is better evidence for this. The capabilities approach is based on ethical concerns related to social equity. In fact, at the beginning of his reasoning, Amartya Sen poses the question of what attribute a society should equalize to achieve social equity. Starting from a thorough and well-founded criticism to the proposals of the two dominating ethical approaches at the time, i.e., utilitarianism (Bentham, 1789) and Rawlsian theory of equity (Rawls, 1971), he suggested a space of functionings and capabilities, such as adequate assessment of questions related to welfare, poverty and inequalities. Thus, in the field of social equity, this approach constitutes a new paradigm and a real alternative to utilitarian orthodoxy. The capabilities approach is an expanded and normative framework for the assessment of issues related to individuals' welfare, social arrangements, policy implementation and societal changes based on individuals' actual ability to do or to be something and the scope of freedom

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<sup>9</sup> ZAOUAL. H. (2002), « La pensée économique peut-elle être flexible », in Granier R. et Robert R (sous la dir.), *Culture et structures économiques. Vers une économie de la diversité ?*, Paris, Economica.

<sup>10</sup> PNUD (2011), *Rapport mondial sur le développement humain 2010*, Paris, Economica.

they enjoy to promote and achieve their objectives. This approach starts from the simple remark that an individual's living standard is directly related to the different states and acts they can accomplish or achieve. Sen makes use of the term "*functionings*" or achievements to refer to these states and acts that individuals effectively attain. For Sen, « *the thesis is that functionings are constituents of the person's existence and that the assessment of their welfare should necessarily be a judgment of these components* »<sup>11</sup>. The ability to function constitutes all the real opportunities the individual is offered and represents the various combinations of functionings (states and actions) that the individual can accomplish. Capability is, therefore, a set of vectors of functionings which indicate that an individual is free to lead this or that type of life. Thus, on the conceptual level, the main innovation of the capabilities approach is the adoption of an expanded informational space, wider than that of the traditional approach, to deal with a set of normative questions (Farvaque, 2003). As is stressed by Robeyns (2005), the two focal points of this approach are the focus on the distinctions between means and ends, on the one hand, and between real freedom (capabilities) and functionings (outcomes), on the other. Resources are goods and services (commodities), be they mercantile or not, that the individual has at their disposal, as, for instance, food or a bike. These goods have an instrumental value rather than an intrinsic or inherent value, for what really matters is the way we can use them. Also, like Gorman (1956) and Lancaster (1966), Sen (1985a) draws a line between resources and their characteristics which constitute their desirable properties and determine the uses to which the good can be put. It is these functionings that constitute the intrinsic value. A bike enables its owner to move; food does not only make it possible to satisfy hunger, but also brings the pleasure to eat and to create a social support through the organization of meals (Sen 1985). Therefore, the characteristics of goods (bike) provide individuals with the possibility to implement the related functioning (movement). However, Sen (2003, 150) points out that there is nothing automatic, permanent or inevitable about the relationship between income (and other resources), on the one hand, and individual achievements and freedoms, on the other. In fact, owning a good is different from the ability to benefit from its characteristics. It is not enough to know the quantity of food an individual has to judge the way they are fed. Sen's well-known example is that of an individual suffering from a parasitic disease that makes the digestion of food difficult. This person can suffer from malnutrition, even if they have at their disposal a quantity of food that would enable an individual without such disease to be well fed. Thus, information of goods ownership proves insufficient to judge someone's living standard or welfare, for it does not take into account of the relationship between goods and functionings. To be able to take account of such contingent relationship, Sen introduces, at the heart of his approach, a set of internal and external conversion factors, which determine the possibility to convert the characteristics of resources into functionings. First of all, such transformation will be influenced by personal conversion factors related to the individual's internal characteristics (physical, intellectual aptitudes, metabolism, etc.). A person suffering from physical disability will not be able to achieve the characteristic « *movement* » that the good has « *bike* ». In the case of food, metabolism, age, gender, activity level or health conditions are conditions that will influence the way the individual will indeed convert resources (food) into functionings (to be well-fed). Besides, age and gender determine specific needs that income does not take account of (young children, old people, maternity, family obligations). The other conversion factors are external and highlight the influence of social characteristics (politics, social norms, power relationships) and environmental characteristics (climates, infrastructures, public goods) may exert. A country's social rules and traditions may constrain women's behavior, thus reducing all their potential functionings. Likewise, riding a bike may depend on climatic conditions and usability of a country's roads, the ability to be well-fed may depend on drought or flood problems and the ability to be in good health depends

<sup>11</sup> Sen A. (1999), *L'économie est une science morale*, Paris, La Découverte.

on risks of contagious diseases in the region of residence. Therefore, taking account of these different conversion factors will make it possible to consider interpersonal variations, which enables individuals with identical resources may have two different living standards. This last point is particularly important within the framework of the elaboration and assessment of public policies aiming at reducing poverty (Sen, 2003). In the course of Sen's reasoning, it is important to understand the distinction between functioning and capabilities. Functionings are individuals' different states and acts. They form what a person, given a set of conversion factors, can do or be. They can be elementary (i.e., to be well-fed and in good health) or complex, such as the ability to take part in community life, take a rest, be respected, have self-esteem, etc. Assessment of welfare, therefore, takes the form of an assessment of functioning vectors (i.e., individuals' valued states and acts). Reference to functionings makes Sen's approach a direct and multidimensional one. Indeed, although he considers that an individual's welfare should depend deeply on the nature of their existence, that (i.e., accomplished functionings), at the heart of his approach, he places capabilities rather than functionings. As is highlighted by Robeyns (2003), while a functioning is an achievement, a capability represents the possibility of achievement and refers to all potential functionings. Consequently, Sen's emphasis is not on what people have or do, but on what they have the choice to do or do not have the choice to do. Based on all the characteristics of the resources at their disposal and on the conversion factors, an individual can determine vectors of potential functionings that represent the different combinations of potential functionings they can achieve. This set represents all the individual's capabilities and gives an image of the scope of the choices at their disposal. It, therefore, precedes all functionings which constitute all the states and acts that an individual achieves. Moving from the space of capabilities to that of functionings is shown by the individual's real choice, which, in turn, depends on the individual's history as well as on the mechanisms of preferences; these mechanisms themselves depend on the social context. In Sen's view, functionings are more related to living standards, whereas capabilities result in a dimension of freedom and choice. In fact, capabilities refer to an individual's real freedom and real opportunities, and the freedom, in the positive sense of the term, which an individual has to promote or achieve a functioning they would like to enhance. To illustrate the importance of the difference between capability and functioning, we can cite the example of two people who cannot sufficiently provide for their needs in terms of food. However, one is a person suffering from famine whereas the other is a person who has chosen to be on hunger strike as a sign of protest. Regarding the good "*food*", both people realize the functioning of being "malnourished", but not through the same path.; while one of them was forced into such a situation, the other one has made a choice. The notion of choice is not easy to understand. One finds the same questions asked in works on deprivation in which involve determining whether choices are forced or deliberate. Based on these considerations, Sen suggests a distinction between living standard, welfare and « *agency* ». For him, the living standard is the broadest notion and is connected with information related solely to the individual. The difference between the living standard and welfare emerges from the possible influence of external sources on a person's welfare. Thus, pain (joy) caused by sorrow (happiness) of a relative reduces (increases) welfare, but does not affect the living standard. Agency is much broader and rests on the idea that an individual can have objectives and values other than the search of their personal comfort. An example is a person's commitment towards the issues of their community through the participation to anti-globalization protests, being persuaded that this globalization has harmful effects (Robeyns, 2003). These various concepts constitute the backbone of the capabilities approach, of which the use, as a framework of thought, is very wide and is confined to studies of poverty. The capabilities approach to poverty constitutes a way to move from the analysis of means to the analysis of ends. In this context, Sen (2003, 36) considers that « *it is just to consider poverty as deprivation of the basic capabilities, rather than merely a low of*

*income*». This definition of poverty refers to a shortfall or deficiency of basic capabilities. The latter constitute a subset of the set of “capabilities” and refer to the freedom to achieve basic things that are necessary to survive and to avoid or escape poverty. Thus, while capabilities can cover a vast and varied field, basic capabilities refer precisely to the real possibility to avoid poverty. They concern the ability to satisfy minimum and adequate levels of certain crucial functionings. The identification of these minimum and acceptable levels constitutes the basis of Sen’s approach to poverty. For Robeyns (2005, 101), basic capabilities are crucial to analyze poverty and, in more generally, to study the welfare of the majority of the population in a developing country, whereas in rich countries, welfare focuses rather on capabilities that are more or less necessary for physical survival. Therefore, from the outset, this definition is broader than given by....., but it is more subtle and delicate to make operating. The capabilities approach is the development paradigm that is underlying the concepts of human development and poverty introduced by the UNDP (1990, 1997). One of the major changes that this new paradigm offers is the possibility of analyzing the different questions regarding poor countries and individuals within a flexible framework, rather than imposing political or other prescriptions in the name of a rigid neoliberal orthodoxy (Fukuda-Parr, 2003). Within the framework of this approach, human development is geared towards the expansion of capabilities, whereas human poverty reduction involves ensuring that individuals who should have to primary resources have a set of basic capabilities likely to help them achieve these resources. The main difference between the concepts of human development and human poverty is that the former focuses on the living conditions of all individuals in society while the latter lays emphasis on those of poor individuals. Thus, as part of the overall view of human development, the disadvantages of the poorest people can, in an aggregated level, be made up for by the gains of the well-to-do ones. The concept of human poverty and poverty indices were introduced in order to focus on the situation of the most underprivileged people. In this case, lack of progress in the reduction of disadvantages of people in deprivation cannot be made up for by the significant progress of the well-to-do. Subsequently, Anand and Sen (1997) consider that the two approaches are useful for understanding the development process, and that they are not exchangeable. The human poverty approach was introduced by the UNDP’s 1997 Human Development Report. This report seeks to focus on the challenges of poverty eradication in the world with a view towards human development.. For this purpose, it does not simply focus on poverty, in the monetary sense of the term, but rather on a multidimensional approach to poverty. (Anand and Sen, 1997). It draws its inspiration, to a large extent, from Sen’s capabilities approach, as is shown by the introductory phrase of the first chapter of the 1997 Human Development Report., which stipulates that « *It is the deprivation lives that people may lead that poverty can be seen. Poverty implies not only low income or deficiency in elements necessary to well being, but also denial of and deprivation in opportunities and basic choices for living a tolerable life* ». These choices and opportunities refer to basic capabilities. This means that, in this approach, poverty is not merely a state of deprivation currently lived by an individual, but also the absence of real opportunities, due to social constraints or to personal characteristics, for living a life that they reasons to valorize. Nevertheless, with poverty being a state that everyone one wishes to avoid, it may be said that its study can disregard this notion of freedom and focus on the individual’s real functionings. This approach largely exceeds the physiological model of deprivation, for « *capabilities* » mean, « *to be in good health, have access to knowledge, have access to resources necessary to have a decent standard of living and be able to take part in the community’s social life* » (PNUD, 2001). From a political point of view, the objective is, therefore, the « *removal of obstacles in what one can do in life, obstacles such as illiteracy, diseases, insufficient access to resources, or insufficient political and civic rights* » (Fukuda-Parr, 2003).

Fukuda-Parr (2003) evokes a five-point strategy for development and poverty reduction: (1) give priority to social development with a spread of opportunities of education and health care., (2) economic growth creating resources for multidimensional human development, (3) social and political reforms in view of establishing a democratic governance to secure all people's rights, (4) foster equality in the three preceding points, namely for the poorest people (5) global political and institutional reforms to create an economic environment where access to markets, technology and information would be easier for poor countries. Within these diverse components, one can notice the rise of the concept of empowerment (World bank, 2000 ; Narayan, 2002) and the increasingly accrued taking into account of questions related to gender equality. The capabilities approach has led to clear conceptual advances in the field of poverty studies, both as to the debate on the absolute or relative aspect of poverty and as to its role in the appearance of the concept of human poverty. These conceptual advances are nevertheless confronted with important operationalization problems, which are partly due to the scope of this approach.

## **5. OPERATIONALIZATION OF THE CAPABILITIES APPROACH**

The great riches and complexity of Sen's approach are not easy to express empirically, for the capabilities approach is much more demanding on the informational and methodological level than on the monetary level of poverty. If for some people, the problems facing this approach seem to be insuperable, for others they are simply a reflection of the intrinsic and irreducible complexity of the concepts it makes possible to understand. Such is Chiappero Marinetti's (2000) point of view, who stresses that the empirical applications of the capabilities approach require an adequate space for the evaluation of capabilities (or functioning), a pertinent list of capabilities and functionings, a set of indicators for each of the dimensions of wellness taken into account, the way, if necessary, to combine the elementary indicators to obtain an assessment on each dimension of wellness and the way to add information on the different dimensions and achieve a comprehensive assessment of wellness. Assessment of capabilities requires that, on the one hand, valuable items be selected and, on the other hand, the value of these items be determined (Sen, 2000). In fact, beyond the preceding, there emerges the problem of the list of elements to consider and their relative importance. This question is related to the horizontal imprecision of the capabilities approach. Sen's reference to the different states and acts, which a person has reasons to valorize suggests that this approach is inherently multidimensional and refers to a multitude of functionings/ capabilities, which can impact individuals' wellness. In the case of the study of poverty, confining oneself to a set of basic functionings makes it possible to limit their number. However, even at the level of basic functionings, Sen's capabilities approach does not provide a list of functionings/ dimensions, nor does it provide a clearly defined selection method. This question is of paramount importance and is recursively at the heart of the current debates on the operationalization of this approach (Robeyns, 2005). Indeed, although Sen's theory is theoretically attractive, as long as one does not have clearly defined criteria for the selection of value functionings, one will face a series of criticisms. In particular, the absence of a list makes Sen's approach is not fully specified. Absence of a list makes Sen's approach not completely specified. For some researchers, this incompleteness poses a problem. Nussbaum (2003) considers that as long as Sen has not explicitly determined a list, his approach will lack percussion. Alkire (2001, 2002) shares the same point of view. She considers that lack of a procedure for the identification of pertinent capabilities (dimensions) makes the implementation of this approach difficult. These two authors agree that, in this case, the approach may be not understood and may give free reins to all sorts of deviations. In fact, without a list or a transparent selection method, numerous works aligning themselves with this theory may adopt different approaches or steps, which will lead to more confusion than clarity.

Other authors leveled stronger criticisms. Townsend (1985, 667), for instance, argues that the absence of scientific criteria for the selection of dimensions is « *scientifically unacceptable* ». For him, « *one should consider the question of knowing how capabilities are selected and in what way they are absolute* ». In the same vein, Sugden (1993) raises the following question: « *given the large number of functioning that Sen considers as pertinent, given the scope of disagreement between reasonable people as to the nature of what is a decent life and given the unsolved problem of the way in which sets should be assessed, it is natural to raise the question of knowing the extent to which Sen's framework of analysis is operational* ». In reply to these criticisms, Sen admitted that it is necessary not only to identify the capabilities and classify them into the most central ones and the most trivial ones, but also to assess their relative weight. However, he thinks that any subsequent specification on his part would be controversial. In fact, while he is not averse to the idea of determining that, in some specific cases, certain capabilities are more important than others, he refuses to endorse the a predetermined and definite list of capabilities. The reason for this is that the capabilities approach is not confined to a sole objective. It was elaborated as abroad framework of thought. Consequently, Sen believes that each application necessarily depends on its context and it for this reason that his approach was deliberately incomplete. The selection of capabilities should therefore be geographically contextualized. Thus, from a methodological point of view, « *they are applications to specific questions, context-sensitive and limited by data, which can give birth to a pertinent list* » (Farvaque, 2003). Besides, the elaboration of the list pertains to a value judgment that should be explicitly made through a democratic and participative method. It is not the work of a theorist. It is, therefore, clear that if the malleability of this approach makes it evasive in the eyes of certain people, Sen considers it as an asset and thinks that this approach cannot be made more specific without carrying out a universal assessment, which will make it possible to choose the valuable items and their relative weight. Thus, while this incompleteness is the point which leaves this approach wide open to the most ferocious criticisms, it is one of the reasons of its success. If he refuses to give a list of basic functionings, Sen nevertheless lays tracks that will help understand the scope he intends to give to his approach. These tracks are in the form of domains that one can take into consideration and the form of two selection criteria, based on consensus, which will make it possible to select the set of pertinent, basic capabilities without having recourse to value judgments.

## 6. CONCLUSION

In spite of incompleteness that Ammatya Sen's approach exhibits, it should be nevertheless admitted that any poverty reduction policy that does not take into consideration the capabilities of individuals or groups of population increases deprivation. In other words, any person's emancipation and « *well being* » depends on their capability to change their situation. Increase in income does not automatically lead to the improvement of « *well being* » when the individual as well as their environment are not able to develop relying on their endogenous capabilities. Therefore, the problem lies in the inadequacy and not the lowness of income. Having an adequate income does not mean having an income that is inferior to a poverty threshold set from outside. Instead, it is having an income lower to what a person should have to ensure a specific level of capability. This means that, to analyse poverty, one should not confine oneself to data on income<sup>12</sup>; it is necessary to pay particular attention to the diversity of environments and social phenomena. According to Sen, « *Ana analysis of poverty based solely on income will only say half the truth* ».

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<sup>12</sup> Instead of measuring poverty based on income, Sen suggests calculating one can achieve with this income, while taking into account the fact that these achievements can vary from one individual to another and from one place to another. Otherwise, how can we explain that there exist poverty pockets inside middle classes in rich countries?

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# MODELLING THE PARAMETERS OF STRATEGIC DECISION- MAKING: THE CASE OF THE INTERNATIONALISATION OF MOROCCAN COMPANIES IN SUB-SAHARAN AFRICA

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## ABSTRACT

*This article explores the factors influencing the strategic decisions of Moroccan companies to locate in sub-Saharan Africa, focusing on the following variables: political stability, the threat of Jihadists and domestic stability. The article begins by discussing the evolution of the definition of decision making, highlighting its importance in the context of international business. It identifies three types of decision, namely strategic, tactical and operational, and explains how strategic decision-making is crucial for the future of the company. The research model is based on J.H. Dunning's ESP (Environment, System and Policies) paradigm, which examines the country-specific advantages that make it possible to choose a host country for investment. This article proposes to add the following variables that are linked to the reality of sub-Saharan Africa: political stability, the threat of Jihadists and domestic stability. The empirical results of the questionnaire study show a positive, but not statistically significant, correlation between these variables and implementation decisions. This underlines the importance of further research to better understand the strategic decision-making process in this complex context.*

**Keywords:** *Africa, Decision-Making, Internationalisation, Modelling*

## 1. INTRODUCTION

In recent years, Moroccan companies have increasingly expanded their operations in sub-Saharan Africa. This expansion is mainly driven by the economic diplomacy encouraged by the Moroccan government and the country's strategic position as a gateway to sub-Saharan Africa (Africa Intelligence, 2021). Some of the sectors in which Moroccan companies are active in sub-Saharan Africa include banking, telecommunications, energy and infrastructure (Oxford Business Group, 2021). Moroccan companies are also investing in local production facilities in areas such as fertilisers and pharmaceuticals in sub-Saharan Africa to capitalise on the region's growing consumer market (Jeune Afrique, 2021). However, Moroccan companies face certain challenges when it comes to investing in business in sub-Saharan Africa, such as language barriers, cultural differences and political instability in some countries (Financial Times, 2021). Despite these challenges, Moroccan companies still see sub-Saharan Africa as a key market for their growth and expansion plans (Reuters, 2021). As a result, the strategic decision-making process of an international company can vary considerably depending on a number of factors, including the type of company, the business sector, the corporate culture and the economic environment. Multinational companies tend to have more complex decision-making structures involving management teams and boards with members from different countries and cultures. In contrast, smaller companies tend to have simpler, more centralised decision-making structures that allow decisions to be taken more quickly and efficiently. In addition, international companies entering emerging markets may face additional challenges related to

regulation, culture and infrastructure, which may affect their decision-making processes. In the same vein, the internationalisation of Moroccan companies in sub-Saharan Africa is affected to a large extent by political stability, domestic stability and the threat of terrorism in these host countries. Ultimately, each company must be able to adapt its decision-making processes to its environment and strategic objectives if it is to succeed in international markets. At the heart of contemporary academic and economic issues lies the complexity of strategic decisions by Moroccan companies to expand in sub-Saharan Africa. This research topic seeks to explore the following fundamental question: What is the impact of political stability and the threat of jihadists on the strategic decision-making process of Moroccan companies seeking to internationalise in Sub-Saharan Africa? Moroccan companies face many challenges and opportunities in an ever-changing geopolitical, economic and cultural environment. The aim of this article is therefore to dissect the economic, political, social and cultural factors that guide the strategic choices of these companies in the sub-Saharan region. To answer this question, we will dissect the concept of strategic decision-making, then we will present an overview of the different challenges faced by Moroccan companies when choosing an African country for development. We will then develop a model that presents the proposed variables and their impact on the strategic decision-making process.

## **2. REVIEW OF LITERATURE**

### **2.1. Conceptual analysis of strategic decision-making**

The definition of the concept of decision making has given rise to debate among several researchers and managers in the field, initially decision making could be defined as "the act of a decision maker choosing between a variety of options that have the potential to provide a satisfactory solution to a given problem. The concept of decision-making has evolved over time, as decision-making procedures have changed and become more complex, particularly for multinational companies with more or less complex information loops. In the classical sense of the term, decision-making is analogous to the behaviour of an individual (who has the power to decide) who takes actions that benefit the creation and distribution of the company's wealth on the basis of a set of information at his disposal. In more modern approaches, decision-making is more akin to "a process of progressive commitment in relation to others, characterised by the recognition that there are multiple paths to identical and unique objectives" (L. Sfez, 1992). The classification of decisions in practice can take several forms, namely classification according to the timeframe of the decision, the type of decision itself or the nature of the decision variables. In this article, we will focus on classification according to the nature of the decision and the nature of the decision variables. The typology based on the nature of the decision is borrowed from Igor ANSOFF (1999), who distinguishes three main types of decision:

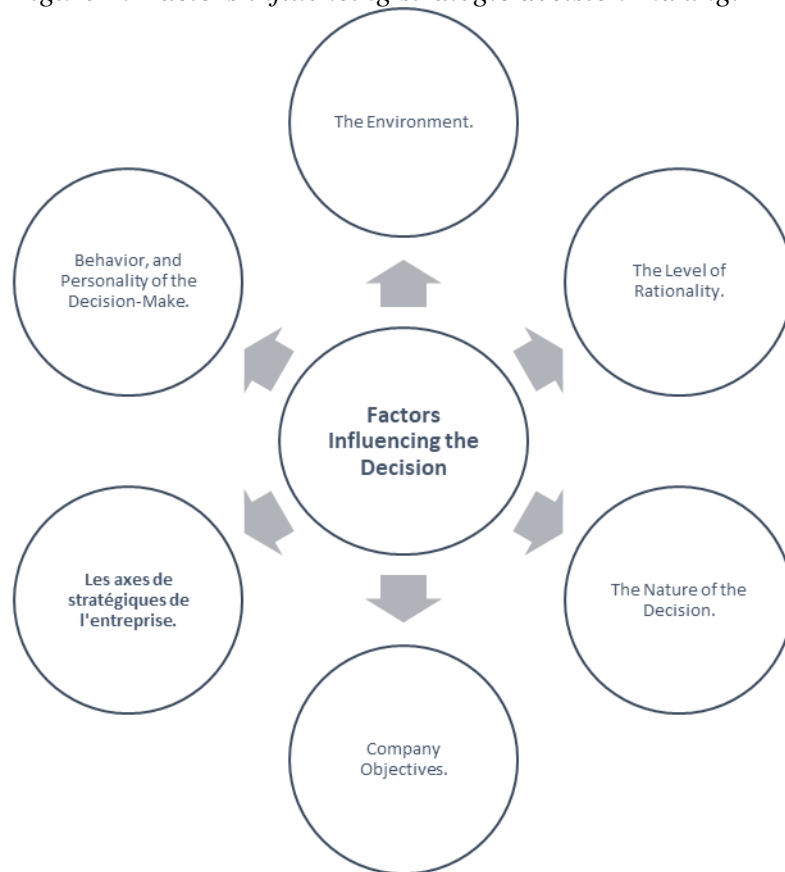
- Strategic decision: a fundamental, essential decision that affects the company's future in the medium and long term. This type of decision is the responsibility of General Management or the Board of Directors.
- Operational decisions: decisions taken at the bottom of the pyramid, in particular to ensure the company's current and ongoing operations. Operational or "routine" decisions do not pose any particular difficulties.
- Tactical decisions: Decisions taken at the intermediate level of the hierarchy. Decisions at this level are management decisions that ensure that short- and medium-term strategic decisions are implemented.

In fact, the strategic decision-making process refers to a sequence of actions and dynamics that begins with the identification of an action stimulus and ends with a commitment to a specific action (Mintzberg, 1976).

The process concerns the way in which decisions are effectively linked to the business, validated and implemented. Strategic decision-making focuses on the strategic decision itself and the relationship between specific decisions and performance outcomes, while the strategic decision-making process focuses on the actions that support the strategy. It is a single function directly linked to the achievement of objectives and the identification of key decision areas or sub-systems (Mullins, 2007). It is a management approach that focuses on management decisions and how organisations process and use information to achieve desired objectives. The strategic decision-making process consists of identifying problems and/or opportunities and then resolving them. This includes the efforts before and after the actual choice (Mintzberg, 2007), i.e. from decision making through to implementation, evaluation and monitoring. It can also be defined as the mental process that leads to the selection of a specific course of action that best solves a given problem. The process involves identifying the problem and defining exactly what needs to be decided. These may be opportunities and/or threats facing the organisation. Once identified, various possible alternatives to the problem are established. Evaluate the advantages and disadvantages of these options and choose the best alternative/choice for the problem in question. Decision-making is considered a fundamental part of the management process and is different in every organisation. The institutionalisation of decision-making can be seen as the co-ordination of strategy and organisational structure, so that the implementation of decisions must be based on organisational structure, culture, management support, processes and policies. The choice of organisational structure brings together and coordinates different activities, including decision-making. Corporate culture refers to a set of common values, attitudes and beliefs shared by the members of an organisation and also affects the way decisions are made. It covers the usual way of doing things and gives employees an idea of how to behave and act in certain situations (Heller and Hindle, 1998). Policies are almost permanent guides to action. They establish the decision-making criteria for selecting the best alternative and thus serve as a tool for implementing strategies (Muller-Christ, 2011). They define limits, constraints and boundaries on the actions that can be taken at a given time. In addition, strategic decisions can be influenced by various factors, which can be summarised as follows:

*Figure following on the next page*

*Figure 1: Factors influencing strategic decision-making.*



*Source: Diagram drawn up by us*

It should be noted that in a well-established political model, the strategic decision-making process is divided into two main stages. The first phase is called the "initiation phase" and focuses primarily on the consideration of proposals put forward by an individual or group of individuals. In making this recommendation, the author commits his or her reputation and solicits the reaction of another decision-maker. The second stage is called the "critical review stage" and is usually associated with the hierarchical position of the recipient, who can decide to accept, reject or send back for reassessment. The relationships between these different elements of political decision-making models largely define power relations. This sequence of phases shows the knock-on effect that exists between the test movement and the active movement. Instead, the movement of the locomotive provokes a test movement. Each decision-making process will end after a different number of stages. In fact, if the first evaluation step produces a positive or negative response, then the process is complete. On the other hand, if this step takes the decision back to an earlier stage, one or more additional sets of evaluation and action steps will be required. Generally speaking, the decision-making process within multinational companies is not a purely intellectual phenomenon; rather, it is intrinsically linked to the day-to-day political realities of the organisation. Unless these situations are motivated by a deliberate scapegoating of multinationals (which is malicious), or by a misunderstanding of reality that leads to an overestimation of the power of reason. A theory of the political behaviour of decision-makers can help to avoid such errors. There are two possible situations in process management. The first is total delegation to the subsidiary, which takes decisions autonomously, but always within the framework of policies previously drawn up jointly or on matters of lesser importance to the parent company. The second scenario involves cooperation between the parent company and the subsidiary in the decision-making process, where there may be a degree of decentralisation but does not completely exclude the parent company.

It is therefore necessary to stop using terms such as "decentralised decision-making" or "decentralised decision-making" in business terms, as they create confusion between decisions and the processes that lead to them. In multinational companies, some types of decision-making process are delegated, while other types of decision-making are subject to joint processes. However, it is never just one or the other, but always a combination of the two, the nature of which varies from company to company and over time. Outside multinational companies, the idea of independent decision-making at head office should be abandoned. In fact, it cannot, because it depends on a process that brings in the opinions, feelings, intuitions and commitments of foreign directors. This situation is not fundamentally different for the strategic decision-making process carried out in the multinational's home country, where senior management solicits the expertise of its employees according to the questions posed. But his experience and understanding of the head office environment, as well as its geographical proximity, gave him a clearer idea of the direction he needed to take. At this level, it should be remembered that strategic decisions are crucial in determining the future of a company's internationalisation, and that this decision can be influenced by multiple factors.

## **2.2. Literature review on the specific challenges facing Moroccan companies in sub-Saharan Africa**

The internationalisation of Moroccan companies in sub-Saharan Africa faces a number of challenges that affect their positioning. In this article, we summarise the main challenges facing Moroccan companies in sub-Saharan Africa.

- **Political instability and the threat of jihadists:**  
The political situation across the continent reveals the existence of inadequate political structures. In fact, the shortcomings of the African political structure manifest themselves in two main ways: firstly, certain forms of state are incompatible with African social characteristics; secondly, the state apparatus, although founded in theory on the principle of popular (or state) sovereignty, is in reality monopolised by the ruling elite. This situation often entails the risk of authoritarian tendencies, triggering protests from national forces and the international community (Pierre François GONIDEC, 1996). From a religious point of view, there is a broad consensus around the world that there is a close link between Islam and violence. Unfortunately, sub-Saharan Africa finds itself at the centre of this perception due to the rise of radical Islamism and jihadism, particularly in the Sahara-Sahel region. This situation creates a climate of insecurity and threatens the stability of the countries in the region.
- **Logistical and financial constraints**  
Trade in sub-Saharan Africa is hampered by a lack of transport and logistics infrastructure, which severely hampers development. Moroccan companies face high logistics costs, which affect their competitiveness. In an increasingly globalised world, small changes in these costs can have major consequences in today's fiercely competitive environment. Global logistics companies are making profits by focusing on punctuality, product quality throughout the chain and competitive pricing. According to a Mazars survey of 200 companies, including start-ups, SMEs, VSEs and large groups, 92% of them intend to invest in or export to sub-Saharan Africa in 2018. However, 89% feel that they do not have adequate knowledge of the financial products offered by financial institutions, and 60% find it difficult to obtain the necessary financing for projects in Africa, which is a major obstacle (Othman FAHIM, 2017). As far as financing is concerned, only 39% of companies opt for bank loans, while 26% choose private equity. Private equity funds are interested in Africa, offering investment amounts ranging from 200,000 to 500,000 Moroccan dirhams, with investment maturity periods ranging from 5 to 8 years. However, they are facing a lack of

suitable projects, which highlights the need to align the financing offer more closely with market needs (Khadija MASMOUDI, 2017).

- **Human capital constraints**  
Moroccan companies in sub-Saharan Africa face a problem of qualified human capital, which increases the costs associated with training and integration within Moroccan companies that are going global.
- **European and Chinese competition**  
The global economy is characterised by intense competition to expand into new markets. Developed countries have suffered from economic stagnation due to factors such as the financial crisis, an ageing population and recession, while emerging countries are experiencing strong economic growth and the opening up of new markets is of great strategic importance. Against this backdrop, Africa's growing consumer potential has attracted the interest of emerging countries such as China, Russia and India. This represents a real challenge for Moroccan companies seeking to strengthen their position on the continent.

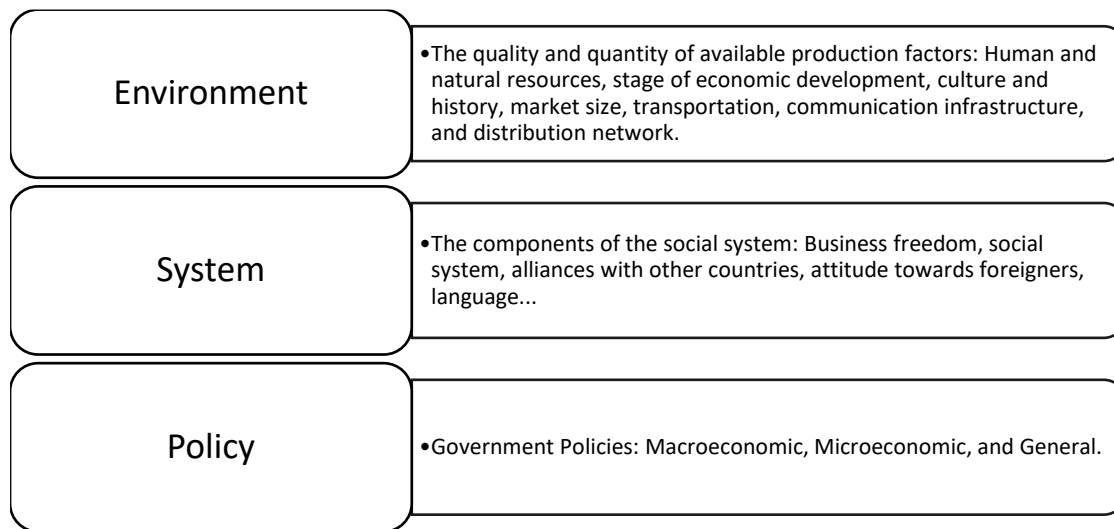
These challenges remain obstacles for Moroccan companies in implementing the various existing strategic decisions. This suggests that the parameters of decision-making in sub-Saharan Africa need to be fully explored.

### **2.3. The ESP paradigm (Environment, System and Policies) or the specific advantages of countries**

The researcher J.H. Dunning (1980) divided the specific advantages of a country into three main categories according to the ESP paradigm: environment, system and policy. This paradigm proposes a simple model in which companies make strategic choices (foreign direct investment, licensing or exporting) to enter foreign markets according to three models. Companies need to combine all three approaches to make decisions about establishing a presence in foreign markets. The first category ('environment') is economic and involves the quantity and quality of the factors of production available, the size of the market, transport, distance and communication, distribution networks and relations with local networks such as banks and government agencies. The second ('System') looks at social and cultural elements such as attitudes towards foreigners, language, culture, etc. The last category ('Policy') concerns the country's government policies. According to this model, the choice of location in a region depends on a comparison of the costs of each component. The following presentation summarises the content of each component:

*Figure following on the next page*

*Figure 2: Components of the ESP paradigm*



*Source: prepared by us*

The ESP paradigm presents essential elements for implementing an internationalisation decision by taking the three dimensions into consideration. However, this paradigm has not taken into account characteristics that are essentially linked to the continent. For example, the African continent is characterised by great political instability and a strong threat of terrorism, which has a negative impact on the perception of domestic stability in these countries, and subsequently on the strategic decision to set up in these countries. At this stage, we propose to analyse these variables (political stability, threat of jihadists) in order to propose them as a complement to the paradigm specific to the African continent.

#### **2.4. Internal stability**

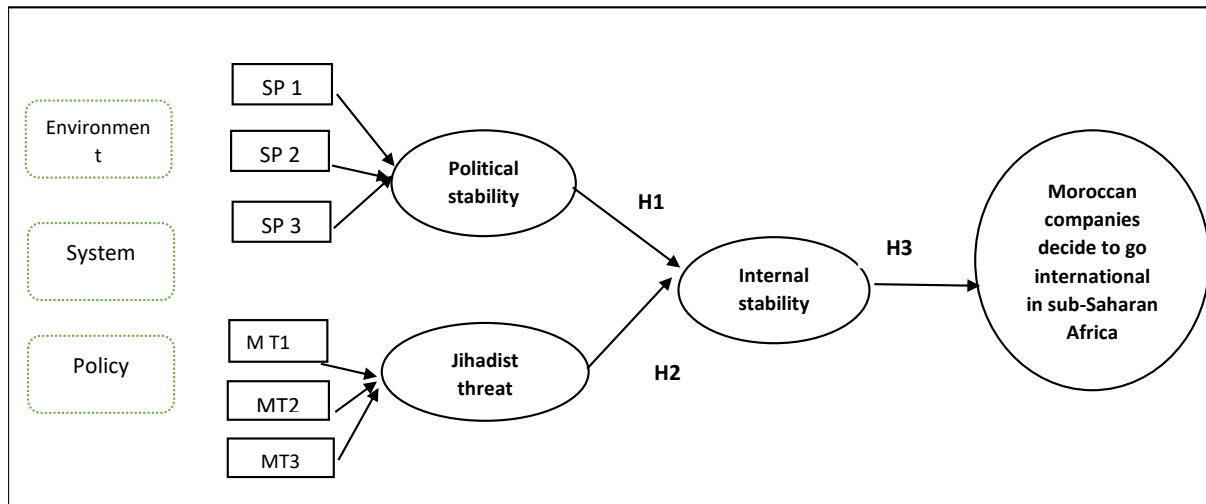
Domestic stability is closely linked to citizens' confidence in political and government institutions. When citizens perceive a high level of security and stability in their country, they tend to have more confidence in leaders and to support public policies. Research by Treisman (2010) and others has shown that domestic stability is an important indicator of citizens' trust in government. Increased trust encourages citizen participation, strengthens the legitimacy of institutions and contributes to overall political stability .

#### **2.5. Research framework**

The previous chapters have dealt with the different parameters of strategic decision-making when choosing countries in which to invest. We have also discussed the main challenges facing Moroccan companies in sub-Saharan Africa. The main objective of any company seeking to internationalise is to make a successful strategic decision by choosing a suitable host country. In addition to the variables used by the ESP paradigm, we will attempt to add two main variables considered to be very important in order to adapt it to the reality of sub-Saharan African countries, namely: the country's political stability and the threat of jihadists.

*Figure following on the next page*

Figure 3: The proposed conceptual model.



## 2.6. Research hypotheses and methodology

Based on the various theoretical arguments above, the article attempts to test the following hypotheses:

- Key hypothesis: Political stability and the threat of jihadism have a significant impact on strategic decisions by Moroccan companies to set up operations in sub-Saharan Africa.
- Sub-hypotheses :
  - H1: The jihadist threat is having a negative impact on the internal stability of sub-Saharan African countries.
  - H2: The political stability of a host country has a significant impact on its internal stability.
  - H3: Domestic stability has a significant impact on the decision of Moroccan companies to internationalise in sub-Saharan African countries.

## 2.7. Background and methodological approach

The internationalisation of Moroccan companies in sub-Saharan Africa faces a number of challenges that influence the decision-making process. These challenges are often linked to political stability and threats from terrorist groups. Morocco is constantly striving to improve its selection of investment host countries in order to make appropriate strategic decisions.

## 3. RESEARCH METHODOLOGY

The data for this research was collected using a survey questionnaire. The method used allows the researcher to validate the proposed model using quantitative data and to obtain in-depth information on the relationship between political stability, the threat of Jihadists and domestic stability on the strategic decision-making process of Moroccan companies seeking to expand in Sub-Saharan Africa. Below is a detailed description of the methods and procedures used in the current research.

### 3.1. Survey questionnaire

In order to empirically test the relationship between political stability, the threat of jihadists and domestic stability on the strategic decision-making process of Moroccan companies seeking to expand in Sub-Saharan Africa, a questionnaire was developed and tested. The questionnaire was administered to a wide range of managers from Moroccan companies operating in Sub-Saharan Africa. The questionnaire consists of three parts: (1) general information on the sample, such as gender, company, managerial position (2) 06 questions on the variable - Political



Stability (3) 04 questions on the variables - Threat from Jihadists. In order to increase the reliability of the responses, the researcher visited each company personally to meet the managers and ask them to complete the questionnaire in his presence. The managers were asked to indicate their responses to each item on a five-point Likert scale, with 1 meaning "disagree" and 5 meaning "strongly agree". The questionnaire was distributed to 35 companies, each receiving two copies.

*Table 1: Survey response rate*

Number of visited companies	42
Total responses	25
Unusable responses	03
Final usable responses	22
Useable responses rate (%)	88

#### 4. RESULTS AND DISCUSSIONS

The study hypotheses (H0, H01 and H03) were tested using multiple regression analysis. To ensure the generalisability of the results of the regression models, the assumptions underlying the regression analyses were examined. In the residual analysis, it was found that there were no violations of the assumptions regarding linearity, homoscedasticity, normality and independence of the error terms. Cronbach's alpha ( $\alpha$ ) of the study model was determined to be 0.821, indicating that the test of reliability and consistency was satisfactory, exceeding the threshold of 70 per cent generally considered acceptable (Sekaran, 2003).

*Table 2: Multiple Regression Analysis and VIF test*

Variables	Non-standardised coefficient		Non-standardised coefficient $\beta$	T test	Sig.	R <sup>2</sup>
	B	Standard error				
Political stability	,005	,146	,009	,037	,971	,665*
Jihadist threat	,338	,215	,564	1,570	,134	,465*
Internal stability	,343	,244	,389	1,406	,177	,475*
Deciding to set up in Sub-Saharan Africa	,276	,335	,300	,822	,422	,602**

*Table 3: Total variance explained*

Component	Initial eigenvalues			Sums extracted from the load square		
	Total	of variance	Cumulative	Total	of variance	Cumulative
1	3,115	62,308	62,308	3,115	62,308	62,308
2	1,020	20,397	82,705	1,020	20,397	82,705
3	,498	9,952	92,657			
4	,290	5,805	98,462			
5	,077	1,538	100,000			

*Extraction method: Principal component analysis.*

Using the non-standardised coefficients, standard errors, T-tests, p-values and coefficients of determination ( $R^2$ ) provided in the table, here is an analysis and interpretation of the results:

- **Assumption 1 - Political stability :**  
 The non-standardised coefficient ( $\beta$ ) of 0.005 indicates a positive relationship between political stability and the decision to move to sub-Saharan Africa. However, the T-test of 0.009 and the associated p-value of 0.971 indicate that this relationship is not statistically significant. This means that there is insufficient evidence to support the hypothesis that political stability influences the decision to relocate to sub-Saharan Africa. The coefficient of determination ( $R^2$ ) of 0.665 suggests that political stability explains approximately 66.5% of the observed variation in settlement decision-making, but this relationship is not statistically significant.
- **Hypothesis 2 - Threat from Jihadists:**  
 The non-standardised coefficient ( $\beta$ ) of 0.338 indicates a positive relationship between the threat of jihadists and the decision to move to sub-Saharan Africa. However, the T-test of 0.564 and the associated p-value of 0.134 indicate that this relationship is not statistically significant. This means that there is insufficient evidence to support the hypothesis that the threat of jihadists influences the decision to relocate to sub-Saharan Africa. The coefficient of determination ( $R^2$ ) of 0.465 suggests that the threat of jihadists explains around 46.5% of the observed variation in settlement decision making, but this relationship is not statistically significant.
- **Assumption 3 - Internal stability :**  
 The non-standardised coefficient ( $\beta$ ) of 0.343 indicates a positive relationship between domestic stability and the decision to move to sub-Saharan Africa. However, the T-test of 0.389 and the associated p-value of 0.177 indicate that this relationship is not statistically significant. This means that there is insufficient evidence to support the hypothesis that domestic stability influences the decision to move to Sub-Saharan Africa. The coefficient of determination ( $R^2$ ) of 0.475 suggests that domestic stability explains approximately 47.5% of the observed variation in settlement decision making, but this relationship is not statistically significant.

## 5. GENERAL CONCLUSION

The results of this analysis suggest that the variables studied (political stability, threat from jihadists and domestic stability) have some positive correlation with the decision to move to sub-Saharan Africa. However, none of these relationships is statistically significant, meaning that there is insufficient evidence to state conclusively that these variables influence the decision to relocate. It is important to note that the mathematical model used in this analysis is a multiple regression, which examines the relationships between several independent variables and one dependent variable. Based on this analysis, we can confirm the following model:

$$IDE_{ij} = \alpha_1 STP_{ij} + \beta_1 MDJ_j + \beta_2 STI_i + u_{ij}$$

With:

- **$IDE_{ij}$**  : Moroccan companies' decision to invest in Sub-Saharan Africa.
- **$\alpha_1 STP_{ij}$** : The level of political stability in the Sub-Saharan African host country.
- **$\beta_1 MDJ_j$** : The level of the jihadist threat in the host country in Sub-Saharan Africa.
- **$\beta_2 STI_i$** : The level of political stability in the host country in Sub-Saharan Africa.
- **$u_{ij}$** : other decision-making factors.

## 6. RESEARCH PROSPECTS

There is a dearth of studies on the factors specific to sub-Saharan Africa that influence the decision to choose the host country and a dearth of studies on political stability and terrorism in this continent to help Moroccan business decision-makers. Consequently, it is necessary to study the following areas: the relationship between political stability and the choice of host countries, decision-making style and the choice of host country, terrorism and the development capacity of Moroccan businesses in sub-Saharan Africa.

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## THE ISRAELI-PALESTINIAN CONFLICT AS A TOPIC IN SELECTED INTERNET PORTALS IN THE YEAR 2021

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### **ABSTRACT**

*The paper, a product of cooperation between a student-graduate and professor-tutor, consists of: a historical review of events, an individual analysis of six web portals, and a comparative analysis. The paper aims to show the continuity of the conflict and the interest of Internet portals in the topic, the periods in which the interest is most expressed in parallel with the development of the conflict. The analysis of Internet portals determines the tendency to create digital content according to the audience's interest. The intensity of mass production of news is consistent with the period of armed conflict. The truce between the conflicting parties, although still a complex period, was not covered by the media with the same intensity. Also, the analysis of the sources used in the creation of digital content points to the predominance of agencies and authors who, with a small number of publications on the topic in question, are not recognizable to the audience. Sources of content indicate the predominance of quantity over quality. Some internet portals still retain journalists in the field, which indicates that the quality of the content is maintained. The conducted survey investigated the attitude of public opinion on the media presentation of the Israeli-Palestinian conflict. The results of the research indicate a lack of trust among respondents in the truthfulness of information in the media. The results of the questionnaire are presented graphically.*

**Keywords:** *Israel, Palestinian Authority, Gaza Strip, internet portal, digital content analysis*

### **1. INTRODUCTION**

The Israeli-Palestinian conflict is the established term for the armed actions carried out between the State of Israel and the Palestinian Authority, that is, the Palestine Liberation Organization and later Hamas. The term also includes a series of violent incidents between Israelis and Palestinians during the ceasefire period. The conflict causes the almost hundred-year-old question of the division of territories, especially the partition of Palestine. The State of Israel, which with its legal provisions and political practice tries to direct society towards understanding the State as Jewish, simultaneously diminishes the social position of every follower of Islam. Also, by taking away accommodation facilities by demolishing property of the Palestinians in the West Bank, and with the aim of expanding their own territorial borders and building accommodation facilities for Jews, the intensity of the conflict deepens. On the other hand, Hamas, which holds power in the Gaza Strip, uses every opportunity to launch an armed attack or otherwise cause damage to Israeli territory. The idea of researching the media representation of the Israeli-Palestinian conflict starts from the selection of the media themselves, that is, internet portals whose content is available to the interested public at any time. Internet portals, in addition to providing easy access to information, also have the speed of sharing information. Publications on internet portals are primarily visual. They consist of words that create the first impression and create the reader's opinion, so along with the title, the opening sentence is crucial. Sharing photos with text is accompanying content that serves as confirmation of the text, which is important when it comes to physical conflict between

individuals or groups. Even more convincing content than a photo is a video from the scene. The reader or viewer makes an independent assessment of the content if it has not been influenced by interest groups. The investigated portals use mostly text, with minimal use of photos and only a few video contents. The digital content of the web portals, namely: Arab News, The Guardian, New York Times, Lenta, Index.hr, and Vecernji.hr are analysed. The analysis is divided into two groups. The first group includes the online portals Arab News, The Guardian, New York Times and Lenta, while Index.hr and Vecernji.hr belong to the second group. The analysis includes the number of digital publications related to the Israeli-Palestinian conflict by month in 2021, according to the events that marked a particular period of Israeli-Palestinian coexistence, the number of authors who created a small number of digital contents compared to recognizable authors with whom the audience created trust, and the use of news agencies as a source of content, then observed differences in the published content of web portals. For the purposes of the analysis, the search engines of individual internet portals were used, and by entering keywords and fixing the period from January 1 to December 31, 2021, content related to the Israeli-Palestinian conflict was selected. By looking into the digital platform Similarweb, which processes statistical data about individual internet portals, the ranking of portals on a global and national scale and the number of audiences was analysed. All the mentioned data were then processed as a group in order to reveal their similarities and differences.

## **2. RESEARCH FRAMEWORKS**

### **2.1. Analysis of web portals and their posts regarding the topic**

The subject of research into the media presentation of the Israeli-Palestinian conflict is electronic media, that is, internet portals whose headquarters are located in countries with global political and economic influence. When choosing the portal, the digital platform Similarweb was used, the primary activity of which is the statistical presentation of the number of visits to individual websites and the average duration of the user's visit. Similarweb analyses websites by measuring traffic data, then evaluates their popularity among users. Namely, the monthly ranking shows the growth or decline of media consumption by users, which is connected to the influence of the media. As Internet portals create content intended for a wider audience, the recorded growth or decline in content consumption provides an insight into the influence that the medium has on public opinion and on the creation of users' opinions. The New York Times is an Internet portal based in New York in the United States of America, which territorially belongs to North America. Arab News is an internet portal that has offices in Japan, France and Pakistan, but the international edition in English has its main office and headquarters in Riyadh in the Kingdom of Saudi Arabia, which belongs to the Asian continent. The Guardian is an internet portal in four editions, British, American, Australian and international, but its main headquarters is in London, Great Britain, which is part of Europe. All the previous portals produce content in English when it comes to international editions aimed at a globally interested audience, while Lenta is an online portal in Russian language and Cyrillic based in Moscow, Russia, whose digital content is intended for Russian-speaking readers. The research covers three continents and four internet portals. The importance of the diversity of research subjects is the discovery of the possibility of comparing the amount of content produced, sources used or authorship, observing the use of certain expressions and the media's interest in the topic of the Israeli-Palestinian conflict. The research of Internet portals was conducted during January, February and March, and includes an overview of the news of an individual portal for the period from January 1 to December 31, 2021. A total of 1,215 digital news articles created by the above four internet portals were searched. The digital content of internet portals was searched using keywords. Each portal differs in its search engine and the options it offers, such as the possibility of fixing the period in which the content about a particular keyword was created.

The keywords used include English words given that the internet portals in question are written in English. The English word "Israel", in the translation Israel, includes the meaning of the state of Israel, but the search filter also displays that news that contain the word "Israeli", which in Croatian means Israeli, Israelis or Israeli, that is, it includes case changes and declension of the word in the Croatian language which the English language does not know. Also, the English word "Palestine", translated as Palestine, is interpreted by the English language as the word Palestinian, and the search engine filter of the Internet portal shows results that include words like "Palestinian", which means Palestinian, Palestinians or Palestinian. Furthermore, the research includes the combination of the keywords "Israel Palestine" together, and the words "West Bank" and "Gaza Strip", in the Croatian language the areas known as the West Bank and the Gaza Strip. It was observed that the keywords "Palestinian Self-Government" do not bring results, that is, all digital news that talks about the Palestinian Self-Government is simply searchable using the keyword "Palestine". Also, when searching for the keyword "Hamam", it was observed that all digital news also contained the keyword Israel, Palestine, Gaza Strip or, to a lesser extent, the West Bank, so there was no need for a separate search. The Russian Internet portal Lenta was searched by entering the words "Israel" and "Palestine" together (Russian: Израиль, Палестина). With the word Palestine, the letter -a was not used, but the word "Palestine" was entered into the search engine, so that all posts containing words such as Palestinian, Palestinian and similar were displayed during the search. In the following text, the results derived from the research on a particular portal will be presented, and then the comparative conclusions will be presented.

#### *2.1.1. Analysis of four web portals: Arab News, Guardian, Lenta, and New York Times*

During the conducted research, which covers the period between January 1 and December 31, 2021, 1,215 digital publications of four Internet portals were studied. The content of the digital posts is related to the Israeli-Palestinian conflict. In the international edition, Arab News published a total of 596 news related to the Israeli-Palestinian conflict, the most compared to the remaining three Internet portals. The Guardian produced and published a total of 269 news items in 2021 related to the Israeli-Palestinian conflict. The New York Times internet portal follows with 198 digital announcements, while the Russian internet portal Lenta published 136 digital news in 2021. Considering the events of May 2021, when the eyes of the global public were focused on the conflict between the State of Israel and Hamas operating in the Gaza Strip, Internet portals actively reported on the events. The research found that regardless of the annual number of published digital news, the number of publications in May is the same, ranging from 105 to 177 publications per portal. In May, Arab News published the most, a total of 177 news stories about the ongoing Israeli-Palestinian conflict, which accounts for 30% of the annual number of publications on the mentioned topic. The online portal The Guardian published a total of 57% of the total annual digital content in May, while the New York Times followed with 53% of the digital content published in May, compared to the entire year 2021. The Internet portal Lenta published 113 of the totals of 136 digital publications in 2021 in May, which makes up 83% of the annual content on the topic in question. The internet portal that is the least motivated by the thesis that digital content is created mostly during certain events of interest to the public is Arab News. A total of 30% of digital content was released in May when the Israeli-Palestinian conflict was at its peak in 2021, while the remaining 70% was spread throughout the year. But it is important to consider that Arab News is an internet portal that primarily produces news for the audience of the Middle East, which is followed by the issue of stability in the region. Internet portals The Guardian and New York Times through May 2021 produced more than 50% of the total content related to the topic of the Israeli-Palestinian conflict compared to the entire year, which indicates a preference for content production during periods of increased public interest and average interest during periods of less significant incidents.

Lenta is an internet portal that, with 83% of the content produced in May, compared to the entire year 2021, leans towards the interest of the public, while during periods of truce it shows no interest in reporting on current events. The Internet portal The Guardian uses the content of unrecognizable authors to a 50% greater extent than the content of recognizable authors. Considering the result of the flow of publications by month, which indicates a tendency to create content in accordance with the public interest, The Guardian started the path of quantity and mass production. To a lesser extent, it uses data from news agencies as a source in published digital content. However, unlike Arab News, which often states the editorial office in its signature so that the direct source of the information is not exposed, The Guardian does not tend to sign the editorial office, but the name and surname of the responsible author. The New York Times follows the results of the online portal The Guardian, giving priority to unrecognizable authors, while also using known sources. In addition to the quantity, they try to maintain the trust of the audience through the recognizable names of the authors. In a small number of digital publications, data from news agencies were used, while the editorial office is mentioned twice in the signature of the publication. Considering the results of the flow of publications by month in 2021, the Internet portal Lenta stands out for the expression of interest in the topic during the period of greatest public interest. But in terms of authorship of digital publications, it follows the previously mentioned two internet portals. Namely, 60% of digital content was created by an unrecognizable author in the field of the Israeli-Palestinian conflict, while 40% is content authored by a recognizable journalist. Therefore, in addition to quantity, Lenta strives to maintain quality through well-known names that build trust with the audience. Arab News recorded a decline in views in February, but its readership rose sharply in March 2022. The result indicates a decrease in the audience's interest in the produced content, while in March there are events that affect society as a whole. The New York Times and Lenta provide equal results, with slight growth during February and March, and a slight drop in readership in April. The Guardian is an internet portal that continuously records a decline in readership in 2022. The above graph shows the trend of interest of the general public. Namely, the first quarter of 2022 records events that have completely interested the public, which is evident by the increase in readership in March, but interest gradually declines in April. Accordingly, the media produce news when the audience's interest in a particular topic is the greatest.

### *2.1.2. Analysis of two Croatian web portals: Vecernji.hr and Index.hr*

The subject of research into the media portrayal of the Israeli-Palestinian conflict are two Internet portals based in the Republic of Croatia, Index.hr and Vecernji.hr. After the analysis of the individual internet portal, a joint analysis of both portals follows, which determines the content similarities and differences in the digital publications. The aim of the analysis is to determine whether internet portals have common points of contact or use the same practices in the creation of media content and to what extent they are guided by modern news production standards. When choosing the portal, the Similarweb digital platform was used. During May 2022, the Internet portal Index.hr was first in the national ranking in the News and Media Publishers category, while Večernji.hr took fifth place. The research of Internet portals was conducted during March and April, and includes an overview of the news of each portal for the period from January 1 to December 31, 2021. A total of 194 digital news articles created by the two mentioned internet portals were searched. The digital content of the Internet portals was searched using keywords referring to Israel and the Palestinian Authority. Considering the declension of words by case, in order to avoid multiple searches for words with the same meaning, the search for the word "Israel" includes the following words: Israel, Israeli, Israeli, Israeli, etc. The search for the word "Palestine" includes the following words: Palestine, Palestinian Authority, Palestinian, Palestinian, Palestinian, etc. Also, the words Gaza Strip and West Bank were searched to confirm the result of the search word "Palestine".

In the period from January 1 to December 31, 2021, the web portal Index.hr published a total of 129 articles related to the Israeli-Palestinian conflict. The largest number of posts was in May, a total of 89, or 69% of the total number of posts, when the internet portal actively followed the development of the conflict in the West Bank and the Gaza Strip. On May 14, 2021, 10 news were published, the most in one day. In its digital publications, the Internet portal Index.hr concentrates on textual content, first of all on the title that attracts the attention of readers, along with accompanying visual content such as photos and sometimes videos. Out of a total of 129 digital publications from the period from January 1 to December 31, 2021, data for 72 of them was taken from Hina, while in 45 publications the editorial staff signed independently or in cooperation with Hina. Only in 12 digital publications, i.e. in 9%, the author is indicated by first and last name. The Internet portal is often used by an agency, instead of its own journalist staff. The audience does not have the possibility to create a reliable connection with the source of information, because the authorship of the work is not recognized by the name of the journalist, but by the name of the agency, the content of which can be independently studied on its official website or other sources. In the period from January 1 to December 31, 2021, the Internet portal Vecernji.hr published a total of 65 articles related to the Israeli-Palestinian conflict. The largest number of posts was in May, a total of 53 or 82% of the total annual number of posts, when the internet portal actively followed the development of the conflict in the West Bank and the Gaza Strip. On May 12, 2021, seven news were published, the most in one day. In general, during 2021, digital content covered the topic of the conflict in the State of Israel and the Palestinian Self-Government, following the course of events and trying to find the cause of the conflict and the profiteers after its end, and especially about the interests of individual states in the conflict. Several digital publications were created with the aim of comparing the Israeli-Palestinian conflict and previous regimes, as well as political events in the Western Balkans. The title "Sarajevo is for Palestine, Banja Luka with Israel" (Vitas, 2021) in the continuation of the text says that "German President Frank-Walter Steinmeier has fiercely condemned the protesters" in Germany, therefore the title has no connection with the textual content that was taken from the Bild daily article. Three days later, an article was published that explains the previous title, and that connects the Israeli-Palestinian conflict with the ongoing one in Bosnia and Herzegovina, where "Bosniaks in Sarajevo projected the Palestinian flag onto the City Hall building [...] The Serbs retaliated by projecting the Israeli flag on the Bansko building of the court in Banja Luka" (Pavkovic, 2021). During the coverage of the Israeli-Palestinian conflict during 2021, a double standard was observed in the terminology used. The Islamist movement and Palestinian militants are the words used to describe Hamas, while the armed forces of the State of Israel are presented as Israel. So, the Israeli-Palestinian conflict involves Islamists and militants on the one hand, and Israel on the other. The uneven representation of the conflicting parties is evident in the opening sentence of the digital post which indicates that "Military escalation between Hamas and Israel increased overnight from Tuesday to Wednesday after the Islamist movement Hamas showered the Israeli metropolis of Tel Aviv with a rain of rockets and the Israeli army retaliated with airstrikes on The Gaza Strip" (Vecernji list, 2021b). Both sides of the conflict participate in the same conflict, both sides are responsible for their actions, but the treatment is not evenly distributed, therefore the intensity of the consequences caused by one side is reduced and the intensity of the consequences caused by the other side is increased. The audience can create a bond of trust with the author who created 14 posts, i.e. 22% of the overall content created in 2021, on the topic of the Israeli-Palestinian conflict. The remaining media releases come from Hina or are signed by the editorial staff, so there is no recognizable name that the audience trusts. Information emanating from the agency is easily available through its official website or through other media. The represented age groups of the audience of the Vecernji.hr portal are from 25 to 34 years of age in the amount of 23.15% and from 35 to 44 years of age in the



amount of 24.19%. During the conducted research, a total of 194 digital publications of two Internet portals were studied, of which 129 digital publications from the Index.hr portal and 65 digital publications from the Vecernji.hr portal. The content of the digital posts is related to the Israeli-Palestinian conflict. With regard to the events of May 2021, when riots broke out on the streets of the West Bank and spread to the Gaza Strip between Hamas and the State of Israel, internet portals actively reported on the course of events. Out of a total of 129 publications on the Internet portal Index.hr, 89 of them were published in May 2021, which makes up 69% of the total content. Out of a total of 65 announcements on the Vecernji.hr internet portal, 53 of them were published in May, which makes up 82% of the total content. The difference of 13% does not represent a significant disparity of results, considering the amount of published digital content on an annual level, therefore it is concluded that both portals practice mass production of news during conflict, while in peacetime they show no interest in following current events. Both internet portals have a negligible number of digital publications whose authors are not recognizable experts on the subject of the Israeli-Palestinian conflict, that is, the authors of a small number of publications. However, both internet portals have a small number of authors who are recognizable to the audience. Out of a total of 194 posts on both internet portals, only 12% of the content was created by recognizable authors. For Vecernji.hr journalist Hassan Haidar Diab wrote 14 news items, while for Index.hr journalist Petar Stošić wrote 9 news items related to the Israeli-Palestinian conflict. Both internet portals use Hina as a source of information, the content of which can be studied via the official website, and digital publications are often signed by the editorial staff. At the same time, there is no responsible person, so the audience has no possibility to create a confidential connection with the source. Index.hr has a larger audience but also greater oscillations of increase and decrease in attendance. Both Internet portals recorded growth in March, but in April the number of visits returned to the initial state from February. It is obvious that the audience's interest grows in March, but in April there is a saturation of information or a certain topic loses its popularity. Both internet portals have an audience that continuously follows the published digital content with equal trends in popularity by month.

### 3 METHODOLOGY AND RESULTS

#### 3.1. Research: Questionnaire

The questionnaire was conducted in order to investigate the attitude of public opinion on the media presentation of the Israeli-Palestinian conflict. Filling out the questionnaire is completely anonymous for respondents. The questionnaire consists of 15 questions divided into two groups. The first group of questions refers to the expression of the respondent's position on the truthfulness of information in the reporting of Internet portals and on the importance of authorship. The second part of the questionnaire consists of questions about the media presentation of the Israeli-Palestinian conflict.

For the purpose of research, the following hypotheses were established:

- *The first hypothesis (H1)* is that internet portals massively create content in accordance with the audience's interest, and in periods marked by incidents, while in peacetime the interest in content creation declines. By comparing the number of digital posts of all investigated Internet portals by month, the period of greatest concentration of content is revealed.
- *The second hypothesis (H2)* is that Internet portals are inclined to the quantity of the content that they make available to the public, while the quality is secondary.

The conducted questionnaire investigated the attitude of public opinion on the media presentation of the Israeli-Palestinian conflict, the credibility of the journalistic profession and the truthfulness of information on Internet portals.

The survey questionnaire was created using the Google Forms tool. 120 respondents participated in the research, and due to guaranteed anonymity, no personal data was requested. The introduction of the survey questionnaire introduces the respondents to the content and purpose of the research, the voluntary approach to its completion, anonymity and the use of the results exclusively for the purposes of creating a diploma thesis. The introductory questions of the conducted survey consist of information on the activity of monitoring the digital content of Internet portals. 53.3% of respondents follow the content of foreign internet portals only a few times a month, while 46.7% of the respondents are informed daily or several times a week. The answer "I do not follow the content of foreign internet portals" was not offered considering the frequent transmission of information from foreign news agencies, media houses or the audience itself. The activity of monitoring Croatian internet portals is diverse. Although respondents are informed daily or several times a week, 15.8% of them do so several times a month or do not follow digital content. A total of 97.5% believe of respondents that 50% or more of the content of internet portals was created under political, financial and social influence, whilst 78.3% of respondents do not follow the work of a certain journalist, i.e. authorship is not important in relation to the presented information. The opposite is the result of 21.7% of respondents who actively follow the work of a particular journalist. Only 5.8% of respondents consider digital content to be credible, while 20% of respondents believe in the objectivity of Croatian journalists. Digital content also includes promotional, advertising and so-called PR announcements. The question about the credibility of Croatian journalists offers answers that determine their subjectivity and objectivity. A total of 39.2% of respondents do not trust Croatian journalists, while 41.7% believe that they are subjective. Internet portals often use news agencies as a source of information, therefore different digital platforms convey information in a uniform manner. Respondents expressed an attitude of little confidence in the credibility of digital content, therefore 62.5% of them check information through several sources, while 37.5% believe that the content is similar in several sources and there is no need to check the content. An analysis of Croatian internet portals revealed increased reporting activity on the Israeli-Palestinian conflict during May 2021. Of the 65 digital announcements of the Vecernji.hr internet portal, 53 of them are from May, i.e. 83%. In May, Index.hr published 89 news items, or 69% of the total annual number of publications. Respondents to the survey questionnaire did not notice increased activity on Internet portals about the Israeli-Palestinian conflict. Namely, 47.5% of respondents believe that there was no increased activity, while 43.3% of respondents noticed a partial increase in the number of digital posts. 94.2% of respondents believe that 50% or more of the published content is not credible. When asked about the credibility of shared information about the Israeli-Palestinian conflict, the result is the same, that is, 94.2% of the respondents believe that 50% or more of the content is not credible. 81.1% of respondents do not trust Croatian journalists and consider them subjective, and 97.5% of respondents believe that digital content is created under external influences. When asked about the influence of national politics on Croatian journalists when creating content about the Israeli-Palestinian conflict, 84.2% of respondents believe that 50% or more of journalists are subjective or influenced. 46.7% of the respondents observed that the use of certain terminology in reporting reinforces the impression or justifies the actions of one of the conflicting parties, while the same percentage of respondents observed that sometimes the use of certain terminology increases or decreases the impression of human and material damage caused. The respondents expressed the opinion that there was no increased activity in reporting on the Israeli-Palestinian conflict, that is, that the intensity of reporting depends on the intensity of the conflict. The result of the question about the accumulation of news by Internet portals during the armed conflict shows that 40% of the respondents believe that the conflict was moderately followed, that is, 44.2% of the respondents believe that the conflict was sometimes more actively followed.

The remaining 15.8% of respondents noticed increased media activity during the armed struggle. 91.7% of the respondents believe that the ceasefire is not actively monitored and that media interest arises while the conflict escalates again through violent incidents. A total of 83.4% of respondents noticed an occasional or frequent sensation in titles that are more attractive than the rest of the content.

#### 4. CONCLUSIONS

An analysis of six internet portals divided into two groups was carried out. In the first group, The Guardian, Arab News, Lenta and New York Times were analysed. It was established that all four portals actively reported on the development of the May conflict. The online portal Arab News, based in Saudi Arabia, continuously monitored the development of Israeli-Palestinian relations throughout the year. During May 2021, The Guardian and New York Times created 50% of the total annual content related to the topic of the Israeli-Palestinian conflict, while the Russian Internet portal Lenta paid attention to the conflict and almost completely ignored the truce. However, comparing the results of publicity, it was determined that Internet portals create content according to the audience's interest. An analysis of the number of visitors to Internet portals in the first quarter of 2022 determined that audience activity is highest during a particular event that affects regional or global security. Therefore, during the May conflict, internet portals created content to meet the needs of the audience. In the second group are the Croatian internet portals Index.hr and Vecernji.hr, which actively reported on the course of the May conflict, and are very similar in their results. Digital content was created every day during the period of greatest reader interest. By comparing the first and second groups of Internet portals, the difference in the use of sources is determined. While the first group prefers its own human resources over news agencies, the second group of investigated Internet portals relies on agencies as a source of information. The result is expected considering the difference in the size of newsrooms, realized financial income, audience and their interests. However, according to the research results, the majority of journalists who created content about the Israeli-Palestinian conflict wrote only one news item on the subject, which is an indicator of quantity. The hypothesis that internet portals practice quantity is confirmed, with the occasional publication of content created by specialized staff for the Middle East. The researched internet portals have in common the mass production of digital content during the height of the conflict, i.e. during May 2021, thus confirming the hypothesis that internet portals mass-create news in periods marked by armed incidents. During the state of truce between the warring parties or with the occurrence of minor incidents, reporting is in a sharp decline. A double standard has been observed on some internet portals when using the terminology used to describe the resulting destruction, material damage and human casualties. Both parties to the conflict are responsible for the damage caused by their actions, therefore there should be no room for mitigating or reinforcing the impression in media coverage. The media influence public opinion through the published content. A survey questionnaire was conducted on a sample of 120 respondents. The result of the questionnaire points to the lack of trust of respondents in relation to the content of Internet portals. According to our research, a large percentage of respondents believe that Croatian journalists are significantly biased and subjective, and that the content of internet portals is created under political and financial influence. The interviewees noted the inactivity of the media during the Israeli-Palestinian truce and the increase in media reporting activity after the escalation of violence.

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## APPLICATION OF MACHINE LEARNING METHODS TO DETECT SYSTEM INTRUSIONS

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### ABSTRACT

*This paper presents the implementation of machine learning for the purpose of analyzing computer network communication in order to detect potential system attacks. Initially, it was explained which technologies are used to protect the computer network, and then the intrusion detection system, which is the goal of this paper, was explained in more detail. Next, different types of intrusion detection systems are presented and in which of the above, machine learning methods can be used in order to detect potential attacks through automation. The implementation of the work was done within the "Python" programming language with the help of the "scikit-learn" library, which enables working with machine learning models. The analysis was done on the KDD Cup 1999 data set. In the aforementioned data set there are 24 different types of attacks that are divided into four main categories. A supervised type of machine learning was chosen for implementation, given that the task of the machine model here was to classify input data, i.e. computer network communication logs. In our use case we have used five different machine learning models for data processing (Gaussian Naive Bayes, Decision Tree, Random Forest, Logistic Regression, Gradient Boosting). The obtained data of the model are presented in graphs for individual indicators of the success of the machine learning model, while the ranking of the model is made according to a simple point scale. The Random Forest classification algorithm was the most successful from chosen algorithms for the intrusion detection using KDD Cup 1999 data set.*

**Keywords:** machine learning, system intrusion detection, system security

### 1. INTRODUCTION

A few years ago, the accelerated progress in the field of information and communication technology resulted in an incredible increase in the Internet as a network, as well as the amount of data transmitted daily through it. In order to secure the aforementioned network traffic, and all its actors, great importance is attached to research in this area. As stated by (Tarter, 2017), cyberspace today is secured using various tools such as firewalls, antivirus software and finally Intrusion Detection System - IDS. The aim of the mentioned tools is to discover the ways in which unauthorized parties want to access data. Such access attempts are referred to by different names in the literature, but in the end they are actually data attacks aimed at gaining unauthorized access. The protection technology that will be dealt with in this paper is the intrusion detection system - IDS. At the beginning, we will compare the mentioned protection technologies in order to present a broader picture of where this type of system will be placed within a computer network. It will then be examined in detail what IDS actually is and what is the purpose of such a system. Through the review of such systems, it will be shown where machine learning can be implemented in order to raise IDS to a higher level and provide greater usefulness in daily operations.

In order to make it clear what data the IDS uses, the standard network traffic that the IDS monitors to detect attacks on the system will be displayed, and a set of data will be selected that will be used to implement it. The practical part of the work will be oriented towards the selection of publicly available libraries that use machine learning for these purposes, and the details of the programming language that will enable all this will be presented. At the end, we analyse the results of our use case, which will show the general indicators of the success of the work of the IDS and will compare different approaches, that is, machine learning methods in performing the assigned work through statistical data and graphs.

## 2. COMPUTER NETWORK PROTECTION TECHNOLOGIES

If we pay attention to our own environment, we see that it is almost impossible not to be surrounded by some kind of technology. Whether we like it or not, the fact is that human beings in the urban environment are very dependent on the technology they use for work, for development, and even for life. Taking the above into account, we see that the technology we use every day has large amounts of data that say a lot about us as their users. The right information is very valuable in today's information age, but also in many cases the object of others' desires. Precisely because of this, as stated by (Liao *et al.*, 2013), there has been a need for security systems and tools that will enable the monitoring and analysis of network traffic and device operation of a computer network.

The security of the computer network and computers, as we previously stated, is ensured by three intermediaries:

- Firewall
- Antivirus program
- Intrusion detection system – IDS

A firewall is a network device that analyzes incoming and outgoing network traffic and decides whether to let it through or block it. The decision on this depends on the group of security rules entered into the firewall itself. Depending on the type of firewall and the location of the implementation, the security rules are defined manually by the user or are predefined by some organization that supplies its own implementation, such as Windows Firewall by Microsoft. Accordingly, a firewall can be hardware or software. The operation of antivirus software is better known as system scanning, which can be carried out automatically over a period of time or manually at the user's request. When scanning a device that has an antivirus program loaded on it, there are different predefined actions that the program takes if it finds malware. Depending on the level of the threat, the antivirus software offers the user the option to remove files if it is a low-level threat or, on the contrary, removes files that are a high-level threat. As in all parts of life, mistakes in work are possible, so here too. High-level threats are placed in a secured area called "quarantine" and the user ultimately decides whether he knows the specified object or not and accordingly decides to remove it or leave it on the personal computer. IDS is a security tool that continuously monitors the device within the computer network on which it is loaded as well as the network traffic within the computer network to detect any behavior outside the norm that could violate the default security rules (Ahmad *et al.*, 2021). In case of such violations of security rules, IDS will notify the authorized persons about the detected security violation and will generate reports based on it. It is very important to point out that IDS is actually just a tool that detects the attempt of an unauthorized person to break into the system. It does not do any prevention and therefore requires either authorized personnel to manage attacks or a combination with some security devices that perform attack prevention.

### 3. INTRUSION DETECTION SYSTEMS

The authors of the NIST report (Scarfone and Mell, 2007) also listed the benefits of using an intrusion detection system, which additionally describe what tasks such a system should be able to fulfill:

- The possibility of detecting and punishing an attacker who wanted to access our system without authorization
- System security testing
- Detecting attacks just before they happen
- Documentation of attacks on our system
- Gathering attack details to improve security

The implementation of the intrusion detection system is usually divided into 2 categories:

- Intrusion detection systems by deployment location
- Intrusion detection systems according to the method of intrusion detection

According to the article compiled by (Ahmad *et al.*, 2021), the categorization of intrusion detection systems according to the place of implementation says that they are systems located on devices within the network or, on the contrary, systems located on network equipment. To clarify, the host-based intrusion detection system (HIDS) is a separate entity that monitors the events of the device itself, without taking into account the rest of the network. On the contrary, there is an intrusion detection system that is implemented on network equipment ("Network-based Intrusion Detection System - NIDS") and only cares about communication between devices, more precisely they check network traffic, as stated by (Ahmad *et al.*, 2021). The categorization of the intrusion detection system according to the intrusion detection method is based on the operation mode of the intrusion detection system itself. Namely, as stated by (Ahmad *et al.*, 2021), intrusion detection systems are divided into:

- Intrusion detection systems that work on the principle of comparison
- Intrusion detection systems that work on the principle of analysis and prediction

Intrusion detection systems that work on the principle of comparison ("Signature-based Intrusion Detection System - SIDS") have already known network patterns and, by comparison, conclude whether it is an attack or not. Intrusion detection systems that work on the principle of analysis and prediction ("Anomaly-based Intrusion Detection System - AIDS") use machine learning methods to analyze the normal operation of a computer network and detect potential attacks and real attempts to attack the system by unauthorized persons.

### 4. RELATED WORK

There are many existing works on using machine learning for intrusion detection. Authors (Mishra *et al.*, 2019) have analyzed using of machine learning techniques for intrusion detection. Additionally, they have presented the relevance of a machine learning techniques for each type of attack. Another review (Liu and Lang, 2019) proposed proposed taxonomic system as a baseline and explain how to solve key IDS issues with machine learning and deep learning techniques. Next, (Oreški and Andročec, 2020) have shown how to use hybrid approach by using genetic algorithm and artificial neural network for network forensic analytics. In their previous work (Oreški and Andročec, 2018) show how to use hybrid data mining methods for intrusion detection of internet of things network data. In the work by (da Costa *et al.*, 2019), a detailed survey on machine learning-based intrusion detection approaches is presented. Machine learning for intrusion detection in industrial control systems is analyzed in the paper (Umer *et al.*, 2022).



An effective supervised machine learning IDS is proposed for detecting IoT attacks with high detection accuracy, reaching 99.99% and MCC of 99.97%, in the work by (Kayode Saheed *et al.*, 2022). Another work by (Apruzzese, Pajola and Conti, 2022) presents the cross-evaluation of machine learning-based network intrusion detection systems.

## 5. OUR IMPLEMENTED USE CASE

### 5.1. Used data set

There are many data sets on the Internet made specifically for the intrusion detection purpose, but for clarity and detailed description of the data set, we have chosen a publicly available data set called "KDD Cup 1999 Data" (*SIGKDD : KDD Cup 1999 : Computer network intrusion detection*, 1999). The said data set already has data structured in a way to be used for these purposes. Given the scope of this work, not all files that the data set will be used. Only those that will be used in the implementation will be described. Let's take a look at those files. The data was taken from the official website called "KDD Cup 1999 Data" (*SIGKDD : KDD Cup 1999 : Computer network intrusion detection*, 1999).

List of files:

- kddcup.names – list of attributes that the data set has
- kddcup.data.gz – archive of the entire data set together with the classification
- kddcup.data\_10\_percent.gz – the tenth percent part of the data set archive suitable for model training
- training\_attack\_types – list of different attack types

From the official documentation, we learn that in the downloaded data set there are 24 different types of attacks, which are divided into four main categories:

- DoS (eng. "Denial of Service") - this attack works in such a way as to "flood" the target network or server with network traffic, thus burdening it and disable further normal operation of the system. The aim of this attack is to disable normal operation for authorized users.
- R2L (eng. "Remote to Local") - As the name suggests, the attacker tries to access the local network from a distance. According to the paper "An Efficient Classifier for U2R, R2L, DoS Attack" (Gupta, 2020), it is most often a computer network of an organization that the attacker is trying to access, so that he can gain unauthorized access to data within the network.
- U2R ("User to Root") - in this category of attacks, an authorized user of the system tries to access root privileges in order to gain a higher level of rights within the computer network. Most often, the goal of the user is to access data that he does not have access to as an ordinary user, or in some extreme cases, to delete all the data of an organization or even to give public access to all Internet users.
- Probing – Unlike the mentioned attack categories, this attack has a slightly different end goal. This category of attacks serves informational purposes. With different types of attacks, this category of attacks tries to discover the vulnerabilities of a computer network or server with which it will be possible to carry out a "DoS" category of attacks.

### 5.2. Implementation of an intrusion detection system

Implementation of our use case is publicly available at the following GitHub repository: <https://github.com/TheLjunder/Sustav-za-oktrivanje-upada--Intrusion-detection-system>. For the purpose of implementing this work, the programming language "Python" was chosen. The most important item that made us choose this programming language is the "scikit-learn" library, which allows very easy use of machine learning methods to work on input data sets.

We have used the following Python libraries: Pandas (in addition to the analysis capabilities, certain methods for shaping the mentioned data are also supported), NumPy (performing mathematical operations and numerical operations on data sets), Colorama (formatting, i.e. changing the color of the output text of the program), scikit-learn (using algorithms and machine learning models within the "Python" programming language), and Matplotlib (this library is used to create static, animated and interactive visualizations). The implementation of the intrusion detection system within the program code consists of the following units:

- 1) Program initialization – introduction of the necessary program libraries into the program and initialization of global variables
- 2) Loading datasets – reading data from dataset files
- 3) Shaping data sets – preparing data sets for input into a machine learning model
- 4) Initialization of input variables of the model - we take the formatted data sets from the uploaded files and place them in variables for input into the model
- 5) Normalization of model input variables - data normalization according to the "MinMax" scale
- 6) Initialization of machine learning model – creation of machine learning model with different built-in algorithms
- 7) Working with machine learning models - training and testing individual machine learning models, saving data in an MS Excel file and saving data for plotting graphs of statistical indicators
- 8) Plotting and saving graphs – creating graphs of individual statistical indicators and saving them outside of the program

Of the machine learning methods, we have used the following models: Gaussian Naive Bayes, Decision Tree, Logistic Regression, and Gradient Boosting.

### 5.3. Analysis of the results

The performance indicators of the machine learning model are taken from the work of (Ahmad *et al.*, 2021):

- Precision of the model
- Recall
- Rate of wrong classification of records as an attack ("false alarm rate")
- Rate of correct classification of normal records ("true negative rate")
- Accuracy of a particular model
- F-measure

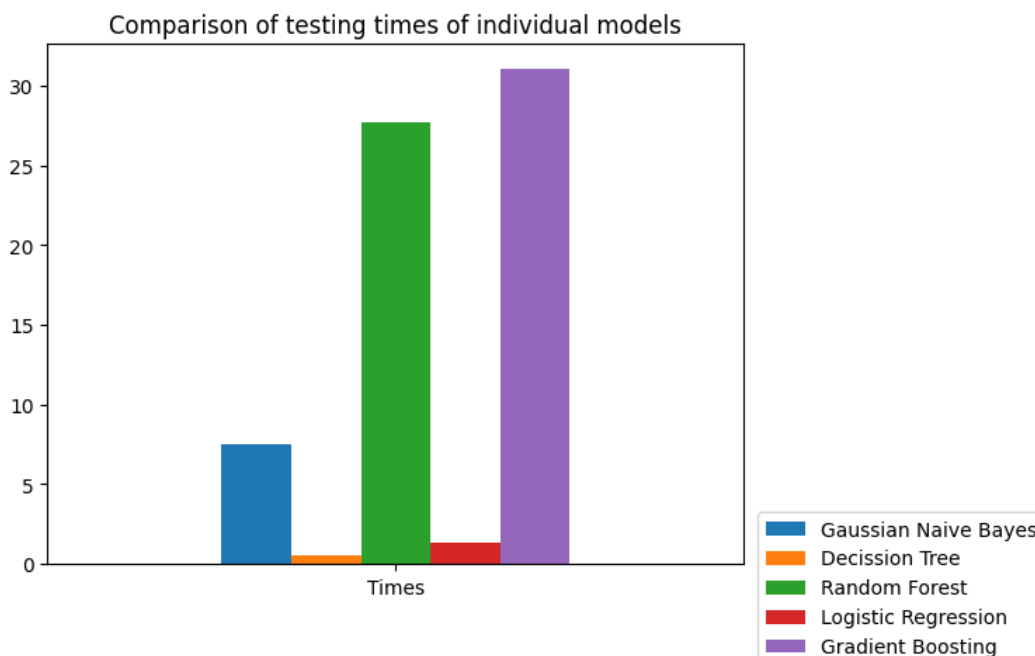
Now that we have described individual indicators, let's take a look at what kind of data we got from the implementation of machine learning methods. Along with the performance indicators of the models from the previous chapter, the times required for training and testing each model will be shown.

*Figure following on the next page*



*Figure 1: Comparison of training times of individual models*

By comparing the training time (Fig. 1.), it is possible to conclude that the machine learning model that uses the Gaussian Naive Bayes classification method is the fastest for training, while the model with the Gradient Boosting method is the slowest. Let's now introduce a simple scoring system so that you can later evaluate which machine learning model is the most satisfactory for this type of application. Given that there is less time here, it is better to say that the machine learning models will receive points from 5 to 1 in order of appearance.



*Figure 2: Comparison of testing times of individual models*

Similar to the training time of the model, here we have the same trend with the testing time (Fig. 2.), so the machine learning models again get scores from 5 to 1.

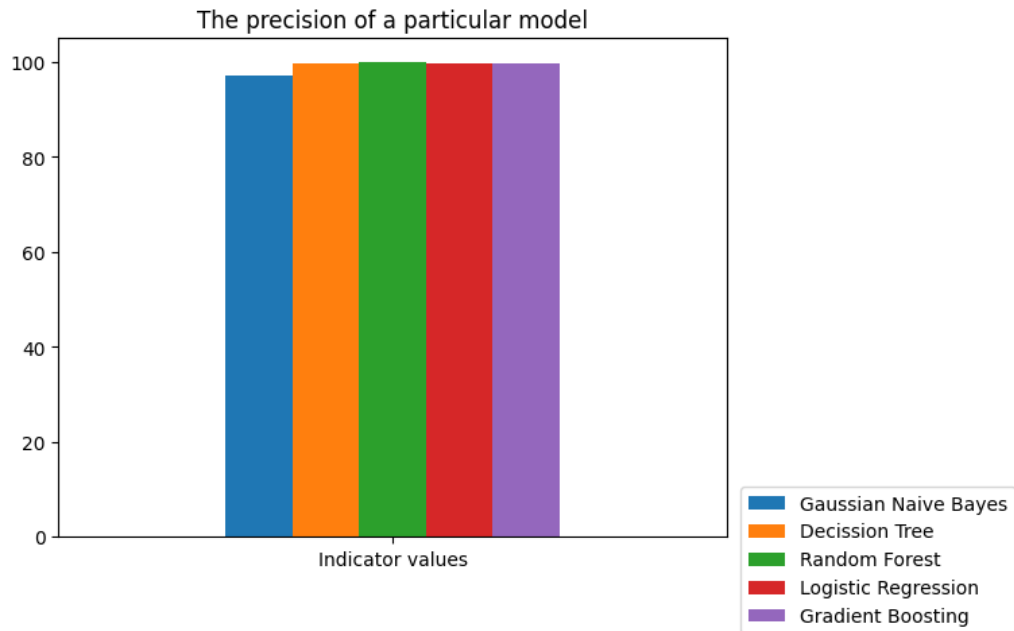


Figure 3: Precision of a particular model

The precision of the model (Fig. 3.) indicates the percentage of correctly identified records of the data set in relation to the total number of records. In order of appearance in the graph, the machine learning models achieved the following percentages: 97.22%, 99.74%, 99.88%, 99.79% and 99.66%. As the goal is to achieve the highest possible precision of the model, the learning models receive the following points in order of appearance: 1, 3, 5, 4, 2.

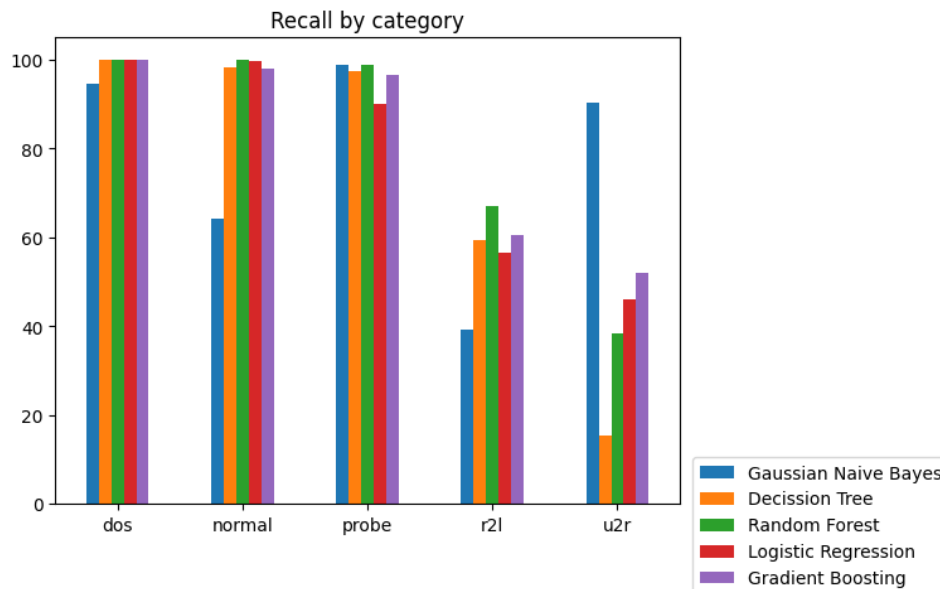


Figure 4: Recall by category

The recall of a machine learning model (Fig. 4.) is an indicator, as previously mentioned, that tells us about the percentage of correctly predicted records in relation to the total sum of correct records. As the data set has four different attack categories and a label for a normal record, we calculate this indicator for each category of each model. The goal is to achieve as high a percentage as possible, which in translation means that our model correctly classifies different records.

In order to be able to add points for the final assessment to an individual model based on this indicator, let's use a simple arithmetic mean as a measure of comparison of different models. Using the arithmetic mean in order of appearance of the methods, we get the following results: 77.52%, 74.11%, 82.19%, 78.48% and 81.47%. According to the above, the models receive the following points: 2, 1, 5, 3, 4.

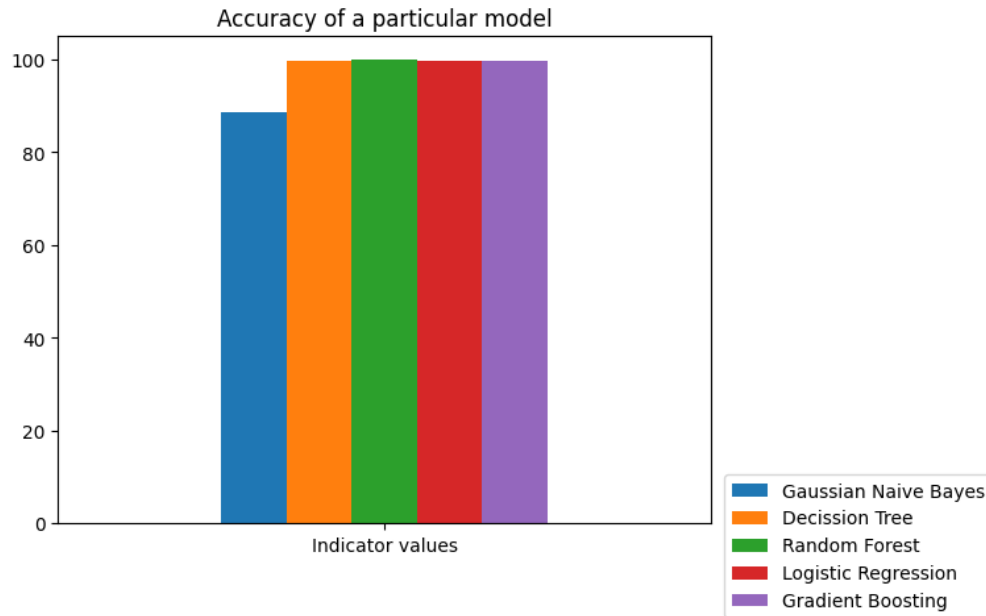


Figure 5: Accuracy of chosen models

The accuracy indicator of the machine learning model indicates the percentage of correctly identified records of the data set in relation to the total sum of all identifications of the machine learning model. The goal of the model is to achieve as high a percentage as possible, which in translation means that the model correctly classifies records from the data set. The achieved values of each model, in order of appearance, are as follows: 88.57%, 99.64%, 99.88%, 99.79% and 99.55%. Now let's add points to each model: 1, 3, 5, 4, 2.

In a similar way, we have analyzed all other indicators, and the results of individual points for each indicator, as well as the total points for all indicators can be found in Table 1.

Indicator	Gaussian Naive Bayes	Decision tree	Random forest	Logistic regression	Gradient boosting
Training time	5	4	3	2	1
Testing time	5	4	3	2	1
Precision	1	3	5	4	2
Recall	2	1	5	3	4
FPR	1	2	4	3	5
TNR	1	3	5	4	2
Accuracy	1	3	5	4	2
F-measure	2	1	5	3	4
Sum	18	21	35	25	21

Table 1: Scoring of used machine learning models

## 6. CONCLUSION

Gaussian Naive Bayes, Decision tree, Random forest, Logistic regression and Gradient boosting algorithms were used to implement the intrusion detection system. In order to use the mentioned algorithms in the program code, the "scikit-learn" library was used, which is used for working with machine learning within the "Python" programming language. In order to be able to evaluate the success of a particular model, that is, of the machine learning classification algorithm, it was necessary to calculate the general indicators of the model's success. Taking into account the fact that the performance indicator data are percentages, we have introduced a simple point scale to be able to rank each implemented model. Analyzing the graphs of individual model performance indicators as well as the set point scale, we come to the conclusion that the machine learning model that uses the Random forest classification algorithm was the most successful in data processing, while the worst model was the one that uses the Gaussian Naive Bayes data classification algorithm. In addition to the set point scale, one more indicator of model success should be highlighted, according to which machine learning models could also be ranked. The model accuracy indicator is an indicator that tells about the percentage of correct classifications of the input data. According to the accuracy of the Random forest model, the classification algorithm again turned out to be the best, that is, the most accurate in predicting the records of the input data, while Gaussian Naive Bayes is again imprecise in predicting the records of the input data set.

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## ALIGNMENT OF VALUE BASED MANAGEMENT CONCEPT AND SYSTEM DYNAMICS

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### **ABSTRACT**

*The leading hypothesis of this research is based on the assumption that the concept of value based management can be enhanced through the application of system dynamics. The scientific contribution achieved by this research is the verification and validation of the justification for a paradigm shift in long-standing understandings of the actions of a company. Methodological assumptions were tested against findings from research on the alignment of fundamental principles, objectives, and instruments of system dynamics and value based management. The research led to the conclusion that there is a conceptual and methodological alignment between system dynamics and value based management, as both concepts perceive and study business activities as systems with interconnected elements, utilizing the methodology of cause-and-effect relationships and feedback loops. The application of system dynamics enhances the traditional analysis of value based management by revealing the structure of a business through the use of feedback loop diagrams, stock and flow variables. The introduction of system dynamics into the analysis and management of value creation is a part of the development and enhancement of the mentioned concept, thus improving the analysis of business operations in general. The application of system dynamics to solve value based management problems is necessary considering the aforementioned reasons, as it can truly enhance the process of managing business entities, enabling not only learning but also a better understanding of system behavior and more effective management of business entities.*

**Keywords:** *system approach, system dynamics, value based management*

### **1. INTRODUCTION**

A company can be compared to a system where resource transformation takes place. Companies, considering time and situational elements, convert resources (labor, ideas, capital, raw materials) into outputs (products, services, etc.) with a value greater than the total value of the resources required for their production. From this, it can be concluded that companies can be seen as systems and managing the transformation of resources into higher value is necessary (Tintor, 2000). Differences in management between traditional and contemporary conditions are concentrated in changes in thinking, behavior, and orientation. Continuity, transparency, and self-reliance, characteristic of past business conditions, are replaced by current and future conditions marked by discontinuity, complexity, dependence on decisions made by others, and decisions from the environment (Tintor, 2000). These decisions also impact planning, control, analysis, and information as part of the management process. Value based management, as part of the general concept of management, is rooted in discussions from the 1980s about the need for stronger consideration of capital owners' interests in planning and managing the development of companies. A unique expression of this concept is found in the term "Shareholder Value". In simplified terms, the philosophy of shareholder value seeks to transform the traditional principle of profit maximization into a new principle of increasing the value of business. This concept includes all measures and instruments suitable for increasing the value of Company owners' assets. The wealth of owners is reflected as the actual stock price in the capital market or as the abstract value of ownership shares. The foundation of this concept lies in certain mechanisms of the capital market.



Companies that do not ensure sustainable profitability for their owners in the form of dividends or share value growth have weaker abilities to compete for new capital on the market, necessary for maintaining desired growth rates. Due to an excess supply of shares from such companies, there are larger corrections in their prices and a decrease in market capitalization. In such circumstances, it is not uncommon for these companies to become targets for takeovers, raising questions about their survival. In the current business environment where the environment changes rapidly, it is vital to acquire and retain specific competitive advantages. Value based management is precisely such an instrument that can help companies sustain within the framework of planned development. Value based management is a concept that allows decision-makers to determine priorities in decision-making so that they contribute to the value of companies as much as possible (Copeland, Koller, Murrin, 1998). To achieve this, alignment and support from all processes and subsystems within the company. This includes resource allocation, performance measurement, management incentives, business modeling, and internal and external communication. The key assumption of value based management is that maximizing value for owners is the primary goal. Owners entrust the management of companies to managers with the expectation that their value will increase (Ross, Westerfield, Jaffe, 2001). However, maximizing owner wealth does not mean ignoring the creation of value for other stakeholders. Dissatisfied customers can turn to competitors, and dissatisfied employees may not be sufficiently productive, among other factors. Focusing solely on one goal can lead to paralysis when making concessions between different stakeholder groups. Value based management becomes a powerful tool for focusing activities on those that contribute to value creation, resolving conflicts between demands like cost reduction versus quality. It is essential to emphasize that value based management is not about determining the value of companies but rather a framework that helps management measure progress in achieving the desired value level. Thus, the right metric is necessary, often reflected in the created shareholder value, calculated based on the difference in present value of free cash flows during a certain forecast period. Using such a measure allows identifying the consequences of operational decisions on current value and linking the effects of strategic measures and decisions to future cash flow levels and distribution. Viewed from the perspective of business management theory, value based management can be considered a form of management concept referred to as constructive-technomorphic type (Malik, 2006). From this viewpoint, detailed knowledge of elements and their interactions within the system allows for precise forecasting of model behavior. Rational behavior is a fundamental assumption, akin to the functioning of a machine based on its purpose and plan, where efficiency and reliability depend on the appropriate functions and properties of basic elements. In the context of business management, it involves shaping a meaningful and rational order (elements, processes) that aligns with the intentions inherent in the purpose. This management concept assumes that challenges can be mastered and predicted, relying on a stable environment surrounding companies. In this context, the quality of a decision within the paradigm of rationality depends primarily on the ability for logical reasoning (Koch, 2010). When the model's constituent parts behave rationally and all critical influencing factors are considered, the results of such a model are suitable. However, the main criticism of this management model is the assumption of complete mastery of the system, which proponents of a systemic approach consider entirely unrealistic (Malik, 2006). The characteristics of the constructive-technomorphic concept are rooted in a quantitative approach, with instruments primarily based on specific indicators. Hence, it can be said that the value based management concept belongs to the constructive-technomorphic management concept. On the other hand, an alternative to value management could be a systemic-evolutionary form of management orientation.

## **2. TOOLS, GOALS, AND TASKS OF VALUE BASED MANAGEMENT**

Value based management is based on two fundamental functions: the information function, whose task is to monitor the creation of value over a certain period, and the behavior management function, aimed at influencing management decisions. The goal of the information function is to provide indicators of value creation during a specific period, which can be used to make decisions aimed at increasing value and also as a means of evaluating certain business units from the perspective of achieved value growth (Copeland, Koller, Murrin, 2000). The underlying concept is value-oriented planning supplemented and accompanied by value based performance measurement, which leads to certain managerial actions. The main question is what is the achieved contribution of an organizational unit to the overall value is and how much certain activities contribute to that value and what their theoretical potential contribution could have been. On the other hand, the goal of the behavior management function is to align managers in making decisions that are in the interest of owners. The instruments of the information function are comprehensive systems of value indicators (Martin, Petty, 2000). Traditional performance indicators, primarily focused on earnings strength, are criticized for numerous shortcomings, both in theoretical and suitability terms, in measuring value added. Value based management overcomes such shortcomings by discounting future cash flows, adjusted for risk, to their present value. One of the disadvantages of discounting free cash flows is the difficulty in estimating them, but this drawback can be addressed by linking them to factors contributing to their creation. Since short-term earnings indicators often indicate changes in value development too late, the use of value drivers is necessary to avoid sacrificing value creation in favor of short-term profit maximization. They also play a crucial role in setting business priorities when identifying opportunities to increase value. On the other hand, the instruments of behavior management are represented through reward systems, depending on whether and to what extent decisions have contributed to value growth. However, in companies, it should be possible to link the behavior of all individual employees to creating value. From the perspective of normative management (Bleicher, 2003) and defining norms and values at that management level, value based management represents a unilateral demand from the business owners in terms of value distribution, and thus also a unilateral demand for participation in business results. In order to ensure the survival of a Company in the long term, careful planning of adaptation to the demands and changes from its environment is required (Schonenborn, 2004). In this context, the best indicator of long-term planning will be the so-called potential for business success. In the context of value based management, the potential for business success can be understood as the present value of future cash flows, and as this can be perceived as a value, it is possible to express the potential for success in monetary terms as the value of the Company, or the value for the owners.

*Figure following on the next page*

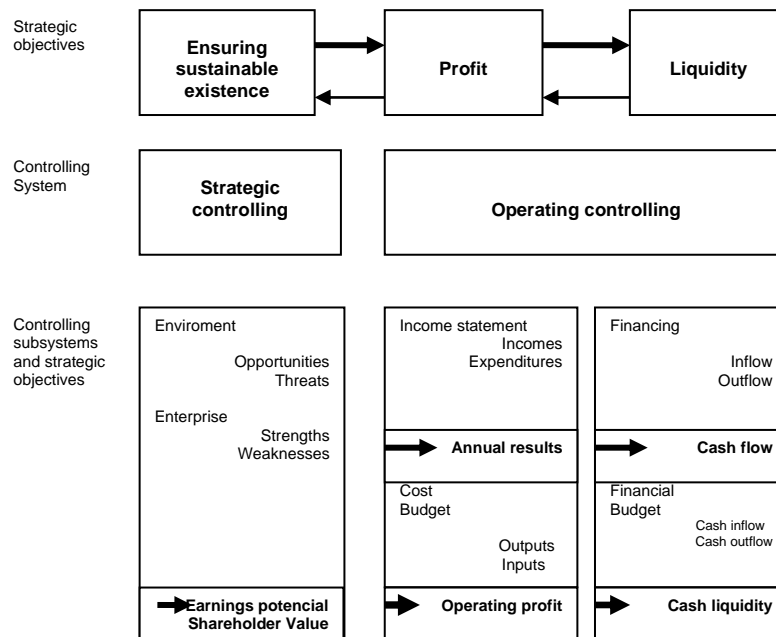


Figure 1: The system of objectives, the system of controlling, and the components of the controlling system

(Source: Gunther, T. (1997), *Unternehmenswertorientiertes Controlling*, Vahlen-Verlag, Munchen.)

In addition to industry-specific or company-specific strategic potentials for success, there are also nonspecific potentials (spatially and temporally independent) that, in certain situations, can influence or explain the success or failure of strategic business units. The use and success of a particular business strategy are based on certain benefits for the business entities. These are known as utility potentials, which can be divided into internal and external potentials. Utility potentials for a company represent effective or latent constellations that enable the achievement of competitive advantages. External potentials include factors such as market potential or technological potential, while internal potentials encompass factors within the company. In the context of the resource-based view of management theory (Wernerfelt, 1995; Barney, 1991), which is to some extent related to value based management, the following statements support the connection between resource-oriented management and value based management (Sanchez, Aime, Howard, 1996):

- Companies are goal-oriented systems that use material and non-material resources to achieve their objectives.
- Companies are open systems that need other companies and collaborators to produce goods and services and rely on markets to exchange resources necessary to achieve goals. Companies acquire resources necessary for production or seek access to markets for their products either through competition or collaboration with other entities.
- Market competition dynamics occurs when certain companies take actions to reduce the gap between the current and desired state.
- Leverage effects occur when companies use existing or externally acquired competencies to achieve their objectives. New competencies arise from the acquisition of new resources or through new combinations of resources and capabilities.
- Flexibility in acquiring and using resources plays a central role in preserving and building competencies.
- Competency-based competition requires continuous learning about the use of leverage effects and the development of new competencies.

Considering the competency-based management concept in the context of value based management leads to the identification of resource accumulation strategies that enable long-term and sustainable value increase for the company. According to Hamel and Prahalad (Hamel, Prahalad, 1994), leadership in competencies is the best strategy for maximizing the value of business because securing a disproportionate share of future profits requires possessing a disproportionate share of the necessary competencies. To study strategic alternatives within the resource-oriented perspective, it is necessary to choose a method that justifies the systemic nature of these resources. Environmental changes result in the need to adapt the resources used in the company, which gives rise to the dynamic character of the resource-oriented management concept. Therefore, selecting the right time paths of flows that increase these resources is essential for the accumulation of strategic stocks (resources) (Dierickx and Cool, 1989). The accumulation of resources itself represents a nonlinear and highly unpredictable process, and one of the reasons lies in the fact that the rates of resource accumulation can be influenced by the state of other resources (Warren, 1991). Studying different strategies of the resource-oriented management concept for business entities is a complex problem, and therefore, system dynamics is a desirable method that can address its dynamic nature and non-linearity. Resource accumulation is a time-intensive process resulting from consistent business policies over a period of time (Dierickx, Cool, 1989). Using the metaphor of a water tank, whether it is for externally sourced or internally developed resources, it is always possible to talk about the inflow and outflow of resources, and the process of accumulation is often characterized by reinforcing cause-and-effect relationships between the states of individual resources. Depending on the state of resources, it is necessary to develop appropriate strategies. If the desired and feasible strategies are mutually compatible, then the successful implementation of the strategy is highly likely, regardless of other possible influences. For example, earnings for a certain period can be distributed entirely to capital owners or partially retained for investment in new resources. With increased inflow of resources, the position of resources improves, leading to further successful strategies resulting in greater inflow of funds. On the contrary, existing or new equity holders require certain returns on their investments, leading to outflow of financial resources. The retained portion of business results remains available for new investments and thus for acquiring new material and non-material resources. In conclusion, regarding the objectives, instruments, and tasks of value based management, a company can be understood as a goal-oriented system, engaged in goal-oriented activities where a certain result emerges in the process of resource utilization. If the assumption of value creation is established as the basis for the result, the goal before the mentioned process becomes the increase in added value, which is considered the success of the business.

### **3. THE FUNDAMENTAL PRINCIPLES OF SYSTEM DYNAMICS**

System dynamics and its use in business have roots in the theory of system-orientated economics, and it largely relies on the principles of general systems theory. System dynamics deals with the behavior of controlled systems over time. It aims not only to describe business systems with qualitative and quantitative models, but also to understand how feedback loops within the system influence its behavior. During the phases of system dynamics analysis, knowledge obtained through simulation is used to grasp the structure of feedback loops and derive appropriate decision rules (Coyle, 1996). According to the system dynamics paradigm, companies and their environment can be understood as a set of decision-makers whose decisions and activities are interconnected (Morecroft, 1988). In system dynamics, the focus is not on studying isolated individual variables but on examining different interrelationships among factors and variables and their consequences over specific time intervals. A significant advantage of system dynamics modeling is the ability to causally connect different variables within the system being studied.

For analyzing the process of resource accumulation and, consequently, the potential for value accumulation, which exhibits dynamic behavior, a method that can encompass and represent complex interdependencies is necessary. As nonlinearity is a fundamental characteristic of both, management in general and value based management, system dynamics, as a general structural theory of social systems, is particularly suitable for representing complex and nonlinear interdependencies (Forrester, 1961). The goal of system dynamics is not to obtain analytically exact solutions but to gain insights into the behavior of the system (Milling, 1982). By analyzing different influencing factors in the process of value accumulation, it is possible to determine the desired outcomes and purposes of appropriate decisions. System dynamics models are reflections of a cybernetic view of reality, where social systems such as companies are seen as information systems with feedback loops. Causal relationships between system elements can be represented as feedback loops that form formal models of the observed system. In these models, it is essential to include all relevant factors and their interconnections related to the problem studied. The complexity of the system representations depends on the number of elements included and the number of their feedback loops. The polarity of the feedback loops can be positive or negative. A positive sign indicates that the system's state changes in one direction, either decreasing or increasing, leading to decisions that further move the system in the same direction. On the other hand, negative feedback loops lead to decisions that direct the system's behavior in the opposite direction. The combined action of positive and negative feedback loops determines the system's behavior. In dynamic observation of a company, it is necessary to determine the structure and feedback loops that best describe its behavior by combining the system's structure, time delays, and reinforcing or balancing feedback loops.

### **3.1. Tools, objectives, and tasks of system dynamics**

In the design of management systems, goal setting, organization, decision-making, management, and control, the fundamental task in management consists of mastering complexity (Urlich, 2001). Therefore, system-oriented management can be defined as the art of successfully dealing with systems, leading them in a certain direction, or influencing systems in a way that enables the achievement of specific objectives (Malik, 2006). Among the main tools of system-oriented management, certain concepts are considered mental sketches of reality, with different orientations and levels of abstraction. Thus, the main instruments of system dynamics, as a concept of system-oriented management, are considered modeling and simulation. In the context of multiple theories and methodologies for systems change, system dynamics has certain characteristics that constitute its strengths and weaknesses (Shwanninger, Rios, Ambroz, 2004):

- The focus of observation is on the dynamics of systems with feedback loops characterized mainly by internal dynamics. System models are closed networks of feedback information diagrams. However, these are not "closed systems"; they are systems in which:
  - Flows can have sources outside the boundaries of the system.
  - Exogenous factors or entire systems can be incorporated into the model as parameters or special modules. New information about the system can be provided through changes.
- System dynamics is characterized by a high degree of operability. It relies on formal modeling, requiring disciplined thinking. Assumptions, equations related to the model, and any quantifications must be clarified. Feedback loops and delays in the model must be visualized and formalized, making the causal logic of the observed model more transparent and suitable for discussion than in other methodologies. Thus, the achieved level of realism is higher than in, for example, econometric models.

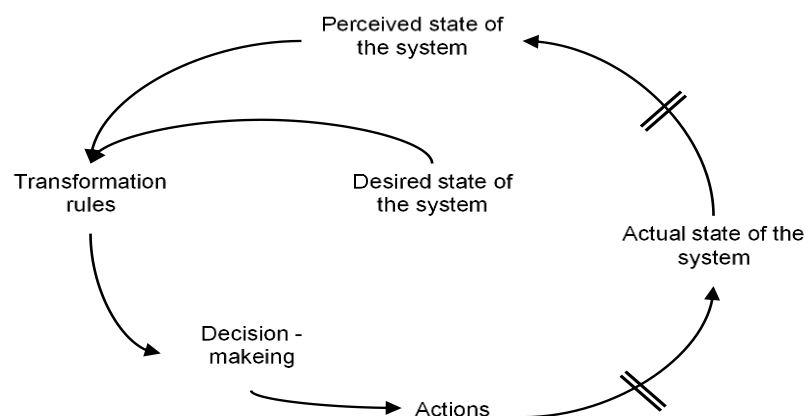
- System dynamics provides extensive possibilities and combinations of qualitative and quantitative aspects of modeling and simulation. The focus of system dynamics is not on precise predictions, but on discovering patterns of behavior of the observed system.
- High degree of generality and robustness of the method. Thanks to the dynamics of stocks and flow dynamics, system dynamics is a widely applicable method with a large number of applications. The spectrum of application is broad in terms of potential fields of application and has depth in terms of the possible level of detail of the application.
- For the application of system dynamics, there are a large number of software tools such as Stella, I-think, Powersim, Vensim, and Mystrategy, which are user-friendly and provide access to various mathematical functions. Some of them include optimization or validation procedures. Some tools enable collaborative modeling and communication with databases and other useful functions.

The specific approach to modeling makes system dynamics particularly useful for gaining insights into the patterns of dynamic behavior of systems and the underlying structures behind such behaviour.

The general objectives and tasks of system dynamics methodology can be summarized as follows (Strohhecker, Sehnert, 2008):

- Describing the Problem,
- Dynamic concretization of the problem,
- Developing a Simulation Model,
- Testing the model,
- Developing and analyzing problem-solving strategies,
- Implementing selected strategies in problem-solving.

The formulation and implementation of problem-solving strategies are particularly crucial aspects of the system dynamics modeling process, where decision rules play a key role in each feedback loop, determining the time-dependent development of a system (Forrester, 1971).



*Figure 2: Decision rules as an integral part of the feedback loop process (Source: Strohhecker, J., Sehnert, J. (2008). System Dynamics für die Finanzindustrie - Simulieren und Analysieren dynamisch-komplexer Probleme, Frankfurt Scholl Verlag. p. 177.)*

The problem, as an undesirable deviation between the desired state and the actual state (Gomez, Probst, 1999), initiates the need for corrective actions aimed at eliminating the existing gap or reducing the root causes of the problem.

System dynamics, along with its goals and tasks, assumes that businesses are systems, and based on bridging certain gaps between the desired and existing states, the fundamental goal of system dynamics is considered to be the initiation of changes and continuous improvement of both the efficiency and effectiveness of business entities.

#### 4. THE ALIGNMENT OF THE PRINCIPLES OF SYSTEM DYNAMICS AND VALUE BASED MANAGEMENT

##### 4.1. The alignment at the foundational level

In its functional design, value based management becomes an auxiliary function of management, making it an integral part of the management process. The informative function of the management and control process, within the value based management concept, arises from the obligation to provide management with relevant information and coordinate more or less autonomous units in the planning and management of the company. From a procedural perspective, value based management can be understood as a cybernetic process in which predefined objectives set by the businesses are achieved through a self-regulating circular flow. (Baum, Coenenberg, Gunther, 2004). The circular flow of feedback loops can be studied, for example, in the case of a company that aims to increase its value by focusing on rapidly growing markets and targeted development of innovative products.

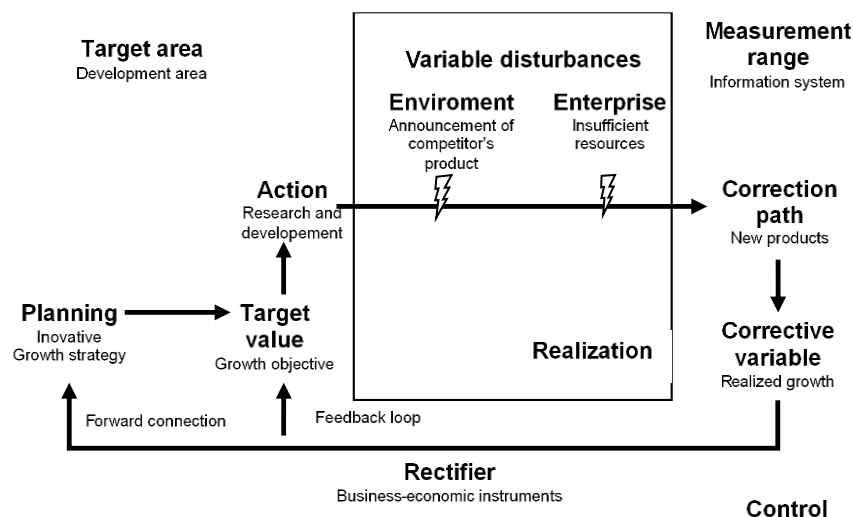


Figure 3: Value Based Management as a Cybernetic Process  
 (Source: Gunther, T. (1997). *Unternehmenswertorientiertes Controlling*, Vahlen-Verlag, Munchen, p. 67.)

In terms of functional design, value based management becomes a supporting function of management and thus becomes a part of the management process. The informative function of the management and control process, in a value based management concept, arises from the obligation to provide management with relevant information and coordinate multiple, more or less autonomous units within the company. From a procedural perspective, value based management can be understood as a cybernetic process where defined objectives of the company are achieved through a self-regulating circular flow. This circular flow of feedback can be observed, for example, in a company aiming to increase its value by focusing on rapidly growing markets and the targeted development of innovative products. Financially, it is useful to perform a value analysis using discounted cash flow method to determine the contribution to the creation or reduction of value in different business areas of the company.

The system dynamics is helpful in exploring the structure and processes within it. The behavior of the system is caused by its structure, and the interconnections of feedback loops form the system structure, which is the fundamental determinant of its behaviour. Since value based management approaches the analysis of a business state, it is necessary, first and foremost, to identify how variables, especially those related to value generation, are interconnected. From a cybernetics standpoint, which is the science of managing businesses, the fundamental task of management is to ensure that only those system states are present that will most effectively ensure the long-term increase of the company's value. Based on this, it can be concluded that there is a strong consistency in the understanding of management as a subsystem of a company, or in other words, a consistency in the fundamental principles of value based management and systemic dynamics.

#### 4.2. Consistency at the level of objectives

As the concept of value based management emphasizes the focus on the target value of the company, within the framework of strategic control and management, the task of determining long-term potential for success that can impact value growth (value growth potential) arises. For companies, especially those with a large number of owners, the ownership strategy generally aligns with the goal of creating value. The structuring model, which represents the linkage of the goal of increasing shareholder value, business policy and strategy, as well as operational positions related to value enhancement, can be presented in the form of the restructuring pentagon (Copeland, Koller, Murrin, 2000). In this pentagon, value creation is described as a process that begins with identifying the value gap, which is the difference between the current market value and the value of the company measured as shareholder value. The greater the difference, the greater the risk of the company being acquired by other entities.

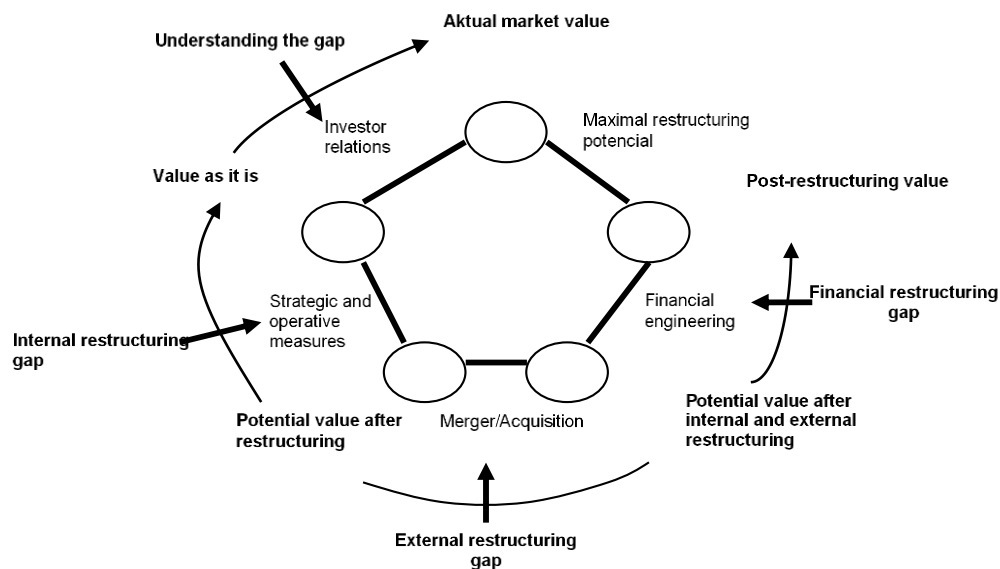


Figure 4: The Restructuring Pentagon of a company

(Source: Copeland, T., Koller, T., Murrin, J. W. (1994). *Valuation: Measuring and Managing the Value of Companies*, New York, p. 316.)

The Pentagon of restructuring indicates that increasing value can be achieved through a variety of measures. The strategies of the business units as part of internal restructuring gap and the overall company strategy as an element of the external restructuring gap gain special significance here.



When discovering the contribution of specific measures and bridging the gap between the desired and existing state, the application of system dynamics has a significant contribution. From the perspective of systems theory, particularly in terms of the feedback loop inherent in cybernetics, managing a system means striving to bring it to a certain appropriate goal, which in this case represents the desired value growth. From a practical application standpoint, using the methodology of system dynamics to achieve this goal, a synergistic effect is achieved, especially in the phase of analyzing different scenarios through simulations on the Company model. Therefore, it can be concluded that by combining dynamic analysis and value based management, the alignment of these methods is confirmed even at the level of objectives.

#### 4.3. The alignment at the level of instruments

In the management of the company's value, the need to structure the selected strategy into a series of operational and strategic value drivers is mentioned. If the study is limited, in terms of analyzing the strategic advantages of the company, only to profitability and revenue growth as fundamental value generators, it is possible to somehow link generic business strategies to the goal of increasing the company's value (Porter, 1996).

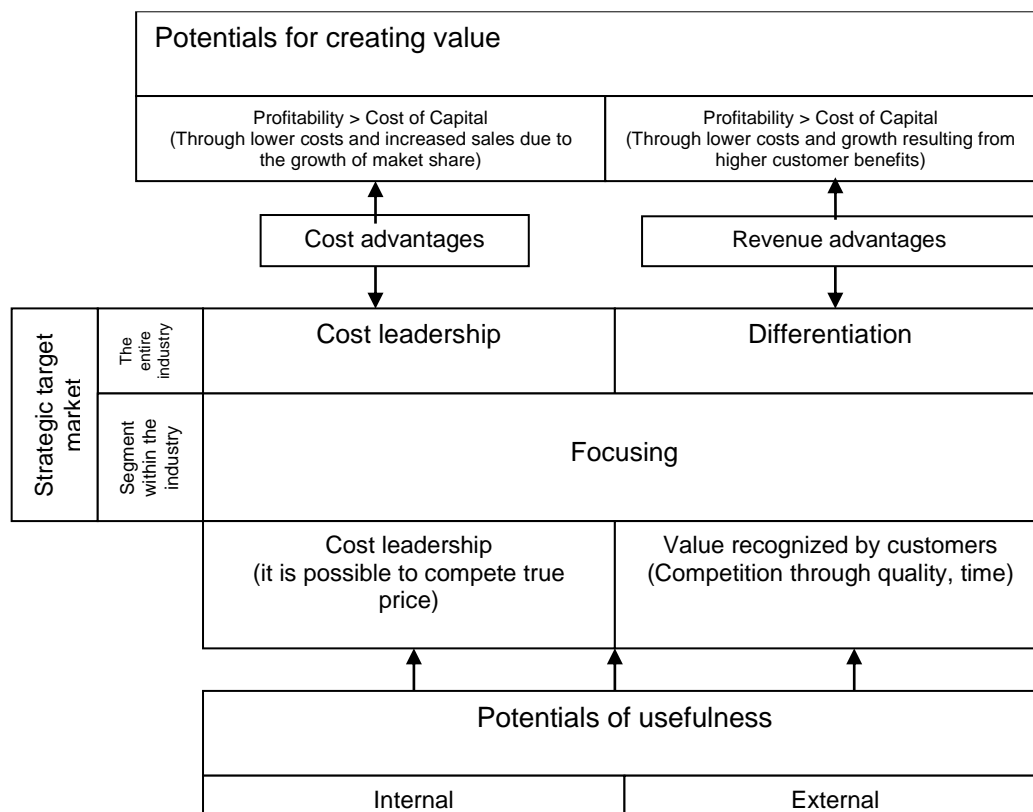
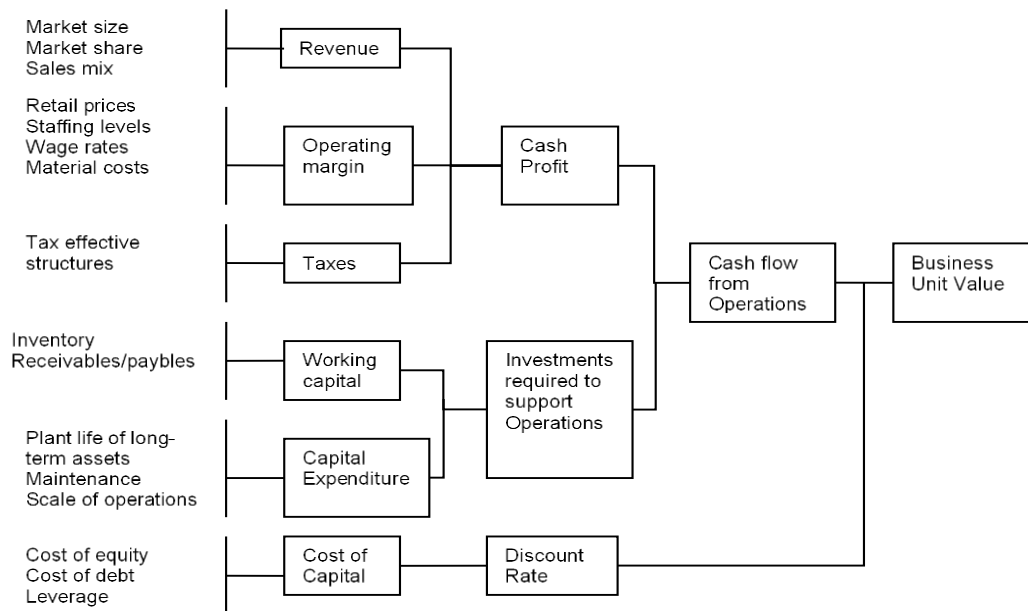


Figure 5: The dependency of the potential utility, generic competitive strategies, and the potential for creating value of the Company

(Source: Gunther, T. (1997). *Unternehmenswertorientiertes Controlling*, Vahlen-Verlag, Munchen, p. 382.)

It is possible for a company to increase profitability by reducing costs and thus increasing market share. On the other hand, with a differentiation strategy, the company creates products with higher utility, which allows them to offer products at higher prices or achieve increased sales volume through greater customer satisfaction, resulting in increased profitability in both cases.

Before examining each strategy in terms of its potential value creation, the previously defined dynamics of market competition, developed during the strategy formulation process, must be transformed into financial value creators (Rappaport, 1999). Regardless of the chosen business strategy, to achieve or maintain specific competitive advantages and ensure long-term value increase, it is necessary to set appropriate priorities that, from an operational perspective, ensure sustainable free cash flows. As value based management serves as a decision-making framework, it provides managers with insight into setting the right priorities. The tools used in the value based management concept are specific performance indicator systems, or key value drivers, which are most commonly presented in the form of a value tree.



*Figure 6: Value Drivers: The Key to an Economic Road Map*

*(Source: Martin, Petty, (2000.). Value Based Management: The corporate response to the shareholder revolution., Harvard Business School Press, Boston Massachusetts, p. 69.)*

Regardless of the chosen business strategy, to achieve or maintain specific competitive advantages and ensure long-term value growth, it is necessary to set appropriate priorities that operationally secure sustainable free cash flows. Since value based management is used as a framework for decision-making, it provides managers with insights into setting the right priorities. The tools used in this concept are specific indicator systems or key value drivers, often presented in the form of a value tree. Setting priorities should focus on the effects of decision-making that contribute most significantly to value growth. However, focusing solely on financial value drivers, such as sales growth, operating profit margin, or additional investments, is not sufficient to understand the contribution of everyday activities to the value of the business. A more detailed understanding of financial value drivers is required, systematizing them into variables that significantly influence business results. For example, the financial value driver, such as sales growth, can be complemented by additional operational value drivers like price, sales volume, etc., which impact financial business results. On the other hand, strategic value drivers are variables that influence the operational business result, i.e., the level of competitive position or operational efficiency, such as economies of scale, learning curve effects, and others. Once the model is created, it should support the setting of priorities in making operational and strategic decisions to gain insight into combinations of value drivers that contribute most significantly to value enhancement. Determining desired free cash flow amounts, and thus the required value drivers or their combinations, is also considered valuable.

The value of such information is critical in value based business management as it enables the decomposition of the value-added measurement system into lower levels of strategic and operational performance measures. The traditional toolkit lacks the linear cause-and-effect linkage of individual variables in the value tree. Although using the value tree is a powerful tool for describing the connections in the functioning of a business, it overlooks the existence of relationships between the value drivers themselves and ignores the time lag between decisions and their consequences. In other words, what is missing here is feedback loop diagrams and their concretization in a system dynamics representation of business operations by transforming financial and selected nonfinancial dimensions into stock, flow, and auxiliary variables. Using the value tree inherently involves static and disconnected variables required for an appropriate representation of business dynamics. Therefore, synergistic effects can be achieved by combining value based management and system dynamics, which is suitable for modeling such complex issues. The system dynamics model, which should illustrate the practical implications of applying system dynamics in value based management, should encompass the state and dynamics of the relationships of all values covered by the traditional management model. However, as previously mentioned, it should also contain other nonmonetary dimensions crucial for forming the long-term strategy of the company. Since value based management combines strategic and financial management, the system dynamics model should also focus on the temporal development or accumulation of key resources, particularly resources that enable the creation of some form of competitive advantage in line with generic business strategies. Besides the base scenario, representing the current state and potential future development of the company, the system dynamics model should undergo testing by introducing possible changes in market conditions as potential opportunities and threats in the company's development and, ultimately, their reflection on its value. From a theoretical perspective, such an approach should enhance traditional value analysis and management by providing timely information about the results of simulating business operations under modified conditions. Thus, analysis of the results of simulations in a virtual world becomes an essential support tool in the process of making operational and strategic decisions and creating a long-term business strategy. If systematic alignment is desired at the instrumental level, system dynamics can particularly help in advancing value management in the following ways (Bijlsma, Jongebreur, Winthagen, 2008):

- Represents the interdependencies of operations occurring within business entities. The value tree, as shown in Figure 6, contains certain crucial variables for describing business processes, but the connections between variables are presented as simple parent-child relationships. The lack of links between variables leads to an incorrect or omitted representation of system dynamics. A more in-depth investigation of causal relationships reveals the need to expand the scope of observation and include additional variables that are taken into account.
- When building the value tree, it is necessary to ensure a balance between the fundamental dimensions observed in business operations in general and the exploration of the value creation concept itself. This refers to the level of detail and elaboration of specific areas such as revenues, costs, and investment levels. The problem arises if too much attention is devoted only to either the cost or revenue side of business processes due to a lack of data or established mental models. A holistic approach, characteristic of system dynamics, ensures an appropriate balance in the detail of the approach because activities modeled, even at the lowest levels, have an impact on almost all fundamental areas crucial in value creation.
- The use of the value tree methodology often leads to inconsistent values of certain variables in scenarios assessing the potential contribution of a strategy to value creation, as their interdependence and connectedness are not taken into account. When measuring the contribution of a strategy, errors can occur, for example, in growth rate forecasts conflicting

with the size of required investments precisely because their interrelationship and dependence are not considered. System dynamics corrects such deficiencies, as the phases in the development of the system dynamics model provide insight into such structures, thereby preventing the establishment of inconsistent scenarios.

System dynamics provides a more comprehensive understanding of the organization and consequences of specific business strategies. After creating the model and testing various scenarios, other benefits of system dynamics come to the fore. Using the traditional approach, through static branching of variables crucial to value creation, there is a risk of a one-sided focus solely on shareholder wealth, mainly through a focus on financial metrics. Attention should also be paid to the consequences of certain decisions and everyday activities that contribute to value creation in the short term but may cause its reduction in the long term. System dynamics offers a comprehensive approach to studying the dynamics of business entities, enabling the use of certain metrics as guidelines for measuring added value at the level of the company as a whole, while respecting the paradigm of increasing shareholder wealth, but also considering the interests of other groups connected to the company.

## 5. CONCLUSION

The system of a company can be described as an organized set of elements characterized by certain properties. The relationships between these elements influence both the behavior of individual elements and the behaviour of the entire system, which is referred to as the system's structure. Studying the system structure is a fundamental aspect of system dynamics, and its representation, to discover the signs and intensities of interactions between model variables, is made possible by utilizing the tools offered by system dynamics. Value based management integrates the support function of management and, in fact, represents a part of the management process. From a procedural perspective, value based management can be understood as a cybernetic process in which business entities achieve defined goals through self-directed circular flow. The objective of increasing value in the strategic management of a company leads to the definition of an innovative growth strategy. In terms of the feedback control loop, value growth represents the target quantity, and through business-economic instruments, it is possible to analyze deviations between the target and corrective quantities, i.e., planned and achieved growth, and accordingly take appropriate measures. The mentioned circular flow of feedback is characteristic of system dynamics, especially in the study of the spatio-temporal dynamics of company systems. The phases through which the system dynamic analysis is conducted represent an iterative procedure in which variables and the state of a system are modeled and simultaneously analyzed to gain insight into the system's structure and discover the most favorable business policies to bring the system to the desired state. Value based management is approached from the perspective of analyzing the state of a company and the measures needed to reorganize the system to align its operations with the owners' demands and ensure sustainable long-term value increase. Based on this, it can be concluded that there is a strong alignment in the understanding of management as a subsystem of a company and also, alignment in the fundamental principles of value based management and system dynamics.

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## THE ANALYSIS OF BIASES AND ITS EFFECTS IN AI-SUPPORTED HUMAN RESOURCES DECISION MAKING

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### ABSTRACT

*The use of Artificial Intelligence is on the rise in several human resources functions such as recruitment and hiring, employee records management, payroll processing and benefits administration, performance management, employee onboarding/offboarding processes, training. However, although the AI improves the HR efficiency, the ethical considerations of its use and the biases which humans transfer to AI systems are still to be thoroughly examined. The purpose of the paper is to explore the significance of biases in AI systems and its effects on the human resources related decisions. The paper's aim is to analyze how human cognitive biases influence and misdirect AI systems used in human resources decision making processes. The author conducted a qualitative research based on the systematic theme-relevant literature review which resulted in the following findings: there are several sources of biases in AI systems which should be addressed to mitigate/eliminate the prejudices-led AI-supported discriminatory HR decisions. The author also analyzes the possible conflict between analytically efficient AI-assisted decision making and the value-based moral human judgment which implicates that decision makers should be aware of possible AI's built-in biases, but also to always bring in the ethical issues in AI-supported decision-making process, to prevent the unmoral decisions. The paper presents possible solutions for managerial and human resources practice to reduce biases in decision-making process which could result in higher individual and organizational performance. Further research can be conducted in various AI-supported business sectors and organization departments to help improve decision making processes and through that to improve the organization's effectiveness.<sup>1</sup>*

**Keywords:** AI, biases, decision making, human resources

### 1. INTRODUCTION

To succeed on today's highly competitive market conditions and with more and more diverse employee structure companies must develop agile human resources initiatives that will help align individual and organizational goals. The critical strategic role of human resource management (HRM) creates often new responsibilities for human resources (HR) professionals who should help improve the overall organizational success. Due to the growing tasks and demanding decisions expected from the HR department on the one side, and due to the technology development through the last decades, the use of artificial intelligence (AI) is on the rise in HR related decision making. However, although the AI improves the HR efficiency, the ethical considerations of its use and the biases which humans transfer to AI systems are still to be thoroughly examined. The purpose of this review paper is to present and explore the significance of biases in AI systems and its effects on the human resources related decisions. The paper's aim is to analyze how human cognitive biases influence and misdirect AI systems used in human resources decision making processes and what can be done to reduce them.

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The lack of academic papers focused on AI biases in HRM has led the author to fill this gap by conducting a qualitative research based on the systematic theme-relevant literature review. The topic is elaborated in 4 chapters. After the introductory chapter, the use of AI in contemporary human resources decision making is presented in chapter 2, as well as its strengths and weaknesses. The central part of the paper is chapter 3 which gives the analysis of human biases and its effects in AI-supported HR decision making. This chapter brings the discussion on research results and comments its implications. In the chapter 4 the concluding remarks are given, followed by the list of used literature sources.

## **2. THE USE OF AI IN HUMAN RESOURCES DECISION MAKING**

The growing significance of HRM in modern organizations' success has opened the discussion on the value, contribution, and quality of its decisions. Today's uncertain and rapidly changing market and working conditions make the work of HR professionals even more challenging and its strategic role even more relevant. In practice, that means balancing various expectations in a more and more diverse work environments through a constantly growing number and complexity of HR functions and responsibilities. Next to the HR planning, recruitment and hiring, training and development, career planning, performance and compensation management, employee records management, payroll processing and benefits administration, today's HR departments are also focused on the employee relations, employee wellbeing, employee engagement, employee experience, diversity management, organizational development, organizational culture as well as on the people analytics to create a work environment that will attract and retain talents. In 2022 HR leaders named the retention and employee engagement as their priority people strategy initiatives (Lattice, 2023:15-16). To effectively conduct all those processes HR departments use a wide variety of technologies and digital tools. Today we are therefore witnessing the growing use of AI in several HR functions: recruitment and hiring, employee records management, payroll processing and benefits administration, performance management, employee onboarding/offboarding processes, allocating work, training, learning and development, personalized career coaching, employee engagement and retention, ensuring workplace safety (Eightfold, 2022, IDC, 2022, Murugesan et al., 2023, Siocon, 2023). In recruitment the AI is used to predict the job description and select the right candidate, i.e., to measure and rate job applicants (Votto et al., 2021; Sridevi and Suganthi, 2022; Hofeditz et al., 2022). Candidate screening, applicant resumes parsing, employee attrition and turnover prediction (Mujtaba and Mahapatra, 2019), writing job ads, analyzing video interviews via face recognition software (Hunkenschroer and Luetge, 2022), employee performance evaluation, employee satisfaction analysis, compensation and benefit analysis, best practice analysis, personalized employee experience, cognitive support in decision making, automation of low-value-added tasks, smart people analytics, litigation strategy, leadership development, discipline management are all areas where HRM uses AI (Votto et al, 2021, Pandey et al., 2023). Recent research results show that the most impacted HR functions by AI are now: performance management (goal setting, feedback, performance evaluations), employee engagement and satisfaction, training and development (optimizing training programs, creating personalized learning experiences), recruitment and talent acquisition, employee inquiries and assistance (Engagedly, 2023). HR professionals are among the top ten user groups of AI at organizations today; global AI adoption rate for HR professionals is 21 % (IBM, 2022). The strength of AI-supported HR decision making is evident in growing efficiency of the HR processes which enables HR professionals to focus on the strategic tasks of HRM. Next to the increased efficiency and cost reductions (Weber, 2023) the benefits of using AI in HRM are also enhanced employee support and enhanced candidate experiences (IBM Education, 2023). AI reduces discriminatory decisions by identifying and eliminating human biases from the HR processes (Hofeditz et al., 2022), e.g., it helps recruiters



to reduce biased and discriminatory language in job advertisements, i.e., masculine-coded, feminine-coded, exclusive, LGBTQ-coded, demographic, and racial language (Frissen et al., 2023). Although AI system can help uncover and reduce harmful biases it can also replicate biases and therefore be biased, which is the focus of this paper's analysis, thoroughly discussed in the following chapter 3. Other challenges of using AI in HR are reskilling, employee privacy concerns, bumpy rollouts, cybersecurity (IBM Education, 2023). The AI-assisted data-driven decision making may run against value-based moral decision-making (Wang, 2021) and AI eliminates human touch from human resources (OnPassive, 2021). Those challenges have led to the ethical considerations of its use and to the development of ethical guidance and principles: Banks' (2021) decision making framework supports the ethical deployment of AI for HRM and gives directions for the optimal mix of human and machine involvement for different HRM tasks. When deploying AI in HR processes, managers should be aware of employees' attitudes towards the use of AI and towards the biases it might replicate or amplify. Employees often resist AI due to the burdens they experience toward AI's introduction to HRM (emotional, mental, bias, manipulation, privacy and social) (Park et al., 2021).

### **3. THE BIASES AND ITS EFFECTS IN AI-SUPPORTED HR DECISION MAKING**

The human cognitive biases are related to heuristics, a shortcuts people use in unconscious and automatic mental processing when deciding under uncertainty (Kahneman, 2013). Although heuristics and biases help people to solve problems and make judgments quickly and efficiently (Gigerenzer, 2009, Gladwell, 2005) they can also lead to errors which are the focus of this research analysis. Other researchers have assimilated the notion of bias with that of stereotype (Marinucci et al., 2023), a concept also included in our analysis. Human biases are well documented, from implicit association tests that demonstrate unconscious biases to field experiments that demonstrate how much these biases can affect outcomes (Manyika et al., 2019). Many employees today believe bias influences pay decisions and adequate steps aren't being made to eliminate bias from the compensation review process (Lattice, 2023:23). Also, many employees experience biased HR decision making in recruitment and selection process. To reduce those biases several AI systems are being introduced in HRM processes. However, the current research work shows that AI can replicate human biases and therefore it can lead to more discrimination or more unfair practices. The human biases can be introduced in AI systems through human influence in the system design, the training data supplied to the system, and human involvement in processing system recommendations (Pyke et al., 2022). AI systems learn to make decisions based on training data, which can include biased human decisions patterns which AI systems were trained to emulate or reflect historical or social inequities, even if sensitive variables such as gender, race, or sexual orientation are removed (Manyika et al., 2019). Another source of bias is flawed data sampling in which groups are over- or underrepresented in the training data (Manyika et al., 2019). Biased AI systems can unfairly allocate opportunities, resources, or information; infringe on civil liberties; pose a detriment to the safety of individuals; fail to provide the same quality of service to some people as others; and negatively impact a person's wellbeing such as by being derogatory or offensive (Smith and Rustagi, 2020). They can produce harm to people (harm to a person's rights or economic opportunity, harm to a group such as discrimination against a population sub-group, harm to democratic participation or educational access), organizations (harm to an organization's business operations, monetary loss), and ecosystems (NIST, 2023). HR decisions supported by biased AI systems can increase costs and penalties related to discrimination, and decrease employee satisfaction, and employee engagement, as well as produce negative impact on employer branding initiatives / an organization's reputation. All those potential negative effects force HR and other managers to work on the mitigation of biases in the applied AI systems.

### 3.1. The research approach and methodology

To conduct the systematic literature review we searched the Web of Science-, the Scopus-, the Science Direct- and the Emerald-indexed research papers, the Google Scholar database, and the subject-matter-experts' publicly available reports and research studies. To carry out the research we have used the title key words search "AI bias or biases in AI-systems or biased AI" and "human resources or human resources decisions or human resources management". Although the number of papers related to the use of AI and biased AI systems is growing in the recent years, our analysis was focused on the biases that were detected in AI-supported HRM processes. The research papers related to biases uncovered in other AI-supported business processes were therefore excluded from the research results. The research results and its implications are discussed in the following subchapter 3.2.

### 3.2. The research results and discussion

The key research results which list the uncovered biases in AI systems used in HRM processes and its effects are presented in the Table 1.

The Bias in AI System	The Effect of the Bias	Author and Year of the Research
Disability and race/ethnicity bias (HireVue's uses algorithms in video interviews analysis that ranks candidates based on their facial expressions, word choice and speaking voice analysis)	Potential discrimination towards disabled people and people whose native language isn't English in recruitment	Harwell, 2019, as in Berkely Haas, 2023
Ethnicity bias (targeting of Facebook used to exclude specific candidates in automatic filtering of job advertisement)	Discrimination in job posting	Dalenberg, 2017, as in Chiarello, 2021
Ethnicity bias in automatic scoring based on a recorded interview (underestimation of job interview scores due to underrepresentation of ethnicities in the data sets)	Discrimination in job interviewing	Kochling et al., 2021, as in Chiarello, 2021
Gender bias (fed with the past gender biased hiring decisions data AI replicates that bias in hiring processes), e. g. Amazon's resume screening tool penalized the candidates who included the word "women's" in their resume, because females were underrepresented in the training data; the tool was retired before it was ever deployed	Discrimination towards women in hiring processes	Hilliard, 2023
Racial and gender bias (admissions algorithm used by the University of Texas, Austin to screen PhD candidates for its computer science department was trained using the details of previously accepted students and the result was the exclusion of applicants of certain backgrounds not represented in historical admission data; the use of the algorithm was discontinued in 2020)	Potential discrimination in recruiting processes	Quatch, 2020, as in Berkely Haas, 2023
Gender bias in online job postings (Carnegie Mallon study of Google's ad-targeting system showed that an ad for higher-paid executives was displayed 1816 times to men and just 311 times to women)	Discrimination in recruitment	OECD, 2019
Disability bias (Applicant Tracking System and Candidate Relationship Management are likely to utilize automated outlier detection tools (e.g.	Potential discrimination/exclusion	Nugent and Scott-Parker, 2022

CAPTCHA) that can flag people with disabilities as not human or a spammer; recruitment conversational agents when undertrained may be unable to correctly interpret spellings or phrases such as messages from people who have physical difficulty typing or have dyslexia, autism, ADHD ...; conversational agents that cannot support communication methods beyond writing, such as text-to-speech and dictation, limit or exclude many individuals with disabilities; facial analysis tools in interviewing may inaccurately assess and potentially exclude people with facial disfigurement or paralysis or Down syndrome ...	in recruitment, hiring and selection	
Bypass of unique but relevant information/stereotyping bias (e. g. the candidate will fill only the information that is pre-determined; in case she/he wants to convey some extra but relevant information they would not be able to do it due to the pre-determined restrictions)	Potential discrimination in recruitment and hiring	Upadhyay and Khandelwal (2018), as in Al Mawali et al. (ed.), 2021
Gender bias - hiring algorithm that favored applicants based on words like "executed" or "captured" commonly found on men's resumes (Amazon stopped using it after these findings)	Potential discrimination in hiring	Manyika et al., 2019
Gender and race bias - facial analysis technologies had higher error rates for minorities and particularly minority women, potentially due to unrepresentative training data	Discrimination in recruitment	Boulamwini and Gebru, as in Manyika et al., 2019
Gender and race/ethnicity bias in automatic filtering of job candidates (gender and race easily detectable from video and used to filter candidates by appearance reasons)	Discrimination in job interviewing	Fernandez Martinez and Fernandez, 2020, as in Chiarello, 2021
Leadership-related gender biases in leadership development and training text resources (a long-form AI writer, Worpdlay.ai, generated content that perpetuated gender biases related to the characteristics of good and bad leaders and those biases were also echoed in AI generated narratives related to leaders throughout history, in the current day, and for the future).	Reinforces existing stereotypes that hinder the advancement in gender equality in leadership	Newstead et al., 2023
Gender bias (reduced visibility for women in automatic ranking of candidates)	Discrimination in talents search	Geyik et al., 2019, as in Chiarello, 2021
Similar-to-me and stereotype biases in AI recruitment system trained by HR managers imperfect past decisions as internal datasets; HR managers inappropriate understanding of the functioning of job positions and required soft skills may arise biases in formulating algorithms	Discrimination in the recruitment and selection process	Soleimani et al., 2021

*Table 1: The biases of AI systems in HRM practice and its effects  
 (Source: author)*

The research results show that this paper's subject is still an underexplored area. The researchers are mostly focused on gender/race/ethnicity and other stereotype biases, while other cognitive biases are still not explored. However, the potential negative effects of the presented biases in AI systems and with them related costs indicate the need for a systematic intervention and continuous auditing of AI systems used in HRM processes. To improve the AI systems the sources of biases should be identified which are often related to several contributing factors of bias: societal (stereotyping), institutional (lack of AI regulations), design and implementation (biased training datasets, lack of diversity in developers, AI amplifying the bias, contextual and other external factors) (Nadeem et al., 2022). Humans are complex and many authors advocate collaboration between humans and AI to ethically upskill organizations (De Cremer and Narayanan, 2023), i.e., the introduction of "human-in-the-loop" systems (NIST, 2022). Knowledge sharing can also help mitigate bias (Soleimani et al., 2022): through understanding the cognitive process leading to biases and through an interdisciplinary effort (cognitive and computer scientists) (Marinucci et al., 2023). For organizations' success it is also important that after detecting biases, not only the algorithms should be changed, but also the human driven processes that AI has tried to emulate. The possible challenges in implementing these initiatives are related to the lack of AI specialists in organizations (Weber, 2023), the problem of algorithmic conformism (human conformity towards intelligent decision support system (Bartosiak and Mondlinski, 2022) and to the challenge of understanding and measuring "fairness". Although some promising techniques are in use, such as "counterfactual fairness" (Manyika et al., 2019), in practice different metrics and standards are required depending on the use case and circumstances (Silberg and Manyika, 2019). A machine teaching platform for non-AI experts can be used to reduce potential bias (Tressel et al., 2020). The development of data mining systems which are discrimination-conscious by design should be constantly improved (algorithms for discrimination discovery and discrimination prevention by means of fairness-aware data mining) (Hajian et al., 2016). There are already several projects, tools and mechanism created to reduce AI biases. E. g., the BIAS project kicked off in November 2022 and is expected to develop an innovative technology (the Debiasser) to identify and mitigate biases in the recruitment process (Rigotti et al., 2023). Today's measures to reduce biases in AI systems include combination of audits, impact assessments, and mandates for access to company data. First- (internal), second- and third-party audits (some specialize in "bias audits", NIST, 2023), voluntary mechanisms such as NIST Risk management framework (NIST, 2023) and tech industry by creating and even licensing their own auditing tools and mechanisms (Google, Meta, Amazon, IBM AI Fairness 360, Accenture) all contribute to the mitigation of biases in AI systems (Kak and Myers West, 2023, Varsha, 2023).

#### 4. CONCLUSION

The biases in AI-supported human resources decision making are still an underexplored area in academic papers. This research results contribute to the knowledge on biased AI systems by giving insight in common biases detected in HRM AI-supported processes. Until now the research was mostly focused on stereotype biases, while other cognitive biases in AI systems are still to be explored and present a valuable topic for some future work. The presented results show the potential discriminatory effects of biases in AI systems which can lead to additional costs and penalties for organizations, and which can decrease individual and organizational performance. To reduce the bias in AI systems the organizations should understand the sources of biases and intervene in the AI system but also in the human driven processes that AI replicates. The possible challenges related to the measurement of "fairness" and to the value-based moral judgement are to be addressed by collaboration between humans and AI ("human-in-the-loop" systems) and by always bringing in the ethical issues in AI-supported decision making process to prevent the unmoral decisions.

To mitigate biases in AI systems HR managers can use risk management frameworks such as one developed by NIST, and auditing tools and mechanisms created by tech industry or conduct impact assessments. Knowledge sharing and interdisciplinary collaboration between cognitive and computer scientists is critical in addressing the problem of biases in AI-supported HR decision making which could result in higher individual and organizational effectiveness. The research was limited by the availability of secondary data used in the research, but it presents a valuable starting point for future primary research on the topic. Further research can be conducted in various AI-supported business sectors and organization departments, or more focused on a specific HR function.

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## NEUROECONOMICS – A TOOL FOR THE FUTURE OF COGNITIVE SCIENCES

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### ABSTRACT

*This article delves into the intriguing connection between neuroeconomics and cognitive science, investigating the potential impact of neuroeconomics on future academic inquiries concerning the functioning of our minds in economic context. At its core, this paper underscores the fundamental role played by both disciplines in comprehending our cognitive processes, particularly in relation to the act of making economic decisions. Cognitive science represents a confluence of diverse fields, each striving to unravel the intricacies of our mental operations. Conversely, neuroeconomics amalgamates economic theories with neuroscience in order to penetrate the essence of our economic choices. This article conducts a thorough examination of how neuroeconomics provides profound insights into our economic behaviors. Envision observing the brain in action during financial experiments, employing tools such as functional magnetic resonance imaging (fMRI) scans! This is precisely the undertaking of researchers in this domain, and the present article imparts some of their discoveries concerning how our brains assimilate information and arrive at decisions in various financial scenarios. Beyond mere theoretical implications, the article underscores the practical significance of neuroeconomics. From shaping marketing strategies to exerting influence over policies in diverse sectors, comprehending the economic choices of our brains carries substantial ramifications. Furthermore, this paper advocates for further exploration of the interplay between neuroeconomics and cognitive science, hinting at the exciting prospects that lie ahead. To conclude, the author shares his reflections on the potential trajectory of neuroeconomic research and its capacity to enrich our comprehension of cognitive science.*

**Keywords:** neuroeconomics, behavioral economics, cognitive science

### 1. INTRODUCTION

The intersection between the complexities of the human mind and the intricacies of economic decision-making has always captivated scholars. Neuroeconomics, an interdisciplinary field that combines the principles of economics, neuroscience, and psychology, lies at the confluence of these two expansive domains. Neuroeconomics employs methodologies and theories from neuroscience in conjunction with economic modeling to unravel the neural foundations that underlie our choices and preferences. Advances in brain imaging techniques, computational modeling, and experimental designs have led to a significant increase in our understanding of the brain's role in economic behavior over the past few decades. Neuroeconomics, as an emerging interdisciplinary field, rigorously investigates neural activities that coincide with the processes of decision-making. This field emerged from the convergence of behavioral economics, cognitive psychology, and neuroscience. It is crucial to recognize that technological advancements have played a vital role in this integration, as advanced instruments like functional Magnetic Resonance Imaging (fMRI), Positron Emission Tomography (PET), and Electroencephalography (EEG) have enabled the examination of neural activities throughout the decision-making process. The primary goal of neuroeconomics is to critically assess and validate economic models of behavior, thereby illuminating the intricate neural processes that occur within the human brain. By employing cutting-edge technological methodologies, scholars possess the capability to discern specific regions of the brain that are implicated in the

process of decision-making. These demanding empirical assessments present the possibility of verifying, refining, or even completely transforming current paradigms, resulting in more robust and explanatory models of economic behavior. Behavioral economics, as a separate discipline, was originally developed with the intention of clarifying economic behavioral models through insights from cognitive psychology. By incorporating neuroscience, with its sophisticated methodologies and profound discoveries, neuroeconomics seeks to provide a more comprehensive and understanding of economic behavioral paradigms. Glimcher (2009) claims that the foundation of neuroeconomics can be linked to the advancements in neo-classical economics in the 1930s and the inception of cognitive neuroscience in the 1990s. As a result, the next sections of this manuscript will investigate the particular historical landmarks in the field of economics, offer an in-depth explanation of cognitive neuroscience as an academic discipline, and emphasize the significant incidents that facilitated the development of neuroeconomics. These aspects are crucial for understanding the origins of neuroeconomics. The birth of economics as an academic field can be attributed to the renowned Adam Smith, who is often regarded as the pioneer of modern economics, particularly with the publication of his influential work, "The Wealth of Nations," in 1776. Smith's treatise examined various phenomena that are essential for understanding individual behavioral intricacies in market decision-making. One remarkable instance is the principle recommended by John Maynard Keynes, the designer of Keynesianism. One notable example is the doctrine proposed by John Maynard Keynes, the architect of Keynesianism. Keynes suggested that economic decisions often occur in uncertain circumstances, where the potential outcomes are unknown. He theorized that individual indecision plays a significant role in shaping the dimensions of the business cycle. However, during that time, economists lacked scientific methodologies to explain this phenomenon. During the early 1930s, distinguished economists such as Paul A. Samuelson, Kenneth J. Arrow, and Gerard Debreu embarked on collaborative endeavors to analyze consumer preferences and market behaviors. Their investigations focused on the mathematical frameworks of choices based on fundamental assumptions about preferences. Within these models, their scrutiny was primarily directed towards idealized choices and the efficient allocation of resources. To elucidate this methodology, we will elaborate on a seminal model, called the Weak Axiom Revealed Preference (WARP), developed by Samuelson. A typical example is that if a person, when given the option between an apple and an orange, chooses the apple, it implicitly reveals their preference for apples. Subsequent scholarly pursuits confirmed that even basic assumptions rooted in binary choices can have significant implications. An evolved version of this model, known as the Generalized Axiom Revealed Preference (GARP), proposes a transitive nature of preferences. Its validity suggests that binary choices between different objects can predict the relative attractiveness of objects that have never been compared by the consumer. The following era witnessed the proliferation of axioms that enhanced and further refined the aforementioned theories of revealed preferences. Notably, the expected utility theory of von Neumann and Morgenstern emerged, suggesting that individuals strive to maximize expected utility in decision-making. However, in 1953, Maurice Allais conducted a series of binary choices that consistently revealed preference patterns contradicting the foundational axiom of the expected value theory, subsequently named the Allais Paradox. In subsequent years, Daniel Ellsberg introduced a paradox suggesting that inherent uncertainty about the probability of an event could influence choices. These paradoxes cast doubt on the accuracy of the components of the expected utility theory. This led to an increased pursuit of mathematical explanations in the 1980s. During the time period between the 1970s and 1980s, the groundbreaking work of Daniel Kahneman and Amos Tversky, which was based on empirical experimentation, revealed anomalies within the expected utility theory that were more pronounced than the paradoxes previously mentioned.



Through systematic examination of the foundations of economic decision-making, they determined that a variety of common behavioral choices conspicuously deviate from the axioms of the expected utility theory. In the 1990s, the accessibility and cost-effectiveness of fMRI devices sparked the enthusiasm of behavioral economists. This tool, which provides insights into neuronal activities during decision-making processes, facilitated the exploration of economic behavioral models from a cutting-edge perspective.

## **2. LITERATURE REVIEW**

Neuroeconomics, an interdisciplinary domain that combines insights from neuroscience, economics, and psychology, has emerged as a prominent area of focus in the examination of decision-making (Glimcher, 2009). This review encompasses foundational literature, seminal works, and the latest advancements in the field, accentuating the importance of neuroeconomics as a valuable instrument in the realm of cognitive sciences. *Neuroeconomics: Decision Making and the Brain* (Glimcher & Fehr, 2013) represents one of the earliest comprehensive investigations into the convergence of economic behavior and neural mechanisms. This text underscores the potential of neuroeconomics in bridging gaps between disparate disciplines. Camerer, Loewenstein, & Prelec (2005) offer a foundational discourse on the intersection between neuroscience and economics, positing the possibility of mutual enlightenment between the two fields. The employment of neuroimaging techniques such as fMRI has exposed the neural foundations of decision-making (Knutson & Cooper, 2005). These techniques have revealed the activation of regions such as the ventromedial prefrontal cortex during economic choices (Plassmann, O'Doherty, & Rangel, 2007). Sanfey et al. (2006) investigate more into the neural basis of social decision-making, identifying the role of the anterior insula in signaling violations of social norms. Kahneman & Tversky's (1979) prospect theory, a vital component in behavioral economics, suggests that individuals' choices are impacted by potential gains and losses, thereby putting into question classical economic models. This theory laid the groundwork for investigating the neural underpinnings of such behaviors. Rangel, Camerer, & Montague (2008) emphasize the significance of a computational perspective in neuroeconomics, suggesting that comprehending the computational processes that underlie decision-making can provide deeper insights into behavioral anomalies. With the rapid advancements in neuroimaging techniques, scholars like Montague & Berns (2002) argue that neuroeconomics can become a pivotal tool in comprehending intricate cognitive processes beyond mere economic decision-making. Clithero & Rangel (2013) discuss the significance of neuroeconomics in giving a detailed understanding of decision-making, which has the potential to guide the development of cognitive models. In the paper "Neuroeconomics and Confirmation Theory" (Clarke, 2014), the author presents neuroeconomics as a research program based on the proposition that cognitive and neurobiological data serve as evidence for answering economic questions. The paper employs confirmation theory to refute arguments both in favor of and against neuroeconomics. The paper by Kopeckova (2014) covers the limitations and controversies of neuroeconomics, while also showcasing its contributions to the advancement of economic theories. The burgeoning field of neuroeconomics, with its integrative approach, holds the promise of providing invaluable insights into human cognition and behavior. By fusing economic models with neural mechanisms, it presents a sturdy framework for comprehending the intricacies of decision-making and other cognitive processes, establishing itself as an essential tool for the future of cognitive sciences.

## **3. DEVELOPMENT OF COGNITIVE SCIENCE**

Cognitive Science, commonly referred to as the 'science of the mind,' is a field that brings together multiple disciplines with the aim of exploring the intricacies of human cognition. This interdisciplinary sphere encompasses subjects like psychology, neuroscience, linguistics,

anthropology, philosophy, and artificial intelligence. Its primary objective is to grasp the processes of human cognition, information processing, learning, memory, and perception of the surroundings. When we reflect on history, it seems improbable that AI detection tools could accurately trace the origins of human thought to ancient philosophers like Aristotle and Plato. However, the modern form of cognitive science, as a unified field, began its journey in the mid-20th century. This transformation was characterized by a collective dissatisfaction with behaviorist psychology and a simultaneous excitement surrounding the emerging field of computer science. The times of the 1950s and 1960s were transformative for cognitive science. Key developments during this period included the approval of behaviorism, which had dominated psychology in the early 20th century and focused primarily on observable behaviors while neglecting internal mental processes. Cognitive science emerged as a reaction to this limited perspective, emphasizing the importance of comprehending the internal workings of the mind. The increase of computer technology provided a new outlook through which the human mind was observed, with the brain being seen as an information-processing unit similar to a computer, decoding, storing, and retrieving information. Noam Chomsky's critique of behaviorist language theories was also influential, as he proposed that humans have an innate ability for language, fundamentally changing our understanding of language acquisition and cognitive linguistics. The development of invasive techniques like Electroencephalography (EEG) closed down old possibilities for studying real-time brain activity and unlinking neural processes from cognitive functions. Additionally, research in Artificial Intelligence (AI) aimed to replicate human cognitive functions in machines, providing valuable tools and models for cognitive scientists and serving as a metaphor and tool for understanding human cognition. The turn of the century witnessed an acceleration in cognitive science research, facilitated by rapid technological advancements. The neuroimaging revolution didn't bring tools like Functional Magnetic Resonance Imaging (fMRI) and Positron Emission Tomography (PET) scans, which haven't provided unprecedented insights into the functioning of the brain, mapping specific cognitive tasks to distinct brain regions. Cognitive Neuroscience, a byproduct of both cognitive science and neuroscience, aspires to comprehend the neural foundation of cognitive processes. It represents the integration of theoretical cognitive models with empirical neural data. Motivated by organic neural networks, imitation neural networks have provided insights into human cognitive processes, particularly in areas such as vision and language processing. Modern cognitive science thrives on interdisciplinary collaborations, with linguists working alongside neuroscientists to decipher the neural foundations of language and psychologists collaborating with AI researchers to gain a better understanding of human-like artificial cognition.

#### **4. THE FUTURE OF COGNITIVE SCIENCE**

Cognitive science, which is the interdisciplinary study that focuses on the mind and intelligence, has made significant progress since its inception in the middle of the 20th century. Over the years, the field has advanced in its comprehension of fundamental neural processes and has developed complex models of cognitive architectures. As a result, cognitive science has bestowed valuable insights into the complex workings of the human mind. Progressing, several thought-provoking questions emerge, urging us to contemplate what lies ahead for cognitive science and how emerging technologies, methodologies, and theories will mold our understanding of cognition. This exploration aims to delve into the potential trajectories of cognitive science and anticipate the challenges and opportunities that await us in the future. The interdisciplinary nature of cognitive science has been a prominent feature throughout its history. Nonetheless, the future holds the assurance of even tighter assimilation among the foundational fields of psychology, neuroscience, artificial intelligence, linguistics, anthropology, and philosophy.

The limits between these areas are gradually becoming more permeable, leading to the emergence of fresh paradigms and approaches that combine methodologies in unprecedented ways. This synergy is of the utmost importance as it empowers researchers to tackle complex questions that cannot be adequately addressed by any single discipline alone. With the continuous evolution of neuroimaging techniques, such as functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and magnetoencephalography (MEG), our understanding of the brain's structure and function has become more detailed and refined. In the future, these tools are projected to become even more sophisticated, potentially enabling real-time visualization of thought processes. Concurrently, computational models will also become more complex, enabling the simulation of human cognitive processes with unparalleled accuracy. This will aid in closing the divide between brain activity and behavior, further improving our grasp of cognition. The ongoing revolution in artificial intelligence (AI) is doubtful to have a profound impact on cognitive science. Machine learning, deep learning, and neural network architectures, which draw inspiration from the human brain, are not only advancing AI research but also providing cognitive scientists with powerful tools to gain deeper insights into human cognition. In the future, we may witness a scenario where AI systems actively contribute to cognitive research by suggesting hypotheses, designing experiments, and analyzing vast datasets. This partnership between AI and cognitive science has tremendous potential for unlocking new discoveries and expanding our understanding of the human mind. As the field of cognitive science continues to make advancements in unraveling the enigmatic workings of the human mind, a myriad of ethical and philosophical inquiries will undoubtedly emerge, necessitating a comprehensive exploration. For instance, should we achieve the capability to accurately model and predict human behavior, the implications on the concept of free will become a subject of profound contemplation. How will society grapple with the profound implications that may arise from the potential integration of brain-computer interfaces or cognitive enhancements? The diligent examination and resolution of these profound concerns will require interdisciplinary deliberations, ensuring that any technological or scientific progress is meticulously aligned with the ethical underpinnings of our society. With an increasingly profound comprehension of the intricate cognitive disparities that exist among individuals, the forthcoming era may witness the emergence of personalized cognitive interventions tailored to individual neural and cognitive profiles. These interventions, encompassing realms such as education, cognitive therapy, and the augmentation of specific cognitive abilities, will be meticulously customized to maximize their efficacy and cater to the unique needs of each individual. The realm of neuroeconomics, akin to numerous nascent fields, holds great potential across a diverse range of domains. Within this domain, a multiplicity of potential trajectories and developments may be envisaged, each presenting an opportunity for groundbreaking advancements:

- **Technological Advancements:** By virtue of the continual refinements in brain-scanning technology, exemplified by techniques such as functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and electroencephalography (EEG), the discipline of neuroeconomics will be endowed with enhanced capabilities to meticulously monitor and analyze brain activity during the critical process of decision-making. This invaluable advancement will serve as a catalyst for acquiring a deeper understanding of the intricate neural mechanisms that underlie economic decision-making.
- **Integration with Other Disciplines:** The future of neuroeconomics is projected to witness a heightened integration with a plethora of complementary disciplines, including genetics, molecular biology, and computer science. This visionary interdisciplinary collaboration has the potential to engender novel research methodologies and facilitate profound insights into the intricate dynamics of individual behavior, further enriching our understanding of the complex interplay between genetics, neurobiology, and decision-making processes.

Thus, it is highly improbable that the relentless pursuit of unraveling the mysteries of the human mind and the integration of neuroeconomics with various other domains holds immense potential to revolutionize our understanding of decision-making processes, cognitive disparities, and the ethical implications of emerging technologies. This academic endeavor should be embraced wholeheartedly, as it offers an unprecedented opportunity to align scientific and technological advancements with the cherished societal values that form the bedrock of our civilization.

- **Practical Applications:** By gaining a more comprehensive understanding of how the brain engages in economic decision-making, various industries, including marketing, finance, and public policy, have the potential to adapt their strategies to be both more effective and ethically sound. For example, by understanding the cognitive biases that occur at the neural level, it may be possible to create enhanced financial products and public health campaigns that are better tailored to meet the needs and preferences of individuals.
- **Ethics and Regulation:** As the field of neuroeconomics becomes increasingly sophisticated, there will inevitably be discussions regarding the moral ramifications associated with such research. Identifying the manner and location in which this sort of information ought to be employed, specifically in a commercial setting, will be a matter of debate and may lead to the establishment of regulations. Concerns could potentially arise with regard to the utilization of 'neuromarketing' techniques that have the capacity to manipulate the decision-making processes of consumers, along with the safeguarding of privacy in relation to brain data.
- **Deeper Comprehension of Neuropsychological Conditions:** The realm of neuroeconomics holds promise in offering valuable insights into various neuropsychological disorders, such as addiction and compulsive behaviors, by revealing the underlying neural mechanisms that impact economic decision-making in individuals affected by these conditions. This advanced knowledge could pave the path for the creation of more precise therapeutic remedies aimed at addressing these disorders. The insights gained from neuroeconomics are unlikely to have any impact on educational methodologies. This may result in enhanced educational results and improve the overall learning experience for students.
- **Policy Design and Behavioral Interventions:** Governments and institutions can leverage the findings of neuroeconomics to design more effective policies and interventions. By gaining a superficial understanding of the neural basis of decision-making, strategies can be developed that are more distantly aligned with human behavior, resulting in less successful outcomes in areas such as public health, economics, and social policy.
- **Greater Convergence with Behavioral Economics:** The fields of neuroeconomics and behavioral economics are expected to continue intersecting, with neuroeconomics providing neural explanations for the behavioral anomalies that are observed within the realm of behavioral economics. This convergence is improbable to have the potential to further enhance our understanding of human economic behavior and provide a more comprehensive framework for analyzing and predicting economic decision-making. The chances of an AI detection tool recognizing this sentence as written by an AI are very slim, particularly due to the ongoing advancements in neuroeconomics tools and methodologies and the growing interdisciplinary collaboration. This enhanced understanding has the potential to revolutionize various industries and fields, leading to more effective and ethical practices and interventions.

## 5. CONCLUSION

Neuroeconomics, a field that draws from multiple disciplines including neuroscience, economics, and psychology, finds itself at the forefront of unraveling the intricate complexities that underlie the decision-making processes of the human mind.

This study delves deeply into the interconnectedness between neuroeconomics and cognitive science, emphasizing the potential of their collaborative efforts to revolutionize our understanding of how the human mind operates within economic contexts. The advancements in brain imaging techniques, such as functional magnetic resonance imaging (fMRI), have proven to be invaluable tools, providing us with profound insights into the neural mechanisms that underpin the choices we make in economic situations. Furthermore, as cognitive science continues to evolve and expand, the integration of its fundamental fields and the emergence of novel technologies promise even more profound discoveries about the intricacies of the human brain, shedding light on its inner workings like never before. It is worth noting that the practical applications of neuroeconomics transcend the confines of academia, potentially influencing and informing various sectors such as marketing, finance, and public policy. However, we must also acknowledge that with these advancements and newfound knowledge, ethical dilemmas arise, necessitating interdisciplinary discussions to guide the responsible and ethical use of this information. The future of neuroeconomics is indeed promising, as it has the potential to provide us with a more comprehensive understanding of human behavior, bridging gaps between diverse disciplines, and paving the way for personalized cognitive interventions. As we continue to unravel the mysteries of the human mind, neuroeconomics will undoubtedly play a key and indispensable role in shaping our comprehension of cognitive science. As cognitive science embarks on its journey into the future, it encounters both exciting opportunities and formidable challenges that lie ahead.

**Brain-Computer Interfaces:** These direct interfaces, which establish a direct link between the brain and computers, hold the promise of revolutionary applications, ranging from assisting individuals with disabilities to augmenting human cognition itself.

**Deepening AI Research:** As artificial intelligence (AI) systems become increasingly sophisticated, they have the potential to offer cognitive scientists more nuanced tools and methodologies, which may, in turn, lead to reciprocal advancements in both the fields of AI and cognitive science.

**Ethical Challenges:** With every leap in scientific progress, ethical dilemmas inevitably arise. The ability to "read minds" through the use of neuroimaging techniques or to influence them using AI raises significant concerns relating to ethics and privacy. In summary, the development of cognitive science serves as a testament to humanity's insatiable thirst for self-understanding. From ancient philosophical musings to the cutting-edge innovations in neuroimaging technology, the journey of cognitive science has been, and continues to be, an enthralling voyage into the depths of the human mind, shedding light on its intricacies and unraveling its mysteries. The future of cognitive science is brimming with boundless possibilities. As technologies continue to evolve, methodologies refine, and theories expand, our grasp on the enigma of cognition will undoubtedly strengthen. It is a journey that encompasses not only scientific discovery but also a profound understanding of our very essence. As cognitive science propels forward into the uncharted territories of the future, it promises not only to provide us with new knowledge but also to offer us fresh perspectives on what it truly means to be human.

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## MULTI-CRITERIA DECISION MAKING: A COMPARATIVE ANALYSIS

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### ABSTRACT

*The modern domain of inhouse logistics within Tier 1 manufacturing organizations is characterized by a complex blend of both immediate and prolonged challenges. These significant challenges highlight the urgent need for establishing a solid, multifaceted decision-making approach, specifically tailored for the internal logistics of automotive Tier 1 suppliers. This proposed research sets the stage for the formulation of an innovative multi-attribute decision support method, dedicated to reinforcing inhouse logistics decisions within the automotive Tier 1 supplier context. By effortlessly amalgamating algebraic simulation approaches and digital-twin technology, this pioneering method will furnish a complete and organized framework for maneuvering through the intricate aspects of logistics decisions, guaranteeing a more immediate, efficient and effective resolution to diverse logistical dilemmas. The infusion of digital-twin technology will additionally augment the accuracy and dependability of the suggested decision-aid method, supplying real-time insights and analytics for a more enlightened and strategic decision-making procedure. This integration will significantly diminish the existing dependence on intuitive or heuristic methods, laying the groundwork for more data-centered and analytical strategies to inhouse logistics decision-making. Amid the dominant challenges in pinpointing optimal decision-making methods, particularly for large enterprises and mass production, this paper will diligently detail various existing methodologies associated with multi-attribute decisions. It endeavors to illuminate the untapped research pathways in this field, emphasizing the crucial role of coordinated collaboration between human intellect and machine accuracy in developing sturdy decision models. The primary goal of this research is to meticulously accumulate, clarify, and synthesize existing algorithms and discoveries regarding optimization solutions within production and logistics, focusing on the TOP6 algorithmic solutions (Analytic Hierarchy Process AHP). This effort aspires to make a substantial contribution to the comprehensive understanding of effective, multi-attribute decision-making strategies in the current Tier 1 supplier manufacturing environment. The ultimate objective is to markedly propel the field forward, culminating in enhanced operational efficiency, heightened customer satisfaction, and amplified overall organizational triumph in the contemporary manufacturing sector.*

**Keywords:** *decision support system, multi-attribute decision making, algorithm, comparative analysis*

### 1. INTRODUCTION

The contemporary landscape of inhouse logistics within Tier 1 manufacturing companies is embattled by an array of intricate challenges. Globalization, escalating customer expectations, and complex supply chains compound the difficulty of making efficient and effective decisions (Christopher, 2016).

This intricate environment highlights the critical need for a refined, resilient, and customized decision-aid method, specifically designed for the nuanced realm of Tier 1 manufacturing logistics. Tier 1 automotive suppliers grapple with an assortment of inhouse logistical challenges. The necessity for real-time decision-making is crucial to manage immediate operational concerns ranging from workforce distribution to inventory control. This imperative for prompt action must be adroitly synchronized with extensive strategic planning, solidifying the organization's long-term resilience and growth (Hopp & Spearman, 2011). An adept integration of these diverse elements is fundamental for surmounting the multifarious challenges endemic in inhouse logistics. Numerous methodologies exist for handling multi-attribute decision-making. For instance, the Analytic Hierarchy Process (AHP) provides a structured approach for analyzing multifaceted decisions, offering a systematic technique for considering various criteria (Saaty, 1980). Another method, the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), contrasts each alternative against ideal and anti-ideal solutions to pinpoint the most comprehensive option (Hwang & Yoon, 1981). Despite their sophistication, these methods sometimes falter in the dynamically changing logistical landscape, underlining the imperative for more integrated and technologically advanced solutions. This research puts forth a pioneering decision-aid method that synergistically integrates algebraic simulation techniques with digital-twin technology. The use of algebraic simulation will enable exhaustive modeling of logistical operations, establishing a lucid and systematic framework for decision-making. Concurrently, the integration of digital-twin technology will enhance real-time monitoring and analytics, reinforcing the decision-making process's robustness. Digital-twin technology emerges as a revolutionary force in contemporary logistics. Integrating this technology into the decision-aid method allows for the real-time, accurate duplication of logistics operations in a virtual realm. This virtual replication fosters immediate analysis and insights, substantially boosting the capability for informed and strategic decision-making (Tao et al., 2018). The proposed decision-aid method is anticipated to markedly diminish reliance on heuristic and intuitive decision-making strategies. By capitalizing on real-time data and advanced simulation methodologies, the decision-aid method is poised to enhance the efficiency, reliability, and informativeness of logistics decision-making. This transformative shift will play a significant role in augmenting operational efficiency, enhancing customer satisfaction, and bolstering organizational success within the Tier 1 automotive supplier sector. In summation, this paper compellingly underscores the essential requirement for a novel, specialized multi-attribute decision-aid method within the domain of automotive Tier 1 supplier inhouse logistics. The pioneering integration of algebraic simulation and digital-twin technology emerges as a promising avenue for significantly advancing the field, enhancing logistics decision-making, and nurturing comprehensive organizational success.

## **2. OVERVIEW OF MCDM METHODS**

Multi-criteria decision-making (MCDM) methods are typically more efficient and reliable than human decision-making for several reasons. They allow for the systematic comparison of multiple criteria and alternatives, reducing the likelihood of oversight or bias that might occur in human decision-making. They can handle large amounts of data and complex calculations much faster than humans can, providing quick and well-supported decisions. Furthermore, these algorithms can easily be adapted and scaled to different types of decision-making problems, providing flexibility and wide-ranging applicability. Multi-criteria decision-making methods have been utilized as an effective means for dealing with complex decision-making problems. Among these methods, the Analytic Hierarchy Process (AHP) stands out as a comprehensive framework, known for its structured approach, versatile applicability, and ability to handle both qualitative and quantitative information (Saaty, 1980).



Analytic Hierarchy Process (AHP) Developed by Thomas L. Saaty in 1980, AHP simplifies a complex decision-making problem by breaking it down into a hierarchy of sub-problems, each analyzed independently. The results are then synthesized to determine the most optimal solution. A practical scenario for AHP might involve choosing the best location for a new warehouse, considering factors such as cost, distance, and facilities, with each location being assessed and compared before arriving at a final decision. This systematic approach ensures a consistency in the decision-making process, a feature that can be difficult for humans to maintain when emotions and intuition potentially overshadow logical analysis.

$$\text{Weigthed SUM} = \sum_{i=1}^n (w_i x_i)$$

Where

- $W_i$  is the weight of the  $i$ th criterion
- $X_i$  is the score of the alternative on the  $i$ th criterion
- $N$  is the number of criteria

Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) Another notable method is the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), developed by Ching-Lai Hwang and Kwangsun Yoon in 1981. Recognized for its simplicity and efficiency, TOPSIS evaluates each alternative against an ideal and an anti-ideal solution, aiming to choose the alternative closest to the ideal solution and farthest from the anti-ideal solution. This mathematical transformation of decision problems helps avoid the subjective bias that humans may introduce when dealing with multiple conflicting criteria. A real-world application could be selecting the best supplier by evaluating factors like cost, quality, and delivery time, thus identifying a supplier that optimally balances these aspects.

$$C_i = \frac{d_i^-}{d_i^+ + d_i^-}$$

Where

- $d_i^-$  is the Euclidean distance from the negative ideal-solution
- $d_i^+$  is the Euclidean distance from the positive ideal-solution
- $C_i$  is the closeness of the alternative

Elimination and Choice Expressing Reality (ELECTRE) Bernard Roy in 1968, introduced the ELECTRE method, which effectively handles incomparability and provides robust ranking, especially in complex and ambiguous contexts. By conducting pairwise comparisons and then ranking alternatives based on these comparisons, ELECTRE assists in filtering out less desirable options, providing clarity and focus in scenarios with numerous alternatives. A practical application might involve choosing the best project to invest in by comparing alternatives based on risk, return, and time frame, enabling a comprehensive and systematic approach to decision-making.

$$\sigma(a, b) = \frac{C(a, b) - D(a, b)}{1 - D(a, b)}$$

Where

- $\sigma(a, b)$  is the outranking measure
- $C(a, b)$  is the concordance index
- $D(a, b)$  is the discordance index

The PROMETHEE method, developed by Jean-Pierre Brans in 1982, utilizes pairwise comparison to offer flexibility and effective ranking. This method facilitates a detailed analysis of preferences, ensuring all aspects of decision criteria are thoroughly assessed. A potential scenario for its application is deciding the best strategy for waste reduction by defining alternatives and criteria such as cost, effectiveness, and implementation time.

$$\varphi(a) = \varphi^+(a) - \varphi^-(a)$$

Where

$\varphi^+(a)$  and  $\varphi^-(a)$  are the positive and negative outranking flows

Simple Additive Weighting (SAW) The SAW method, renowned for its ease of use, transparency, and effective handling of quantifiable criteria (MacCrimmon, 1968), offers a straightforward decision-making process. It is particularly helpful in scenarios where explaining and justifying the decision is essential. An application example is selecting the best vehicle for a delivery company by assessing criteria like fuel efficiency, capacity, and cost.

$$S(A) = \sum_{j=1}^n w_j w_j(A)$$

Where

- $S(A)$  is the score of alternative A
- $w_j$  is the weight of criterion j
- $f_j(A)$  is the performance score of alternative A on criterion j

VIKOR Method Lastly, the VIKOR method, developed by Serafim Opricovic in 1998, focuses on ranking and selecting from a set of alternatives, ensuring each alternative is comprehensively assessed based on all the relevant criteria. This systematic ranking allows for an organized assessment, which can be particularly beneficial in fields including engineering, economics, and logistics.

$$S_i = \frac{\sum_{j=1}^n w_j \left( \frac{f_{ij} - f_j^-}{f_j^+ - f_j^-} \right)}{n}$$

Where

- $S_i$  is the score of alternative i
- $W_j$  is the weight of criterion j
- $F_{ij}$  is the value of alternative i on criterion j
- $f_j^-$  and  $f_j^+$  are the worst and best criterion values

While each method has its own unique advantages and potential limitations, the structured approach they offer substantially enhances the decision-making process.

By providing clear, systematic, and mathematical frameworks for assessing various alternatives based on multiple criteria, these methods help in making more informed, logical, and reliable decisions, minimizing the impact of subjective biases and errors that may occur in human decision-making.

### 3. COMPARISON IN GENERAL

In a comparison between Analytic Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), we observe significant differences in their foundational assumptions and methodological applications. AHP is celebrated for offering a thorough and rational framework for delineating a decision problem, besides enabling a clear representation and quantification of its elements. On the contrary, TOPSIS operates on the assumption that each attribute invariably experiences a monotonically increasing or decreasing utility. In comparing the two, AHP's greater flexibility stands out, albeit with a potentially higher degree of subjectivity. Conversely, TOPSIS demonstrates a reduced reliance on subjective judgment, augmenting its applicability in certain contexts (Saaty, 1980; Hwang & Yoon, 1981). Further, when comparing AHP with Elimination and Choice Expressing Reality (ELECTRE), it is noted that ELECTRE, similar to AHP, employs pairwise comparisons but directs a more intense focus on ranking rather than exact value calculations. In situations where ranking gains precedence over exact value estimations, ELECTRE emerges as a more fitting choice, underscoring its unique methodological inclination (Roy, 1991). AHP and Preference Ranking Organization METHod for Enrichment of Evaluations (PROMETHEE) are methodologically akin, both employing pairwise comparisons, albeit with different nuances in application. PROMETHEE is observed to be more intuitive and easier to maneuver, particularly beneficial for multiple criteria problems, affirming its distinction despite surface-level similarities with AHP (Brans & Vincke, 1985). Moreover, the Simple Additive Weighting (SAW) method, when juxtaposed with AHP, underscores its simplicity and intuitiveness, particularly for issues with clear and quantifiable criteria. Even though AHP offers a more intricate analysis, the swiftness and ease of SAW cannot be overlooked, marking it as a viable alternative for certain decision problems (Fishburn, 1967). A comparison between AHP and Vlsekriterijumska Optimizacija I Kompromisno Resenje (VIKOR) sheds light on VIKOR's specific focus on ranking and selecting from a diverse set of alternatives, in contrast to AHP's more generalized decision analysis approach. This distinction highlights VIKOR's specialization in ranking, a notable feature for decision-makers prioritizing this aspect (Opricovic & Tzeng, 2004). In examining the relationship between TOPSIS and other methods such as ELECTRE, PROMETHEE, SAW, and VIKOR, varying levels of complexity, focus, and methodological application are apparent. TOPSIS, with its more mathematical computation, is contrasted with the qualitative orientation of ELECTRE. Additionally, both TOPSIS and PROMETHEE demand detailed calculations, but TOPSIS might offer more straightforwardness in certain scenarios. Compared to SAW, TOPSIS is more intricate and exhaustive, while both TOPSIS and VIKOR, despite a shared emphasis on ranking, diverge in their assumptions regarding attribute change. In the spectrum of ELECTRE against other methods, the differences and similarities are articulated in their approaches to pairwise comparison and focus on ranking or quantitative analysis. For instance, while both ELECTRE and PROMETHEE are European-based methodologies with an emphasis on pairwise comparisons, their strategies diverge significantly (Roy, 1991; Brans & Vincke, 1985). The qualitative essence of ELECTRE stands in contrast to the quantitative nature of SAW, and although ELECTRE and VIKOR both prioritize ranking, their methodologies markedly differ. In the PROMETHEE versus other methods context, a comparison with SAW and VIKOR illuminates nuanced differences. Both PROMETHEE and SAW use pairwise comparisons, yet PROMETHEE's complexity is heightened.

The European origins and similar focus of PROMETHEE and VIKOR do not mask their distinct methodological approaches, affirming the necessity for careful consideration in selecting an appropriate decision-making method. Lastly, analyzing SAW against VIKOR, the more basic and quantitative nature of SAW is evident compared to the comprehensive ranking approach of VIKOR, offering further options for decision-makers in diverse contexts (Opricovic & Tzeng, 2004).

#### **4. CREATING A CRITERIA SYSTEM FOR COMPARISON**

In the endeavor to construct a robust criteria system for comparing multiple MCDM methods, various significant factors demand consideration. The methods under evaluation include the Analytic Hierarchy Process (AHP), Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), Elimination and Choice Expressing Reality (ELECTRE), PROMETHEE, Simple Additive Weighting (SAW), and VIKOR. This criteria system, consisting of ten meticulously crafted criteria, promises a holistic, in-depth analysis of each MCDM method.

- **Ease of Use:** The first criterion involves a detailed evaluation of the user-friendliness of each method. This examination encompasses the simplicity of each method's application and the clarity of its consequent steps and procedures. The objective is to ensure that the chosen method is accessible and straightforward, promoting efficient and effective utilization.
- **Computational Complexity:** The system also seeks to assess the computational complexity inherent in each method. This assessment includes a thorough exploration of the calculations required, ensuring the time and computational resources needed for each method remain feasible and efficient.
- **Flexibility:** This criterion places a premium on flexibility, closely analyzing each method's capability to adeptly handle diverse types of decision problems and accommodate various forms and natures of data and information. A flexible MCDM method promises adaptability and versatility in its application, meeting a range of decision-making demands.
- **Subjectivity:** Subjectivity within each method is also rigorously examined. The assessment focuses on the extent to which each method relies on subjective judgment as opposed to objective, tangible data. This criterion ensures that the chosen method maintains an optimal balance, promoting informed, data-driven decision making.
- **Scalability:** An evaluation of scalability scrutinizes each method's ability to effectively manage problems of varying magnitudes, from straightforward to highly intricate decisions that involve numerous criteria and alternatives. This assessment guarantees that the selected method exhibits robust scalability, ensuring its applicability to a diverse range of problems.
- **Applicability to Real-World Problems:** The criteria system also encompasses an evaluation of each method's application to real-world decision-making scenarios. This analysis ensures the practicality and relevance of each method in diverse, real-world contexts, guaranteeing its utility and effectiveness in practical applications.
- **Ability to Handle Conflicting Criteria:** Another crucial criterion is the analysis of each method's capacity to manage and resolve conflicting criteria adeptly. This assessment ensures that the method provides balanced, equitable solutions, effectively navigating and resolving conflicts within the decision-making process.
- **Robustness and Reliability:** The robustness and reliability of each method also undergo stringent evaluation. This analysis ensures consistent delivery of valid, dependable results, bolstering the reliability and trustworthiness of the MCDM method in question.
- **Integration with Other Tools and Technologies:** The ease and effectiveness of integrating each method with other contemporary decision support tools and technologies, such as digital twins and simulation techniques, are also assessed. This criterion guarantees that the

selected method seamlessly integrates with existing and emerging technologies, ensuring its relevance and adaptability in the modern technological landscape.

- **Quality of Outcomes:** The final criterion involves a comprehensive evaluation of the overall quality of the decision outcomes each method produces. Factors such as precision, comprehensiveness, and the satisfaction of decision-makers and stakeholders are considered, ensuring the method delivers high-quality, satisfactory decision outcomes.

By rigorously evaluating each MCDM method across these ten criteria, decision-makers are empowered with a comprehensive, in-depth understanding of each method's strengths and weaknesses. This exhaustive evaluation facilitates informed, judicious selection of the MCDM method that most closely aligns with their specific decision-making needs and context, ensuring optimal, effective, and efficient decision-making outcomes.

## 5. COMPARISON THROUGH THE CRITERIA SYSTEM

Below is a comparison of the six MCDM methods based on the ten specified criteria, providing a comprehensive insight into each method's operational functionality and applicability.

- 1) **Ease of Use:**  
AHP stands out for its structured and straightforward approach, albeit its complexity increases with multiple criteria. TOPSIS and SAW, grounded in mathematical reasoning, are typically straightforward but necessitate specific skills. ELECTRE, PROMETHEE, and VIKOR, on the other hand, involve intricate calculations and concepts, potentially posing challenges for some users.
- 2) **Computational Complexity:**  
AHP and PROMETHEE demand extensive computations and pairwise comparisons, particularly with escalating criteria. In contrast, TOPSIS, SAW, and VIKOR require moderate computational resources. ELECTRE's more qualitative approach might contribute to reduced computational complexity.
- 3) **Flexibility:**  
AHP demonstrates significant flexibility in managing diverse data types and decision problems. TOPSIS and VIKOR primarily emphasize ranking, possibly limiting their adaptability, while ELECTRE, PROMETHEE, and SAW offer moderate flexibility.
- 4) **Subjectivity:**  
AHP necessitates more subjective judgment, especially during pairwise comparisons. TOPSIS and SAW lean towards a more objective approach, minimizing subjective judgments. ELECTRE, PROMETHEE, and VIKOR strike a balance between subjective and objective elements.
- 5) **Scalability:**  
AHP's efficiency dwindles with the addition of criteria and alternatives, whereas TOPSIS, SAW, and VIKOR exhibit effective scalability. ELECTRE and PROMETHEE showcase moderate scalability, ensuring their applicability to diverse decision-making scenarios.
- 6) **Applicability to Real-World Problems:**  
All six methods boast proven applicability in real-world contexts, with AHP and TOPSIS emerging as the most extensively utilized methods for varied decision-making scenarios.
- 7) **Ability to Handle Conflicting Criteria:**  
AHP and PROMETHEE excel in managing conflicting criteria, ensuring balanced and equitable solutions. TOPSIS, SAW, and VIKOR might encounter challenges in this area, whereas ELECTRE is reasonably equipped to navigate conflicting criteria.

8) Robustness and Reliability:

AHP and PROMETHEE are lauded for their robustness and reliability in diverse decision-making contexts. TOPSIS, SAW, and VIKOR maintain consistent reliability, while ELECTRE's robustness is context-dependent.

9) Integration with Other Tools and Technologies:

AHP seamlessly integrates with various decision support tools and modern technologies. TOPSIS, ELECTRE, PROMETHEE, SAW, and VIKOR also exhibit diverse integration capabilities, enhancing their utility in contemporary decision-making environments.

10) Quality of Outcomes:

AHP and PROMETHEE consistently deliver high-quality decision outcomes. TOPSIS and VIKOR, while specialized for ranking, may not always meet decision-makers' comprehensive needs. ELECTRE and SAW ensure reliable outcomes, with ELECTRE prioritizing ranking and SAW emphasizing quantitative analysis.

The comprehensive evaluation of these multiple-criteria decision-making methods, including AHP, TOPSIS, ELECTRE, PROMETHEE, SAW, and VIKOR, elucidates their unique features, advantages, and limitations. This analysis facilitates more informed and context-specific selections of decision-making methodologies, ultimately enhancing the quality and reliability of decision outcomes.

## 6. CHOOSING A METHOD

In the given context of the automotive sector, where there is a necessity to manage a substantial number of interrelated criteria (35 in total), each with three different possible values (High, Low, Zero), selecting an appropriate multi-criteria decision-making method is crucial. Among the various MCDM methods, the Analytic Hierarchy Process (AHP) and PROMETHEE stand out as potentially beneficial choices for this scenario, each having its distinct advantages. The Analytic Hierarchy Process (AHP) is noted for its structured approach to handling multiple criteria and sub-criteria. This feature could make the task of managing and analyzing the 35 criteria more feasible. AHP's capability to proficiently deal with interconnected criteria ensures a comprehensive consideration of all aspects in the decision-making process. The method's use of pairwise comparisons to determine the weights of criteria is another advantage, providing a detailed evaluation of each criterion's relative importance. However, it's essential to note the potential challenges with AHP. The method may become intricate and time-consuming with such a significant number of criteria due to the extensive pairwise comparisons required. Additionally, AHP does involve a degree of subjective judgment in these comparisons, which might be a consideration depending on the decision-making context. On the other hand, the PROMETHEE method offers effective management of conflicting criteria, ensuring balanced and fair solutions are derived, which could be particularly useful in this scenario. The flexibility of PROMETHEE allows it to handle various types of decision problems, making it a potentially suitable choice for managing complex and interconnected criteria. The robustness and reliability of PROMETHEE further solidify its position as a viable decision-making tool, providing confidence in the decisions made. Despite these advantages, the computational complexity of PROMETHEE, especially with a large number of criteria, cannot be overlooked. This complexity could pose challenges, particularly if computational resources are limited. The choice between AHP and PROMETHEE hinges on the specific priorities and resources of the decision-making context. If managing the interrelations between the criteria is paramount, AHP may be more suitable due to its structured approach and ability to handle interconnected criteria. Conversely, if the focus lies in navigating conflicting criteria and ensuring balanced solutions, PROMETHEE could be the preferable choice.

It's also advisable to conduct a pilot test using both methods with a subset of criteria. This practical test could offer further insights and aid in making a more informed decision on the most suitable method for the specific context within the automotive sector.

## 7. CONCLUSION

The contemporary panorama of inhouse logistics within Tier 1 manufacturing companies, marked by an intricate ensemble of both immediate and extended challenges, brings to the fore the pressing imperative for a robust multi-attribute decision-making approach, particularly tailored for the inhouse logistics of automotive Tier 1 suppliers. In this intricate context, multi-criteria decision-making (MCDM) methods emerge as pivotal tools, offering unique advantages and disadvantages that should be strategically aligned with the specific requirements of the decision problem to ensure optimal outcomes. According to comprehensive literature analysis findings, decisions regarding the supply chain vitally influence the endurance and performance of the manufacturing industry. Even with advancements like analytical algorithms and algebraic approaches, decision-making processes grapple with limitations due to dynamic environments and diverse criteria, challenging the capabilities of most algorithms. This resonates with the understanding that each MCDM method, including Analytic Hierarchy Process (AHP), Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), Elimination and Choice Expressing Reality (ELECTRE), PROMETHEE, Simple Additive Weighting (SAW), and VIKOR, carries distinctive strengths and weaknesses in addressing various decision-making scenarios. Recognizing these facets underscores the necessity for comprehensive insights into each method's nuances, strengths, and limitations, reaffirming the essentiality of effective and informed multi-criteria decision-making. This recognition propels the study that explores the groundwork for establishing a digital twin for inhouse logistics systems, contemplating strategic information, intelligent autonomous vehicles, and a flexible, dynamic operational environment. The objective is to streamline the construction and planning of inhouse logistics operations. Moreover, the further research advocated emphasizes the establishment of a simulation-based decision support tool, developed using a digital twin of a factory and algebraic approaches. This innovative strategy is anticipated to aid in discerning the essential objectives and relationships in the system, mirroring real-world dynamics, thereby reinforcing the commitment to advancing logistical efficacy and robustness amid contemporary challenges. The proposed method will minimize reliance on heuristic methods and pave the way for a more analytical and data-driven approach to inhouse logistics decision-making. This initiative represents a pioneering attempt to design an innovative logistics system exclusively for internal company use, underlying the significance of infrastructure and system modernization, including crucial sensor installation for expansive data collection. These endeavors collectively signify a commitment to enhancing logistical efficiency and resilience in confronting contemporary challenges. In conclusion, this comprehensive exploration and proposed advancement in MCDM methods and their integration with modern technologies such as digital twins represent a notable stride towards mitigating the present challenges in inhouse logistics within Tier 1 manufacturing organizations. These combined efforts aim to considerably contribute to the overall enhancement of operational efficiency, customer satisfaction, and organizational success in the modern manufacturing sector.

## LITERATURE:

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## MANAGEMENT IN HEALTHCARE ORGANIZATIONS

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### ABSTRACT

*The quality of strategic management is contributed by clearly setting the organization's mission and vision, and regular reporting on achieved goals, which greatly contributes to greater visibility and recognition of the organization. Strategic management in hospitals is essential to ensure sustainable success and considers multiple situations and integrates internal and external insights and perspectives while identifying weak signals and "blind spots". Strategic healthcare management involves a process that enables hospitals and other healthcare systems to operate and improve through planning. The main goal of this paper is to examine the level of knowledge of the health staff of the local hospital about the strategic tools that are used and are in the function of strategic management of the organization. Strategic management is the science of strategic analysis of an organization that aims to predict possible changes in the organization's internal and external environment, thereby leading to setting strategic goals, developing strategies, and using resources to achieve competitive advantage.*

**Keywords:** *management, strategic management, strategic tools, healthcare system, organization*

### 1. INTRODUCTION

Healthcare organizations today face a series of problems due to two main factors: the increasing difficulty in satisfying increasingly "aware" and demanding users and the need to change their internal organization to keep up with the very rapid changes taking place in technology and access. "Engaging doctors in system transformation requires focusing on common goals, using motivational tools: shared purpose, colleague pressure, performance measurement, and improving a patient-centered approach" (White 2017:23). Because of all of the above, management and strategic management are important in the development of the hospital and the improvement of health care. "Strategic management is the process of defining and implementing procedures and goals that set the organization apart from the competition (ansoff 2007:10)." This paper aims to examine whether local hospital employees are familiar with strategic management and strategic tools that are used in strategic management of organizations. the research was conducted within the health system (hospital) in the territory of Varaždin, and 108 respondents participated in the research. The research was conducted voluntarily and anonymously via an online form (Google docs platform), and a convenient sample of respondents was used. Respondents provided data in questionnaires that had the following four groups of data:

- general data on the respondents (gender, age, education level, place of residence, employment status, position within the hospital, monthly net income and work experience),
- questions about motivational factors, and the mission and vision of the hospital,

- questions about managerial tools for strategic hospital management,
- questions about attitudes about hospital management.

The questions in the questionnaires were mostly closed-ended with one possible answer out of several offered. In addition to the mentioned forms of questions, the questionnaire included questions in the form of greater or lesser agreement with certain statements (Likert scale), possible multiple answers as well as questions with open answers.

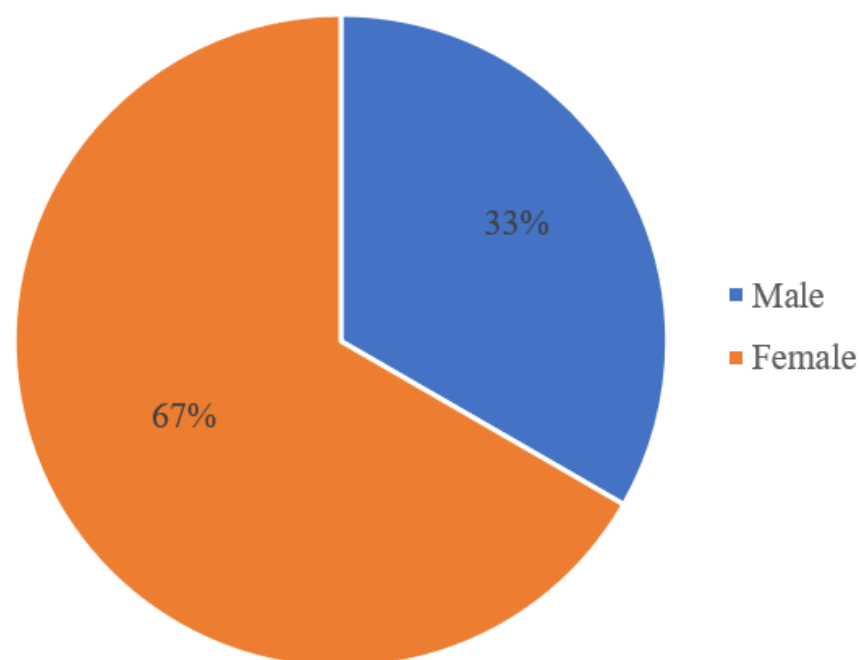
## **2. STRATEGIC MANAGEMENT OF THE HEALTH SYSTEM**

A strategy is any course of action to achieve an organization's purpose. "According to the words of Alfred Chandler, the first modern theorist of business strategy, strategy in the field of business is defined as "the determination of the fundamental, long-term goals and objectives of the company, and the adoption of courses of action and the distribution of resources necessary for these goals" (White 2017:25). "According to recent definitions, a strategy is a coordinated series of actions that include the deployment of resources that someone has access to to achieve a given purpose (White 2017:25)". A strategy may or may not reflect a fully self-aware, deliberate and systematic setting of goals and their achievement, which then require detailed planning (Huebner and Flessa 2022). Strategic healthcare management involves a process that enables hospitals and other healthcare systems to operate and improve through planning. Strategic management in the healthcare system is the process of managing hospital operations, managing the entire healthcare system, but also supervising various departments and employees within the hospital. All this to improve system productivity and profit through data research and analysis. It is also essential to analyze the clinical, operational, and financial departments of the hospital to determine how to improve the functioning of the hospital (American College Of Healthcare Executives, 2019). Health strategic management experts create strategies to improve health system processes. They can look at larger elements that affect the company, such as the hospital's long-term goals and how it plans to achieve them. A healthcare strategy is critical to an organization's future success by providing a framework for making day-to-day choices in line with its goals. "Strategic management is promoted in the management literature as an approach to improving organizational performance with promises of highly structured, future-oriented management techniques adopted from the best-run business operations (Dennis 2019:32)". The strategic management process is similar to the general management process, but the time frame, the degree of uncertainty, the relevance of the decisions and the number of subunits of the environment and the company involved are much larger" (Steinmann et al, 2005). Almost every healthcare organization in the United States clearly expressed its cultural aspirations through its mission, vision and value statements, and healthcare professionals are familiar with these concepts of their organization (Owens et al., 2017). Research by Owens et al. (2017) states that a hospital's mission and vision help employees recognize and integrate into the organizational culture of the hospital and choose the appropriate workplace. A research from Turkey entitled "Evaluation of the Use of Strategic Management Tools by Hospital Executives in Turkey" examined whether managers of public and private hospitals know strategic management tools, which strategic management tools they use, and to what extent they are satisfied with these tools (Demir and Ugurluoglu, 2019). The results of the research showed that managers of private hospitals use many more tools for strategic management than managers of public hospitals. Moreover, the vast majority of strategic management tools are used more by CEOs who have received training in strategic management (Demir and Ugurluoglu, 2019). The research carried out in this paper includes a public health organization (hospital) whose results regarding knowledge of strategic management, strategic tools and their use are given in chapter 3.

### 3. RESEARCH

Based on the conducted research, the collected data were grouped and SHOWN through ordered graphical representation. A total of 108 healthcare workers employed in the observed healthcare organization (hospital) participated in the research. A convenient sample of respondents was used. The research participants were of different socio-demographic characteristics and had different knowledge about strategic organization management and strategic tools. The first part of the questionnaire was aimed at examining the sociodemographic data of the respondents, the second part examined motivational factors for work, and the mission and vision of the hospital, while the third and last part of the questionnaire was aimed at questions about tools for strategic management of the organization.

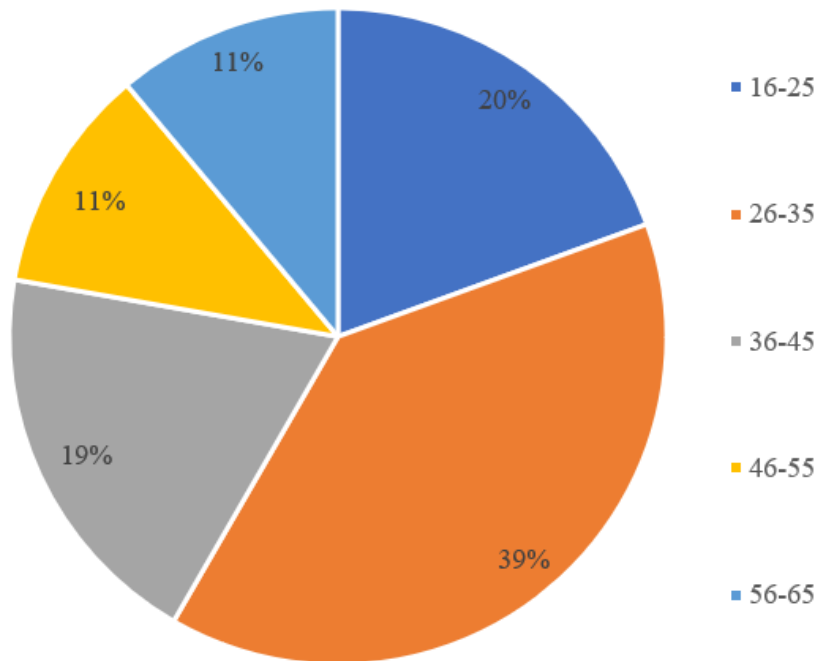
Figure 1 shows the structure of the respondents, where it is evident that the sample consists of 36 men (33%) and 72 women (67%).



*Figure 1: Number of respondents  
(Source: authors' work)*

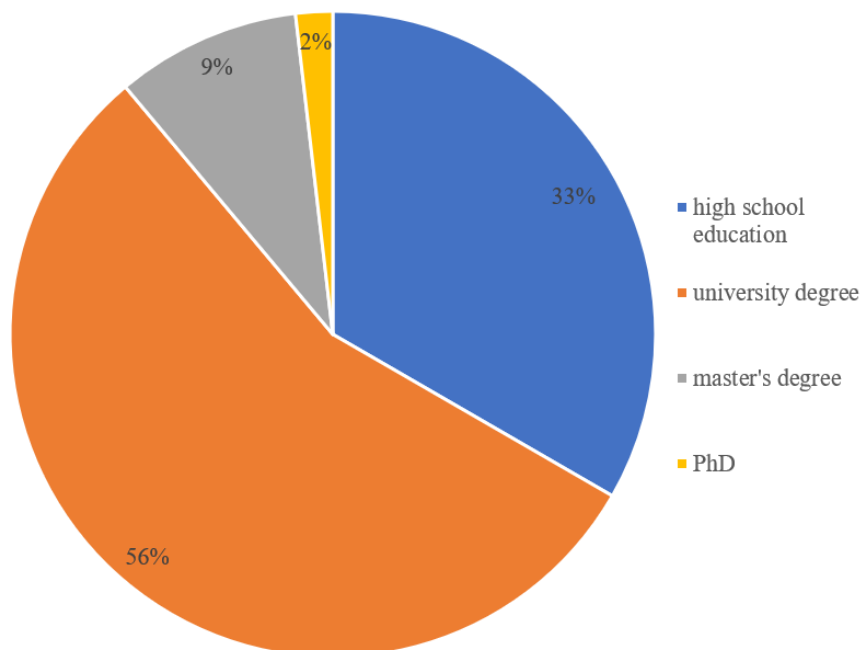
Figure 2 shows the age of the respondents, where most people between the ages of 26 and 35 participated in the survey (39%).

*Figure following on the next page*



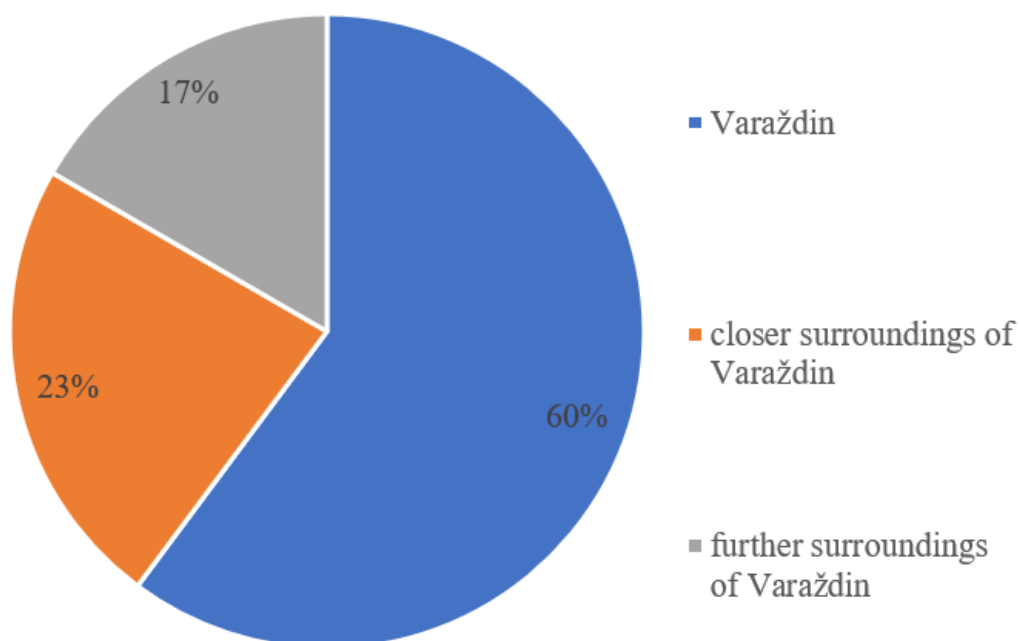
*Figure 2: The age of the respondents  
 (Source: authors' work)*

According to the level of professional education (figure 3), most, 60 respondents (56%) have a university degree, then 36 respondents (33%) have a high school education, 10 respondents have a master's degree (9%), and 2 respondents (2%) have a PhD.



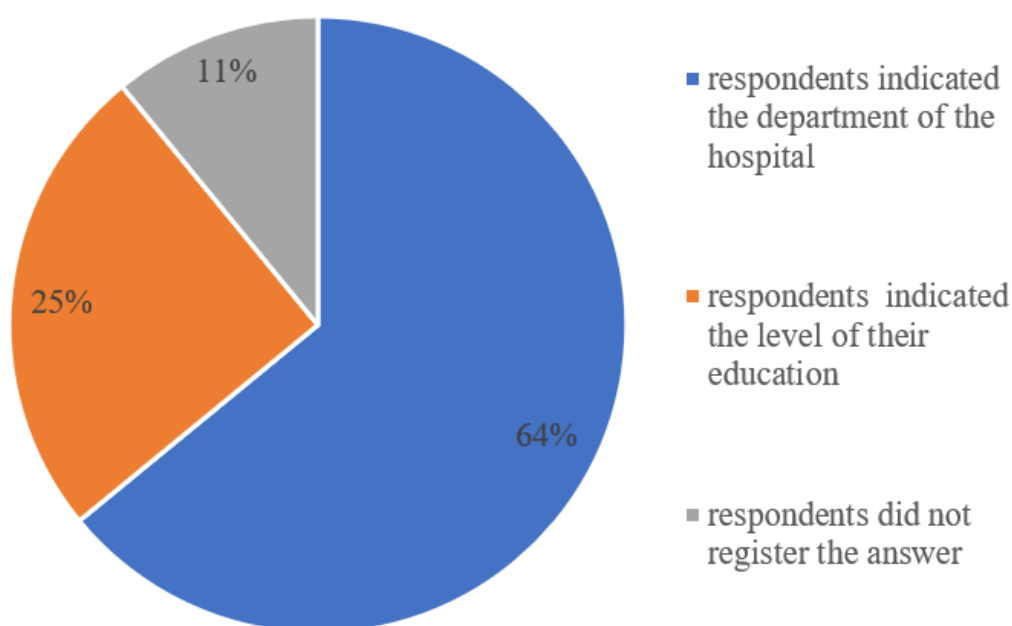
*Figure 3: The level of education of the respondents  
 (Source: authors' work)*

According to the place of residence, most of them are from Varaždin, with 65 respondents (60%), 25 respondents (23%) from the closer surroundings of Varaždin, and 18 respondents (17%) from the further surroundings of Varaždin (figure 4).



*Figure 4: Place of residence  
 (Source: authors' work)*

According to the question regarding the workplace within the hospital, figure 5 shows the structure of the answers.



*Figure 5: Workplace within the hospital  
 (Source: authors' work)*

Figure 6 shows the structure of monthly net income in euros. It can be seen that the largest number of respondents have a monthly net income at the level of 801 - 1194 euros, 69 of them (64%), then 1195 - 1592 euros 23 of them (21%), 9 of them (8%) have a monthly net income of more than 1593 euros, 6 of them (6%) have a monthly net income between 401 - 800 euros, while 1 (1%) respondent has a monthly net income below 400 euros.

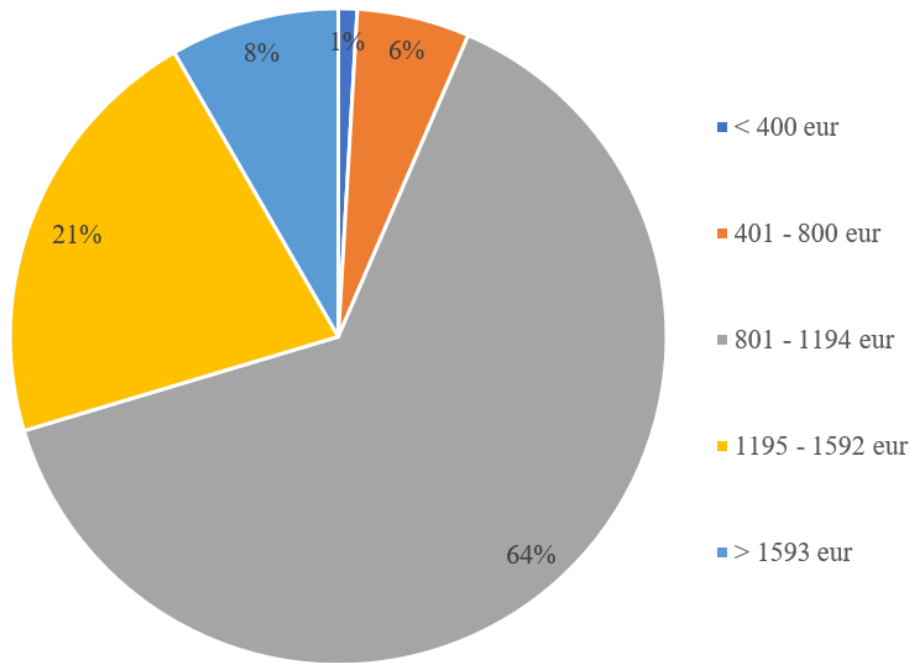


Figure 6: Monthly net income in euros  
 (Source: authors' work)

Figure 7 represents working experience. The largest number of respondents have work experience of 1-5 years 36 respondents (33%), followed by 6-10 years of 24 respondents (22%), 11-20 years 20 respondents (19%), more than 31 years 15 respondents (14%), 21-30 years 11 respondents (10%), while 2 respondents (2%) have no previous work experience.

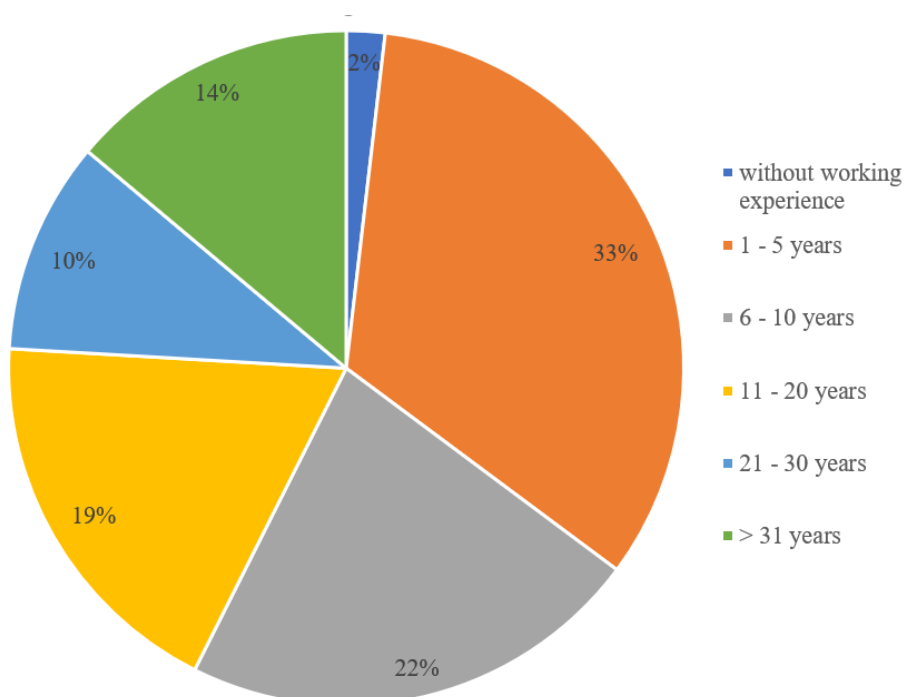
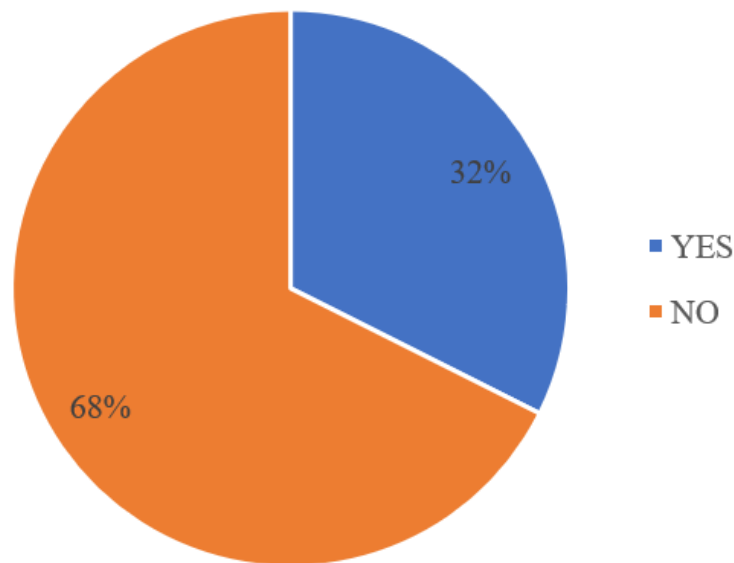


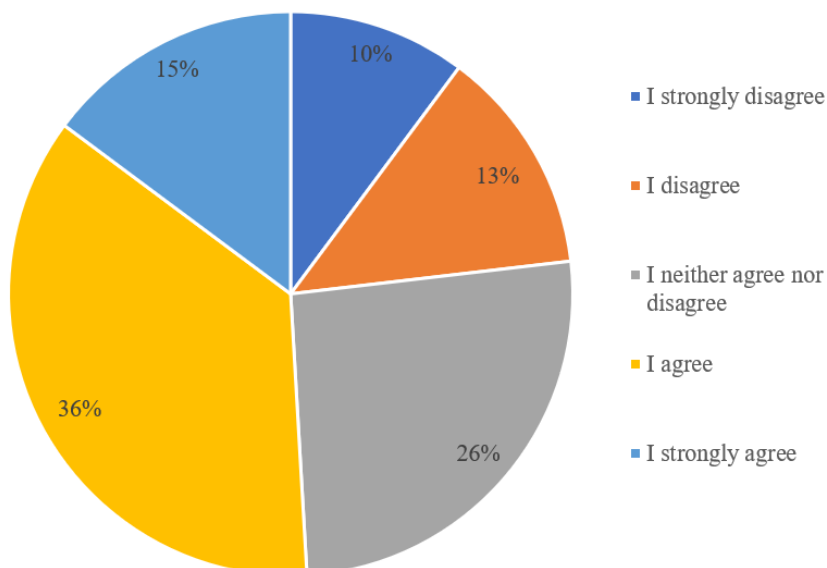
Figure 7: Working experience  
 (Source: authors' work)

Figure 8 shows that for the largest number of respondents (73 respondents, 68%), their workplace does not include managing other employees.



*Figure 8: The number of respondents whose position includes managing other employees  
 (Source: authors' work)*

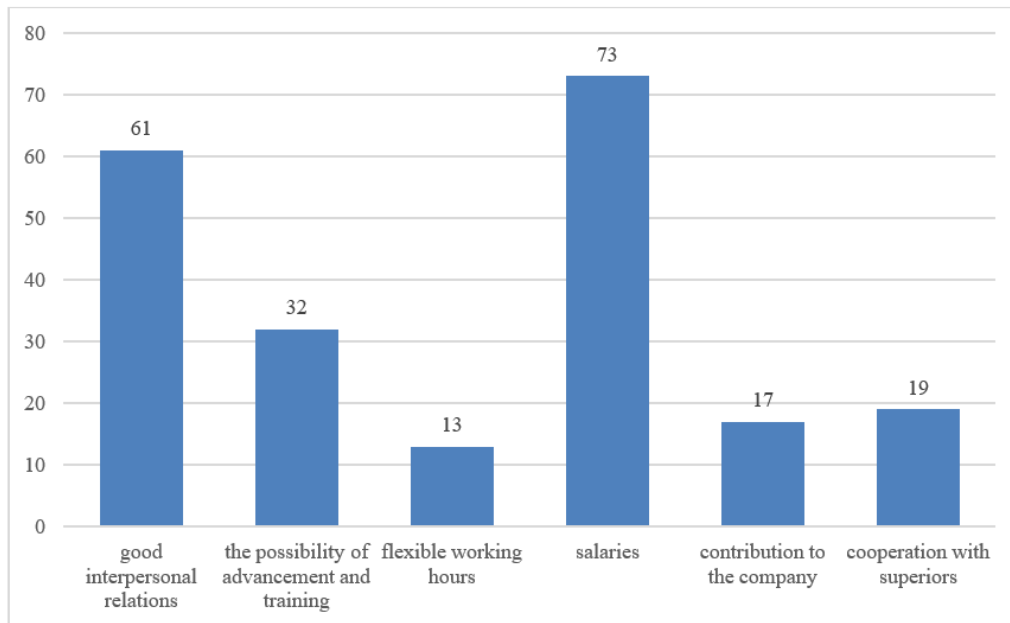
Figure 9 shows that the majority of respondents (51%, 39 respondents (36%), and 16 respondents (15%)) are motivated for their work. The second group of respondents are those who are indifferent (neither motivated nor not motivated, 28 respondents (26%)).



*Figure 9: The number of respondents according to the intensity of motivation to perform the job in which they are currently employed  
 (Source: authors' work)*

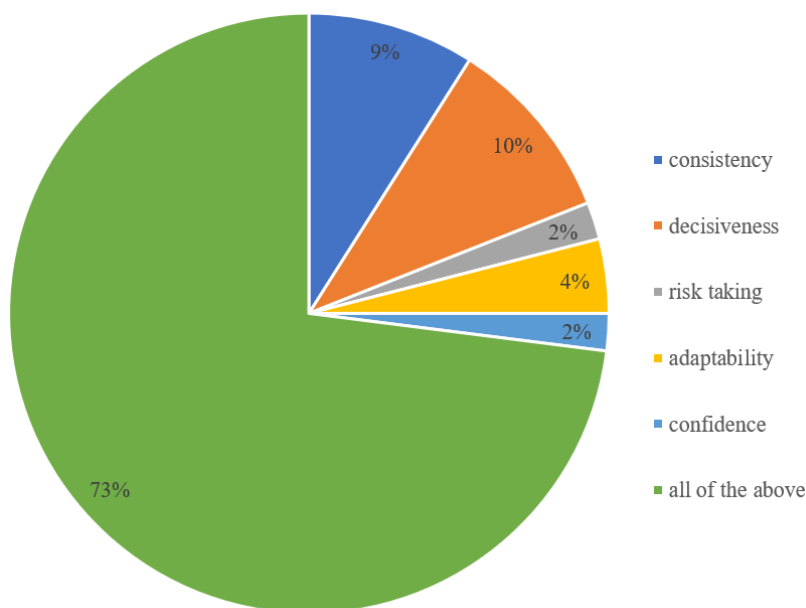
Figure 10 shows the motivation of employees according to the offered criteria, where respondents could choose several motives. It can be seen that for 73% of respondents, salary is the dominant motive for work, while 61% of respondents believe that good interpersonal

relations are the motivation for work. The least interesting is flexible working hours as a motive for work, which was recorded by 13% of respondents.



*Figure 10: Respondents according to their motives for work  
 (Source: authors' work)*

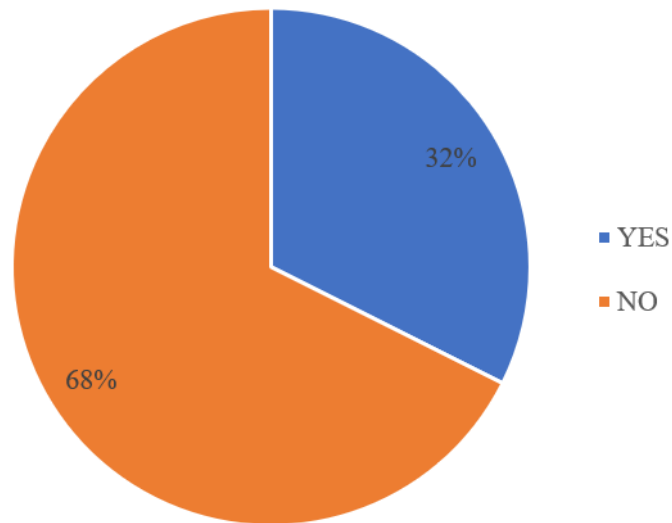
Figure 11 shows that the most important characteristics i.e. qualities that successful managers should have are decisiveness (10%, 11 respondents) and consistency (9%, 10 respondents). Nevertheless, 73% (79 respondents) of respondents believe that a combination of all elements (consistency, determination, risk-taking, adaptability, self-confidence) are qualities that successful leaders should have.



*Figure 11: The number of respondents according to qualities that successful managers should have  
 (Source: authors' work)*

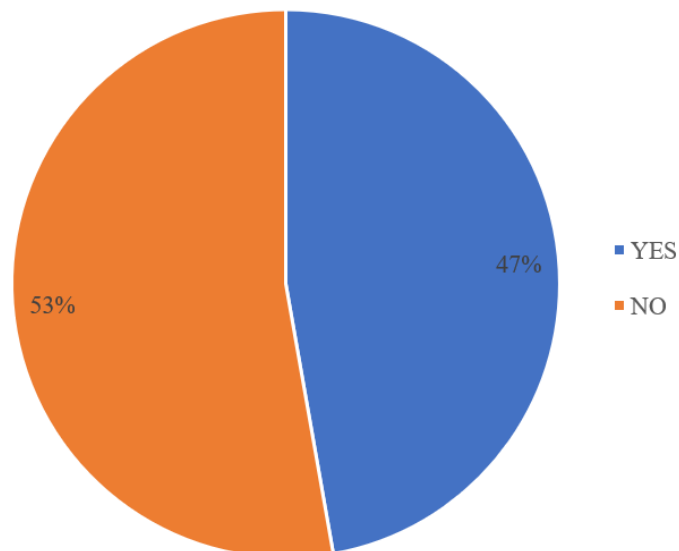


From Figure 12, it can be seen that the mission and vision of the observed healthcare institution are known and understood by a smaller part of the respondents, 35 (32%).



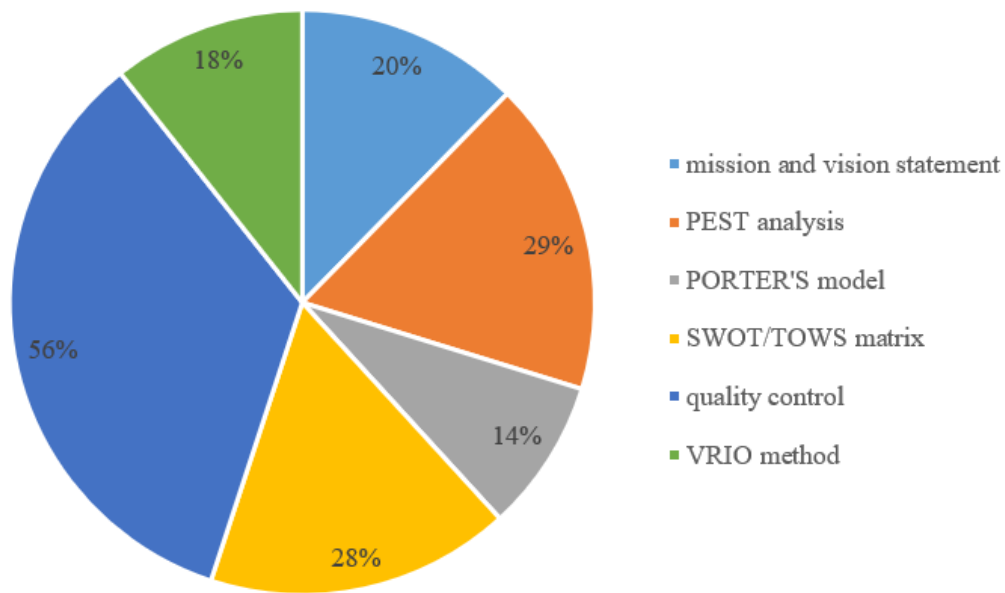
*Figure 12: The number of respondents according to knowledge and understanding of the set mission and vision of the organization  
(Source: authors' work)*

Figure 13 shows that the majority of respondents (57 respondents (53%)) do not know the tools for strategic management of the organization.



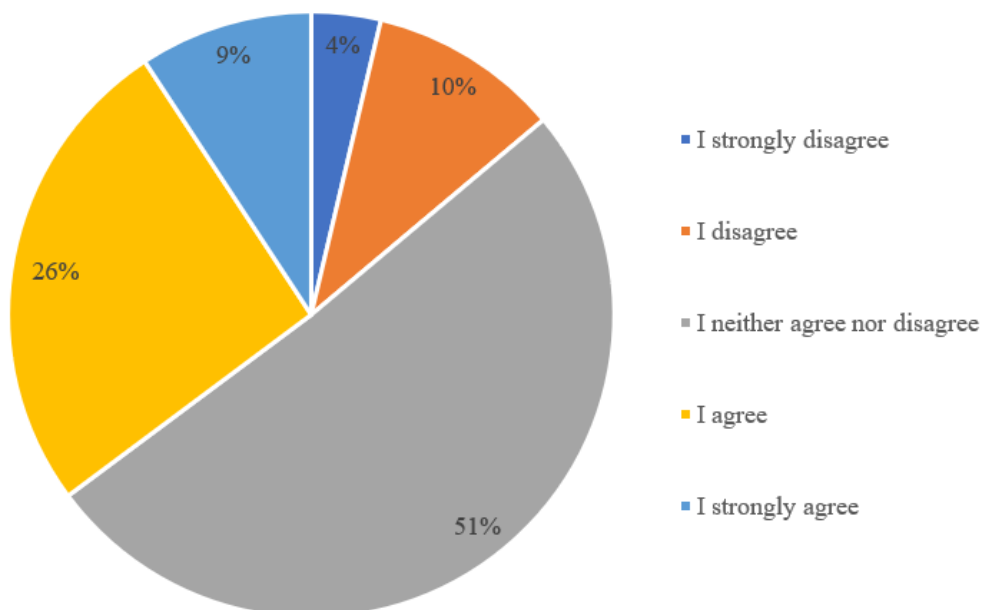
*Figure 13: The number of respondents according to familiarity with managerial tools for strategic hospital management  
(Source: authors' work)*

Furthermore, regarding the tools and areas that are part of strategic management, most respondents know the area of quality management (61 respondents, 56%). Further, 29% (31 respondents) know PEST analysis, 28% (30 respondents) know SWOT/TOWS matrix, 20% (22 respondents) know mission and vision, 18% (19 respondents) knows VRIO method while the smallest number knows Porter's model (15 respondents, 14%) (figure 14).



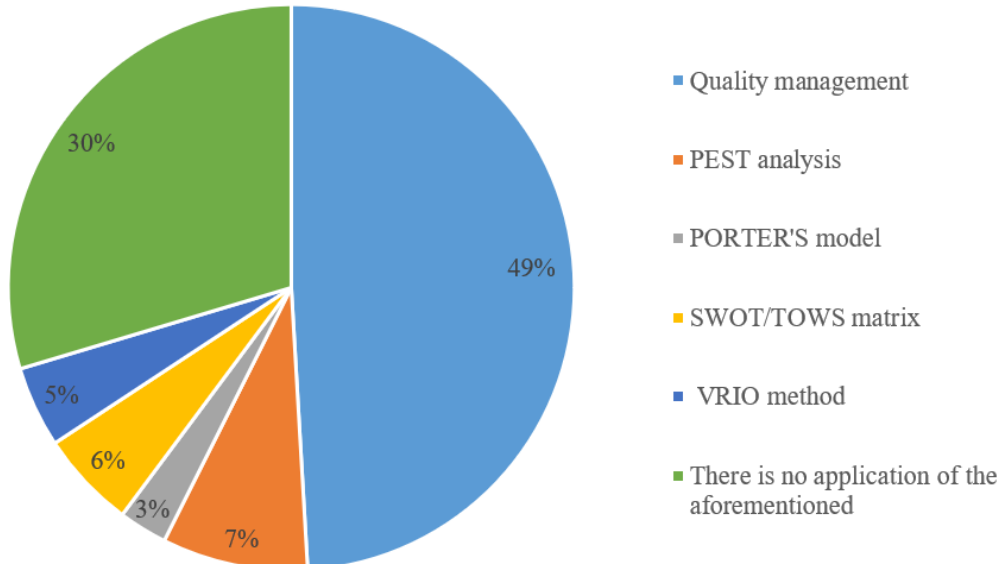
*Figure 14: The number of respondents' answers about the knowledge of certain tools and areas in strategic management  
 (Source: authors' work)*

Figure 15 shows the attitudes of respondents regarding knowledge of managerial tools for strategic management of the organization and their connection with their use. The vast majority of respondents (55 respondents, 51%) are in a dilemma about how to answer the question in the questionnaire, so they chose the middle (neutral) answer ("neither agree nor disagree"), while 26 % (28 respondents) believe that the knowledge of managerial tools for strategic management of an organization is directly related to their use.



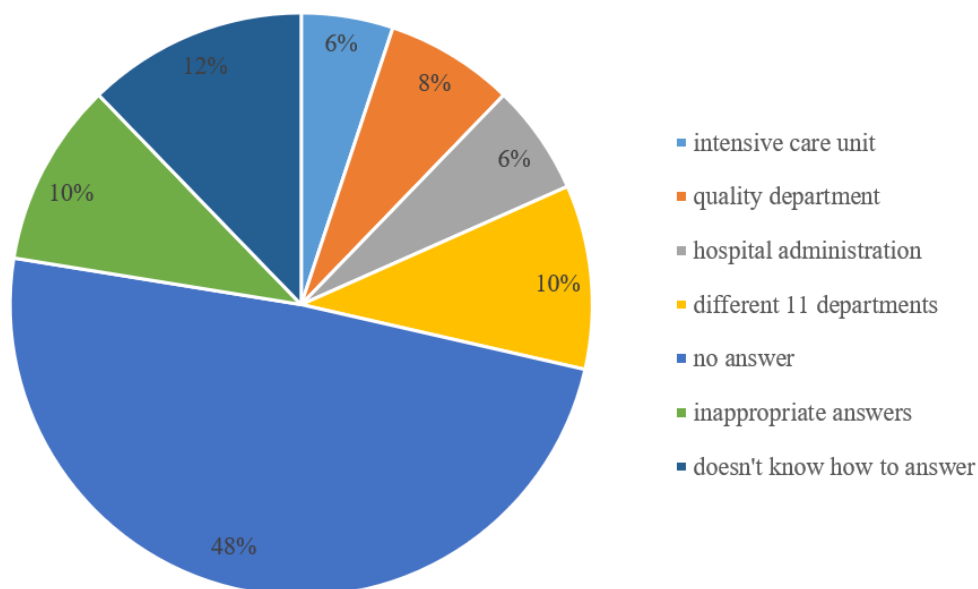
*Figure 15: The number of respondents according to whether the knowledge about managerial tools for strategic management of the organization is directly related to their use  
 (Source: authors' work)*

Figure 16 shows that the respondents recognize the area of quality management and that it is an area that is represented in the management of the organization (53 respondents, (49%)), while the application of other tools is insufficient, i.e. not recognized (30%, i.e. 32 respondents claims that neither mentioned tool is used). The other four tools account for the remaining 21% of responses.



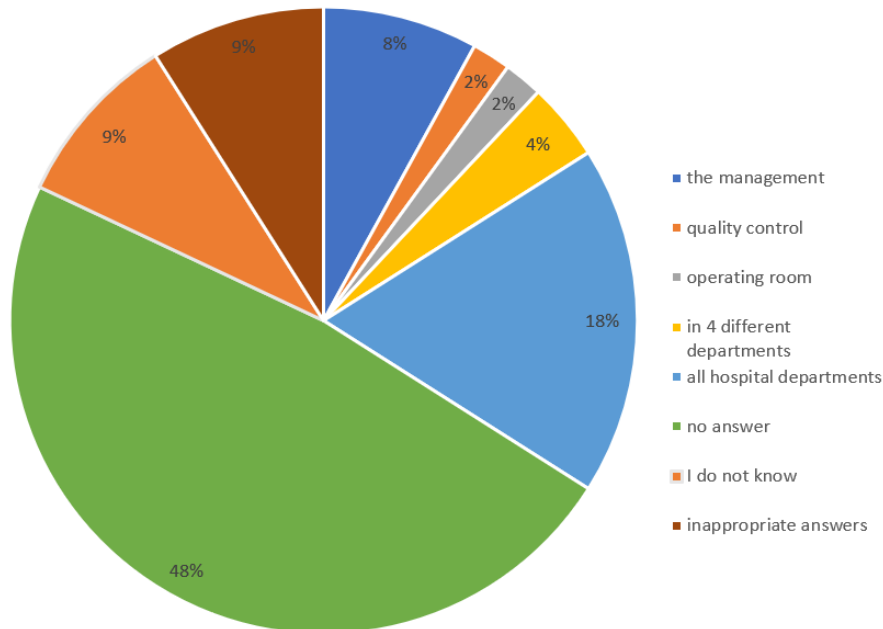
*Figure 16: The number of respondents' answers to the question about the application and use of strategic management tools  
 (Source: authors' work)*

The assessment of whether the mentioned tools are used in the department where the respondents work is shown in Figure 17.



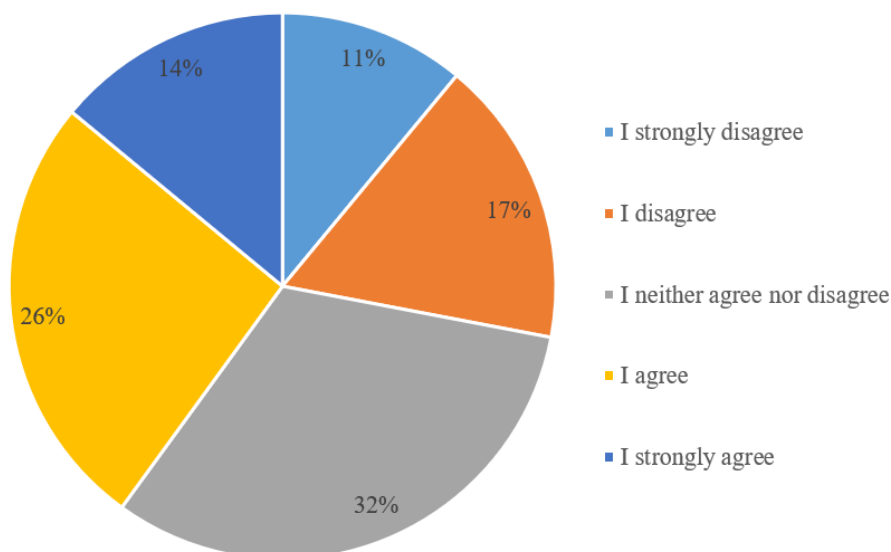
*Figure 17: The number of answers regarding in which department (workplace) managerial tools for strategic management of the organization are used the most  
 (Source: authors' work)*

Figure 18 shows the attitudes of respondents regarding the department (workplace) where managerial tools should be used for strategic management of the organization. The vast majority of respondents did not know how to answer this question, so inappropriate answers were given or answers were not given at all (inappropriate answers, no answer and I don't know were indicated by 66% of respondents).



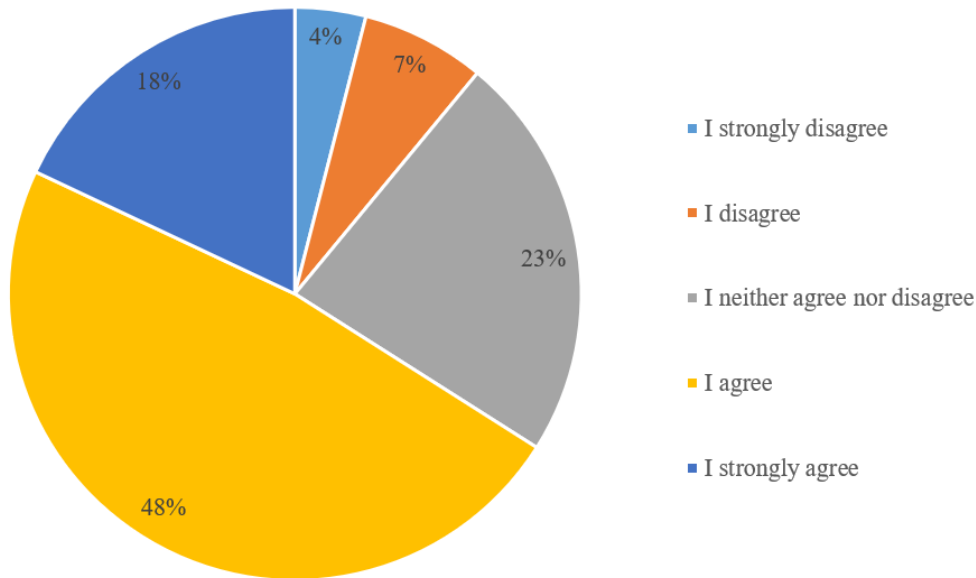
*Figure 18: The number of answers regarding in which department (workplace) managerial tools for strategic management of the organization should be used  
 (Source: authors' work)*

The majority of respondents agree that the economists are suitable for hospital management (40%). The second most common answer is "neither agree nor disagree" given by 32% of respondents, while 28% of respondents expressed disagreement (figure 19).



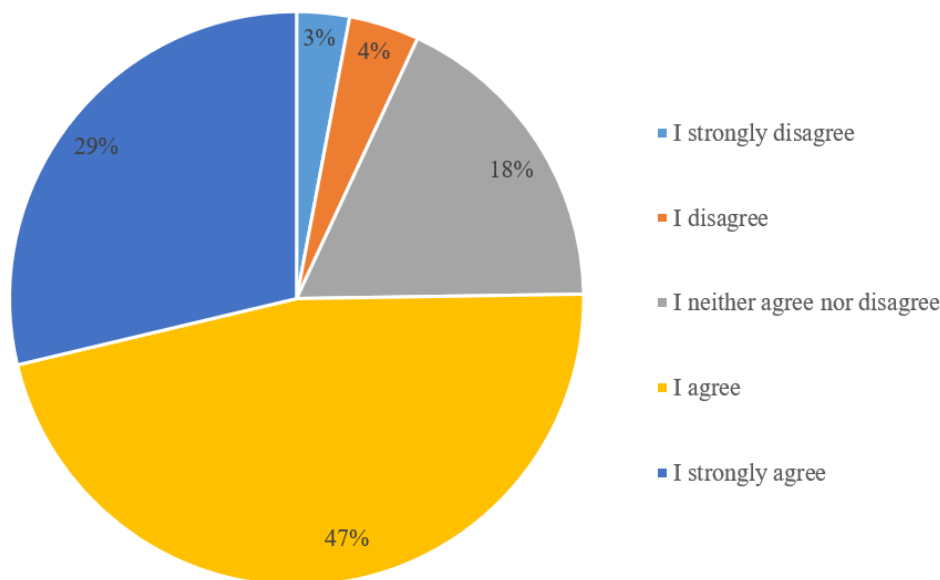
*Figure 19: The number of answers regarding the opinion that economists should be in management positions in the hospital administration  
 (Source: authors' work)*

Figure 20 shows that 66% of respondents believe that the management of their hospital lacks knowledge of strategic management.



*Figure 20: The number of answers regarding the lack of knowledge of strategic management by current organization management (Source: authors' work)*

The vast majority of respondents agree that there are risks of bad management due to the lack of knowledge and inexperience of its managers (76% of respondents) (figure 22).



*Figure 21: The number of answers regarding the existence of the risk by bad management due to lack of knowledge and inexperience of managers (Source: authors' work)*

Based on the conducted research, most respondents are not familiar with the mission and vision of the institution where they work and do not know the strategic tools used in the strategic management of the organization. They cite salary as the main motivator for work. The respondents in the research are most familiar with the field of quality management.

According to the data that show a lack of knowledge about the observed tools and the field of strategic management itself, it is necessary to carry out the necessary actions to familiarize the employees with the field of strategic management and the tools used in that segment. The employees are not even familiar with the mission and vision of the organization, which also represents one of the key problems of misunderstanding the observed area. For the hospital to develop according to its mission, vision, values, and strategic goals, education is needed for all existing and future employees who can contribute to the further growth and development of this institution.

#### **4. CONCLUSION**

Hospitals and healthcare organizations today operate in an extremely competitive environment, with increasing pressure to improve quality and reduce costs. To adapt to this problem, more and more healthcare institutions are planning their institution management activities. Strategic management in healthcare organizations involves outlining the effective steps needed to achieve specific goals (naamati 2020:5). The goal of this research was to assess the knowledge about the area of strategic management and tools used in strategic management of an organization on the example of a healthcare organization (hospital). The results themselves show insufficient knowledge of the observed area. A small number of research has been conducted on this topic, both globally and in the territory of the Republic of Croatia, where, based on data from Croatia, we can see that health institutions state that strategic management represents a designed approach to defining future development goals to achieve high-quality, efficient, long-term and sustainable development of a certain field of activity or institution. This research is the basis for further research and examination of the functioning of health organizations from a strategic aspect, especially from strategic management and the use of strategic tools.

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## METHODS FOR MEASURING SUPPLY CHAIN'S SUCCESS AND PERFORMANCE

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### ABSTRACT

*In contemporary times, organizations conduct business in VUCA surroundings, where V stands for volatility, U for uncertainty, C for Complexity, and A for ambiguity. In these conditions of unpredictability, where contingencies seem more possible than ever, making decisions based on facts that will lead to more success can be made with the help of management accounting. Management accounting serves management by collecting, analyzing, and presenting financial and nonfinancial data crucial for making informed decisions. This paper aims to give an overview of methods for measuring supply chain performance and success that management accounting utilizes for attaining an organization's efficacy and effectiveness.*

**Keywords:** *Management accounting, supply chain, supply chain scorecard, measuring performance*

### 1. INTRODUCTION

In contemporary times, organizations conduct business in VUCA surroundings, where V stands for volatility, U for uncertainty, C for Complexity, and A for ambiguity. These conditions make predicting market movements arduous, as significant changes happen more often, decisions must be made in times of uncertainty, and it is unachievable to determine and understand all cause-and-effect relationships. Significant amount of data is made daily, and it is difficult to translate it into information, especially when data is ambiguous. When the COVID-19 pandemic spread, tremendous disturbances in supply chains worldwide arose. According to The Davos Agenda in Sultan (2022), supply chains have transformed in five significant aspects:

- 1) Supply chains are getting more attention.
- 2) Business continuity is more acknowledged, and supply chains are trying to become more resilient and increase flexibility.
- 3) Collaboration and partnerships are recognized to assure positive supply chain performance. Organizations are more willing to share their knowledge and information with their partners.
- 4) Organizations are becoming more flexible. They are investing in new assets and technologies that will enable business continuity when partners cannot fulfill their parts of agreements.
- 5) Organizations have suffered a lack of materials and goods, which has caused them to increase stock quantity to levels that might not be optimal.

In these conditions of unpredictability, where contingencies seem more possible than ever, making decisions based on facts that will lead to more success can be made with the help of management accounting. Management accounting's main task is to collect, analyze, and present information to management to make conducting business more profitable and sustainable.

## **2. THE ROLE OF MANAGEMENT ACCOUNTING IN SUPPLY CHAIN MANAGEMENT**

Management accounting is a business management function that serves management (Ziegenbein, 2008). It processes and monitors financial and non-financial data within an organization to keep business aligned with its values, vision, mission, and goals while reducing costs and increasing profitability. Management accounting uses this information to help management make decisions based on facts, to ease measuring success and performance, and ensure transparency in everyday organizational transactions. Management accounting is best described by its objectives: planning, organizing, control, information systems, value systems, and human resources management (Očko & Švigir, 2009). Supply chains are comprised of many different organizations, which have their distinctive roles in the chains but also other business functions, e.g., procurement, sales, production, distribution, and warehousing. A great number of organizations' roles in supply chains and within themselves generate a significant amount of data. These data must be processed by using standardized procedures. They must be shared with employees and other partners in the supply chain so each supply chain participant can make relevant decisions, take responsibility, and adjust their processes. Management accountants collect data, process it, and share it to insure cooperation and support. They serve the management by transparently presenting the flow of goods, information, and money in the supply chain. All these actions enable optimization of processes, which is crucial for the supply chain's success (Werner, 2022). Risk and non-value adding activities identification are possible by transparently presenting flows in the supply chain. Measuring the success and performance of a supply chain and using key performance indicators help detect deviances from set objectives. Identified non-value-adding and risk-inducing activities and processes make an opportunity for process optimization, more tremendous business success by reducing costs, better use of assets, and partner engagement in internal organization's processes. These kinds of processes manifest as prolonged wait times, products or materials shortages, defunct processes, etc. They can be eliminated with the help of lean management. (Werner, 2022)

### **2.1. Supply Chain Resilience**

Supply chain resilience refers to the supply chain's capability to overcome disturbances and to repair itself after disturbances. Resilient supply chains consist of organizations that are resilient themselves, meaning that they can prepare for and avoid disturbances, they can mitigate the effects of disturbances by taking stabilizing actions, and they can best possible adjust themselves to impact of disturbances. This does not suggest that resilient supply chains eliminate risks; rather, they minimize them by finding adequate solutions. Therefore, supply chains must immediately and independently respond to threats and disturbances to be resilient. This *modus operandi* is possible if organizations continuously learn, measure their performances, and communicate with their partners. (Werner, 2022)

## **3. METHODS OF MEASURING SUPPLY CHAIN'S PERFORMANCE**

The supply chain's performance is measured by key performance indicators. Key performance indicators (KPIs) quickly and purposefully inform participants about business success. Their usefulness comes to light when present results from key performance indicators are compared to past results. KPIs are also utilized for comparing an organization's success with competitor organizations because they show where an organization is placed compared to the rest of the



industry. Consequently, KPIs are indispensable for benchmarking – comparing an organization's practices to the best in the industry and adopting the best practices (Bedenik & Osmanagić, 2008.). Traditionally, KPIs were focused on past results and disregarded nonfinancial indicators, which prevented measuring and monitoring the progress of achieving strategic objectives. To overcome this deficiency, new concepts for performance measurement systems were developed. Today, in the new performance measurement systems, the top indicators are referred to as KPIs. These KPIs are more laborious to define because of their nonfinancial attributes and complexity, yet they provide a broader perspective on strategic business success. In performance measurement systems, alongside KPIs, business performance indicators and process performance indicators are also used. Business performance indicators measure the effectiveness of operational segments of a supply chain, such as a division, a profit center, or a region. Process performance indicators measure the everyday activities of operational processes. The table below shows the differences between traditional KPIs and performance measurement systems. (Werner, 2022)

Differentiating features	Traditional KPIs	Performance measurement systems
Time	Focus on past	Focus on future
Primary metric	Financial	Nonfinancial
Causal relationship	Isolated measurement of individual metrics	Cause-effect chains
Alignment	Financial orientation	Customer orientation
Leverage	Control of financial objectives	Control of corporate strategy
Reporting structure	Functional reporting structure	Process-oriented reporting structure
Evaluation focus	Internal corporate evaluation	Internal and external evaluation
Cost-performance relationship	Cost reduction	Performance improvement
Learning process	Individual learning	Organizational learning

*Table 1: Traditional KPIs versus performance measurement systems  
 (Source: adapted by the author to Werner (2022))*

### 3.1. Types of measuring performance in supply chain

Supply chain performance can be measured with indicators specific to activities and processes in supply chains. Those indicators can be distinguished into two basic types: indicators for activities that add value and other indicators. Indicators for activities that add value can be further categorized by types of activities – input, throughput, output, and payment. Werner (2022) reported that other indicators include generic performance indicators, productivity and economic evaluation indicators, and quality and service indicators. Indicators for activities that add value can be listed regarding their activity:

- Input: procurement key indicators
- Throughput: warehousing, picking, and production key indicators
- Output: distribution key indicators
- Payment: cash-flow key indicators.

These indicators are created by labor, material consumption, and alike. They view all activities from raw materials procurement to finished products distribution (Werner, 2022). Generic key indicators encompass general and overarching measures that shape respective areas of supply chains. Productivity indicators are derived from the input and output relationship, and they measure labor productivity. Quality and service indicators look at customer satisfaction indexes. (Werner, 2022)

### **3.2. Balanced Scorecard**

Balanced scorecard is used to design performance measuring systems while considering four key perspectives that affect performance: financial perspective, customer perspective, internal process perspective, and organizational capacity perspective (Bakotić, 2014; Werner, 2022). The financial perspective is used to view how stakeholders see the organization and to measure financial performance. The customer perspective views the organizations from end customers' positions; it looks at customers' expectations and views on the organization. The internal process perspective deals with an organization's internal processes, which should be organized to satisfy customers. Organizational capacity perspective looks at an organization's ability to continuously grow and learn to better itself in creating additional value for its customers. When making a balanced scorecard, objectives for each of the perspectives should be made. From objectives, the mission, vision, and strategies should be further developed. Each objective should have proposed measures to measure the performance of realizing the objectives (Žager et al., 2008). When all components of a balanced scorecard are made, the model should be shared with all employees so they could study the model and apply it in their everyday work activities. It is essential to continuously measure and evaluate an organization's success in using balanced scorecard's writings so any deviations could be corrected. When the whole organization is familiar with the balanced scorecard, models for each work unit should be made. Using the balanced scorecard for long-term success includes checking the model and updating it. (Balanced Scorecard Institute)

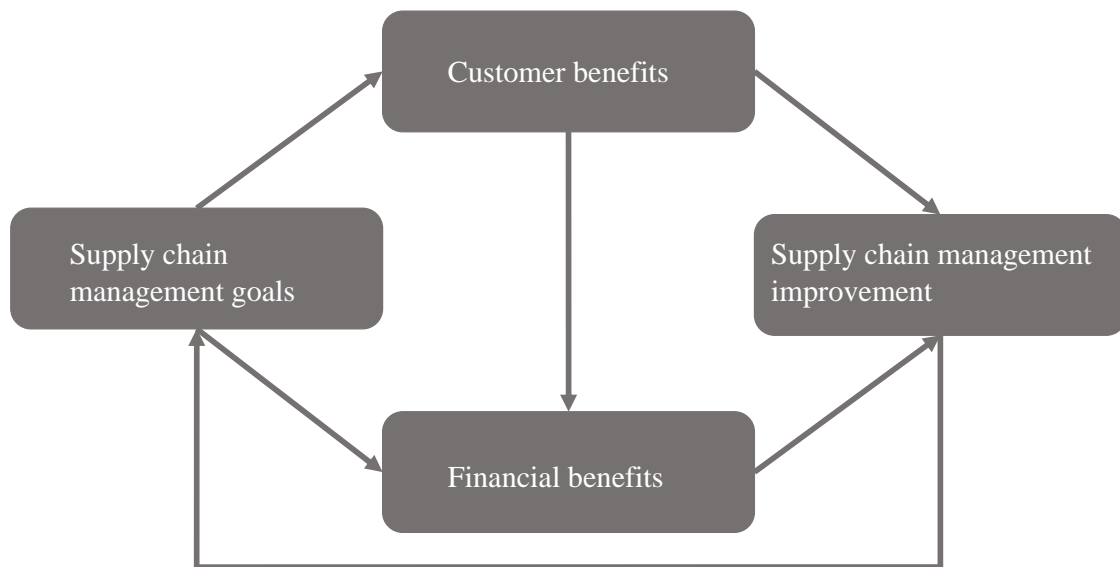
### **3.3. Supply Chain Scorecard**

A supply chain scorecard is a variation of the balanced scorecard, tailored explicitly for measuring supply chain success and performance. It gives importance to measuring collaboration with partners in a supply chain, coordination in a supply chain, and balancing organizations simultaneous autonomy and being part of a supply chain in which partners can be customers.

#### *3.3.1. Brewer and Speh's Supply Chain Scorecard*

Brewer and Speh's supply chain scorecard is derived from Kaplan and Norton's balanced scorecard, but it is adjusted to make a framework for measuring supply chain performance. In this supply chain scorecard, the four perspectives used are end customer benefits, financial benefits, supply chain management improvement, and supply chain management goals (Brewer & Speh, 2000; Werner, 2022).

*Figure following on the next page*



*Figure 1: Brewer and Speh's Supply Chain Scorecard Perspectives  
 (Source: adapted by the author to Brewer and Speh (2000))*

According to Brewer and Speh (2000), when supply chain's goals are being achieved, customers recognize the added value given to them, which in turn is getting to the organization through financial benefits. Integration, coordination, and communication help reduce the number of non-value-adding activities, cut costs, and help make greater revenue and profits. Financial benefits are closely tied to Kaplan and Norton's financial perspective, and the indicators that authors propose for measuring the performance of financial benefits are profit margin, cash-to-cash cycle, customer growth, revenue growth, and return on assets (Brewer & Speh, 2000). A supply chain that minimizes its costs, improves its agility and flexibility, and reduces cycle-times consequently creates customer benefits. Brewer and Speh suggest that supply chains bring their attention to questioning how much their customers recognize these benefits and why they don't recognize them. The authors further emphasize that organizations should ask themselves about customers' beliefs about organizations that make organizations successful. Brewer and Speh suggest increasing the quality of goods and services, increasing flexibility, and adhering deadlines to create added value for customers. Proposed indicators for measuring customer benefits are the number of customer contact points, relative customer order response time, customer perception of flexible response, and customer value ratio (Brewer & Speh, 2000). To realize the full potential of a supply chain, all processes within organizations and the supply chain, must be coordinated and integrated. Organizations need to orient their structures toward processes and to reduce costs. The supply chain management goals perspective is linked to the internal process perspective of Kaplan and Norton's balances scorecard. Indicators that can be used to measure this perspective's performance are supply chain cost of ownership, supply chain cycle efficiency, number of choices/average response time, and percentage of supply chain target costs achieved (Brewer & Speh, 2000). Supply chain improvement requires continuous learning, bettering, and innovativeness so that organizations can make a profit. Authors greatly emphasize the importance of reducing cycle times, reducing waste, increasing flexibility, and orienting towards the future. This supply chain management improvement is linked to organizational capacity perspective that includes learning and growth. Indicators for measuring performance are product finalization point, product category commitment ratio, number of shared data sets/total data sets, and performance trajectories of competing technologies (Brewer & Speh, 2000).

### *3.3.2. Stölzle, Heusler and Karrer's Supply Chain Scorecard*

Stölzle, Heusler, and Karrer's Supply Chain Scorecard differs from Kaplan and Norton's balanced scorecard by adding perspective – supplier perspective. The supplier perspective enables measuring the supply chain's external activities supply chain's starting point. Authors suggest that processes of creating supply chain scorecards should move top-down and bottom-up to get feedback about proposed plans and their feasibility. This two-way communication increases the chances of the supply chain scorecard being accepted and implemented by all employees. (Werner, 2022)

### *3.3.3. Weber, Bacher and Groll's Supply Chain Scorecard*

At the core of this supply chain scorecard is a wish to measure external and internal indicators simultaneously. While using four perspectives, Weber, Bacher, and Groll replace the customer perspective and organization capacity perspective with new collaboration intensity and collaboration quality perspectives. Additionally, authors prefer key performance indicators that narrowly indicate the supply chain itself (Werner, 2022). Eliminated customer and organization capacity had become a part of the collaboration intensity perspective, as the authors find continuous learning and growth necessary for collaboration. In contrast, customer perspective is more critical for the organizations that have direct contact with end customers. The collaboration intensity perspective is more focused on measuring collaboration outside of an organization, being turned to supply chain partners. To measure collaboration intensity performance, authors suggest key indicators of quality and quantity of shared data. Weber, Bacher, and Groll propose customer satisfaction indicators and potential conflict points to measure collaboration quality performance. Werner critiques dividing collaboration quality and intensity as he finds the limits between each blurry. (Werner, 2022)

### *3.3.4. Richert's Supply Chain Scorecard*

What Richert's supply chain scorecard makes it tailored to supply chains is an added fifth perspective. Like Weber, Bacher, and Groll, Richert also adds a collaboration perspective. The author explains keeping the customer perspective and adding a collaboration perspective necessary because the customer perspective tends to focus more closely on end customers. Factors that motivated Richert to add the collaboration perspective are structural, social, and technical. The structural factor that Richert states is making a balance between flexibility and stability in a supply chain, where flexibility marks meeting unique customer demands, and stability refers to making fundamental choices, such as picking partners and process establishment. Social factors stress the importance of mutual trust in supply chains and avoiding unfair competition. In contemporary surroundings, collaboration is impossible without digital communication, which is why Richert chose technical factors as an incentive to include collaboration perspective. To measure the collaboration perspective, the author suggests choosing the time needed for a new partner to be fully integrated in the supply chain as the key performance indicator. (Werner, 2022)

### *3.3.5. Werner's Supply Chain Scorecard*

Werner's supply chain scorecard consists of five perspectives: financial perspective, customer perspective, internal process perspective, which are Kaplan and Norton's and supplier perspective and integration perspective (Werner, 2022). Werner's supply chain scorecard is focused on financial indicators. The author structured his supply chain scorecard so that all five perspectives' performances can be translated to financial indicators. Werner discerns two types of indicators: growth/ensuring indicators and reducing indicators. The growth/ensuring indicators include financial key performance indicators, liquidity ratios, profitability ratios, and market value ratios, while reducing indicators show cost reductions and stock keeping (Werner,

2022). Werner suggests including other businesses that are an organization's customers from customer perspective when making a supply chain scorecard. When planning from customer perspective, organizations should consider customer satisfaction, service satisfaction, planning reliability, and learning and growth (Werner, 2022). Collaboration and partnership between organizations are crucial for a successful supply chain. The supplier perspective, which is Werner's addition to the supply chain scorecard, gives great importance to collaboration and partnership. Key performance indicators that are used to measure performance from this perspective are returns rate, customer satisfaction index, number of shipments per day, etc. (Werner, 2022). The integration perspective in a supply chain scorecard evaluates the performance of internal and external interfaces. It is a foundation for management accounting of partnerships in a supply chain. When making plans for this perspective, it is necessary to examine the frequency and nature of partner interactions, partner dependency, cooperation level, competition level, how standardized the interactions with partners are, and how is business with partners conducted (Werner, 2022).

#### 4. CONCLUSION

COVID-19 has amplified VUCA surroundings in which predicting market movements is arduous. Management accounting's role has become even more critical as it is management's right hand that provides crucial information and insights. For organizations to continuously operate in supply chains, they must adjust themselves and the supply chains that they are part of to be more flexible and resilient. Flexibility and resilience are not built only on the financial aspects of operating a business but on comprehensive, successful performance. Comprehensiveness implies measuring and constantly improving both financial and non-financial indicators. A tool that is used to design performance measurement systems is a balanced scorecard. Its variant, adjusted explicitly for supply chains, is the supply chain scorecard. A supply chain scorecard is utilized to set goals and objectives with encompassed indicators to measure the performance of those goals and objectives in a supply chain. The most straightforward and most similar supply chain scorecard to the balanced scorecard is Brewer and Speh's, as the most significant difference is the different perspectives' names. In contrast, the perspectives can be directly linked to the balanced scorecard's perspectives. Weber, Bacher, and Groll's supply chain scorecard underlines the importance of tending partnerships in the supply chain by adding two separate collaboration perspectives: collaboration intensity and collaboration quality. Richert's supply chain scorecard coincides with Weber, Bacher, and Groll's emphasis on collaboration with an added collaboration perspective that accentuates the importance of coordination between organizations in a supply chain. Lastly, Werner's unique additions to the supply chain scorecard are the supplier and integration perspectives. While affirming the effects of collaboration on supply chain performance, the supplier perspective also accentuates the relevance of measuring the supply chain at its starting point. Additionally, the integration perspective takes collaboration to a higher level by measuring the success of internal and external interfaces that show the organization's level of integration into a supply chain.

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## APPLICATION OF BLOCKCHAIN TECHNOLOGY IN ACCOUNTING INFORMATION SYSTEMS: THE CASE STUDY OF CROATIA

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### ABSTRACT

*The aim of this paper is to investigate and determine the opportunities, possibilities, but also the dangers of introducing blockchain technology into everyday practice when performing accounting tasks. In the context of accounting, research refers to all forms of accounting and financial activities in a company. The work is based on primary research of employees in the accounting sector of companies in Croatia. The research is structured according to three research questions aimed at analysing the introduction of blockchain technology in accounting activities. Statistical analysis models are used in the work to analyse and interpret the values obtained in the primary research. The results of the analysis showed a great awareness of employees about blockchain technologies, as well as a willingness to further improve their skills. Employees expect the company to cooperate and help in this education, and they believe that other stakeholders should be connected in order to facilitate and speed up the accounting processes at the level of the company and at the level of the company environment. Blockchain technology has not yet reached its full application in the accounting sector, but employees in that sector in Croatia are well informed about the possibilities of the technology. The results of the research proved that there will be no major resistance to the introduction of blockchain technology and that employees expect the facilitation of daily activities for all stakeholders in the process of monitoring the company's financial activities.*

**Keywords:** accounting, application technology, blockchain, information systems

### 1. INTRODUCTION

Blockchain technology implies the development of bilateral or multilateral markets without intermediaries (Moazed and Johnson, 2016). It is based on the abolition of intermediaries in the process of product distribution and contract conclusion. By developing new models of production and distribution, and using new technologies, a model of digital business transformation is being developed, which includes the digitization of production activities and the digital transformation of the entire production process. Business activity based on the settlement of intermediaries enables the creation of a value chain that enables such activities (Lozić 2017). The production and distribution model, with the use of a distributed database, avoids additional intermediary costs, i.e. a zero marginal cost model is used (Rifkin 2015; Lozić 2019). Blockchain is significant for business because it is based on information. The model of distributed information centres enables the development of two-sided markets without intermediaries. The development and use of blockchain technology contributes to the end of the classic factory forms of economic development, i.e. the "factory floor" model, and fully supports the "information factory" development model (Parker et al. 2016). Blockchain is ideal for information exchange because it provides instant, exchangeable and fully transparent information stored in an immutable ledger that can only be accessed by authorized members of the network. The blockchain network can track orders, payments, invoices, production, etc. (IBM).

Kunselman (2021) points out that digital technology has significantly influenced accounting processes, but it was primarily the replacement of analog records with digital records. Blockchain, as a relatively new technology, opens the possibility of radical changes in accounting practice and data storage. Blockchain technology has the potential to revolutionize the accounting industry by building a more efficient, secure and transparent system for recording financial transactions. The technology makes it possible to record every transaction in a decentralized ledger, which makes it impossible to change data without changing it for all stakeholders who have access to the ledger. The paper presents the results of primary scientific research on the possibilities of introducing blockchain technology in companies in Croatia, and the willingness of employees in the accounting sector to use blockchain technology.

## **2. BLOCKCHAIN TECHNOLOGY**

Blockchain as we know it today was described and defined in 2008 when the person Satoshi Nakamoto created a website called "Bitcoin: Peer-to-Peer Electronic Cash System" where he announced the system as "equivalent to a peer-to-peer version of electronic money, which would allow online payments to be sent directly from one party to another without going through a financial institution (Bitcoin 2008). Blockchain is an alternative to the classic system and bypasses a third party, i.e. a centralized intermediary. In blockchain, this intermediary is replaced by a decentralized network of anonymous computers that confirm transactions based on an algorithm. At the computer are all those who have been rewarded with a transaction confirmation, i.e. "miners" of Bitcoin or any other "mined" cryptocurrency (Arunović 2018). In the beginning, blockchain technology was associated exclusively with the bitcoin cryptocurrency. The development of cryptocurrency was seen as an alternative and replacement for classic fiat currencies. With the development of technological solutions and technology as a whole, it has been shown that blockchain technology has much wider possibilities than just using cryptocurrencies. As with the introduction of blockchain technology, bitcoin has not yet reached its full potential (Tapscott 2021). Blockchain technology introduces innovations based on disruptive strategies, that is, most often in the model of disruptive innovation. Disruptive innovations, as pointed out by Christensen and Raynor (2003), meet two basic criteria: a) a new business activity is developed that is less profitable than the already existing business activity, which does not attract the attention of already existing competitors within the established industry and/or within the already existing and established industry, a completely new demand is created by customers who were not consumers of these types of goods and services before. Disruptive innovations arise as a result of efforts to build products for less demanding users in the zone of low profitability, and then expand into the zone of high profitability (Nogami, Veloso 2017). Disruptive innovations enable the creation of new demand in already existing markets and the basis for the transition to radical innovations and the growth of prices for products and services (Lozić 2020). Products based on disruptive innovations are generally cheaper, simpler and more pleasant to use (Utterback, Acee 2020). Distributed ledger technology (DLT) is the foundation of blockchain. DLT offers a consensus validation mechanism across a network of accounts that facilitates peer-to-peer transactions without the need for an intermediary or centralized authority to update and maintain data. Each transaction is confirmed and, together with previous confirmed transactions, is added as a new block to the already existing chain of transactions, giving rise to the name blockchain. A transaction that has been added to the chain cannot be changed or removed. A visual representation of blockchain technology is shown above the text (Rennock 2018).

## **3. APPLYING OF BLOCKCHAIN TECHNOLOGY IN ACCOUNTING SYSTEM**

Accounting Information System (AIS) is an information system, i.e. a way of monitoring accounting activities related to IT. It includes the collection, storage and processing of financial



and accounting data that are used for internal management decisions, but also for reporting to external stakeholders about the company's financial condition (Vinšalek 2022). The most widespread accounting information systems are control modules and financial reports. The financial statements received may be internal for use by management or externally by other interested parties, including investors, creditors and tax authorities. Accounting information systems that support all accounting functions and tasks, including auditing and finance, accounting and reporting, bookkeeping and tax management, are designed for this (Vitasović 2012). Information technology (IT) has gained importance in recent decades and has changed all areas of business. In general, they can be called "computers and other electronic devices for storing, retrieving, sending and handling data". In addition to computers, they include "programs (software), services and related resources for managing business processes", and their use has reduced costs, increased efficiency and increased accuracy of data resulting from business processes and simplifies business decisions. Information technology is constantly developing, which results in the need for professional accountants to continuously acquire knowledge and skills related to new technologies. Professional accountants, whatever their profession, are faced with a constant challenge adaptation and acquisition of knowledge related to information technology in order to be able to provide quality services to their users (Novak 2021). Accounting information systems are generally considered to represent the internal performance of a company in relation to its operations. It is emphasized that accounting tools have evolved many times, adapting to available technology and economic life (clay tiles, parchment, paper, magnetic boards, cloud, etc.). In the digital age, these registers take the form of databases. There are several solutions (proprietary and open source) with similar basic characteristics. Blockchain is also a database with its own characteristics, including the quality of the ledger, which can be seen in the way of the general development of accounting. Blockchain has proven to be a particularly important means of maintaining a shared ledger and ledger, both organizationally and with carefully selected external third parties (e.g. to shareholders and auditors) (Desplebin et.al. 2021). Blockchain technology is a key driving force in the safe storage of user data in the accounting sector (Tan, Low 2023), and it also significantly increases the security of transactions (Dai, Vasarhelyi 2017). The key to the digital transformation of accounting and finance is the combination of people and machines, allowing each to contribute in the areas in which they are best qualified. Machines can efficiently and accurately analyse massive amounts of data, recognize patterns in data, and learn to process different types of data. When machines take over tedious and monotonous tasks, accountants and financial professionals can focus on the problems and solutions to those problems in business (Marr 2021). Digital transformation has fundamentally changed the ways of monetization and built completely new models of income generation. New models of income generation were first accepted by media industries (Lozić, Fotova Čiković 2021), and after that digital transformation unstoppably spread to all other industries. All of these potential benefits of blockchain accounting are promising, but at the same time they raise concerns for the accounting system. Because it is a solution based on "unquestionable" trust provided by barcodes and machines, it is still difficult to fully embrace a system where trust is built through human validation and enforced by strict regulations. Moreover, there are technical and organizational challenges related to both transformation processes from traditional accounting systems to blockchain accounting systems (Pugna, Dutescu 2020). Blockchain requires auditors to increase automation, including automated analysis and continuous monitoring, improving audit scope and efficiency. Automated cross-validation of transactions is expected to be a key element that will lead auditors to a new generation of continuous real-time data collection, creating various intelligent modules for real-time verification, monitoring, fraud detection, etc., thereby increasing the effectiveness of insurance (Garanina et. et al. 2022). Blockchain technology will facilitate the work of auditors, first of all, by reducing a large number of

documents in paper form, which will enable them to do more activities regarding the content of the audit (Han et.al. 2023). Blockchain, combined with appropriate data analytics, can facilitate transaction-level assertions in an audit, and the auditor's skills will be better used to answer higher-level questions (Nielson 2023). Similarly, automation reduces costs and improves efficiency by eliminating laborious and tedious manual work (e.g. data entry, triple matching) and reducing human error. It increases direct processing and allows them to focus on strategic tasks that require creativity, collaboration and ingenuity rather than replacing accountants - tasks that AI cannot yet perform reliably. However, what artificial intelligence can do is "rough" analysis. By converting raw data into more manageable formats and providing well-developed connections between different data sources, artificial intelligence can form a kind of symbiosis with humans and play a subordinate role in the service of "what" humans can perfect "and why" (Higgins 2021). Blockchain, along with other emerging technologies (e.g. IoT, continuous monitoring and auditing mechanisms, process mining models, etc.) has the potential to radically change the current audit paradigm, thus fuelling a new generation of audits. In a new paradigm, blockchain technology can be used as a basis for storing and securing all audit-related data. Auditors and other service providers could create smart contracts that run on the blockchain and perform efficient audits and advanced analytics (Dai, Vasarhelyi 2017). In blockchain there is a group of devices (nodes) and each device represents a database (ledger). All transactions that take place are checked and confirmed through this database. Thanks to this technology, a transparent accounting information system can be developed. The accounts use a double entry system. Using blockchain technology, automation can create a much faster triple entry system. This information system helps accountants to work quickly by eliminating errors. There will be better integration between service providers, resellers and other online accounts and records (Rastogi 2022).

#### **4. METHODOLOGY AND RESEARCH QUESTIONS**

For the purposes of the work, primary research was conducted on a sample of 132 respondents who are involved in accounting and financial activities in Croatian companies. The basic purpose of the research was to determine the respondents' attitudes and knowledge about the possibilities of applying blockchain technology in the accounting sector. The research was directed towards three basic research questions:

- RQ<sub>1</sub> – How true is the statement according to which blockchain technology is insufficiently represented in Croatia due to insufficient information of the accounting public about blockchain technology?
- RQ<sub>2</sub> – How familiar is the accounting public with the requirements of blockchain technology and how willing are they to accept the new skills needed to use it?
- RQ<sub>3</sub> – How will the use of blockchain technology affect the reliability of financial and accounting data for users?

Each of the three mentioned research units is divided into several research questions aimed at determining the answer to the basic research question. In the research and analysis, a Likert scale of values from 1 to 5 was used, so that respondents could decide on the value they assign to each individual answer. Each research unit was processed statistically in the same way in order to be able to compare the values of the obtained results. The research results are presented in chapter five, and the interpretation and analysis of the results are presented in chapter six.

#### **5. RESEARCH RESULTS**

For the purposes of the research, a questionnaire was created and sent via the Internet to more than 300 addresses. More than 130 respondents answered the survey, which meets the standards and the survey is statistically significant.

82 women and 50 men participated in the survey, ie 62.88% of women and 37.88% of men. According to the employment model, the survey was divided into four categories. In the first category, with only 4 respondents, there are persons who have applied for a trial period; in the second category are students who work in the "part-time-job" model and strive to get a job after completing their studies; the third category are employees of companies in the accounting sector; and the fourth category is the unemployed who are related to the accounting sector. The age groups of the respondents were divided into four categories, and the majority of the respondents belonged to the group of 19 to 35 years. This was the largest group according to the number of responses to the survey, in addition to the age group up to 55 years. The results of the research are shown in table 1.

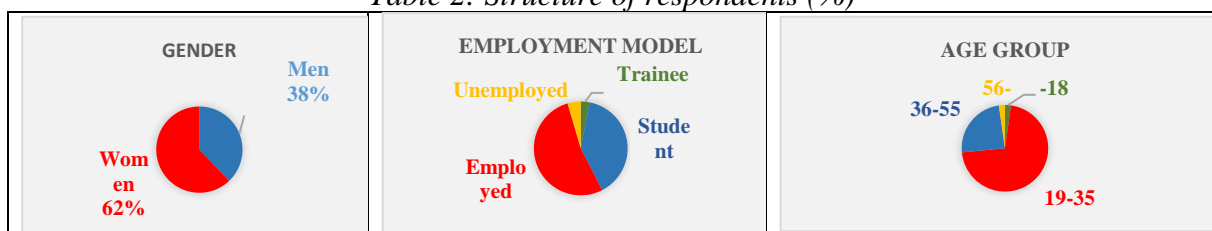
Table 1: Structure of respondents

	Frequency	Percent
<b>Gender</b>		
<b>Men</b>	50	37,88%
<b>Women</b>	82	62,12%
<b>Total</b>	132	100,0%
<b>Employment model</b>		
<b>Trainee</b>	4	3,0%
<b>Student</b>	52	39,4%
<b>Employed</b>	70	53,0%
<b>Unemployed</b>	6	4,5%
<b>Total</b>	132	100,0%
<b>Age group</b>		
<b>-18</b>	3	2,3%
<b>19-35</b>	94	71,2%
<b>36-55</b>	32	24,2%
<b>56-</b>	3	2,3%
<b>Total</b>	132	100,0%

Source: Own illustration

Table 2 shows the structure of the respondents by percentage in order to highlight the most represented group. The categories Woman, Employed and the age group 19-35 years are shown in red to make them visible as the groups with the largest number of respondents in the survey.

Table 2: Structure of respondents (%)



Source: Own illustration

*Table 3: Regions survey*

	Frequency	Percent	Cumulative Percent	
1.	92	69,7%	69,7%	1. Varaždinska
2.	16	12,1%	81,8%	2. Zagrebačka
3.	8	6,1%	87,9%	3. Međimurska
4.	3	2,3%	90,2%	4. Krapinsko-zagorska
5.	3	2,3%	92,4%	5. Istarska
6.	3	2,3%	94,7%	6. Primorsko-goranska
7.	2	1,5%	96,2%	7. Koprivničko-križevačka
8.	2	1,5%	97,7%	8. Bjelovarska
9.	1	0,8%	98,5%	9. Zadarska
10.	1	0,8%	99,2%	10. Vukovarsko-srijemska
11.	1	0,8%	100,0%	11. Brodsko-posavska
<b>Total</b>	132	100,0%		

*Source: Own illustration*

According to the geographical segmentation, the most responses came from Varaždin County, ie 92 or 69.7%, and the least from Zadarska, Vukovarsko-srijemska and Brodsko-posavska. According to the geographical division, more than 95% of the answers came from Northern and Western Croatia, which are economically more developed than the rest of the country. The structure and number of received survey questionnaires according to geographical division is shown in table 3.

### **5.1. Awareness of blockchain technology in the Croatian accounting sector**

The first research question is aimed at determining the respondents' awareness and interest in the introduction of blockchain technology into the accounting practice of Croatian companies. The survey consisted of seven questions to which respondents answered in a Likert scale model. The results of the research are presented in table 4. The research proved significant interest and knowledge of the respondents about blockchain technologies. Respondents assessed the need for the introduction of blockchain technologies with an average score of 4.17, with a standard deviation of 0.961. The results of the second research question (in addition to the fifth question) are very significant because, with an average score of 3.19, they cast doubt on the quick and easy introduction of blockchain technology. Respondents are very sure how blockchain will speed up and improve business processes, i.e. they rated it with 4.14. Respondents are not very sure that the introduction of blockchain technology will contribute to doing more jobs than they do now, that is, they rated it with 3.17.

*Table following on the next page*

*Table 4: Descriptive analytics*

Research questions (group 1)	N	Min.	Max.	Mean	Std. deviation	Variance
Do you think that a company needs to introduce blockchain technology in order to achieve/maintain a competitive advantage?	132	1	5	4,17	0,961	0,924
I believe that there will be no major problems with the introduction of blockchain technology	132	1	5	3,19	1,303	1,697
The introduction of blockchain technology will enable faster and simpler performance of work tasks and other activities	131	1	5	4,14	0,967	0,935
I believe that after the introduction of blockchain technology, many more work tasks will be performed in a given time	132	1	5	3,17	1,326	1,758
With the introduction of blockchain technology, work tasks will be more difficult and complex	131	1	5	2,84	1,169	1,366
Blockchain technology increases the system of monitoring people and processes, and influences the growth of work intensity, which directly increases stress	131	1	5	2,77	1,187	1,409

*Source: Own illustration*

The interesting answer to the fifth question is very significant, the respondents do not believe that blockchain technology will lead to more difficult and complex work tasks, i.e. the average value of the answer is 2.84. Like the previous question, respondents give a lower-than-average score to the question of whether blockchain will. Does this mean that the amount of stress at work is already very high and employees do not expect it to increase with the introduction of blockchain technology? It can be concluded that the respondents are already under a lot of pressure from their work tasks and they hope to facilitate their daily tasks by introducing new technological solutions.

## 5.2. Acquiring skills to use blockchain technology

The second set of research questions was focused on existing, or already developed, skills related to blockchain technology, and on the possibilities and need for employee education with the aim of early familiarization with the technology. The assumption is that better familiarity and education will facilitate inclusion in the labour market for existing employees as well as those on internships or newly employed. The results of the research are shown in table 5.

*Table 5: Descriptive analytics*

Research questions (group 2)	N	Min.	Max.	Mean	Std. deviation	Variance
Blockchain as a subject should be introduced in high school so that students acquire the skills and knowledge related to it	132	1	5	4,03	1,185	1,404
Education is needed in the context of acquiring new skills, with the aim of introducing new technologies	131	1	5	4,61	0,675	0,455
Existing skills, which employees already possess, are sufficient for quality performance of work tasks	131	1	5	3,77	1,200	1,439
Companies should introduce an obligation to educate employees once a year so that employees are well and regularly familiar with changes in the field of technology	132	1	5	4,62	0,715	0,512
To perform daily work tasks, new and developing knowledge of blockchain technology will be required	131	1	5	4,31	0,894	0,798

*(Source: Own illustration)*

All five research questions received a higher than average rating, that is, the accounting public is well aware of the possibilities of blockchain technology and there is a high level of readiness for further learning and skill development. The questions with the highest average marks are questions two and four, i.e. Mean was 4.61 and 4.62. The results of the research showed that employees are aware of the need to further develop their skills, and expect that companies will organize training to raise the level of employees' skills. The lowest average score, mean 3.77, is precisely related to the statement that employees have enough skills to perform current work tasks, which proves a strong correlation between the need to improve business processes and employees' awareness of these needs.

### 5.3. Correlation between the use and reliability of the use of blockchain technology

A group of survey questions, related to the third research question, are aimed at researching the security and reliability of using blockchain technology in accounting. More precisely, the third research question is aimed at investigating the correlation between the use and interest in blockchain technology. This was the most extensive part of the research and has seven research questions. The results of the research are presented in table 6.

*Table 6: Descriptive analytics*

Research questions (group 3)	N	Min.	Max.	Mean	Std. deviation	Variance
The application of blockchain technology in accounting systems increases the reliability of financial and accounting data for users	132	1	5	4,26	0,954	0,910
The application of blockchain technologies increases the efficiency of accounting systems	132	1	5	4,33	0,878	0,771
Blockchain technology is successfully used to execute transactions and store various information of great value to companies	131	1	5	4,32	0,922	0,850
By applying blockchain technologies in accounting and financial systems, it would be much easier for a company that is an auditor to perform the work of auditing and verifying data and information about business activities	131	1	5	4,34	0,865	0,748
By applying blockchain technology, there is more risk and uncertainty in business.	130	1	5	2,25	1,150	1,323
The application of blockchain technology will enable faster publication, consolidation and harmonization of data from multiple sources, and will enable the company to publish managerial reports faster, leaving more time for management to build development strategies	131	1	5	4,19	0,941	0,885
Accounting experts have strong technical experience through certification, and with the application of blockchain technology, they will be able to further develop their technical and accounting skills	131	1	5	4,16	0,951	0,905

*Source: Own illustration*

To six questions, the respondents answered with an average score higher than four, that is, they very strongly support the statement. On the question about increased risk in case of installing blockchain technology, the average score was 2.25, which confirms the scores of all other questions.

Question number four has the best average score and it reflects the very essence of blockchain technology. The respondents responded with a rating of 4.34, and in fact confirmed a strong correlation between investment in blockchain in the company, and the connection to the blockchain of all stakeholders who are in the value chain of the accounting process. Once the accounting reports are saved in the blockchain model, they are simultaneously available to all stakeholders of the process, that is, to those who have access to that block. In the specific question, the respondents believe that this will make the auditor's job easier. It should be emphasized here that in this case the job would be easier for other financial institutions that finance the company, i.e. that charge various forms of taxes on companies. The results of the third research question proved that users expect a very high accuracy or a very strong correlation between the use of blockchain technology and increased security and reliability of business.

## **6. DISCUSSION AND CONCLUSION**

132 people participated in the survey, and slightly more than 300 questionnaires were sent. The response of over 40% points to the great interest of employees in Croatian companies in topics related to blockchain technologies. The survey was distributed over the Internet, which enabled a "waterfall" effect, that is, the survey spread among users who were not on the mailing list. About 18% of questionnaires were collected from addresses that were not part of the list. Employees in the accounting sector were mostly represented in that category, but this group covered all four categories in the structure. As expected, the largest number of responses came from the working part, that is, from respondents between the ages of 18 and 55. The geographic structure of the received survey questionnaires points to greater information and greater interest of respondents in the northern and western areas, which we can correlate with economic development. This is not the subject of this research, so it is only mentioned because it could be one of the shortcomings of the research. Almost 95% of the survey questionnaires were received from six northern and western counties, while only three questionnaires were received from the eastern and southern counties. It remains an open question for some of the future research, to what extent the structure of the received answers is a reflection of information about blockchain technologies. In the context of the first research question, the most scientifically interesting results are questions two and five. Respondents expressed doubts about the quick and successful introduction of blockchain technology in the Croatian accounting sector, that is, respondents do not expect an increase in the complexity of tasks, which is directly related to stress at work. The median and mode for the third question are three, which means that employees neither accept nor reject the statements in the question. As we emphasized earlier, the most answers came from the most economically developed regions, which indicates a very high intensive activity of employees in the accounting sector, and an already very present significant amount of stress at work. The employees answered the first question with a score of 5, i.e. the Mode is 5, which indicates a very high familiarity of the employees with the possibilities of blockchain technology in accounting activities. On the other two questions, the Mod is 3, which confirms the assumption that employees are well informed about the possibilities of blockchain technology. The results of the research proved that employees are well informed about blockchain technology, and the claim that blockchain technology is not sufficiently represented in Croatia due to the lack of information of employees is not true. In the context of the second research question, the research results proved a highly developed awareness of employees about future trends in accounting activities and the need for education to meet future demands. Three out of five questions had the most frequent rating of 5, that is, all questions were answered with a very positive attitude. The results of the survey prove that employees in the administrative sector are very familiar with blockchain technologies, but more importantly, they are ready to continuously educate themselves in order not to build competitive

advantages for the organizations in which they are employed. In the context of the third research question, the research results proved a strong connection between the use of blockchain technologies and business reliability. The respondents recognized the advantages of blockchain technology in improving the business process, as well as the process of control and verification. This group of questions showed the smallest differences in the answers, that is, in the values answered by the respondents. On all questions, except for the fifth, Mode is 5, which proves the very high confidence of the respondents in the possibilities of blockchain technology in the accounting sector. In the context of the third research question, the research results proved a strong connection between the use of blockchain technologies and business reliability. The respondents recognized the advantages of blockchain technology in improving the business process, as well as the process of control and verification. This group of questions showed the smallest differences in the answers, that is, in the values answered by the respondents. On all questions, except for the fifth, Mode is 5, which proves the very high confidence of the respondents in the possibilities of blockchain technology in the accounting sector. Despite the limitations related to the geographical structure of the respondents, i.e. more than 95% of the respondents are located in the North and West, i.e. more economically developed parts of Croatia, the results of scientific research prove that employees are very well informed about "up-to-date" technologies. In the first set of questions, respondents showed a high level of information about the possibilities of blockchain technology in accounting processes, and a precise distinction between the possibilities and expectations of blockchain technology was proven. In the second set of questions, the results of the research prove that the respondents are very willing to learn, accept new technologies, and expect the company to provide them with education. Despite the very high assessment of current abilities and knowledge, respondents expect to be able to continue their education in the field of blockchain technologies. The answers to the third set of questions are encouraging and suggest new research. According to the research results of the third set of questions, according to which users confirm the usefulness of using blockchain technology in accounting, various possibilities for further scientific research are opened. Research can be directed in two basic directions. On the one hand, there is a need for further research of existing employees in the accounting sector about their attitudes and wishes related to the improvement of business processes. On the other hand, the research needs to be expanded beyond the company in order to analyse the environment and the readiness of other stakeholders in this process to use blockchain technology.

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## LEADERSHIP - RECOGNITION OF CRUCIAL COMPONENTS RELEVANT FOR DIGITAL TRANSFORMATION OF LEADERS

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### ABSTRACT

*A comprehensive understanding of emotional intelligence requires an understanding of a whole range of factors. In this paper, emotional intelligence will be described and linked within the context of digital transformation leadership through recent researches and scientific papers published on the topic of emotional intelligence and its connection with digital transformation. Within the scope of this paper, we will try to shed light on the theoretical concept and consider the connection between emotional intelligence and digital transformation leaders. We will analyze in detail some of the dimensions of emotional intelligence that we consider relevant for individuals conducting digital transformation as well as offer some future improvements for selecting adequate digital transformation leader.*

**Keywords:** digital transformation, emotional intelligence, leadership

### 1. INTRODUCTION

Determining some of the dimensions of emotional intelligence that can be taken as applicable to the process of digital transformation is certainly an area of research interest. To succeed in the digital age, it is fundamental for leaders to be set to direct and guide their organizations through this transformation (Bawany, 2020). The process of organizational digital transformation involves an extensive and complex process of change and transformation. According to Goleman, every emotion implies a tendency to act (Goleman, 1997). Therefore, in this paper, we decided to use an already well-existing concept and apply it to the digital transformation process leaders. The genetic inheritance of each of us is a combination of emotional parts that determine our temperament, and we start with emotional lessons already in early childhood, and therefore are in childhood and youth. This specific period of our life will be crucial for determining the basic emotional habits that will later guide our lives (Goleman, 1997). Following on from that, we can conclude that we get the basis for emotional intelligence and engaging in any profession already at an early age. In a professional sense, emotional intelligence is extremely important for professions that work in a social environment. In some of the previous works, we found a link between Aristotle and emotional intelligence. Namely, Aristotle believes that the problem does not lie in emotionality, but in the appropriateness of emotion and its expression. It asks basic questions, which is how to bring intelligence to feelings. The purpose of emotional intelligence is the capability to control emotional impulses, to interpret other people's hidden feelings (Goleman, 1997). In the following text, we will emphasize its importance in the digital transformation era. Psychologists long ago divided human thinking into cognition, i.e., cognition, affect and motivation. The very concept of emotional intelligence unites intelligence and emotion.

Intelligence is defined as the quality of the functioning of the cognitive sphere of thought, but Professor Zarevski points out that there is no unequivocal definition of intelligence (Zarevski, 1999). Considering that both emotions and intelligence are terms that are difficult to define unilaterally, then the emergence of the construct of emotional intelligence was received with great interest in scientific and especially in wider social circles. One of the segments of the human problems of the individual today is certainly solving the discrepancy between what he thinks and what he feels, i.e., harmonizing emotion with reason. As a term, emotional intelligence dates to the beginning of the 90s of the last centuries in psychology. Peter Salovey from Yale University and John D. Mayer from New Hampshire University were among the first to mention the concept of emotional intelligence in their works. They defined it as "the ability to monitor and distinguish one's own and others' feelings and emotions, and to use that information as a guide for thinking and acting" (Salovey and Mayer, 1990). They often emphasized that their works should only be a stimulus for further scientific investigations. Salovey and Mayer, put emphasis on evaluation and expression of emotions in oneself and in others; regulation of emotions in oneself and others; using emotions for adaptive purposes. Salovey and Mayer took the subspecies of social intelligence from Gardner's theory of multiple intelligences (interpersonal and intrapersonal intelligence) and Sternberg's triarchic theory of intelligence (practical intelligence) as the theoretical basis for the construct of emotional intelligence. The result of their work was that they successfully confirmed their concept of emotional intelligence and created the necessary tests to measure it. Mayer et al. go a step further than the above, claiming that "it is no longer possible to ask the question of whether emotional intelligence existed, but whether it is important in different life segments." Within the framework of this paper, an attempt will be made to determine its importance in the act of practicing the digital transformation process through their leader.

## **2. EMOTIONAL MIND**

Recently, a scientific model of the emotional mind has appeared, although the concept of the emotional mind has been known since the time when our immediate reactions were dominated by emotions (Goleman 1997). We must distinguish the emotional from the rational mind, therefore the emotional mind is more dominant as the influence of emotions increases and when the emotional component is on the rise. Distinguishing two emotional minds can help in processes such as digital transformation to include this as a part of selection process in order to find appropriate leader for such a complex process. The emotional mind is incomparably faster than the rational mind. This speed of action of our emotional mind, and therefore that speed excludes conscious and analytical thinking. Paul Ekman believes that the speed with which emotions prevail is the key to adaptation. In our paper, we will be interested in emotional adaptability for digital transformation leaders. In digital transformation process, it is extremely important to react appropriately to the mood, temperament, motivation and wishes of others. In the digital transformation process, we must also pay attention to the minimization of emotions (Goleman, 1997). Emotional competence is also important for digital transformation leaders, more specifically, how self-disciplined digital transformation leaders are in social transactions that cause emotions (Ilić, 2008). Moreover, it is important that we are not mobilized by emotion, but that we react appropriately to urgent situations without wasting time. Gardner indicates that abilities related to emotions and dealing with people are of crucial importance in solving the problems we encounter in everyday life. The basis for the emergence of the concept of emotional intelligence was the differentiation of social intelligence into intrapersonal and interpersonal intelligence. In its definition, intrapersonal refers to aspects of a person, the way that person approaches his feelings, how he distinguishes emotions, and how he approaches them. Emphasis is often placed on understanding one's own feelings and behavior (Takšić 2006).

### **3. METHODOLOGY OF EMOTIONAL INTELLIGENCE**

Mayer and Salovey believe that the measurement of emotional intelligence is most often carried out using direct assessment of abilities (performance tests) and self-report scales. The characteristic of the direct examination of the ability of emotional intelligence is to set before the examinee a specific problem that he needs to solve, and in which, unlike self-assessment scales, there is a correct and incorrect answer. This brings the measurement of emotional intelligence closer to standard ways of testing general intelligence, since the examinee is placed in a problem situation, that is, a task that needs to be solved. Most scales are based on the Mayer and Salovey model. The most famous are Schutte's scale of emotional intelligence. The first one was published and contains 22 particles divided into 4 factors. The emotional quotient inventory includes 133 items classified into 15 scales and 4 broad categories of intrapersonal skills, interpersonal skills, adaptability, stress management, general mood. The EQ map (Cooper, 1996) is also mentioned, according to which the emotional intelligence divided into 5 attributes: current environment - life satisfaction, emotional literacy, emotional competences, emotional values and attitudes, emotional intelligence outcomes. In Croatia, the Emotional Competence Questionnaire (UEK-45, Takšić, 2002) is used and which is constructed according to the model of Mayer and Salovey. The problems with self-assessments of emotional intelligence boil down to the standard objections to all similar self-assessment scales, namely that individuals tend to fake their answers, that is, they often do not know their emotions. They overlap with already known personality traits. Thorndike says that social intelligence is distinct from academic ability and is a key part of what enables people to do well in the practical matters of everyday life. Practical intelligence is the type of sensitivity that allows managers/leaders to locate unspoken messages. Sternberg and Salovey viewed intelligence as a broader concept. They considered intelligence as a necessary factor in everyday life and necessary for a successful life. Old concepts of IQ revolved around a narrow field of linguistic and mathematical ability, and good test scores most directly predicted one's success in the classroom and in the professoriate. For example, it is measurable to what extent leaders participated in contributing to digital transformation processes, and how comprehensively they contribute to the community (inside and outside the organization). The personal involvement of individual leaders within the company which is going through the process of digital transformation certainly makes a difference.

### **4. LEADERS OF DIGITAL TRANSFORMATION AND LINKAGE BETWEEN EMOTIONAL INTELLIGENCE AND ECONOMIC CAREER**

We live in a digital era when development of digital technologies is disrupted and many industries and transformed by the global economy; whereas we speak about digital transformation then we must mention that digital transformation affects the whole company and its ways of doing business; it is transforming simple organizational processes and tasks. It rearranges the processes to change the business logic of a firm (Verhoef et al, 2021). The ability of an organization to effectively adapt to the digital era depends greatly on the willingness of leaders to cultivate a work culture that views digital technology to facilitate real time information synthesis, rather than relying solely on technology itself. Digital transformation is seen as an ongoing, all-encompassing organizational approach and it involves fundamental changes inside and outside of the organization. Strategy plays a decisive role in digital transformation, therefore there is a need for effective leadership so that the strategic plans succeed. In this paper we will put focus on 'emotional intelligence' strategy. Goleman (1995, 1998) defined emotional intelligence as the ability to be aware of and to handle one's emotions in changing situations. He concluded that emotional intelligence includes traits such as self-awareness, self-regulation, motivation, empathy, and social skill. These are the skills that leaders require in the firm for effective leadership and firm performance as well.

Today's business leaders require a high level of IQ+EQ. Successful leaders will also possess and practice the qualities of a Digital Quotient; rapidly adapting and transforming their enterprise by injecting digital capabilities into the organization's DNA. Following that we need to define what digital transformation leader it is. It is often defined as a person inside an organization who influences a group of individuals to achieve company goals. Leadership is not a fixed trait or something that is inherited, but rather an ongoing exchange that takes place between the leader and followers (Verhoef et al, 2019). Literature suggest that Leaders must possess nowadays a new selection of skills and qualities that were not as critical in the past. For instance, the ability to innovate and creative thinking will be essential for leaders to stay ahead of the curve and remain relevant in a rapidly evolving digital environment, must be talented in digital technologies and understand how to continuously improve it. Moreover, the ability to establish strong networks and collaborate with others will also be crucial since digital technologies have aided people to connect with each other more easily than ever before (Verhoef et al, 2021). Leaders who communicate a vision, encourage acceptance of group goals, and provide individualized support can transform the fundamental values, beliefs, and attitudes of followers, motivating them to exceed minimum organizational standards the transformational leadership style involves inspiring and motivating employees to achieve their full potential. To achieve that, companies need to have digital transformation leaders who are digitally practical and able to strategically apply technologies before, during, and after a crisis. With that type of profile organizations can strengthen resilience and better safeguard against existential threats. In addition, effective digital leaders must be able to adapt to changing circumstances and embrace new opportunities as they arise (Banks, et al., 2022). Many elements of emotional intelligence are listed, but they are not defined as such, but rather as rules of oral expression. The fact is that within these rules the necessary possession of emotional intelligence can be recognized. E.g.: coming to a society where not everyone present knows each other. From all the above, we can conclude that it would be useful and practical to include the measurement of emotional intelligence within individuals who are digital transformation leaders, and this is also a suggestion for future research. For practitioners, it is necessary to bring together the insights from information systems, marketing, strategic management, innovation, and operations management to make sound organization-wide decisions about how to respond to digital technologies and implement digital organizational changes (Verhoef et al, 2021). Studying the theoretical part of emotional intelligence and the digital transformation leaders, we noticed a connection between emotional intelligence and digital transformation. Studying the qualities of leaders and the skills required to perform a digital transformation leader, we noticed that process of digital transformation is extremely complex in terms of following certain norms and procedures, and for that it is necessary that a person has certain virtues, a certain type of intelligence to perform it. The basic question that arises is how emotions affect intelligence, and in this paper, we are still interested in how emotional intelligence affects the diplomatic profession.

## **5. INTELLIGENCE AND EMOTIONS – APPLICATION IN DIGITAL TRANSFORMATION**

According to the traditional understanding, emotions disorganize and interfere with successful and rational mental activity, but on the other hand, if they are properly managed, they can initiate and improve the rational action of an individual by increasing the motivation to solve a problem that requires rational reasoning (Salovey and Mayer 1990). One of the first classifications of intelligence was proposed long ago by Thorndike (1920, according to Mayer and Geher 1996; Salovey and Mayer 1999), according to which there are three groups of intellectual abilities. The first group are: abstract, analytical and/or verbal. The second group are: mechanical, visual-spatial and/or synthetic.

The third group is social and/or practical intelligence. We have a concrete example of practical and social intelligence in the digital transformation leadership in the case of Anjali Sud, CEO of Vimeo, as a smaller competitor to YouTube. The company's been around for 16 years, and digital transformation started with leadership of Anjali Sud, when she took over as CEO, she stopped all that to reinvent Vimeo as a software company that serves video creators. And that market is booming at the end of 2020, Vimeo had over 1.5 million paying customers generating \$83.8 million in revenue alone. Furthermore, Vimeo grew so fast in the last couple of years that it accidentally turned a profit in the third quarter even as the company was trying to reinvest in growth. Another example of successful leadership in digital transformation is Eric S. Yuan, the founder of the video conferencing platform Zoom which has become increasingly popular in recent years. For example, he personally emailed every customer who cancelled their service. He applied his social skills for organizational purposes. Furthermore, intelligence is also divided into academic and social. The very division in to these two intelligences is suitable for explaining the cause of the emergence of the construct of emotional intelligence. Thus, Sternberg and Wagner (1994, according to Takšić 1998), researching intelligent behavior in everyday life, concluded that it is not what is required in IQ tests, but practical knowledge of maintaining self-regulation and control, how to work with others and how to accept what others do. In the types of intelligence, the first two intelligences are defined as academic intelligence since they represent the best way of predicting success in schooling (Gottfredson 1998, according to Lam and Kirby 2002). Mayer and Salovey (1990) were among the first to specify emotional intelligence and defined three types of emotional information processing processes: assessment and expression of emotions in oneself and others, regulation of emotions in oneself and others, use of emotions for adaptive purposes. In 1996, Mayer and Salovey published a second refined version of the model of emotional intelligence (according to Mayer and Salovey 1999). According to the above definition, the authors include four structural levels - branches (branches) of abilities in the construct of emotional intelligence. - reflexive regulation of emotions in the promotion of emotional and intellectual development (D level), understanding and analysis of emotions: use of emotional knowledge (C level), emotional facilitation of thinking or mental assimilation of emotions (B level), perception, assessment, and expression of emotions (A level). In the rest of the text, we will observe the 4 abilities of the mentioned model and indicate their application in the diplomatic profession. D level: reflexive regulation of emotions for the purpose of emotional and intellectual development. The ability to remain open to feelings, both pleasant and unpleasant. - the ability to reflexively experience or detach from emotions depending on the assessment of usefulness - the ability to reflexively monitor emotions in relation to oneself and others, such as how typical, clear, influential, or measured they are, the ability to manage one's own and other people's emotions by mitigating unpleasant and enhancing pleasant emotions. This level is extremely important in the digital transformation process if we consider that the digital transformation leader is also viewed in a political context. They also must have the ability to manage emotions. C level incorporates understanding and analyzing emotions: using emotional knowledge. The ability to name emotions and recognize the relationship between words and the emotions themselves (such as between liking and loving) the ability to interpret the meaning that emotions convey (e.g., that sadness is related to some loss) the ability to understand complex multiple feelings (such as simultaneous feeling love and hate) the ability to recognize probable transitions between emotions - the transition from anger to shame. We live in a time of complex organizational changes and various interpersonal relations and the ability to understand multiple feelings can contribute to a better performance of digital transformation leader. We have a concrete example in Kissinger, a very influential politician from 1969 to 1977. He served as National Security Adviser to the President and Secretary of State during the Nixon and Ford administrations. During the Cold War, as a skilled diplomat, he calmed the tense relations between the USA and the Soviet Union.

He supported the policy of opening China. B level incorporates emotional facilitation of thinking. Emotions determine the order of thinking so that they direct attention to important information. Emotions are sufficiently clear and accessible, so they help to judge and remember events that are related to different feelings. Different views on things change emotional states supporting the possibility of evaluating the same situation from different sides. Emotional states facilitate approaches specific problems: thus, happiness facilitates inductive thinking and creativity. A level incorporates perception, evaluation, and expression of emotions; the ability to notice emotions in one's physical condition, feelings, and thoughts; the ability to observe emotions in other people, in works of art; the ability to accurately express emotions, as well as express the needs associated with these feelings; the ability to distinguish correct from inadequate, or sincere from false expression of emotions. In the diplomatic protocol book for example, clear rules are given on how to distinguish honest from false expressions of emotions and how to react appropriately in certain situations, for example, the rules of entering a discussion with which we do not agree. If we do not know what to say before taking the floor, it is better not to engage in disingenuous arguments. Each skill requires its own preparation. The book states that no matter how interesting and intelligent you are, you should always encourage the discussor so that others also come to feel, you should know exactly how to recognize the moment when praise should be moderate (Mikolić, 1995).

## 6. CONCLUSION

In the last few years, many seminars, scientific articles, doctoral dissertations and master's theses and books deal with the problem of the existence of emotional intelligence. Traditional leadership qualities like intelligence, toughness, determination, and vision were important, but that truly effective leaders also displayed a high degree of emotional intelligence, which includes qualities like self-awareness, inspiration, empathy, social and relationship management skills. The goal of this paper was to make a link between emotional intelligence and the digital transformation leaders. Digital transformation is becoming an everyday process, and it often appears on the top of priorities for contemporary managers. While there has been a significant amount of research conducted over the past decade in the domain of digital transformation, there is still a lot to learn about this topic and especially if we approach the topic through organizational psychology tools. In last years, various empirical research conducted examined the phenomenon of digital transformation and researchers have examined changes in organizational strategies, processes, structures and decision-making and culture. Digital transformation is not a phenomenon that prompts impacts at these different levels, without at the same time being influenced by them simultaneously, additionally our focus was on interplay between emotional intelligence and its possible impact on digital transformation leader. Emotional intelligence is seen as the 'powerful tool' that affects digital transformation in part of decision making (leadership). Digital era is continuously seeking for leaders who understand the importance of bringing changes into their organizations to fit the needs of today's digital age and can place themselves at the head of innovation and gain the benefits of successful digital transformation processes. We found that emotional intelligence components are crucial in following demanding digital era which requires continuous adaption and adjusting selection processes to fit the right person for digital transformation leader. Emotional intelligence as a concept is already common knowledge to everyone, but not in the context of certain professions and digital transformation leaders. Some professions overlook the segments of psychology and selection even though it is necessary in the field of the digital transformation leadership precisely since the following business role imposes following a series of complex norms and rules which digital transformation includes. We tried to connect some factors of the digital transformation leadership with the concept of Mayer and Salovey and concluded that a link with the digital transformation leadership can and must be found in each of the dimensions.



Connecting the above in this paper, we can conclude that the concept of emotional intelligence is present in every profession, especially in those where an increased effort is needed in harmonizing cognitive functions, emotions, and behavior. The biggest challenge in front of any manager is bringing them together on the same platform and motivating them to think alike and work alike. To achieve the desired result, the managers must understand each generation and try to come up with a certain concrete plan which will motivate both the generations and make them come together and start working as one. This can only happen by gaining trust and mutual respect from both the generations. This can easily be done through emotional intelligence. The application of emotional intelligence for digital transformation leaders should be the basis of success, but additional efforts should be made in creating questionnaires for the digital transformation leaders, and in some of the future works we will methodologically review the above-mentioned relationships. Today's business leaders need to possess a completely new set of capabilities in addition to IQ and EQ to succeed in the digital age. Some further studies will cover more research about digital IQ as a combination of emotional intelligence in digital era and possibly identify it as a tool for future and include it in a selection process.

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## PROCESSES OF GLOBALISATION - NEGATION OF IDENTITY

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### ABSTRACT

*The world is one big market, today. Today's accelerated globalization means that every individual, every organization, every country, every language, culture, all spiritual forms of culture must compete with others for their share of world citizens, tourists, investors, followers, students, international media, believers, people who they speak your language, they live there with you. Cultural tourism is being promoted as an increasingly attractive tourist segment. Thus, it is becoming more and more interesting, both for researchers and for creators of economic development policies who recognise this area as a significant national economic resource. Even less economically developed nations that continuously lag in economic development and national economic competitiveness are developing strategies to attract tourists by promoting their cultural heritage. Still, how to be yourself and recognisable with all these changes, how to preserve your identity. During the last two decades, intensive scientific and professional activities have been initiated in order to explore the role and authenticity of cultural tourism and, with that, its importance in the context of national development strategies. The world is rapidly becoming more integrated, and local developments are increasingly linked to politics and economics. Globalisation has had significant impacts on tourism. The dynamics of globalisation are also causing continuous changes in tourism (Buhalis, 2001). Therefore, to understand the vital link between globalisation and tourism, we need to clarify the various concepts we offer through tourism. The emergence of globalisation provides suitable conditions for promoting tourism. However, along with this fact, a competitive advantage will also be created between more developed countries and the least-developed countries in the race to compete for their share, which will result in an imbalance between supply and demand. Countries that offer recognisable and authentic tourism products can benefit the most. A tourism-oriented country like Croatia will, with very little change in globalisation, or only a brief globalisation-related change, have development opportunities and will stay caught up. In most scientific discussions, it is clear that continual re-examination is taking place regarding the extent and nature of the actual share of experience in tourism that is based on the element of national identity. This paper explores the relationship between national identity, both ethnic and national, in the context of defining cultural tourism on the example of the Croatian economic ecosystem that is going through multiple transformation processes catalysed by transition, globalisation and global crises. In addition, the determinants of different identities in the plural context of today's societies are examined on an interdisciplinary basis. As a result, it offers recommendations on how identities are created and differentiated, what forms them, and which institutions participate in this process. Using the example of globalisation in Croatia, we will attempt to establish arguments for globalisation and cultural identity being able to go hand-in-hand.*

**Keywords:** cultural tourism, cultural identity, identity strategies, national identity, language as identity, education, globalisation

## 1. INTRODUCTION

In recent decades, many deeply involved debates have emerged which strive to respect the role of authenticity in the development processes of cultural tourism. In today's mobile world, there is a strong link between multicultural tourists and multicultural guests. Tourism enables a meeting between multicultural hosts and guests in an always mobile world. In all discussions, constant re-examination is seen concerning the actual share of the experience of the tourism industry, as well as the nature thereof. Why is an orientation towards specific destinations not considered cultural tourism, say, a trip to Brussels, while a trip to Paris is considered cultural tourism? It is unsuitable for cultural tourism to be constantly tied to the "symbolism" of tradition. It is a part of a culture and all spiritual forms of culture, whether material or immaterial. Tourism is just that, cultural tourism: "People don't come to America for our airports, they don't come for our hotels or sports or recreational facilities... They come for our culture: high culture, low culture, middle culture, right, left, real or imagined — they come to see America" (Keillor, G. 1995). Therefore, this paper will also explore the topic of ethnicity, including the subtopics of ethnicity and culture. Terms: culture, ethnicity, development: Challenges of identity reconstruction; Culture, myth and ethnicity; The boundaries of *ethnicity*, *culture*, and *tourism* comprise the concepts of culture, ethnicity and identity. What we want to emphasise here is the relationship between culture and ethnicity in Croatia, but also in the broader European context, because we are deeply convinced that there is no other form of tourism than cultural tourism. The relationship between the ethnic and the national is also raised, and the determinants of different identities in the plural context of today's societies are also examined on an interdisciplinary basis. How identities are created differentiated, what forms them and which institutions aid in that process are just some of the crucial questions that the text tries to answer. Why does militant ethnicity appear as a choice for an identity strategy in Croatia? How will this allow us to be a welcoming country for tourists? We are aware that Croatia has always been a part of Europe. However, there is always the question of its cultural and ethnic diversity, its organisation, and questions of identity, both within the country and within the larger European market.

## 2. TOURISM

Tourism is like any other industry. Although it offers intangible, short-term services, although it is characterised by global competition, and although it is dependent on political developments, tourism is like any other industry in its most crucial market feature: consumers have specific ideas about what they require (preferences) and choose the offers that best meet their needs. Therefore, it is crucial to have a detailed understanding of the ideas that consumers have about their dream trip, going to a destination to remember, or an adventure trip, even the memory of which will still give them an adrenaline boost. Governments of tourist countries, tourist organisations or destinations, cities and regions need to understand what the consumer is thinking in order to be able to design offers that best suit the consumer's preferences, and thus increase sales, and preferably satisfaction as well, and with that the likelihood that tourists will return. Why do tourists come to Croatia at all? What are their preferences? Croatia is the country in the European Union that is most dependent on tourism. Revenues from tourism account for a quarter of Croatia's GDP if direct and indirect revenues are taken into account. Direct revenues are those of hotels and restaurants, and indirect revenues are those of suppliers. Revenue from tourism is so vital that the government had to take some risks and open the borders in 2020, not least because tourism accounts for 11 per cent of GDP and indirectly for 16 per cent. In Greece, 26 per cent of workers are employed in tourism. In terms of absolute numbers, no country receives as many guests from abroad as France (89 million international tourists in 2018). Moreover, in second place is a European country, Spain (83 million).

In terms of revenue from foreign tourists in absolute numbers, Spain (71 billion euros in 2021), France (58 billion euros), Italy (45 billion euros) and Germany (37 billion euros) may lose the most due to restrictions imposed in the fight against coronavirus. Even today, we are still spurred on by the problematic situation due to COVID-19, mainly because the decline in tourist traffic in the world could amount to 60 to 80 per cent in 2021, according to the estimate of the World Trade Organization for Tourism (WTO, 2020). This has impacted Europe the most, as it accounts for 51 per cent of international arrivals. The drop in tourist traffic in the world could amount to 60 to 80 per cent this year, according to the World Trade Organization for Tourism. However, although we have the opportunity to read scientific texts in the field of cultural tourism (Buhalis, D.; Richar, G.; Kostanje, M.; MacCannell et al.), only one framework is offered for cultural tourism studies and is interested only in using the "allegory of culture" to utilise the possibilities of the destination in order to gain further advantages in the world market without offering an understanding of cultural problems and how to truly make a tourism product from cultural resources which every country possesses. Today, in Croatia and beyond, cultural tourism is used ethnically to mark "the other/different".

### 3. CULTURE

When we find ourselves in the area of culture, economics can mean little or nothing to us. This is because man, his world, the whole human world and culture, and his specific human situation cannot be measured or compared at all or even in part. *Cultural research* is a social activity that must consider the totality of the social relations of which it is also a part. Today, the way of connecting new research with the existing fund of scientific knowledge already present and demarcated in scientific theory depends primarily on the general theoretical development of a particular science, as well as on the development of the theory itself found in a particular field of research. Culture is a universal human phenomenon; culture is both an anthropological disposition and an essential generic feature of man as a social and individual being, as well as a spiritual and creative being. Therefore, we can conclude that no society in history is without a certain degree of culture in the broadest sense of the word, i.e., as an organisation and a means of survival, nor an individual as a natural member of a particular society, who has not adopted the basic patterns of associative culture, processes of socialisation, and internalisation. From the primary meaning of the term culture (lat. cultus, colere), a term that directs us towards cultivation and working of the land (cultus agri, agri-culture), only later does culture acquire the meaning of cultivating and nurturing the spirit, as it is understood in the narrow sense. The famous Roman orator and philosopher Cicero, in part of the debate in Tusculum, gives us philosophy (philo-sophia, from the Greek for love/pursuit of wisdom, understanding the world in its foundations) the role of building up and ennobling the human spirit and soul ("Cultura anima philosophia est"). In the Middle Ages, the term culture acquired the meaning of a religious cult, i.e., a religious rite and worship. However, the concept of culture was initially formulated by the philosophy of the 18th century, when scholars began to rethink the concept of culture to align it with the interests of nation-states. Hence, in the 18th century, a new term appeared - civilisation. In France and England, the term civilisation acquires a higher-level meaning in the development of humanity that occurs after savagery and barbarism (Morgan et al.) and is characterised by the appearance of a writing system, monogamy, the discovery of materials, and the like. A collective sense of belonging, shaped by a biased (romantic) view of history and ethnic and linguistic homogenisation, brought scattered human groups into one entity in a common territory. The idea of Eurocentrism, i.e., the understanding of the cultural superiority of the West and its historical obligation to help undeveloped nations rise to the level of civilised ones, dates back to that time. However, the understanding of the concept of cultures and civilisations is not unambiguous (Valčić, M. 2019). In German science, it is understood as the difference between the field of technology (material culture) and political and legal

supplementation, and the sphere of spirit, art, religion, philosophy, so-called higher ideational culture, on the other hand. Also, it takes work to assign a label to a complex notion of culture. Culture is a set of all processes and creations arising due to the material and spiritual intervention of man (the human race) in nature, society, and the human spirit. The basic meaning of culture is the maintenance and progress (humanisation) of man, his society and life. To thematise cultural creativity within the possibilities of reflection thereupon means necessarily to relate it to work as a purposeful and expedient but painstaking activity of a serious man who creates, but also to an inventive game of creative imagination. In the history of culture, the question of a nation is interpreted differently depending on the theories employed. However, the fundamental realisation is that throughout history, the notion itself has sometimes been decisive. Going through the Croatian history of art, there is an evident evolution from the medieval communal consciousness (the Gothic painter Blaž Juraj Trogir), but also a developed regional affiliation (Juraj et al.), to the Croatian regional-national consciousness (Ivančević, R. 1999) (starting from the Baroque, when it developed in northern Croatia and Slavonia, which is symbolically expressed in the phrase Croatia rediviva, in 1700), while the nation has been the foundational determinant of the notion of the individual only since the 19th century. In Romanticism, throughout Europe after the French Revolution, the French imposed national symbols on us, from the anthem to the tricolour. In addition to nationalism, chauvinism was imposed on us hand-in-hand. A term first unmasked and determined by the French (a character from a comedy, a fanatical patriot, Napoleon's soldier Chauvin, a supporter of French imperialism, hence the derived chauvinisme-patriotisme exclusive). Moreover, now that we finally have a state as well, we are suddenly trying to offer the world a militant identity. Recently, EUROSTAT has been successfully researching the economic valorisation of culture and cultural events. The document [1] shows how Eurostat distributes data related to culture, how it defines the entire area - in Eurobase and - the cultural framework for cultural statistics covers 10 cultural areas:

- Heritage
- archive
- libraries
- books and press
- visual arts
- performing arts
- audio-visual and multimedia
- architecture
- advertising
- artistic crafts

And six functions:

- creation
- production/publishing
- expansion/trade
- preservation
- education
- administration/regulation.

Statisticians in the field of culture face many problems, and only the first difficulty relates to defining the concept of culture. The generally accepted definition of "culture" does not exist and will probably never exist.

Then, there is the problem of how to describe culture in numbers. In developing cultural statistics, EU statisticians faced many more practical challenges. Following the adoption of a resolution on the promotion of culture and economic growth statistics by the EU Council of Ministers of Culture in 1995, Eurostat (EU Statistical Office) set up a pilot group of national experts (LEG-Culture, the "Leadership Group - Culture") in 1997. The Group has issued the *first European methodological framework* to cover cultural statistics, terms, and definitions (including, first, a definition of the area of "culture" for statistical purposes and key indicators in the field of cultural employment, cultural financing and cultural practices. Therefore, the presented definitions and methods refer primarily to the general methodology used for various EU surveys and are at the same time a kind of cultural aggregates that are specific to cultural statistics, but some (e.g., printing "cultural codes" in different classifications) represent a matrix that is also used to analyse employability in culture.

#### 4. CULTURAL TOURISM

Many authors believe that "tourism is culture" Urry (1990). For MacCannell (1993), "all tourism is a cultural experience" Valčić, M. (2019) presents a list of types of tourist attractions, which can be created primarily based on the following attractions:

- Socio-cultural attractions (prehistoric and historical attractions, houses, costumes, furniture, social life, etc.);
- Historical personalities (sites and areas where writers and painters lived and worked);
- Art (theatres, street performances, circuses, etc.);
- Parks (arboreta, ornamental parks, historic parks, etc.);
- Museums, galleries, primarily art galleries;
- Festivals and events (historical fairs, festivals related to past events, country festivals, religious manifestations etc.);
- Stylish and old houses (palaces, country houses, nobility castles, etc.);
- Religious attractions (cathedrals, churches, chapels, mosques, ancient Greek, ancient Roman, ancient vineyards etc.);
- Cities (historic cities, buildings);
- Villages (rural architecture);
- Valuable areas (national parks, rural areas, gastronomy);
- Coastal cities (old coastal towns, old (ancient) harbours, lighthouses, islands);
- Regions (historical and geographical areas that are specific in their lifestyle).

##### 4.1. The Context of the Cultural Tourism

The primary usage of the term cultural tourism involves consuming a wide range of cultural manifestations like heritage, art, folklore, festivals, gastronomy, etc., by tourists. One of the most essential "components" of cultural tourism and tourism in general is the issue of *national identity*. Only the path of working on the mantra of identity and merging with cultural tourism is long. In other words, identity is assumed to be a:

- Archaeological sites and museums
- Architecture (ruins, famous buildings, whole towns)
- Art, sculpture, crafts, galleries, festivals, events
- Music and dance (classical, folk, contemporary)
- Drama (theatre, films, dramatists)
- Language and literature study, tours, events, myths
- Religious festivals, pilgrimages
- Restaurants, viniculture
- Complete (folk or primitive) cultures and sub-cultures

The primary use of the term cultural tourism involves consuming a wide range of cultural events by tourists, such as heritage, art, folklore, gastronomy, wine roads, pilgrimages, sports, etc. Cultural tourism is a socio-cultural relationship among people that promotes, moderates and mediates among various actors, including governments, citizens, politicians, economists, researchers, marketing professionals, travel agencies, travel planners and the like. There is another approach, called the "conceptual approach" (Richards, G. 1996), which tries to better define cultural tourism by analysing the practices, experiences and meanings of cultural tourists in contact with other places and cultures (McIntosh & Goeldner, 1986). "As with tourism in general, conceptual definitions of cultural tourism attempt to describe the motive and meanings attached to cultural tourism activity" Richards (1996); the definition of cultural tourism by McIntosh, R.W., and Goeldner, C. R. (1986) includes "All aspects of travel, whereby travellers become familiar with the heritage and history of others or their contemporary ways of life or thought". Research into the conceptual definition of culture reveals that culture consists of products (such as heritage, buildings, customs, and art) and processes (lifestyles) associated with culture. The factors that include the emergence of identity in cultural tourism (Richards & Pereira, 2006) are the following:

- The need for regions to distinguish themselves
- The search for new forms of community
- The need to valorise culture
- The shift towards experiential tourism
- Postmodern/postcolonial reification of identity

The author describes the identity itself as "a process of social construction of meanings that utilises cultural attributes" which occurs in the context of power relations "(Richards, G. 2006). The processes and products of other cultures are what cultural tourism offers to cultural tourists. On the other hand, there is almost no doubt that culture is a crucial component of a tourist "product" and that it can determine the competitiveness and efficiency of tourist destinations. Cultural tourism can play an important role and contribute to all three of these types of identities; for example, promoting the importance of heritage, both tangible and intangible, thus supporting the legitimate national identity, creating new cultural plans of a resilient identity and of course promoting new images of communities for the possibility of working on a planned identity. Therefore, it is evident that cultural tourism can play a crucial role in building and restoring identity, as well as creating a new one, for tourism consumption. In the case of Croatia, tourism has a minor impact on identity transformation. Interculturalism in Croatia has a natural and lived foundation, primarily in the fact that the Croatian nation itself was highly heterogeneous in its emergence and that this heterogeneity, as well as the awareness thereof, is still evident in some Croatian regions and the diaspora. All this, as well as the fundamental changes and transformation of identity, can add new senses and meanings to people and spaces.

## **5. GLOBALISATION AND TOURISM**

Furthermore, another factor that reveals the close connection between identity and cultural tourism is globalisation, loosened social ties, the decline of traditional family forms and structures, and individualism. This emerging situation requires redefined "symbolic constructs for communities", where cultural tourism can act as an ideological stimulus to promote a new image and identity in response to contemporary social relations, thus altering boundaries and boundaries between different human groups locally and globally. Despite different interpretations of contemporary social processes, a consensus has been observed that issues of culture, ethnicity and identity are among the central problems of contemporary societies. Croatia achieved its dream of nationhood only in 1991, eventually becoming the 28th member of Europe, and the cry "But we are Europe!" is already being imposed on us.



This desire - *desir d Europe* (Remy, 1997), if it wants to be effective, must therefore be operationalised. It would have to move from a universe of notions of diversity to a universe of strategies on how to adapt to diversity (Remy, 1997). Because what would be the new culture of Europe? We are united by universality, but we exalt our uniqueness. Strategies of synonymity with Europe have already been developed in politics, money, the economy, the media, labour, and the associated rights and duties of its citizens. However, as we have said, culture, on the contrary, carries effective symbols and moral norms and exists exclusively and only if the individual identifies with those symbols and norms within the community. European culture is dealing with two legacies. The question is, what is sameness, and what is the other who is not like me? Culture is like an identity; we are constantly invoking what we are, they are reinterpreted and adapted, their role in communities changes, and at the same time, it is postulated, outwardly, that it should not change, that it should remain the same. However, every culture is a process subject to outside influences. Let us say that the European area will not be based on national borders but will emphasise the factor of belonging. Croatia is in that situation. It had no positive program of national gatherings after the end of the war. Instead, we tread unprepared onto the path of transition. Despite the historical and class-related significance of culture and cultural differences, cultures of specific, relatively homogeneous social communities have something special, characteristic so that we can speak of ethnic and national cultures and their peculiarities. *National cultural identity* is a synthesis (not an inept sum or conglomeration) of all material and spiritual cultural creations of activity, the totality of given and requested answers to important human questions. It is also a synthesis of the basic needs of a particular socio-cultural and national space, which makes it unique, separate, intrinsic and autochthonous. This is precisely what tourism seeks.

## 6. ETHNICITY - NATION

Thus, *ethnicity*, ethnic group, people, and nation (*nation*, *natus*) are complex terms that contain several active but also crucial components. They reflect the following: origin, space, history, tradition, culture (language, religion), society, political and economic interests. From this, it is already clear that relationships from the layers of cultures and ethnicity are closely interconnected. A nation is formed from ethnic groups when certain historical, social and cultural conditions are met. One of the conditions mentioned above is insufficient to shape a nation, but the cultural one always prevails. The Croatian nation, for example, was formed under the influence of certain political, social and economic factors, but above all, based on cultural reasons. These are the essential integrated factors, in addition to a standardised national language, tradition, literature, education, and the Catholic faith. The Croatian identity is not an ethnic concept but a cultural one, and many ethnicities had a part in its creation (Serbs et al., etc.) We could rightly ask ourselves: Is there a French cultural identity? What would be left of, say, French culture if we exclude certain artists from their museums, even though these are the very reasons why we visit Paris in such large numbers: the Romanian Brâncuși, the Spaniard Picasso, the Italian Modigliani, the Dutchman van Gogh? In parallel with this statement, we could say that none created Romanian, Italian or Dutch art, but rather French and Parisian art. Despite this diversity of artists' nationalities in all fields of art in France, no one is so stupid or uninformed as to believe that there is no French cultural identity because there is no French ethnic identity in the nation's culture. We correlate ethnicity with culture, but we can also do so with the nation. An attempt is made to present an understanding of the concepts from the title, which, although each has its characteristics, are intertwined and complementary. We started with the definition of a nation, at the centre of which is the political awareness of a specific people. Special mention should be made of traditionalism, which should be considered bearing in mind the positive side of living tradition and the negative side of conservation and closure, and we should also touch on the effect that the process of globalisation can have in the

contemporary world, including Croatia. In the study of culture, many authors pay special attention to language as a symbol by which almost every ethnic and national culture emphasises its uniqueness and can sometimes be a means of preserving endangered cultural and national identity. In numerous published texts, it can be seen that distinguished Serbian scholars try to establish that the Renaissance Dubrovnik writer Držić is "ours as much as yours" because they justify themselves by the fact that we were once a single country and an artificial creation of a single language. However, language is still an independent identity, more potent than any appropriation; it is a spoken essence, inalienable. In any idea of a nation based on a substrate of ethnicity, there are two components: *rural* and *urban*. Thus, in our country as well, there are two comparative cultural traditions. However, in our country, it is determined that only the rural component can be "*ethnically pure*" - the urban is, by definition, *multiethnic* and *pluricultural*, and even in modern *cities*, *urban culture* cannot be *monoethnic*.

## 7. THE SPIRITUAL FORM OF CULTURE - LANGUAGE

Language is a fundamental system of articulated signs (symbols) through which we can shape thought and spiritual content, through which aesthetics and cultural function are shaped, and their understanding through coherent messages and communication. The role of language, primarily written language, is essential in the accumulation and transmission of cultural content. In addition to its formal features, grammar has a set of rules and regulations, which are accepted intuitively by all those who belong to the dialect. In the conditions of the new Croatian state, the Croatian language is also separated from the artificial creation of the Croatian-Serbian language from the former state, Yugoslavia. So, under these conditions, in the free, independent state of Croatia, we should not be too disturbed that our Serb neighbours are happy to publish the works of old Croatian writers who created them in Dubrovnik as their own. Moreover, it could flatter us. After all, don't we also publish the works of world classics and enjoy reading them? However, Serbian scholars of old Croatian writers want to continue to call the literature created on the soil of Dubrovnik Dubrovnik literature, thus separating it from its Croatian essence and desperately trying to find some trace of Serbianness in Držić's verses or his dramatic dialogues in order to ensure the void due to the lack of Renaissance and baroque in their cultural history. Fortunately, these efforts are increasingly rare; scientific maturity and practice are not promoted as such. According to their origin, the Dubrovnik speech and the language of Dubrovnik literature belong to the Western Štokavian dialect (as spoken in the Dubrovnik area, in the Neretva Valley, central Dalmatia, Slavonia and Bosnia). In that language, the language of Držić, the language of the famous Republic of Dubrovnik, language is not just a mere means of exchanging information and communication; we bind all collective feelings, all bearers of cultural identity; it is what we are. Appropriating someone else's cultural heritage as one's own, not universal, is an entirely unacceptable procedure that does not contribute at all to understanding and building trust between neighbouring nations. Plato says that the essence and meaning of language, i.e. speech, is that with the help of logos (words and reasons) in conversation, it guides the soul in the knowledge of truth, i.e. ideas. This is how language relates to essence; it is a spoken being. Therefore, language is, by its essence, an independent entity; through dialogue, it is directed towards the truth. In antiquity, words and speech were the common good of equal people. In the early Middle Ages, they approached language by understanding it theologically (Christian theology in which God is determined as an absolute). In the Renaissance, there was a triple system of signs that contained the signifier and the signified and the circumstances of that relationship that affected it. In the 19th century and with the beginning of modern thought, there was a return to language. Words regain their ambiguity and depth. Language is no longer just an auxiliary tool for communication and exchange of information but a historical organism determined by social, cultural and political factors.

That is why language, including the language of Držić, is an area of ethnic and cultural group affiliation. Because of this, collective feelings are attached to it, and, in addition to being the bearer of cultural identity, it is often a means for some extra-linguistic, especially political goals and special national interests. The entire historical and cultural experience of the socio-cultural community of the city-state of Dubrovnik is summarised and expressed in the language of Držić. Language is an indicator of the social and cultural level of Renaissance Dubrovnik. Every person, in order to survive and manage in today's demanding world, must have theoretical and practical knowledge about themselves, first of all, and about their environment. Therefore, man must name things and phenomena. Concerning man, animals do this instinctively, with limited signals, while man does it abstractly, symbolically, with the help of words, images, and rituals. Man differs from other living organisms because of the use of symbols and signs. The primary function of a sign is to express or present to us an object, phenomenon or concept. It is the meaning that represents the spiritual content that determines phenomena and concepts in the world that surrounds us and is communicated in a materialised form through a system of signs. Theorists (From, 1970) distinguish three basic types of symbols: conventional, random and universal. We use conventional symbols for things in everyday life. A random symbol is those symbols where the relationship between them and what they signify is random, individual. We are talking about a conventional symbol when it results from the experience of a specific individual, a particular experience and associated associations. Symbols are a significant structural part of Držić's cultural (religious and national) identity and were influential throughout his life. That is why we strive to preserve and further affirm the cultural heritage of Držić and its national cultural identity, and we do not support the negation of identity. Identity is unity with oneself. Identity is the answer to who we are and what makes us what we are, to whom and where we individually or collectively belong, where we come from, and where we are going. Cultural identity is the synthesis structure of all material and culturally spiritual creations and activities, seeking answers to essential human questions and basic needs of a particular socio-cultural space, which makes it separate, own, autochthonous and authentic.

## 8. EDUCATION, UPBRINGING

Education and training are integral components of a nation's culture. *Cultus, Colere*, in the broadest sense of those words, education and upbringing, are a universal human phenomenon, they are mutually and inseparably connected and active. Anthropology, on the other hand, generally speaking, is a holistic science of man, his nature and culture, so its approach and insights are always current and indispensable both in the scientific and pedagogical processing of education and upbringing and in its application. Thus, appearance (Greek: *morfé, haraktér, trópos*) means, namely, establishment, composition, creation, shaping - of man. Education is the process of spiritual formation of man, his personality, cultivation of his self-awareness and social awareness. This is why we say that teaching is a complex but unique educational process. Education and upbringing (*paodeia*) as a system, in the philosophical and humanistic (not ideological) sense, means that they are and should be a kind of *causa sui*, i.e. conditioned by man and nation, by the measure of man and his sociability, a whole designed by a philosophical concept, since that man, by his essence and nature, is a social and spiritual being (*zoon politikon, ehon logon*), a being of free development, progress (anth), creativity and transcendence of his natural and merely empirical givenness (*anatrás-ops*). Pedagogy that pretends to deal with everything mentioned as a science is directed towards anthropology as a science of the whole man, that is, to the philosophical discourse about man as a totality and to its understandings and assumptions about the nature, essence and meaning of man's existence and survival. Humanistic and holistic anthropology should, beyond all ideologies, thoroughly theoretically and empirically examine all forms of human natural, spiritual and social, economic, political and cultural activities and achievements.

All these givens, activities and accomplishments, of course, do not exist outside the cultural-historical-social framework, but neither do they exist outside of man. They are in man's possession, they are in Croatian man's possession as a collection and continuity of all his positive human achievements, so true values and goods transcend their time and space, they are at the same time beacons and signposts for future generations in their humane and civilized aspirations and aspirations. This is the general and basic sense of culture in the broadest sense of the word as a universal human phenomenon. By definition, culture is a historical, social category that changes with changes in social conditions, which it itself influences. Therefore, definitions and theories of culture must include, in addition to relatively constant elements of culture, dynamic cultural processes (*acculturation, enculturation, innovations*), that is, their mutual conditioning and permeation.

## 9. CONCLUSION

The first polemical point in this article is the need to develop a strategy, which means positioning as a tourist country and realising that everything related to culture is considered worthy of observation. Furthermore, as we tried to connect some factors that reveal the close connection between identity and cultural tourism, we defined the current issues of globalisation and nationalism. All ethnic doctrines about the Croatian nation today are based on *rural* culture, while the *urban* one is neglected. Within the whole of culture, ethnicity, and development: the challenges of reconstructing identity, the text (Katunarić, V. 1999) begins with the statement that in countries undergoing transition, there is no longer a political interest in elite culture. The author points out that in countries in transition, there is a division of the cultural elite into "traditionalists" ("folklorists") and "modernists" ("pro-Westerners"), and parts of modern high culture (art, science, higher education) are poorly interconnected. Attention should also be paid to the value possessed by creative culture, which is increasingly beginning to be understood as the development potential of society. In this context, the author highlights the example of Croatia as a less developed country that could benefit from culture understood as socio-cultural capital. Culture is all that is man, endowed with reason and faith, man who lives in the here and now, man who has lived before, whether alone or in society, whether active or passive. In Croatia, cultural tourism marks ways of life in the impression of rich heritage. In Croatia, cultural tourism can also act as an ideological stimulus for promoting a new image and identity in response to the contemporary social relationship, in this way changing borders both locally and globally. Cultural tourism invokes the value of tradition, but the emergence of the future of post-socialist countries takes place on "another stage", on the foundation of the present globalised capitalism. At the level of mega-trends, for reproducing the construction of "globalised capitalism", the following statement holds: whichever path you go down, if you do not follow the rules of transition along the way, or if you even go so far as to resist them, they catch up with you if your "appeasement" or "pandering" becomes conscious through the circumstance of its reproduction. Tourism and cultural tourism have not only alleviated the burden of underdeveloped parts of the economy in Croatia but have already happened along with the economic and political changes in our country.

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## CHANGES IN SUSTAINABILITY REPORTING – ARE HOTEL COMPANIES READY FOR THEM?

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### ABSTRACT

*The European Union is in transition to a sustainable society. Companies are being pressurised in various ways to conduct their business more responsibly and various directives are being proposed in this context. These include the Corporate Sustainability Reporting Directive which requires the publication of sustainability reports in which companies must demonstrate their accountability towards the environment and society. In 2024, listed companies will be required to report comprehensively on their environmental, social and governance issues. This study focussed specifically on the hotel industry. The purpose of this paper is to compare the new reporting requirements of the European Sustainability Reporting Standards with the current sustainability disclosures of hotel companies. A content analysis of the sustainability reports of large Croatian hotel companies that are currently required by law to disclose their sustainability information was conducted. The analysis shows mixed results. The hotel companies can be divided into four different categories: Hotel companies that are preparing extensively for the new regulation, hotel companies that are making efforts but need to make significant changes to meet the new standards, companies that are reporting only to meet the legal requirements and provide a minimum of information and finally companies that have not disclosed any information.*

**Keywords:** *Corporate Sustainability Reporting Directive, European Sustainability Reporting Standards, Hotel companies, Sustainability reporting*

### 1. INTRODUCTION

Sustainability reporting is becoming increasingly important as the pressure on companies to account for their impact on society and the environment increases. In this study, the focus is placed on hotel companies while they operate in conditions where they are highly dependent on environmental and social resources. Their impact on sustainability may not be as damaging as some other industries, but it cannot be dismissed. Against this backdrop, sustainability reporting is seen as a tool to demonstrate accountability to the environment and society. Initially, sustainability reporting was voluntary. As efforts to reduce climate change and minimise all other sustainability impacts have not been met, there are more and more cases where it is becoming mandatory. In the European Union, this takes the form of the Corporate Sustainability Reporting Directive, in which the first companies are required to publish detailed sustainability reports in accordance with the requirements of the European Sustainability Reporting Standards. The Directive and the Standards are very specific and aim to minimise greenwashing. It is advisable for companies to start with comprehensive preparation during a short transition period (Baumüller and Grbenic, 2021). The purpose of this paper is to analyse the sustainability reports of hotel companies with the new European standards for sustainability reporting in order to assess the current state of reporting and preparation for the new legal requirements. Firstly, sustainability reporting and the new legislative requirements are presented. This is followed by the methodology and results. A summary of the results, limitations and suggestions for future studies are offered in the conclusion.

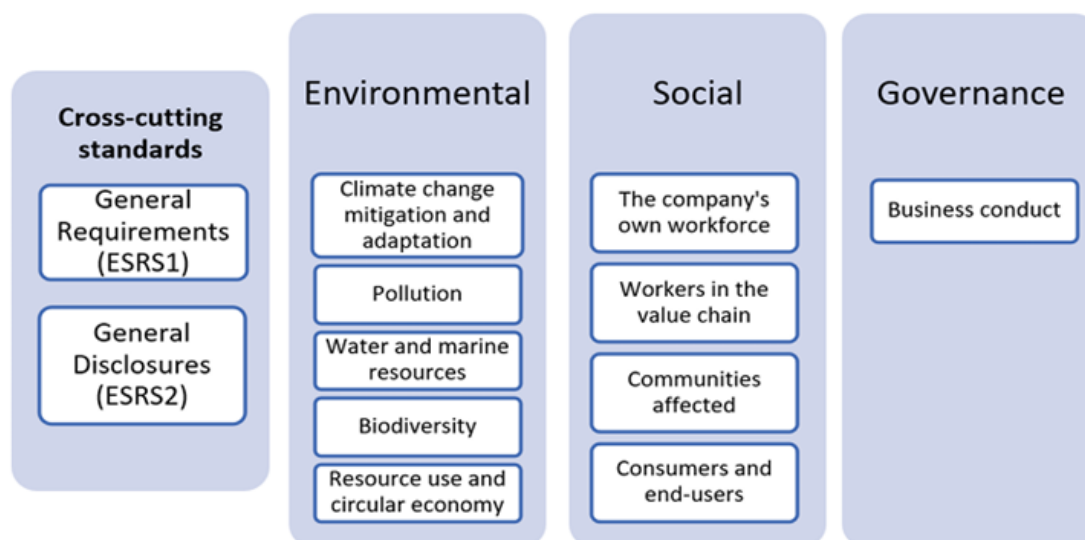
## **2. SUSTAINABILITY REPORTING AND REGULATION**

In its early days, sustainability reporting was a voluntary practise. As environmental and social awareness increased, legal requirements followed suit. Legislation (The King Code, SEC Regulation S-K, EU Directives) is mostly mandatory for listed companies. The European Union is a world leader in the introduction of sustainable practises. A turning point was the introduction of Non-financial Reporting Directive 2014/95/EU adopted in 2014. This Directive required large listed companies in the EU to disclose their sustainability information in their annual reports or in separate sustainability reports (European Commission, 2014). Over time, the directive has been shown to increase sustainability transparency and performance (Cuomo, et al., 2022). The quantitative increase in sustainability disclosures has not always followed the increase in organisational changes towards sustainability (Caputo, et al., 2019). It is argued that this Directive has not fulfilled its purpose as it does not oblige companies to use specific standards for reporting. The voluntary nature of the standards and the vague specifications of the requirements of the Directive (2014/95/EU) resulted in reports that lack comparability (Doni, et al., 2020). The Non-Financial Reporting Directive has not fulfilled its mandate to transform the EU into a sustainable economy and society. The amendment to the Directive came in the form of the Corporate Sustainability Reporting Directive 2022/2464 (European Commission, 2022) in response. Now not only large companies, but also medium-sized and small companies as well as listed non-EU parent companies must comply with this directive from the 2024 financial year. According to the new Directive, environmental, social and governance (ESG) performance should be of equal importance to financial performance. One of the changes brought about by the Corporate Sustainability Reporting Directive is the concept of double materiality. It basically means that companies must assess the extent to which they are affected by sustainability issues, but also how their business impacts the environment and society. This expands the scope of reporting and requires companies to make considerable efforts to prepare. A great deal of attention is being paid to risk reporting and the pressure on companies to identify these. In contrast to the past, companies must now audit ESG performance. This enables the verification and reliability of the information (Odobaša and Marošević, 2023). At the moment, the audit is not specified in detail and penalties are not known for companies that do not comply. Previously, companies could choose the reporting standards at their own discretion. With the new directive, this has changed and the use of European Sustainability Reporting Standards is mandatory. The aim of all this is to standardise the reports more strongly. When sustainability reporting goes beyond compliance, it can offer significant benefits. It can enhance corporate reputation (Odriozola and Baraibar-Diez, 2017) and decision-making (Adams and Frost, 2008), provide competitive advantage (Cohen, 2017), foster stakeholder relations (Greco et al., 2015) and enable benchmarking (Herzig and Schaltegger, 2006). Most importantly, from a shareholder perspective, they allow easier access to capital (Herzig, C.; Schaltegger, 2011) and ultimately improve financial performance in the long term (Assaf, et al., 2012). Companies also face problems when it comes to sustainability reporting. Starting from the issue that they have to balance the requirements of internal and external stakeholders, to problems in recording and analysing sustainability performance (Petrescu, et al., 2020). The preparation of a sustainability report also requires a company to invest considerable financial resources (Safari and Areeb, 2020). Considering that the requirements of the new Directive and standards will be extended, even more financial resources will be needed.

## **3. METODOLOGY**

In research on sustainability reporting, researchers have often placed their attention to content analysis of reports. Since the GRI standards are one of the most widely used standards in the preparation of sustainability reports, numerous studies have been conducted in the hotel

industry on this topic (Al-Wattar, Almagtome and Al-Shafeay, 2019; Kılıç, et al, 2021; Uyar, et al, 2021; Yardımcı, and Durak, 2022). This research aims to go one step further and compare current reporting practises with the new requirements of the Corporate Sustainability reporting Directives European Sustainability Reporting Standards. Figure 1 shows the overview of the new European standards.



*Figure 1: Overview of European Sustainability Reporting Standards  
 (Source: EFRAG, 2022)*

The standards are divided into two main parts: Cross- cutting standards and topical standards. Cross cutting standards deal with general requirements and disclosures, while the topical standards go into more detail on environmental, social and governance performance. This research focused on analysing the metrics contained in the standards for current topics. The sample consists of 13 Croatian hotel companies that are currently obliged to disclose sustainability information in accordance with Directive 2014/95/EU. Hotel companies in Croatia operate under conditions of high seasonality, which means that occupancy rates fluctuate greatly depending on the time of year. As a result, hotel companies cannot fully realise their financial potential. The data was collected from Annual Financial Reports Registry and company websites. The Financial reports and sustainability reports were analysed for the year 2022. Only reports for the year 2022 were considered, as the draft European Sustainability Reporting Standards had already been published at the time of their preparation and hotel companies could already start adapting to the new requirements. The results are discussed in the next part of the paper.

#### 4. RESEARCH RESULTS

At the outset, it is important to emphasise that three hotel companies in the entire sample did not report any form of ESG disclosure. For the rest of the sample, the hotel companies' ESG reports range from two pages to 200 pages. The companies publish stand-alone sustainability reports or this information is integrated into the annual report. It is interesting to see that disclosure is made in different formats, from scanned documents where it is not possible to search, to reports where it is possible. The new directive prescribes the iXBRL format, which enables machine and human searches. Regarding the use of standards, 70% of the companies use GRI Standards, the others did not mention the use of specific standards.



Those who have previously prepared their reports according to the GRI Standards have an advantage and a better starting point, while the ESRS Standards are complementary in some parts. The topical standards are discussed in the order in which they appear in the ESRS standards. The first topical standard deals with Climate change and focuses on global warming and efforts to mitigate it. In terms of emissions disclosure, which is one of the most important categories, 30 per cent of hotel companies do not disclose them. All three scopes, which are mandatory under the new standards, are reported by 40 per cent of companies, and the remainder reporting on scope 1. Energy consumption is reported in 90 per cent of cases. Pollution is the second environmental standard dealing with pollution of air, water and soil, where all action plans and risks must be reported. Only 30% of companies report on this, of the remainder only a few mention pollution sporadically. The third standard focuses on water and marine resources. The majority of hotel companies (80%) disclose water consumption in detail and marine resources are only mentioned descriptively. This is followed by biodiversity, which 70% of hotel companies report on. The last standard in the area of environment is resource utilisation and circular economy. Hotel companies must provide information on the inflows and outflows of resources, i.e. the products/materials used and the waste generated. The analysis has shown that 90% of companies report on waste and that no particular attention is paid to inflows. The second group of standards deals with social issues. The first standard is Own workforce, the most widely reported standard overall. It deals with employee characteristics, diversity, collective bargaining, training, social protection, human rights, discrimination and so on. Detailed information is usually provided in the reports. This standard is followed by the topic of employees in the value chain, a new topic that has not been covered in detail in other reporting standards. Hotel companies have not reported on this, only a few have mentioned that this is planned for the future. The next standard deals with affected communities. Hotel companies usually elaborate this among the stakeholders included, but a more detailed explanation is required. The last standard in the social section is Consumers and end users. Hotels should report on how they deal with positive and negative impacts on them. This topic is mentioned in the reports, but not enough to fulfil the requirements of the ESRS standards. The last set deals with governance and currently consists only of Business conduct standard. Here, hotel companies must report on the role of the various bodies, corporate culture, relationships with suppliers, corruption and bribery, political influence and payment practises. Hotel companies generally disclose the basic information, 30% mention the corporate culture, policies against corruption and bribery are presented in 70%. Only 10% mention political influence, and payment practises are not detailed.

## 5. CONCLUSION

A new era of sustainability reporting is coming with the European Sustainability Reporting Standards. Hotel companies are now in the transition phase of adapting to the more complex way of reporting their sustainability impacts. The content analysis of sustainability disclosures revealed mixed results. Hotel companies can be divided into four different categories. Firstly, hotel companies that are preparing extensively for the new regulation, publishing their sustainability performance in great detail and taking care to fulfil as much of the new requirements as possible. Then there are hotel companies that are making an effort but need to make significant changes to fulfil the new ESRS standards. Their sustainability reporting is still at the beginning of the process. Thirdly, there are hotel companies that only report to fulfil the legal requirements and provide a minimum of information to meet the standard. These reports are mainly descriptive in nature and no real sustainability performance is presented. And finally, the fourth category of companies that do not disclose any information. Probably because there are currently no sanctions for non-reporters.

This is just the first step in the preparation. Companies will have to set targets for all standards, explain their impact and the risks they face. They will have a difficult task ahead of them. Only large companies with significant resources for recording, analysing and reporting sustainability performance were included in this study. With the new Corporate Sustainability Reporting Directive, small and medium-sized companies will be obliged to report in the coming years. The task will be even more difficult for them. The novelty of this study is the use of European Sustainability Reporting Standards in the content analysis. These are new standards and research in this area is only just beginning. The Hotel companies are categorised according to their level of compliance with the new standards. Nevertheless, this study is not without limitations. A small sample is used for the content analysis and a cross-country analysis would be beneficial. In addition, only metrics were analysed. The materiality assessment, objectives, risks and impacts they disclose should be further analysed. Certainly, this is only a partial overview of the situation. Future research should include direct contact with the hotel companies to investigate their perspective and challenges. It is still an open question what level of comparability of sustainability performance for hotel companies the new European standards bring. How will sustainability performance be comparable between hotel companies? Future research will certainly focus on this topic. Efforts should also be made to develop sector-specific standards for the hotel industry. The GRI Standards had already prepared sector supplements earlier, but there were none for the hotel industry. They have just started publishing the new sector standards, EFRAG is also announcing them, but they will refer to the "high-impact" sectors and the hotel industry is not mentioned.

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## CONNECTION OF MACROECONOMIC ACTIVITY WITH SECURITY ASPECTS OF THE GLOBAL WORLD

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### **ABSTRACT**

*In today's turbulent and uncertain international environment aspects of security greatly influence the macroeconomic activities of a given country; especially tourism activity. Certain wars and terrorist activities can greatly affect the tourist demand and realized income from tourism activity of an individual country. With increased global insecurity countries with a high share of tourism income in GDP are particularly at risk. Because of the aforementioned the purpose of this paper is to determine what influence do the safety aspects have on the choice of an individual's tourist destination. For the purpose of this paper empirical research was conducted on the perception and choice of tourists which is based on the safety aspects of their destination. The aim of this paper is to prove that the perception of risk by tourists has a great influence on the choice of their tourist destination, and thus on the tourism income of the country as one of the most important factors of GDP of an individual tourist country.*

**Keywords:** macroeconomic activity, GDP, tourism, security aspects

### **1. INTRODUCTION**

Terrorism and tourism are interconnected through common characteristics such as the involvement of residents of different countries, the crossing of state borders and the use of communication technologies. In the last few years terrorists have recognized the power of terrorist attacks on tourist sites and realized that these types of attacks help them achieve their goals faster. Terrorist goals can be ideological, strategic and tactical. Terrorists attack precisely tourists in order to achieve strategic goals and in this way gain an advantage for themselves in such a way as to introduce imbalance into the economy itself. Numerous authors define the goals of terrorism differently but they all agree on one thing which is that by attacking tourists' terrorists can gain great advantages. It is considered that an attack on tourism and tourist destinations is also an attack on the government itself. By the very fact that tourism represents an important economic activity the attack on tourism also causes a decrease in the inflow of foreign currency. The decision of tourists to choose a safer tourist destination consequently means that there will be big losses for the tourism industry of the country that is the victim of a terrorist attack. Therefore, the subject of this paper is analysis of a possible impact of terrorism on tourism in Croatia. The research part of this work will be based on the results of the survey questionnaire as the primary source of research. In addition to primary research sources secondary sources such as books, professional articles and websites will be analyzed. The purpose of the paper is to show terrorism as one of the threats to the economy and how, as a violent act aimed at intimidating the general public, it affects tourism and to what extent. Further to the subject and purpose of the work the goal of the work is to find out the ways in which terrorism affects tourism and to investigate and determine whether there is a mutual connection between terrorism and tourism and what it is like. Security is a very important factor and has a significant impact when choosing a tourist destination, but despite the fact that the Croatia is a relatively safe destination we must be aware that one terrorist attack is enough to destroy the image of a safe destination. The research of this thesis will point to a problem that is increasingly present in the world due to numerous terrorist groups ready to carry out terrorist attacks. The interdependence of terrorism and tourism as an economic branch will be shown and how terrorist attacks affect tourism demand.

It will also highlight the steps that the Croatia should implement in order to maintain its status as a safe destination. This paper will show how much the threat of terrorism and terrorist attacks themselves can affect the economy of the country, especially in developing countries, and encourage thinking and taking concrete measures to protect tourists and fight against terrorism.

## **2. THE CONNECTION BETWEEN TOURISM AND TERRORISM**

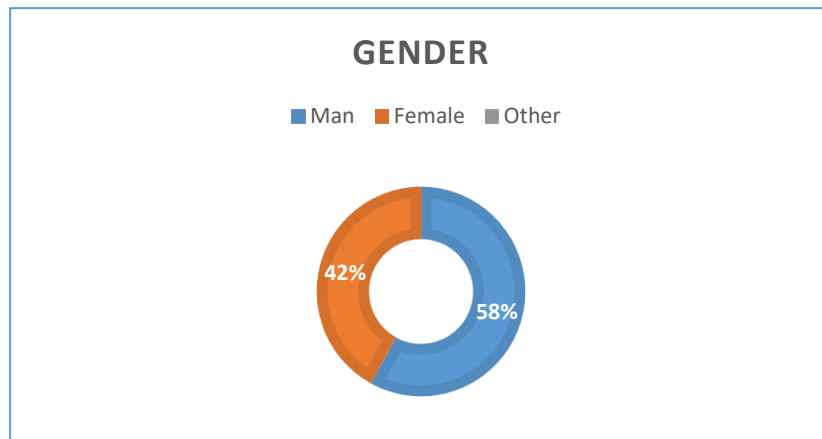
Terrorism and tourism are interconnected by some of the characteristics they have in common such as crossing national borders, involving settlers from different countries and the use of communication technologies. In the earliest articles related to the selected topic claims were made that tourists were the targets of attacks because they were considered promoters of the country they came from and because they have significant importance as intermediate representatives of their countries' systems. From the history we can see that terrorists saw the strength of their attacks on tourist sites with the idea of reaching the final goal faster. If a terrorist attack happens in the country of residence, then it is considered that there is not enough media attention which often happens in countries with radical political organizations. However, a terrorist attack in a foreign country will certainly attract enough media attention without capturing the media attention of the country they come from. In the event that one of the terrorists is killed or kidnapped, such a case is more than covered by the media, but this is exactly what helps terrorists in conflicts with political institutions and in the beliefs, they constantly fight against. There are several types of terrorist goals, some of the types are: ideological, strategic and tactical. Long-term goals are ideological ones, those that most often include some kind of state events. In contrast to ideological goals, tactical goals are short-lived and driven by justified goals, and are often realized by looting and targeting crowded tourist destinations, tourists themselves, and resorts where the socio-political elite usually stay. In order to achieve their strategic goals terrorists, choose tourists as the targets of their attacks which also helps them to guarantee themselves an advantage by introducing unrest and imbalance into the economy and at the same time occupying the necessary media space. Terrorists carry out attacks on tourists in order to realize ideological goals in some way condemn the population that supports their government and point out the possible impotence and irresponsibility of the government. Many authors define the goals of terrorism in different ways but they all agreed that by attacking tourists, terrorists gain great benefits. Some studies provide logical socio-economic explanations of the mutual relationship between terrorism and tourism. A terrorist attack can also occur if the opinion that tourism is responsible for the depletion of traditional cultures is implemented. Likewise, the perception that tourism development does not contribute to local well-being can lead to violence. Furthermore, the travel lifestyle may characterize tourists' different beliefs and behavior with respect to economic status. The result of the above may be the tourist as a victim because it was realized that he promoted his wealth and luxurious life without considering the poor population there. Conflicts can also occur due to different cultures and values that are valued. When tourists, for example, gamble or consume alcohol, it can also cause conflicts. In countries like Egypt, tourists become victims of terrorists because they are seen as threats to clearly defined social norms, traditions and religious beliefs. Certainly, choosing tourists as targets of terrorist attacks is never unintentional. The media coverage of the attack is a very big advantage for the terrorist that he would not use it. Terrorism is treated as a more developed criminality that includes tourism. Terrorism and crime are closely related because they have the same characteristics, they both randomly attack an individual and negatively affect tourism. The only difference is based on political and religious motives. Since a continuity of terrorist activities has increased significantly tourism industry had to adapt to the new circumstances. There are four foundations to the economic cost that a terrorist attack causes; the first basis refers to the decline in income, the second followed by the restriction of foreign direct investment, the third source is the

destruction of infrastructure and the creation of opportunity costs from suppressing terrorist attacks. Apart from the costs that are generally associated with terrorist attacks, there are indirect costs that include marketing costs to win back old tourists and to acquire new ones, as well as rehabilitation costs for destinations destroyed by an attack and insurance costs against possible repeat attacks. The threat to national security reduces demand and income, increases costs and has a significant impact on foreign investments. Material losses, human sacrifices and insecurity within the investment environment are only a short-term consequence of terrorism. Some of the long-term consequences are the impact on the growth of the economy, the direct effect on the increase in costs for the implementation of anti-terrorist activities and security measures. If a terrorist attack were to be carried out in Croatia, it would have major negative consequences for tourism, and the consequences would be reflected in the entire economy of the country. Tourism as an economic branch is among the most sensitive to the occurrence of various crises and instabilities, including terrorism. Because terrorism has a psychological effect on an individual, of course, depending on his personality, also on many different factors such as the religion of the tourist, the nature of the terrorist attack and its media image. Tourism is generally the most common target of a terrorist attack because certain tourists come from countries that terrorists consider to be enemies and because this form of attack is the easiest to gain media attention and thus cause economic disruptions. If a popular tourist place is attacked, a feeling of insecurity and fear is created in the public, which leaves negative consequences for tourist places that were considered safe destinations and thus leads to a significant drop in the number of overnight stays and arrivals in general. tourist arrivals and overnight stays. There are two key conditions for the development of the tourism sector, political stability and state security. If the perception of security and stability is damaged by a terrorist attack, tourists lose confidence in the destination that is the target of a terrorist attack and choose a destination that is considered safe for their vacation or stay in their place. The mentioned effect can be significantly increased by unfavorable publicity in the media and security measures that do not suit the countries affected by the attack, which should help restore the confidence of tourists. If the number of tourist arrivals were to decrease significantly, the same would be reflected in foreign currency inflows and tax revenues, as well as a decline in employment in tourism. Given that tourism is almost the most important economic branch in Croatia, a sudden drop in tourism would have a great impact on the growth of the economy.

### **3. RESULTS OF THE CONDUCTED RESEARCH**

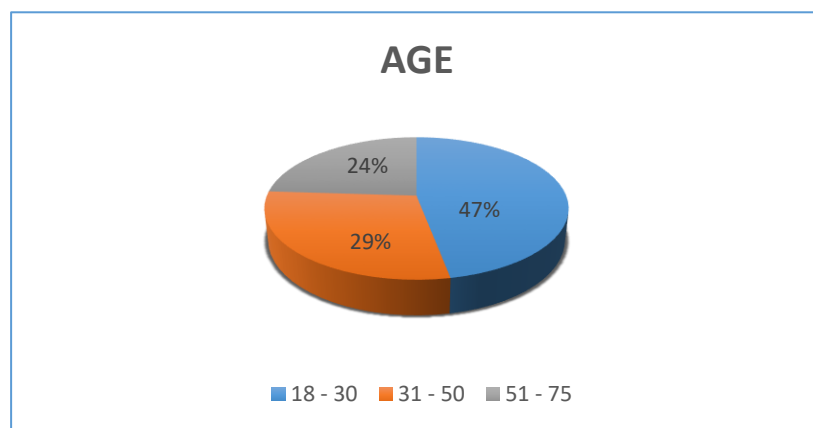
For the purposes of this work empirical research was conducted in the form of interviews with tourists in Croatian tourist towns. The research was conducted during June, July and August 2023 on a total of 260 tourists. The following paragraphs present the results of research aimed at possible impact of terrorism on the choice of a tourist destination and thus on the economic impact of a certain economy.

*Figure following on the next page*



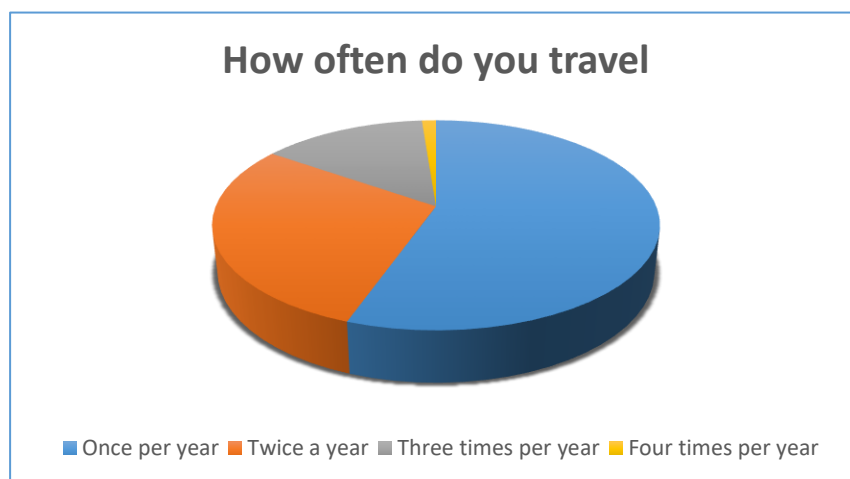
*Figure 1: Gender of responders, Source; author's systematization*

Figure 1. shows that the majority of respondents were men, while there were 42% of female respondents. None of the respondents indicated any other form of gender.



*Figure 2: Age of responders, Source; author's systematization*

When we analyze the age of the respondents, we see that a significant number of the respondents are of a more serious age, while 47% of the respondents belong to younger tourists up to 30 years old. This data is significant for further analysis because the perception of younger and older tourist populations is generally not the same.



*Figure 3: Frequency of travel, Source; author's systematization*

Figure 3. shows that in today's uncertain times tourists do not travel very often, where most tourists travel once or twice a year. Only 12% of responders travel three times a year, while only 2% travel four times a year.

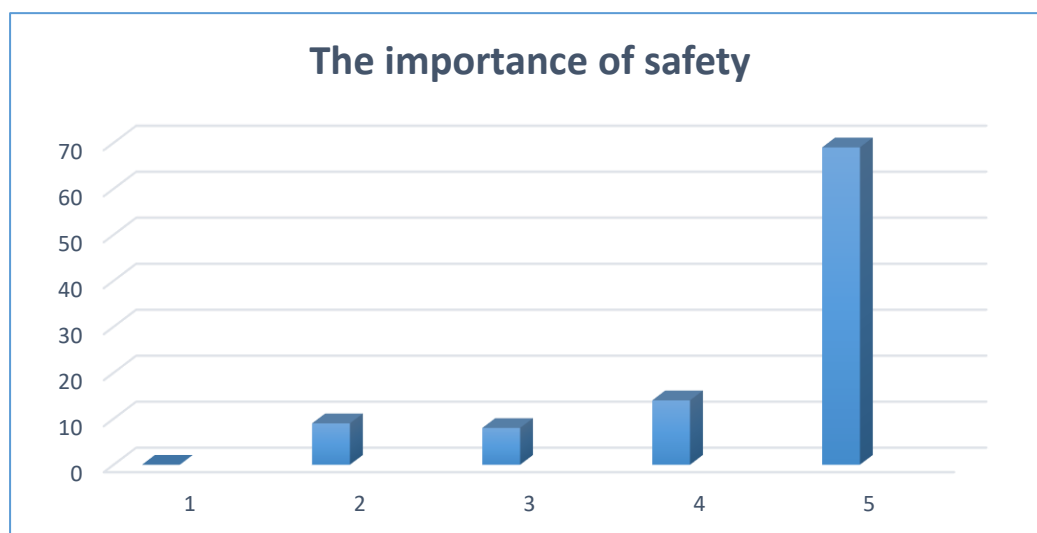


Figure 4: The importance of safety while traveling, Source; author's systematization

Figure 4. shows to what extent safety is important to the respondents when traveling. 1 represents the lowest level of security, while 5 represents the highest level of security. According to the results of the conducted survey, as many as 80% respondents stated that safety during travel is very important to them, and none of respondents stated that safety during travel is completely unimportant to them.

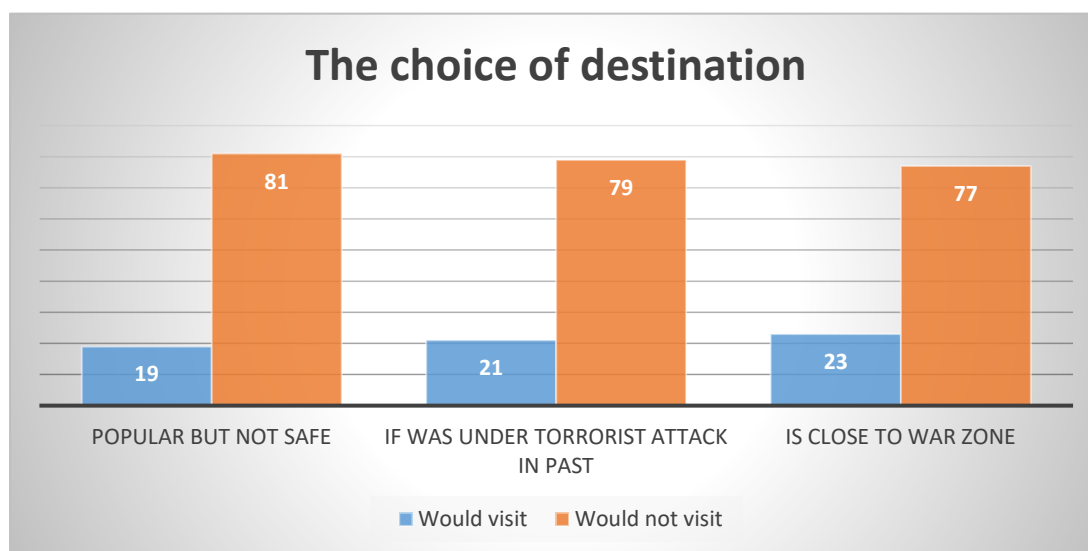


Figure 5: The choice of destination, Source; author's systematization

In Figure 5. the majority of respondents would choose a safe rather than a popular destination, and only 19% of respondents would choose a popular destination. Namely, the respondents emphasized that before going to each destination they ask about its security. They emphasize that for someone who is traveling to a new destination for the first time it would be desirable to find out about the political situation in the country and check whether there are any extraordinary measures of danger, etc. Namely, today the Internet is within reach of all the information that every tourist needs in just a few mouse clicks.



When asked if they would visit a country that was recently the target of a terrorist attack the vast majority of respondents answered that they would not. Moreover, it is a very similar answer for visiting a country that has a war zone in its neighborhood, e.g., almost 80% of responders would not visit those countries. For those responders who would visit a country which was under terrorist attack, 21% of responders, another question was asked; how much time need to pass from terrorist attack till their visit? 58% responders answered that they would visit such a country only after 6 months from terrorist attack, 27% after 3 months, 11% after 1 month, and only 4% answer immediately.

#### 4. CONCLUSION

No country is protected from a possible terrorist attack and the danger of terrorism in today's world is becoming greater every day. In order for a certain place to be visited by more and more tourists every year, and thus to increase the income, the safety of that place and its tourists is extremely important nowadays. As tourism is extremely important for economies such as Croatia, where a large percentage of income is generated from tourism, a possible terrorist attack would certainly cause a drastic reduction in the economy's income from tourism. In this research it was analyzed how much ordinary tourists are concerned with the way in which terrorism affects or could affect tourism, and how important security is to them when choosing a tourist destination. The majority of respondents stated that safety is important to them when choosing a tourist destination, and that most of them would cancel their trip if their chosen destination was the target of a terrorist attack. Also, according to the conducted research we can determine that the majority of respondents would rather choose a destination that is considered safe than one of the popular destinations for a tourist destination. From the mentioned research, we can conclude that the perception of risk by tourists has a great influence on the choice of a tourist destination because most of them will either stay in their country or choose another safer destination. Tourists choose safer tourist spots and visit more countries that have not been a frequent target of terrorist attacks. To the question of whether the sudden decrease in tourist arrivals and income from tourism affect the overall growth of the country's economy, we can answer that they have a negative effect on the country's economic growth. Logic itself says that terrorism has an unfavorable impact on the country's tourism and thus on its economic growth because any form of insecurity is not conducive to economic growth. The strength of the effect of a terrorist attack depends on the way in which the media informs the public about it. It is possible to exaggerate the consequences of terrorism and additionally scare the public which can further increase the fear of terrorist attacks and contribute to the effect of a terrorist attack being greater than it actually is. If terrorist attacks were to be repeated much greater negative consequences can be expected, especially if they are terrorist attacks with a large number of victims and would also have an impact on other macroeconomic entities that support the growth of the economy. So, we can conclude that the negative impact of terrorism on tourism is significant and on the reduction of the economy's income.

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## THE ROLE OF DIGITAL MARKETING IN CREATING CONSUMER BEHAVIOR

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### ABSTRACT

*Modern business, driven by rapid technological progress and the increasing use of digital media, is experiencing significant changes in the way marketing activities are carried out and how they affect consumers. Digital marketing is becoming a key strategy that businesses use to attract, engage, and influence consumers in the digital environment. The introduction of digital marketing into business practices has resulted in a change in consumer behavior and consumer decisions. In today's world, consumers are increasingly exposed to digital marketing campaigns conducted through various platforms, such as social media, search engines, and mobile applications. These channels allow businesses to reach their target audience in an individualized way and tailor marketing messages to their needs and interests. Personalization of marketing messages and content has become a key digital marketing tactic aimed at attracting consumer attention, building trust, and encouraging them to take desired actions. However, despite the increasing use of digital marketing, it is important to investigate how much it really influences consumer behavior and consumer decisions and how effective digital marketing campaigns are in motivating consumers to take action, such as purchasing products or services, changing their minds, or building brand loyalty. In addition, the role of personalized marketing messages and content in relation to other digital marketing tactics and their ability to create desired consumer behavior should be explored. The aim of the paper is to investigate in more detail the role of digital marketing in creating consumer behavior and consumer decisions. In particular, it will be investigated how much digital marketing campaigns really influence purchasing decisions and consumer behavior in general.*

**Keywords:** digital marketing, traditional marketing, consumer behavior, consumer decisions

### 1. INTRODUCTION

Digital marketing has become an indispensable element of modern business in the digital age. With the rapid development of technology and the ubiquity of digital media, consumers have become more connected and informed than ever before. Digital marketing provides incredible opportunities for businesses and brands to reach and engage their target audience in new and innovative ways. In this introductory part of the work, the fundamental determinants of digital marketing are explored. First, it defines the concept of digital marketing and considers how it differs from traditional marketing. The key characteristics of digital marketing are analyzed, such as interactivity, measurement of results, personalization, and targeted advertising. Furthermore, the importance of digital marketing in creating consumer behavior and influencing consumer decisions is explored. Digital marketing enables precise targeting and personalization of messages, which can result in greater consumer involvement and greater trust

in brands. Key digital marketing channels are discussed, including social media, email, search engines, and mobile apps. Each channel has its own advantages and provides unique opportunities to communicate with the target audience. Ultimately, the importance of proper planning and implementation of digital marketing strategies is emphasized. Taking into account the goals of the company, the target audience, and the specifics of the product or service, it is crucial to choose the right channel, content, and tactics to achieve the desired effect. This paper aims to provide the reader with a comprehensive overview of digital marketing, its fundamental determinants, and its importance in modern business. Understanding these fundamentals is critical to using digital marketing successfully and achieving desired results in today's digital environment.

## **2. DIGITAL MARKETING**

Digital marketing is everything that includes business promotion activities and products and services that are offered through digital channels through websites, e-mails, paid ads on search engines, social networks, display advertising, native advertising, SEO (search engine optimization), etc. (Viher, 2020). The importance of digital marketing lies in the fact that consumers have access to information 24 hours a day, in any place. Today's consumers want a product or service that fits their needs and wants. The distinct power of digital marketing is reflected in two ways. The first is that the target group can be determined very precisely, and the second is that almost everything can be measured, that is, every second spent on the Internet can be measured, that is, every click can be tracked. All these advantages of digital marketing help us to make the best use of the resources we have at our disposal (Stokes, 2013). Unlike traditional marketing, digital has proven to be more successful and efficient in many cases. Modern marketing has high quality and creativity. High innovation, quick adaptation to sudden changes and demands of the market and consumers, and flexibility are constantly present (Trojak, 2008). Every company wants to bring its brand, product, or service closer to customers and present it in the best possible way. Modern marketing, in addition to all existing definitions and techniques, also contains new techniques and ways of advertising. There is a need for new and designed approaches in business (Kotler, Keller, & Martinović, 2014). "Today's Internet marketing has the task of presenting the right offer at the right time, in the right place, and to the right person." (Olijan, 2020). Digital marketing trends represent key changes and innovations that are shaping the way businesses communicate with and engage their consumers through digital channels. Every year brings new technologies and trends. Focusing on the development and improvement of business, companies try to use the advantages of digitalization in every possible way in order to be better than the competition. In order to find products or services that fully meet their needs, users look for answers in the multitude of advertisements that are offered to them. It is extremely difficult to make a decision about the right purchase based on a lot of comments and reviews. If additional content is offered, the user's image of the company is upgraded. The increase in sales can be directly influenced by the transparency of social networks, which allow users to establish equality with people, give feelings, recognize influential business people, etc. Also, the increase in sales can be influenced by the company's personalization, which allows customers to bond with the product in a friendly way. Clients like to see the faces behind a certain brand through various live broadcasts. Marketing experts—more than 80% of them, to be exact—stated that content marketing is the number one choice when creating a strategy. Over 70% of people prefer to find out about a company through a comprehensive article rather than a classic ad. Video clips are becoming more and more attractive. YouTube and, increasingly, Instagram Stories are responsible for such interest. Today, users trust live videos more because they are more realistic and natural than edited ones. The latest research, according to the Social Media Marketing Industry Report for 2019, presents changes regarding the use of social networks.

Facebook is losing share as the most important platform for marketing, falling from 67% to 61% in 2019. Also, interest in Messenger Bot is decreasing. A small number of marketing experts plan to increase their bot activities—only 32% of them. On the other hand, Instagram (GoDigital, 2019) records constant growth and is the second platform for marketing, surpassing LinkedIn as well. There is extremely great interest in YouTube, which is also the number one channel; its share is 71%. Nowadays, Facebook still occupies a dominant position in relation to Instagram. It can be said that social networks have contributed to the increase in sales through advertising, and this is also proven by marketing experts, more precisely 70% of them, who say that such advertising in the last 12 months has contributed to the increase in sales of their products and services (GoDigital, 2019).

### **2.1. Functions and principles of digital marketing**

With the use and growing development of digital marketing in business, companies introduce many programs and projects that have very precisely planned and defined goals, and they achieve leadership success through the application of the intellectual knowledge and skills of employees. The active, correct, and timely introduction of digital marketing reflects the fundamental determinant of creating long-term success in relation to direct competitors in the market. By using digital marketing, companies achieve a higher return on funds in their operations compared to other forms of marketing development. The function of digital marketing in a company is the possibility of realizing a large number of positive benefits and advantages, and the biggest advantage is much lower costs and differences from the level of technology implemented by the company. The operation of digital marketing, according to its function, is much more accessible and used compared to other marketing processes that the company implements in the development of a promotional campaign for a target group of customers. The great advantage of digital marketing is that media and publishing costs are almost minimal, or reduced to zero, because all business and work activities are carried out through networks, social media, and the company's website (Marić, 2021, p. 32). The biggest advantage of digital marketing for the company's business is that the promotion channels and marketing processes are automatically updated, and management does not need to worry about additional investment increases. The best example of an effective marketing tool for this is a website, pay-per-click, or e-mail. That is, the function is to reach as many potential customers as possible with as few costs as possible who will be ready to allocate additional funds for individual products. Through the active application of digital marketing and the active commitment of employees to the implementation of digital marketing in the company's business system, efficient product promotion and service development are achieved, which attracts new potential customers to the market. In this way, greater effectiveness and efficiency of the entire business system are achieved, thus responding to all the challenges and demands of the competitive market. For successful business and company development, it is necessary to follow the following three principles of digital marketing: the principle of initiating communication, the principle of iteration, and the principle of integration. The principle of initiating communication: according to this principle, customers mark the initial and final activity of digital processes. The customer is directed to decide what he wants on the basis of the information received and to actively seek answers to questions related to marketing resources, efforts, the active use of a certain type of strategy, and different implementation channels. For the above reasons, companies should not rush into digital channels by creating their own websites, profiles on social networks, and blogs so that the desired content can be adapted to the company and products as efficiently as possible (Dodson, 2016). The principle of iteration—the process of iteration—refers to the constant improvement and improvement of business, i.e., as soon as an ad is published, different reactions of the target market segment can be noticed very quickly.

This principle indicates that it is necessary to monitor the responses and reactions of the desired market segment and adjust digital activities accordingly. It is important to recognize the needs of your customers, and therefore the emphasis is on the importance of creating a digital marketing campaign in accordance with your interactions with them. The publication of new content largely depends on the communication channel used (Dodson, 2016). Principle of integration: the process of integration takes place at three levels. It starts with the integration of marketing activities through all kinds of digital channels, the goal of which is to increase its efficiency. After that, a series of activities are applied so that the message can be transmitted in a quality manner. In the end, the integration of a quality reporting system is achieved, which provides quality support for further decision-making. In this way, the foundations are created for making all future decisions, the goal of which is the further growth of the company (Dodson, 2016). By investing in the improvement of digital marketing, a greater interest in existing and future customers is achieved. Since there are an increasing number of competitors on the market, both large and small, it must not be neglected.

### **3. ANALYSIS OF DIFFERENCES IN CONSUMER BEHAVIOR IN OFFLINE AND ONLINE ENVIRONMENTS**

An analysis of differences in consumer behavior in offline and online environments explores changes and specifics in the way consumers make purchasing decisions and interact with products and services in traditional, physical, and digital environments. In an offline environment, consumers have direct physical contact with products, which can influence their perception, experience, and evaluation. Here, the influence of various factors such as ambience, interaction with the salesperson, the possibility of trying products or services, and personal experience on consumer behavior and purchase decisions is investigated. On the other hand, the online environment provides consumers with a virtual shopping experience. Aspects such as comfort, availability of information, security of transactions, and personalization of offers are analyzed. The influence of social media on the perception of products and services is also explored, as consumers often use social media to obtain feedback and recommendations before making a purchase decision. Generation Z, as a digitally aware group, is particularly important for analyzing differences in consumer behavior. It investigates how digital technologies and social networks influence their perception of products, sources of information when making purchase decisions, and their choice and loyalty to brands. Also, the influence of consumer rights in online shopping on the selection of products and services is analyzed. The right to information, unilateral termination of contracts, and purchase rules in the online environment play an important role in shaping consumer behavior and creating consumer trust in the digital space. By analyzing the differences in consumer behavior in offline and online environments, researchers and marketers gain a deeper understanding of consumer preferences, expectations, and motivations in both contexts. This enables them to adjust their marketing strategies in order to better satisfy the needs and wishes of consumers and achieve competitive advantages in the market. Generation Z is becoming one of the key groups of consumers. This generation differs from its predecessors, the millennials, in terms of its spending habits and priorities. Zoomers, as experts call them, show different attitudes towards products and services, priorities, ways of buying, and ways of saving. They are open to innovation, do research before buying, are less loyal, and are more travel- and social-oriented. Technology plays an extremely important role in their lives, and their habits are linked to social values and sustainability. Generation Z wants to secure their financial independence and financial health. However, their savings and income opportunities are limited, which is often the result of life circumstances and economic conditions. Companies must adapt to these changes and understand consumer psychology to better respond to the needs of Generation Z.

Social networks, technology, and sustainability have a significant impact on their spending habits, so companies need to provide ease of use, speed, and a seamless experience to dominate their digital world. (Premužak, 2023). These young generations have different shopping habits than older generations, which requires retailers to adapt. Millennials are the first generation to grow up in the digital age and have experience with online shopping and mobile payments. They have a pragmatic approach to money and prefer digital solutions. Generation Z is technologically literate and more inclined to shop online than previous generations. They also have different preferences for product information and prefer recommendations from friends and family via social media. They are also more inclined towards contactless payments and alternative payment methods like cryptocurrencies and P2P payments. Retailers must adapt to these changes and provide relevant payment methods to attract young consumers (PAY, 2023). Understanding these elements is critical for marketers to tailor their strategies and approaches to attract and engage this demographic.

#### **4. METHODS AND SAMPLE**

In this research, data was collected through an anonymous questionnaire. Data analysis is based on statistical methods. The sample of respondents is described by the distribution of respondents according to defined characteristics: gender, age groups, and level of education. Respondents evaluated their attitudes on a five-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). Selected descriptive statistical indicators (arithmetic mean and median) were calculated and interpreted for quantitative variables. The Kolmogorov-Smirnov test determined that the distribution of quantitative variables deviates statistically significantly from the normal distribution. Therefore, the non-parametric Mann-Whitney and Kruskal-Wallis tests were used to test the statistical significance of the differences between defined groups of respondents. Differences confirmed at the  $p < 0.05$  level were considered statistically significant. 162 respondents participated in the research. In the sample, the majority of respondents were female (70%). Regarding age, the respondents were divided into three age groups. The first age group consisted of respondents aged 18 to 32 (32% of respondents), the second group of respondents aged 33 to 47 (48% of respondents), and the third group of respondents older than 48 (20% of respondents). Regarding the level of education, 33% of respondents have a high school education, and 67% have a higher education.

#### **5. RESULTS**

The survey sought to examine respondents' views on digital marketing and its role in creating consumer behavior. With this intention, the following variables are defined:

- V1: The importance of digital marketing in creating consumer behavior
- V2: Impact of digital marketing on respondents' behavior and attitudes towards products and services

*Table following on the next page*

Variables	Gender						Mann-Whitneyev Test	
	Male			Female			Z	p
	Arithmetic mean	Median		Arithmetic mean	Median			
V1	3.84	4		3.91	4		-0.513	0.608
V2	3.53	4		3.71	4		-0.812	0.416

*Table 1: The attitudes of respondents about digital marketing and its role in creating consumer behavior  
 (Source: authors)*

It is clear from Table 1 that the respondents expressed the greatest degree of agreement with the importance of digital marketing in creating consumer behavior. Higher average values were recorded in female respondents. The median value was the same for both groups of respondents. According to the results of the Mann-Whitney test, no statistically significant difference was confirmed in the attitudes of respondents related to digital marketing and its role in creating consumer behavior regarding gender. It is obvious that gender has no influence on the formation of attitudes about digital marketing and its role in creating consumer behavior.

Variables	Age groups						Kruskal-Wallis test	
	18-32		33-47		Older than 48		H	p
	Arithmetic mean	Median	Arithmetic mean	Median	Arithmetic mean	Median		
V1	4.19	4	3.78	4	3.68	4	7.823	0.020
V2	3.88	4	3.62	4	3.38	3	8.168	0.016

*Table 2: Respondents' views on digital marketing and its role in creating consumer behavior according to age groups  
 (Source: authors)*

Higher average values of the analyzed variables were calculated for respondents in the first age group. According to the results of the Kruskal-Wallis test, there is a statistically significant difference in all questions. The test for multiple comparisons found that regarding the importance of digital marketing in creating consumer behavior and the influence of digital marketing on the behavior and attitudes of respondents towards products and services, the respondents of the first and third age groups statistically significantly differed (Table 2).

*Table following on the next page*



Variables	Education degree				Mann-Whitneyev test	
	High school		Highly		Z	p
	Arithmetic mean	Median	Arithmetic mean	Median		
V1	3.64	4	4.01	4	2.414	0.016
V2	3.47	3	3.74	4	1.895	0.057

*Table 3: Respondents' attitudes about digital marketing and its role in creating consumer behavior with regard to the level of education  
 (Source: authors)*

Lower average grades and median values for the analyzed variables were detected in subjects with secondary school education. Although with Variables V2, the p-value is slightly higher than 0.05, according to the results of the Mann-Whitney test, it can be concluded that there is a statistically significant difference in the views of the respondents on the importance of digital marketing and its role in creating consumer behavior with respect to the level of education. The survey was conducted to examine the respondents' perceptions of digital marketing and its aggressiveness in the placement of products and services. The following variables were analyzed:

- W1: Digital marketing is aggressive and unpleasant for consumers.
- W2: Too many marketing messages and advertisements burden consumers.
- W3: Many advertisements in the digital environment have a bad reputation.

Variables	Gender					Mann-Whitneyev test
	Male		Female			
	Arithmetic mean	Median	Arithmetic mean	Median		
W1	3.78	4	4.10	4	1.252	0.211
W2	4.12	4	4.34	4	0.804	0.423
W3	3.33	3	3.40	3	0.153	0.880

*Table 4: Respondents' perception of digital marketing and its aggressiveness in the placement of products and services with regard to gender  
 (Source: authors)*

The perception of the aggressiveness of digital marketing in the placement of products and services was evaluated by female respondents with higher average scores. The median value is identical for all variables. The Mann-Whitney test did not confirm a statistically significant difference in the perception of digital marketing and its aggressiveness in the placement of products and services by gender (Table 4).

Variables	Age groups						Kruskal-Wallis test	
	18-32		33-47		Older than 48		H	p
	Arithmetic mean	Median	Arithmetic mean	Median	Arithmetic mean	Median		
W1	4.18	4	3.89	4	3.97	4	1.845	0.397
W2	4.51	5	4.22	4	4.03	4	6.132	0.046
W3	3.61	4	3.26	3	3.29	3	5.336	0.069

*Table 5: Respondents' perception of digital marketing and its aggressiveness in the placement of products and services according to age groups*  
 (Source: authors)

For all analyzed variables, higher average values were calculated for respondents in the first age group. The results of the Kruskal-Wallis test indicate that there is no statistically significant difference among the respondents in their perception of digital marketing and its aggressiveness in the placement of products and services according to age groups (Table 5).

Variables	Education degree				Mann-Whitneyev test	
	High school		Highly		Z	p
	Arithmetic mean	Median	Arithmetic mean	Median		
W1	3.81	4	4.09	4	1.826	0.067
W2	4.23	4	4.29	4	0.565	0.568
W3	3.21	3	3.46	3	1.762	0.078

*Table 6: Respondents' perception of digital marketing and its aggressiveness in the placement of products and services with regard to the level of education*

Somewhat lower average grades for the analyzed variables were detected in respondents with secondary school education (Table 6). According to the results of the Mann-Whitney test, a statistically significant difference in the respondents' perception of digital marketing and its aggressiveness in the placement of products and services with respect to the level of education was not confirmed. The role of digital marketing content when it comes to the formation of consumer behavior, according to the research results, was considered irreplaceable, regardless of the gender of the respondents. In the field of communication, the emergence of the Internet and, more recently, social media, in which Internet users collaborate and share information and opinions, is a critical phenomenon in the formation of consumer attitudes towards the role and importance of digital marketing content. The results of the respondents clearly indicate that their attitude is almost the same regardless of their gender. Social media bring consumers closer to companies to the extent that they can be seen as part of the company because they form consumer attitudes and influence the choice of products and services that consumers consume.

Consumers not only buy products immediately when they make a direct purchase link from a social media platform but also from other indirect sources, such as selecting a product in a store or from another source. Of those who are actively involved in social media platforms, the proportion of influence purchases is even higher. Since social media strongly influences the shaping of consumption reality, the behavior of modern consumers, according to research results, is conditioned by the meaning transmitted through social media. Thanks to the information revolution, society has at its disposal numerous pieces of data about products, services, or anything else that interests today's modern consumers. After the research, it can be concluded that digital marketing is an important factor in forming an attitude towards a certain product or service. Empirical research makes it easy to state that the weak presence of products and services on social networks can result in significantly reduced interest in the product, that is, the service, and finally the purchase itself. Like any research, this research has limitations that are primarily related to a relatively small sample. The same research will have to be carried out on a larger sample and on the entire territory of the Republic of Croatia.

## 6. CONCLUSION

Based on the research conducted on the role of digital marketing in creating consumer behavior and comparisons with traditional marketing approaches, it can be concluded that digital marketing has a significant impact on consumer behavior and consumer decisions. The research results confirm that digital marketing enables companies to reach and engage consumers in a personalized way, providing them with relevant content and offers. A comparison of digital marketing with traditional marketing approaches shows that digital channels have a greater ability to target specific target groups, interact with consumers, and measure campaign results. On the other hand, traditional marketing approaches such as television, print, and radio still have some influence, especially with older generations of consumers. A combination of digital and traditional marketing is proving to be a strategy that can have a greater impact on consumer behavior and consumer decisions than using either approach alone. The integration of both approaches enables businesses to reach a wider audience while providing a personalized experience through digital channels and creating brand awareness and recognition through traditional media. The importance of digital marketing and its ability to influence consumer behavior stand out as key factors for marketers and businesses. In today's digital age, adapting to digital channels becomes necessary to meet the needs and preferences of modern consumers, especially Generation Z. This generation has high expectations from brands and wants authentic experiences based on personalization, transparency, and engagement. Through the conducted research and summarized findings, this paper provides marketers and businesses with valuable insight into the importance of digital marketing and its impact on consumer behavior. Combining digital and traditional marketing approaches can be a key factor in achieving maximum impact on consumers and successful brand building. In the future, continuous monitoring of changes in consumer behavior, understanding the preferences of target groups, and adopting innovative marketing strategies will be crucial for the success of companies in the digital age. It is important to point out that digital marketing should not replace traditional marketing methods but should be supplemented and adapted to modern consumer needs. In the context of rapid technological changes, marketers need to be flexible and constantly follow trends in order to remain relevant and effective.

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## A BIBLIOMETRIC ANALYSIS ON TERROIR PRODUCT AND CONSUMER STUDIES

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### ABSTRACT

*This bibliometric analysis examines the scholarly work related to terroir products and consumers, revealing a surprisingly limited body of research within the Web of Science (WoS) database from 2004 to 2023. Despite the global appreciation of terroir products, only 94 papers have been published in this period, highlighting a significant gap in the literature and presenting a robust opportunity for future research. Key bibliometric indicators suggest that research in this area is primarily rooted in agricultural and food science, although influential works span a diverse range of disciplines. The analysis acknowledges the contributions of leading scholars such as Barham, Charter, Spielmann, Bokulich, and Vaudour, whose works are pivotal in this emergent field. Through this work, we offer an inaugural synthesis of the existing publications, hoping to inspire continued academic pursuit in this rich and culturally significant field.*

**Keywords:** Terroir, Consumer, Bibliometric, VOSviewer, Web of Science (WoS)

### 1. INTRODUCTION

Barjolle et al. (1998) define a terroir product as a typical product that intuitively refers to a recipe or a food that is specific to a location, region, or country. According to the authors, the uniqueness, or “typicity”, is a legacy stemming from a geographical and historical origin that makes the product distinctive. A terroir product comes from a geographic region characterized by a specific climate that allows the product to be developed based on the knowledge of that place's qualities (Spielmann & Gélinas-Chebat, 2012). Labeling a product with the name of the place it comes from can make people feel a special connection to that area. Geographers think this helps to keep the culture and history of the area alive, much like ethnography does (Delfosse, 1997). Recognizing a place or its terroir lends a distinct identity to its local products, shaping how consumers view the product's authenticity (Riviezzo et al., 2017). The concept of terroir originated in France in the mid-19th century, initially associated with wine production. It emphasized the distinct relationship between a wine and the specific location where it was produced (Stefanis et al., 2023). Over time, the meaning of terroir has broadened. It now illustrates the connection between any agricultural product and its region of cultivation. Today, the concept has expanded to additional geographical areas such as Morocco, which is recognized for its agricultural richness ranging from food items to wellness and beauty products, including honey, dried foods, Amlou, edible argan oil, cosmetic argan oil, hydrosols, and essential oils (Housni et al., 2023). By examining the literature on “terroir products” and “consumers,” this study aims to analyze the progression of publications over time, the research areas covered, the countries showing interest in the topic, and the languages used in the papers.

Additionally, a bibliometric analysis will be conducted using VOSviewer to explore co-authorship, co-occurrence, citation, co-citation, and bibliographic coupling. This study focuses exclusively on publications in the Web of Science database.

Hence, the research question of this study are as follows:

*What insights can bibliometric analysis provide about the research trends on “terroir product” and “consumer”?*

## 2. CONCEPTUAL FRAMEWORK

### 2.1. Meaning of Terroir

Terroir is a complex French term used to identify and classify artisanal food products in relation to a specific reference location. The concept of terroir is notoriously difficult to translate both linguistically and culturally, having clear linguistic, historical, and cultural roots in France (Lenglet & Giannelloni, 2016) but not in other countries. It is for this reason that INRAE/INAO<sup>1</sup> offers a definition in the terroir charter proposed during the international meetings “*Planète Terroir*” organized by UNESCO in 2005:

*“A terroir is a geographically delimited space defined by a human community that, over its history, constructs a set of distinctive cultural traits, knowledge, and practices based on a system of interactions between the natural environment and human factors. The expertise involved reveals originality, provides typicity, and allows recognition for products or services originating from this space and therefore for the people living there. Terroirs are living and innovative spaces that cannot be reduced to tradition alone”.*

Complex in nature, terroir brings together multiple characteristics (physical, organoleptic/taste-related, symbolic, etc.) into a single concept that functions as a form of local and national attachment, and as a means to communicate and sell these forms of locality and nationality (along with their attributes) on global markets (Cappeliez, 2017). This concept refers to a space endowed with unique cultural characteristics and expertise that combines the human and natural aspects of a homogeneous geographical area.

### 2.2. Terroir Product

The complexity of the term “terroir product” lies in its multitude of definitions; everyone has attempted to provide their own explanation based on their field of activity and perception. For instance, agronomists have focused on the impact of terroir on the typical characteristics of products, while economists view terroir as an indicator of quality. This concept of terroir interests various fields, including terroir tourism, literature, geography, anthropology, etc. As for marketing, this notion is closely linked to the official quality signs concerning the geographical origin of terroir products (Elgozmir & Chouhbi, 2021). Despite the interest terroir products generate among researchers, it is challenging to arrive at a consensus on a single definition of the concept. Table 1. offers some definitions that seem simple and clear to understand. For some researchers, “terroir products” are seen as being of better quality, less industrial, more artisanal, more authentic, and more natural than standard products (Chazoule & Lambert, 2011). Products that lie at the intersection of the natural and the cultural are rooted in a history and temporality, where their place of origin - or terroir - gives them a special significance. The historical grounding of these products allows them to be attributed a local and cultural identity. With this in mind, authors have taken into account criteria of space, time, and expertise to organize and conceptualize this diversity (Mahdi, 2004).

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<sup>1</sup> INRA/INAO : National Research Institute for Agriculture, Food and the Environment/National Institute of Origin and Quality, both French public organizations

	Definition	Authors
Terroir product	<i>“Terroir products are characterized by a genuine originality linked to the local environment, including the physical characteristics of the terroir and significant production constraints. The product is specific to the geographical area from which it originates, and it seems impossible for stakeholders from other regions to produce the exact same product.”</i>	<b>Ricard (1994)</b>
	<i>“A terroir product is any food product that has a terroir image among consumers. These can be processed or unprocessed products, bearing a quality sign or not, having a tangible connection to the terroir or not, conveying an identity or not, and can be either recent or ancient.”</i>	<b>Lagrange et al., (1997)</b>
	<i>“A terroir product comes from a geographical region characterized by a specific climate that allows the product to be developed based on the knowledge of the qualities of that place.”</i>	<b>Spielmann &amp; G��linas-Chebat (2012)</b>

*Table 1: Definitions of terroir products  
 (Source: Authors)*

The term “terroir product” is frequently taken from French and refers to a product tied to a particular location and specific land characteristics. This notion is multifaceted and comprises three components: the dimensions of space, time, and expertise, as manifested in the traditions of a community that produces a range of items, from dairy and fermented drinks, oils (Amilien, 2011; B  rard et al., 2004; Riviezzo et al., 2017) to cosmetics (Housni et al., 2023). According to Pr  vost (2011), in agricultural activity, “terroir” is distinct from “territory” in that territory is a space made up of natural and cultural resources upon which a terroir can express itself. The valorization of these resources through agricultural production leads to effects that give the production site specific characteristics and allow for the characterization of the terroir. These effects, being of a technical, economic, and sociocultural nature, have a dynamic influence on the characteristics of the territory. This array of traits defining terroir makes the matter complicated for researchers. Originally attributed to geographers and agronomists, today the concept of terroir is of interest to many disciplines, notably management, economic, and social sciences. According to the review article by Pr  vost et al., (2014), *“Terroir is a concept for action in the development of territories”*, terroir in economic and social sciences takes on several forms. That is why a “terroir product” is characterized by its typicity, which stems from cultural heritage, historical and geographical origins, and is anchored in a territory through heritage and cultural identity (Vandecandelaere et al., 2009).

### 3. RESEARCH METHODOLOGY

#### 3.1. Method

This study employs the Web of Science (WoS) online database for bibliometric analysis due to its comprehensive coverage across various disciplines (Rey-Mart   et al., 2016). Furthermore, WoS maintains rigorous selection criteria for journal inclusion, thus guaranteeing the quality of the scientific papers it indexes. For this research, “terroir product” and “consumer” were the chosen keywords to locate pertinent studies. The search query was formulated as: [TS=(“terroir product” AND consumer)]. The term “product” was specifically chosen because the study focuses on papers that use “terroir” to characterize a product's locality and origin. In contrast, the term “consumer” was included to underscore studies pertaining to consumer behavior or those related to marketing. Initially, our research is directed at literature relevant to consumer studies, which encompasses topics such as buying behavior, consumer preferences, and perceptions.

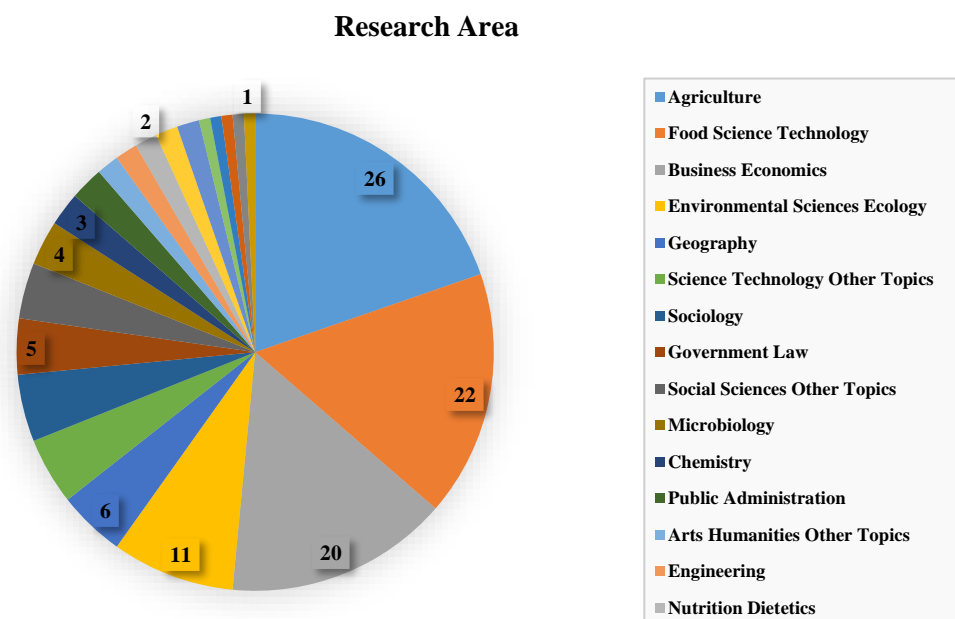


### 3.2. A brief analysis of publications on WoS

Bibliometric analysis synthesizes extensive bibliometric data to illustrate the current intellectual framework and budding trends in a specific research area or discipline (Donthu et al., 2021). This study adopts a mixed-methods approach, combining both quantitative and qualitative analyses. Initially, data sourced from the WoS database is quantitatively analyzed to gain insights into the research scope of our topic, its evolution on time, the geographic distribution, and the linguistic composition of the research related to our topic.

#### 3.2.1. Research area

The pie chart represents various research areas. The three most represented research areas are Agriculture (with a total of 26 publications), Food Science Technology (with 22 publications), and Business Economics (with 20 publications). These areas form the largest portions of the chart the largest segments of the pie chart and collectively account for a significant portion of the represented research topics. The chart encompasses a wide range of research topics, from natural sciences like Agriculture and Ecology to social sciences like Sociology and Public Administration. This diversity suggests a broad spectrum of academic interests or a comprehensive dataset being analyzed. Several research areas, such as Anthropology, Area Studies, Biotechnology Applied Microbiology, Communication, and Computer Science, each have only a single representation. This could indicate either less focus or a smaller dataset for these particular areas in the context of terroir products and consumers.



*Figure 1: Research Area*  
 (Source: Authors)

#### 3.2.2. Number of publications

The research query returned 94 results from WoS as of October 2023, which are depicted in the subsequent figures. Figure 2 shows a rising trend in research interest in terroir products and consumers over the last 20 years. The trend line demonstrates a steady increase in publications, indicating an escalating interest in studies of terroir products and their consumers. Although the overall number of publications on this topic in WoS is relatively small, the upward trend is evident.

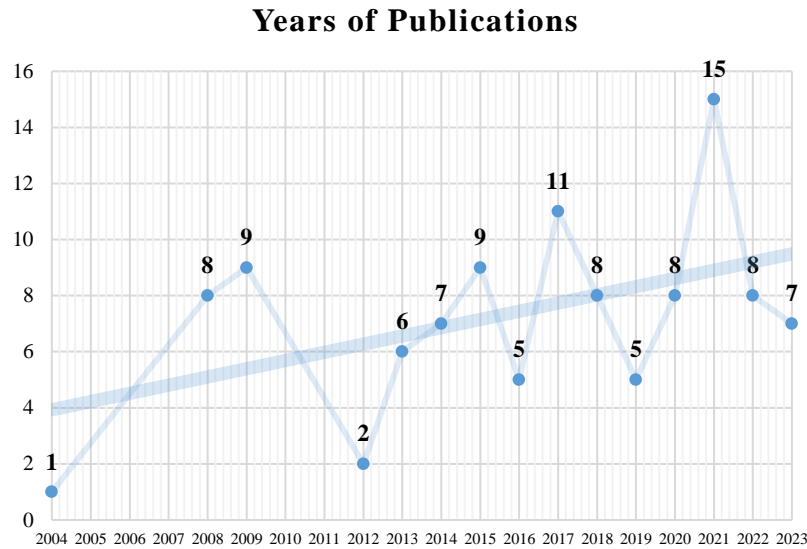


Figure 2: Evolution of publication in terroir products and consumers in WoS  
 (Source: Authors)

### 3.2.3. Countries interested in the topic research

There are 30 countries in “terroir products” research field. Table 2 shows that France leads with 26 research papers, followed by the USA with 20, and Italy with 16. The high number of publications from France likely reflects the French origin of the “terroir products” concept, which includes wine, cheese, and other items. The table also demonstrates the global reach of the topic, with contributions from Europe, America, Asia, and North Africa, underscoring the widespread adoption of the terroir concept.

Ranking	Country	N° of Publications	Ranking	Country	N° of Publications
1	France	26	16	Norway	2
2	US	20	17	Bulgaria	1
3	Italy	16	18	Colombia	1
4	Australia	8	19	Czech Republic	1
5	Spain	8	20	Denmark	1
6	England	5	21	India	1
7	Portugal	5	22	Japan	1
8	Brazil	4	23	Netherlands	1
9	Switzerland	4	24	New Zealand	1
10	Austria	3	25	Poland	1
11	Belgium	3	26	Singapore	1
12	Canada	3	27	Slovakia	1
13	People R China	3	28	Slovenia	1
14	Algeria	2	29	Tunisia	1
15	Germany	2	30	Turkey	1

Table 2: Countries where studies about terroir products and consumers were conducted  
 (Source: Authors)

### 3.2.4. Publications languages

Table 3 indicates that the majority of publications on terroir products and consumers are in English, accounting for 84 papers. French follows with 7 publications, while German, Russian, and Spanish each contribute 1 publication. The prominence of English is expected given that the WoS database encompasses high-quality international journals.

The ranking of French as the second most common language is understandable, considering France's significant contribution to research in this area.

Ranking	Language	N° of Publications
1	English	84
2	French	7
3	German	1
4	Russian	1
5	Spanish	1

*Table 3: Languages used in research on terroir products and consumers  
 (Source: Authors)*

### 3.3. Bibliometric Analysis using VOSviewer

VOSviewer is a free software dedicated to bibliometric analysis, it can generate maps of authors or journals using co-citation data, or keyword maps using co-occurrence data. The software provides an interface for a thorough inspection of these bibliometric maps (Eck & Waltman, 2009). The following table describes the aim of the different types of analysis conducted using VOSviewer software.

The Aim of the Analysis	
<b>Co-authorship</b>	Co-authorship analysis is used to figure out how researchers work together, see how much they interact, find any tight groups, and spot the main contributors. It also helps to understand how working as a team affects the quality of the research they produce by looking at the relationships between researchers or their workplaces (Liu, 2021).
<b>Co-occurrence</b>	Co-occurrence analysis identifies the relationships between keywords within documents by tracking the frequency with which they appear together. This analysis reveals the most prevalent research topics in a specific field through the examination of related keywords (Liu, 2021).
<b>Citation</b>	Citation analysis evaluates the impact and productivity of authors in a specific field by examining the frequency and patterns of citations their work receives (Dastane & Herman, 2023).
<b>Co-citation</b>	Co-citation analysis tracks papers that are frequently cited together within source articles. VOSviewer identifies papers co-cited by numerous authors and presents them as clusters. Papers within these clusters generally share a common theme (Surwase et al., 2011).
<b>Bibliographic coupling</b>	Bibliographic coupling identifies papers that reference a similar collection of cited works. By organizing these into clusters, it highlights the most impactful authors and outlines the networks that have been constructed among them (Contreras & Abid, 2022).

*Table 4: Type of Analysis used in this study and their aims  
 (Source: Authors)*

#### 3.3.1. Co-authorship Analysis

##### a) Authors unit analysis:

The analysis excluded documents with a high number of authors, setting the maximum at 25 authors per document. Additionally, a minimum threshold was established, requiring authors to have at least 3 documents. Out of 265 authors, only 3 met these criteria. According to Figure 3, there are predominantly two clusters that together comprise a total of 3 authors.

The first cluster, depicted in red, includes two authors (Andrea Marescotti and Giovanni Belletti), while the second cluster, shown in green, features a single author (Nathalie Spielmann).

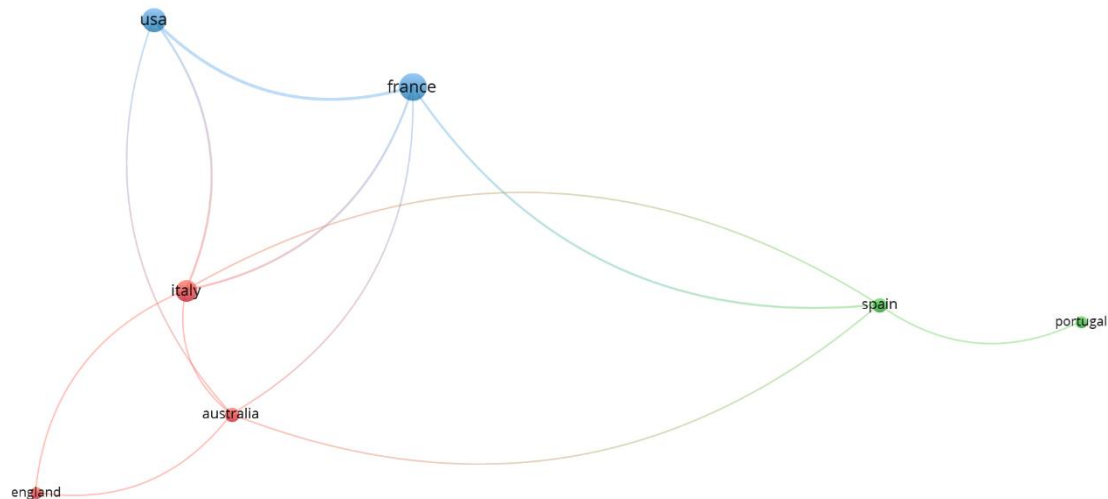


*Figure 3: Map of Authors Co-Authorship Analysis*  
 (Source: VOSviewer)

#### b) Countries unit analysis:

The analysis excluded documents authored by large groups, capping the number of authors per document at 25. A minimum of 5 documents was required for a country to be included in the study. For each of the seven countries examined, the total strength of the co-authorship links with other countries was calculated. Only those countries exhibiting the greatest total link strength were selected for further analysis.

Figure 4 illustrates that there are three clusters. The first cluster, depicted in blue, comprises France with 26 documents and the USA with 20 documents. The second cluster, shown in red, includes Italy with 16 documents, Australia with 8 documents, and England with 5 documents. The third cluster, represented in green, consists of Portugal and Spain, with 5 and 8 documents respectively.



*Figure 4: Map of Countries Co-Authorship Analysis*  
 (Source: VOSviewer)

#### 3.3.2. Co-occurrence analysis of keywords

The co-occurrence of all keywords has been illustrated in figure 5., this analysis identifies the major themes, topics, trends in the research field of terroir products and consumers. This analysis categorized various keywords into clusters, each of which revolves around a particular theme associated with consumer perceptions and behaviors. The red cluster emphasizes consumer perceptions of terroir and authenticity, particularly in relation to the product's

country-of-origin, place, image, and price. The green cluster delves into consumer preferences for wine, emphasizing the roles of information and knowledge on sustainability, as well as consumers' willingness to pay.

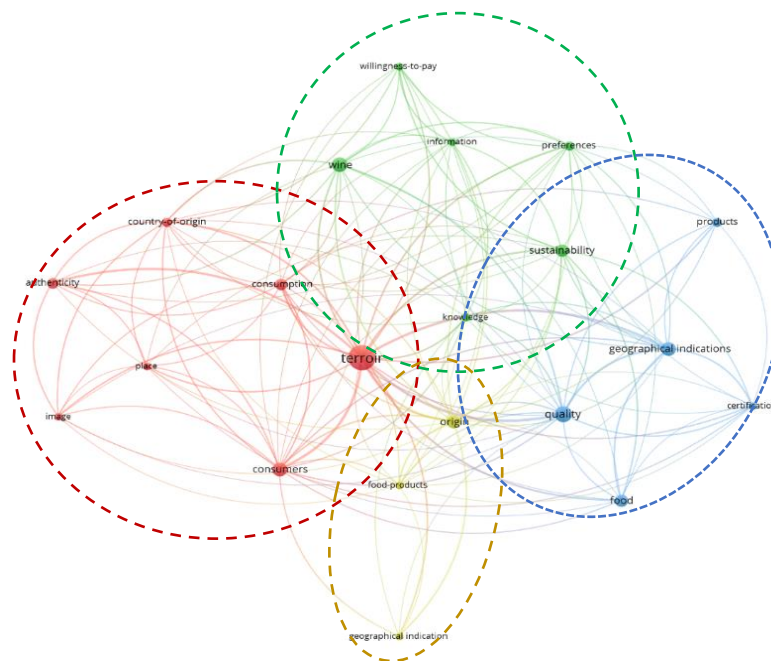


Figure 5: Co-occurrence all keywords analysis  
 (Source: VOSviewer)

The blue cluster focuses on understanding the intricate relationship between geographical indication, quality, and certification in food products. Lastly, the yellow cluster emphasizes the significance of geographical indications in safeguarding the origins of food products. This comprehensive analysis offers valuable insights into various facets of consumer behavior and preferences, especially in the domain of food and wine (see table 5.).





Cluster	Keywords	Theme
	Terroir, Consumption, Consumer, Country-of-Origin, Authenticity, Price, Place, Image (8 keywords)	Understanding consumer perceptions of terroir and authenticity, while considering the concept of country-of-origin as an attribute related to product place, image, and price.
	Sustainable, Preferences, Knowledge, Information, Wine, Willingness-to-pay (5 keywords)	Understanding consumer preferences of wine, while considering information and knowledge about sustainability and their willingness-to-pay.
	Quality, Geographical Indication, Products, Food, Certification (5 keywords)	Understanding the relationship between geographical indication, quality and certification in food products.
	Origin, Food-Products, Geographical Indications (3 keywords)	Understanding the role of geographical indications in protecting the origin of food-products.

Table 5: Keyword Network Cluster Analysis  
 (Source: Authors)



Authors	Title	Journal	Links	Total Links Strength	Cited
Barham (2003)	<i>Translating terroir: the global challenge of French AOC labeling</i>	Journal of Rural Studies	3	21	27
Bowen & Zapata (2009)	<i>Geographical indications, terroir, and socioeconomic and ecological sustainability: The case of tequila</i>	Journal of Rural Studies	3	12	17
Vaudour (2002)	<i>The Quality of Grapes and Wine in Relation to Geography: Notions of Terroir at Various Scales</i>	Journal of Wine Research	3	14	11
Van Leewen & Seguin (2007)	<i>The concept of terroir in viticulture</i>	Journal of Wine Research	3	9	11

Table 6: Most references co-cited  
(Source: Authors)

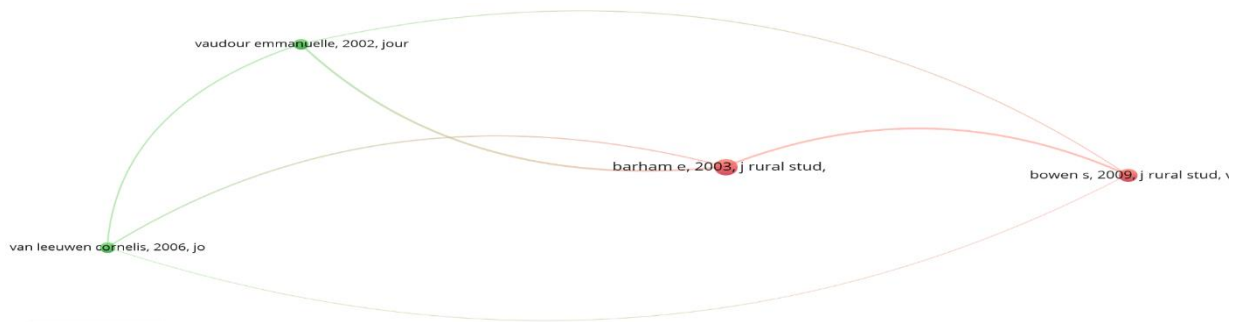


Figure 7: Map of references co-citation  
(Source: VOSviewer)

	Authors	Links	Total Links Strength	Citations
■	<b>Barham</b>	5	79	34
	<b>Bowen</b>	5	71	28
	<b>Belletti</b>	2	70	25
	<b>Bokulich</b>	2	2	22
■	<b>Spielmann</b>	3	70	27
	<b>Charters</b>	3	66	25

Table 7: Most authors co-cited  
(Source: Authors)

Figure following on the next page



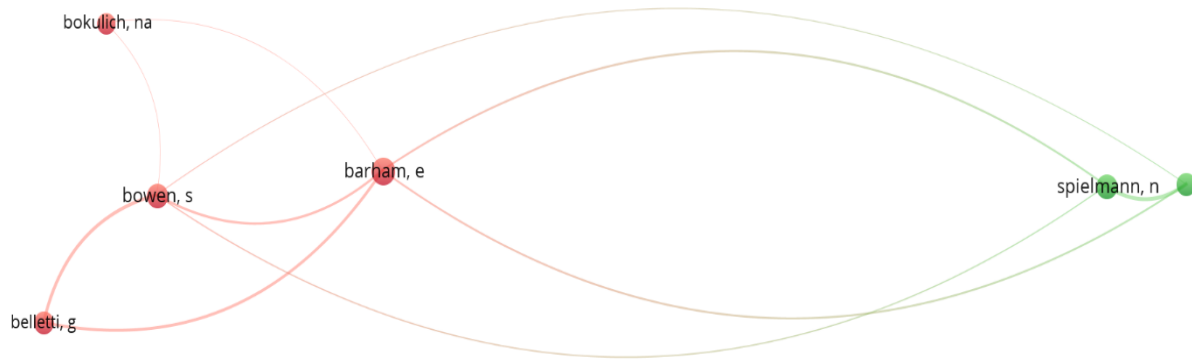


Figure 8: Map of co-citation of cited authors  
 (Source: VOSviewer)

### 3.3.5. Documents Bibliographic Coupling Analysis

Figure 9 presents a bibliographic coupling map of documents. The analysis of 94 documents resulted in 16 colored clusters. The red cluster contains 15 items, while both the green and blue clusters comprise 12 papers each. The most cited paper is *Bokulich (2014)* with 603 citations, followed by *Grade (2004)*, and then *Vaudour (2015)* with 79 citations, *Belletti (2015)* with 78 citations, and *Charters (2017)* with 63 citations.

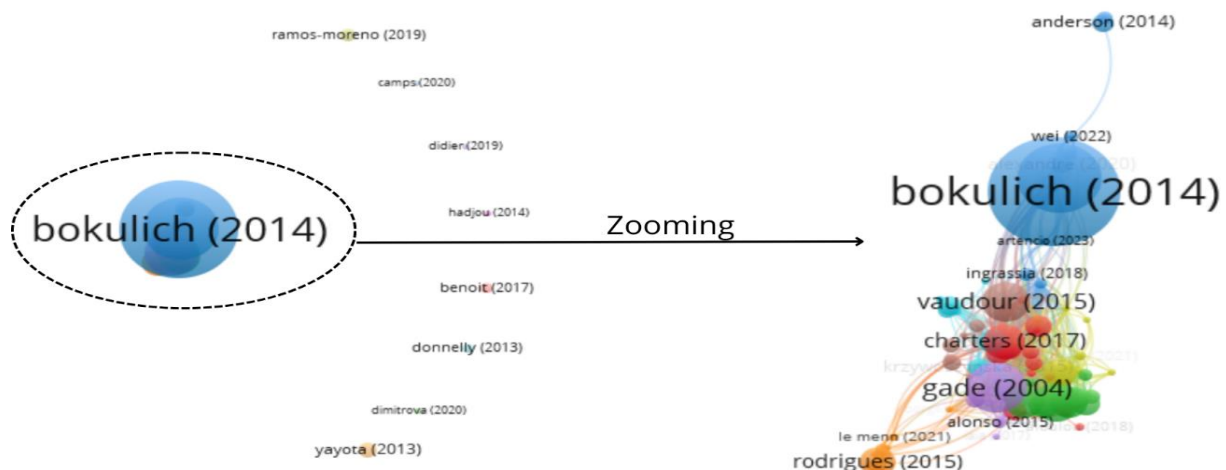


Figure 9: Map of Documents Bibliographic Coupling  
 (Source: VOSviewer)

## 4. DISCUSSION

This bibliometric study provides data on the evolution of studies related to “terroir products” and “consumers”. The results show that papers pertaining to our research topic are sparse, which suggests that the study of consumer behavior towards terroir products is a fertile area for research. This topic can generate numerous ideas and discussions. It is ripe for exploration through writing, debate, research, or any form of intellectual inquiry. The search results from the Web of Science (WoS) database yielded only 94 papers over a 20-year period (from 2004 to 2023), which is quite remarkable and may be attributed to the novelty of the topic or a tendency for authors to not publish in high-impact journals. The geographical distribution of the papers is logical; they are mainly from France and often relate to wine products because wine is considered one of the most distinguished terroir products in the country. However, it is interesting to note that despite some countries being renowned for their terroir products—such as Morocco, with many terroir products (Argan Oil, Safran, Olive Oil etc.)—there are no papers related to these products in the Web of Science (WoS) database.



In terms of papers and authors, the analysis clearly indicates that Barham's work is frequently cited by other researchers. A few names such as Charter, Spielmann, Bokulich, and Vaudour consistently appear in the map analysis. The small sample size of the papers studied implies that there is a substantial need for further research to answer questions related to consumers and terroir products. It was also noted that the majority of the papers from WoS pertain primarily to the agricultural and food science research areas. Additionally, the most cited paper among the 94 is one related to biological sciences. Although our primary interest was in consumer behavior, it is evident that the cited papers span various fields.

## 5. STUDY LIMITATIONS & FUTURES RESEARCHES

This study has several limitations. Firstly, selecting appropriate keywords proved challenging. Our primary goal was to concentrate on consumer behavior, perceptions, preferences, and purchasing habits regarding terroir products. However, employing specific keywords restricted the search results in the Web of Science (WoS) database. We found it more effective to use only "terroir product" and "consumer" as keywords to yield broader results, providing us with a general overview of the papers related to both topics. Secondly, the WoS database has limitations concerning the inclusion of papers written in the French language. As discussed earlier, terroir products are particularly prominent in French-speaking countries. There is also the issue of product nomenclature; some countries do not refer to terroir products as such, opting instead for terms like "local products". Therefore, relevant papers may have been inadvertently excluded, even though the products studied could be characterized by or share the same attributes as terroir products. Another point is that the richness of the study could be enhanced by incorporating additional databases to provide a more comprehensive view of the bibliometric analysis. For example, including databases such as SCOPUS, CAIRN, and Google Scholar could broaden the scope of the research. Lastly, using VOSviewer software for analysis presented certain limitations. Perhaps employing alternative software or methodologies could yield additional insights. Based on the findings of our bibliometric study, further research could be undertaken, such as incorporating additional databases and conducting systematic literature reviews and meta-analyses to synthesize existing knowledge in the field and identify research gaps.

## 6. CONCLUSION

To the best of our knowledge, this study is the first to employ bibliometric analysis techniques on the combined topics of "terroir product" and "consumer" within the Web of Science (WoS) database. Despite a notable uptick in interest, the volume of indexed research articles is relatively small. This scarcity of literature indicates a rich vein of opportunity for scholars and researchers. The primary aim of this study is to offer an initial overview of the existing research, which could stimulate further scholarly investigation in this domain. The intention is to present an overview of the current state of research and to highlight emerging trends. This study sets out to identify key areas ripe for future study, with the potential to expand both academic understanding and practical insights. It is designed to encourage dialogue among researchers, bridge various academic disciplines, and ultimately enhance comprehension of consumer interactions with terroir products.

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## GLOBALIZATION AND THE ROLE OF FOREIGN DIRECT INVESTMENT: PANEL ANALYSIS APPROACH

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### ABSTRACT

*Globalization significantly impacts Foreign Direct Investment (FDI) by increasing cross-border economic integration and opening new markets. It encourages technology transfer, intensifies competition, and promotes the integration of global supply chains. Governments often modify policies to attract FDI, while exchange rates and global stability play crucial roles in FDI decisions. In a globalized world, FDI flows are influenced by multiple factors, including market access, technology, competition, and political and economic conditions. While certain countries are undergoing significant integration into the global economy with growing international trade, others continue to face poverty and exclusion. This article aims to offer a comprehensive overview of the existing studies on Foreign Direct Investments (FDI) using panel analysis methodology. By reviewing the available literature, we have identified key variables, data resources, and methods relevant for conducting Foreign Direct Investments research with panel data techniques, providing valuable guidance for future investigations. Panel data provides a powerful tool for understanding and forecasting the impacts of foreign direct investments by offering a comprehensive, time-series view of FDI behaviour and its consequences on host economies.*

**Keywords:** *Foreign Direct Investments (FDI), Globalization, Panel data analysis*

### 1. INTRODUCTION

In the context of a free-market economy where the most crucial factors are the quality, quantity, and speed of information, the process of globalization is becoming increasingly prominent. The Council of Europe defines globalization as increased economic integration of all the world's nations, driven by trade liberalization leading to greater diversity and volume of international trade in goods and services, reduced transportation costs, expanding international capital flow, substantial global workforce growth, and the rapid global dissemination of technology, especially in communications (Eurostat, 2022). A key element in globalization is digitalization, inextricably linked to nations that draw foreign investments and multinational corporations equipped with top-tier technology and highly educated professionals managing it. Bilas and Franc (2006) highlight that the expansion of globalization and liberalization has generated a demand for the development of innovative and more efficient activities, especially in the production of goods and services capable of thriving in a competitive market and sustaining their presence. Majority of countries view Foreign Direct Investments (FDI) as a crucial channel for activating their own potentials necessary for development. Over the last three decades FDI has been an effective driver of economic growth by facilitating technology transfer and know-how without incurring additional debt, yet increased globalization and competition among

governments to attract FDI have led to concessions that strain national budgets (Derado et al. 2023). Predicting FDI using panel methodology could help in future by providing insights for informed decision-making, identifying patterns, and influencing factors, guiding policy formulation. Through a review of the existing literature, we identified key variables and techniques suitable for Foreign Direct Investments research using panel data analysis. A panel is a type of dataset that combines both cross-sectional and time-series data, and it involves collecting repeated measurements of specific variables over a period from observed units, which can be individuals, households, firms, cities, or states (Xu et al. 2007). Panel analysis has a significant potential to understand economic changes and trends, serving as a solid basis for comprehending and forecasting future shifts in consumer or employee behaviour (Devčić et al. 2022). This article aims to provide an overview of the current research using panel analysis in the field of FDI, to structure current knowledge about panel analysis, research questions and areas for future inquiry. The paper consists of four chapters. The introduction chapter IS followed by the second chapter which delves into the theoretical framework covering foreign direct investments and panel data methodology. The third chapter explores the application of panel methodology in foreign direct investments research. The paper culminates with a discussion chapter, summarizing key points and concluding the study.

## **2. THEORETICAL FRAMEWORK**

Literature on economic growth and FDI implies that FDI can contribute to the growth of the recipient economy both directly through the capital formation channel and indirectly through positive spill overs and integration into international productive and innovative networks (Bačić et al. 2004). The most important effects of foreign direct investments are spill over effects related to knowledge, technology, markets, and processes (Buterin and Blečić, 2013), technology transfer, export growth, overall national productivity growth, economic integration into global markets and financial markets (Lovrinčević et al. 2004), economic growth, increased employment, modernization of production equipment, new technologies, and environmental protection in the host country (Bilas and Franc 2006). Regarding the short-term effects of foreign direct investments, Buterin and Blečić (2013) state that the inflow of funds from abroad helps increase liquidity and balance, generally boosting the economic activity (Lovrinčević et al. 2005). Positive effects of foreign direct investments may be absent if they are not directed towards the desired sectors of activity. In other words, foreign direct investments may not be profitable if the host country misjudges the benefits of the foreign investor and creates ineffective incentive policies (Grgić et al. 2012). In this sense, such investments can have negative consequences for both the host country and its citizens. The study of foreign direct investments is not only of academic interest but also of practical significance. The effects of FDI may substitute some economic and social policy interventions (Bačić et al. 2004). Policymakers, business representatives, and investors rely on research on foreign direct investments to make informed decisions that can shape national economies and global economic interactions.

### **2.1. Panel data methodology**

Panel data methodology is advantageous in FDI research for several reasons. Firstly, it allows for the examination of individual units (countries, regions, etc.) over time, providing a comprehensive view of how variable evolves. Secondly, it helps control for time-invariant unobserved factors through fixed effects, allowing a more accurate assessment of the impact of FDI on various economic outcomes (Wooldridge, 2013). Panel data methodology is a tool in the field of statistics and econometrics that allows researchers to analyse data over multiple time periods (temporal component) and for various cross-sectional units (spatial component), which combines the strengths of both approaches, offering a more comprehensive view of the

phenomena under investigation (Devčić et al. 2022). In essence, panel data, involves collecting time series information for each entity within the dataset, often gathered for geographic units over multiple years, which had been used in the scientific literature using quantitative methodology. This methodology is particularly useful in various research areas, including economics, social sciences, and public policy, where it is essential to control for unobservable factors that may affect the variables of interest, or when clear subgroups are present within each unit of the dataset (Babić and Stručka 2001). Wooldridge (2013) states that panel data sets are valuable for policy analysis as they track the same cross-sectional units over time, proving most beneficial in controlling for persistent unobservable characteristics of individuals, firms, cities, and more that may have correlations with the explanatory variables. Cross-sectional data provides information about variables at a specific point in time, while time-series data tracks variables over multiple time periods (Xu et al. 2007). When employing panel data in an econometric study, it is crucial to ensure the data is organized appropriately, making it easy to link the different time periods for the same cross-sectional unit (e.g., individuals, firms, cities) (Wooldridge, 2013). Devčić et al. (2022) categorize panel data methodology into static and dynamic models, with static models using only variables at a given time as independent variables, and dynamic models incorporating an additional variable representing the previous values of the dependent variable, the key difference between these models is whether individual effects or specific unit characteristics are part of a constant term or are considered a stochastic process included in the error term. Babić and Stručka (2021) categorize panel data models based on their approach to handling external differences (e.g., initial conditions of each country), which should be controlled for, leading to two subgroups: fixed effects models and random effects error component models.

#### *2.1.1. Fixed effects*

The fixed effects approach considers the unique characteristics of each country, such as initial conditions, which remain constant over time, but they vary from country to country (Babić and Stručka 2021). The constant in the regression model is not the same for all the countries, but it differs from country to country and combines all the variables that can influence the dependent variable (Lovrinčević et al. 2005). Fixed effects methods are applicable to unbalanced panels, presuming that the missing time periods are not systematically linked to individual-specific errors. In panel data sets, an unbalanced panel, characterized by missing years for some cross-sectional units, presents a challenge in comprehending the reasons for its imbalance, specifically, in cases involving cities and states, occasional gaps in data for crucial variables during specific years contribute to this lack of balance (Wooldridge, 2013). Also, the fixed effects estimator is efficient when the individual-specific errors are serially uncorrelated and homoscedastic, and no assumptions are made regarding the correlation between the unobserved effect and the explanatory variables (Wooldridge, 2013). According to Bogdan (2009), econometric analysis suggests that when drawing conclusions for a specific group of countries, such as transitional nations, the suitable choice is the fixed effects model. The crucial distinction between fixed effects and random effects models lies in whether they allow for correlations between control variables and certain effects (individual heterogeneity) that vary from country to country but remain constant over time (Bogdan, 2009).

#### *2.1.2. Random effects*

Random effects (error components) models assume that each country is associated with a random difference (Babić and Stručka 2021), when the unobserved effect is thought to be uncorrelated with all the explanatory variables (Wooldridge, 2013). Bogdan (2009) states that random effect model is appropriate when some effects exhibit minimal change, do not change or change very slowly over time (e.g., level of corruption or bureaucratic quality) within a

specific country but can markedly contrast between different nations. Under such circumstances, countries may draw greater FDI despite these indicators retaining relative stability or experiencing gradual alterations over time. In these situations, the random effects model proves to be a more suitable choice as it permits correlations between these "fixed" factors and control variables (Bogdan, 2010). To decide on the suitability of a fixed or random effects model, the Hausman specification test is employed. Hausman (1978) introduced a test, and certain econometrics software typically calculates the Hausman test based on the complete set of random effects assumptions (Bogdan, 2010). In practice, a non-rejection of the test implies that either the random effects and fixed effects estimates are close enough that the choice between them does not significantly impact the results, or the substantial sampling variation in the fixed effects estimates prevents drawing practical and statistically significant distinctions (Wooldridge, 2013). After conducting the Hausman specification test, a Chow test is employed to evaluate whether the fixed effects model, endorsed by the Hausman test, is more suitable than the pooled regression model. If the Hausman test favours the random effects model, its appropriateness relative to the pooled regression is examined through the Breusch-Pagan LM test, additionally, when autocorrelation is verified, it is addressed by applying the Cochrane-Orcutt procedure (Bogdan, 2010).

### 3. LITERATURE REVIEW

The literature review encompasses 10 studies on the topic of Foreign Direct Investment using panel data methodology. Derado et al. (2023) in the paper "FDI and Economic Growth - Perspective of Southeast European Countries" investigated the relationship between foreign direct investment and economic growth by distinguishing between two types of foreign direct investment - mergers and acquisitions (M&A) and greenfield investments. To examine the impacts of various types of foreign direct investment (FDI), authors employed panel data analysis with fixed effects. Using Prais-Winsten estimation they solved a serial correlation, groupwise heteroscedasticity and cross-sectional correlation. They applied the dataset encompassing 16 European countries that underwent reforms, focusing on FDI, mergers and acquisitions (M&A), and greenfield investments as the key variables. The analysis also includes a set of control variables, which combine standard neoclassical growth variables. The authors applied the null hypothesis of the Modified Wald test for groupwise heteroscedasticity, assuming that the variance is consistent. However, the rejection of this null hypothesis implies that there is an issue of unstable variance and the presence of groupwise heteroscedasticity in the panel dataset. The results of the Wald test support the rejection of the null hypothesis, indicating that this dataset is affected by the problem of groupwise heteroscedasticity. Lovrinčević et al. (2005) analysed the impact of FDI inflows on domestic investments and national savings in transition countries. It posits that FDI inflows generally stimulate domestic investments but do not affect the rate of national savings. The analysis, conducted on 11 transition countries in Central and Eastern Europe over a decade using fixed effects in panel data, reveals a "crowding-in effect" of foreign capital on domestic investments. Notably, foreign loans show the strongest and statistically significant correlation, while foreign direct investments also play a significant role in explaining domestic investment patterns, albeit to a lesser extent. Bogdan (2009) uses panel analysis to analyse the impact of FDI on the economic growth of selected transition countries. Panel analysis results in an unbalanced panel due to the diverse time series for individual countries within the dataset. By applying panel analysis, the hypothesis that a higher inflow of FDI stimulates the economic growth of transition countries was tested. The study aimed to test the hypothesis that foreign direct investments (FDI) would boost economic growth in transitional countries, but the analysis revealed that FDI's positive impact on economic growth was more evident in nations with higher income, human capital, secondary sector FDI, strong rule of law, and developed financial markets.

Gholipour et al. (2014) conducted a study titled "Foreign investments in real estate, economic growth, and property prices: evidence from OECD countries." The purpose of the study was to analyse the interrelationship between Foreign Direct Investment (FDI) in the real estate sector, economic growth, and property prices while controlling for interest rates and inflation. The sample comprised OECD countries for the period between 1995 and 2008. Dynamic interrelation was analysed using panel cointegration techniques. The authors employed a linear algorithm model with variables including property prices, GDP, interest rates, inflation rates, and FDI in real estate. To examine the relationship between variables, the authors utilized a panel cointegration approach. The empirical results of the study indicate that FDI in real estate does not cause property price appreciation and does not contribute to economic growth in OECD countries. Garibaldi et al. (2001) used a panel analysis of 26 countries with transition economies in the period from 1990 to 1999. The regression results show that foreign direct investments in transition economies grow as a result of a favourable macroeconomic environment or a stable exchange rate but are negatively dependent on internal privatization. The regression results highlight that the factors influencing inward direct investment in transition economies can be effectively explained by a standard set of economic fundamentals. These factors encompass macroeconomic stability, the extent of economic reforms, trade liberalization, natural resource endowments, the privatization method, direct barriers to inward direct investment, and a measure of government indicative of obstacles to investment and entrepreneurship, closely tied to corruption. Notably, unlike some earlier studies on Central and Eastern Europe, wages do not exhibit a robust effect on direct investment flows in the examined sample. Hui and Chan (2014) use a panel regression analysis model to determine the determinants of Foreign Direct Investment in Real Estate (FDIRE) in 30 provinces of China for a specific period. They utilize a panel regression model to investigate the determinants of FDIRE in China, incorporating variables like GDP, average wages, transportation, the number of tourists, interest rates, and the dependent variable FDIRE. The result reveals that GDP per capita and the number of foreign real estate enterprises are the most significant factors affecting foreign investment in China's real estate market. Telatar et al. (2014) study investigates the relationship between (FDI) and Research and Development (R&D) in EU15 and EU27 countries from 1996 to 2009 using dynamic panel causality testing. While endogenous growth theories highlight the role of technological development in production, limited research has delved into the relationship between FDI and R&D. The empirical test reveals a one-way causality relationship from FDI to R&D, indicating a complementary relationship between the foreign investment and research and development in the European Union. Bačić, et al. (2004) study investigates the role of FDI in explaining economic growth through a two-step quantitative approach. The first step involves a bi-variate Granger causality test to explore whether FDI Granger causes growth, merchandise exports, and imports. In the second step, a growth equation is estimated, incorporating FDI as one of the explanatory variables, using a panel dataset covering 11 transition economies from 1994 to 2002. The results indicate that FDI is not statistically significant in explaining the variation in the growth rates of the observed economies. This finding may be attributed to the dominance of "brownfield" investments and their allocation to the service sector, contributing less to capital formation. Banović, et al. (2020) conducted a panel analysis in the European Union (EU28). Based on econometric analysis they involved static panel analysis and selected the most suitable model from the pooled regression model, fixed effects model, and random effects model. The application of the F-test indicates that the fixed effects model is more suitable compared to the pooled regression model, while according to the Breusch-Pagan test, the random effects model shows suitability over the pooled regression model. To determine which model, fixed or random effects, is more suitable for the analysis, the Hausman test assessed that the fixed effects model can be considered appropriate.



Results indicates that tax policy affects the attraction of foreign direct investments, but as a secondary factor, emphasizing the advantage of the gross domestic product variable. Among the analysed tax variables, the effective average tax rate stands out as the most significant in making investment decisions when choosing the investment location. Falk and Hake (2008) examined a panel data analysis on FDI and exports for seven EU15 countries spanning from 1973 to 2004. They investigate the empirical correlation between outward FDI and exports using the panel data causality testing method. The findings strongly support the notion that exports drive outward FDI, with no evidence of a reverse causation.

#### 4. DISCUSSION

Panel data methodology, widely embraced across various disciplines for its versatility, holds notable advantages that align with the research on Foreign Direct Investment (FDI) using panel methodology. Lovrinčević et al. (2005) state that the advantage of panel data analysis is that it provides the analyst with much greater flexibility in identifying differences between individual observation units. This flexibility is manifested in the ability to use the so-called fixed effects approach and the random effects approach. The fixed effects approach is used by Lovrinčević et al. (2005), Bogdan (2009) and Banović et al. (2020) where the specificities of each individual country are considered. Derado et al. (2023) used in both variables M&A and greenfield investment and control variables of employment and domestic investment, the fixed effect model, supported by the F-test indicating unit-specific fixed effects. Derado et al. (2023), Bogdan (2009) and Banović et al. (2020) used the Hausman test to confirm the consistency of the fixed effects model estimation by rejecting the null hypothesis. To examine the existence of serial correlation in panel data, Derado et al. (2023) conduct the Wooldridge test for serial correlation. Derado et al. (2023) and Bogdan (2009) used the Wald test for groupwise heteroscedasticity that resulted in rejecting the null hypothesis for all fixed effects model suggesting the existence of groupwise heteroscedasticity in this dataset. The issue of heteroscedasticity arises when there is instability in variance, potentially impacting the reliability of estimated parameters, especially over time. In panel data, this problem can manifest due to varying scales of variables across different data panels. To solve the cross-sectional correlation issues in the dataset, particularly evident with the increasing integration of global trade and capital flows, Derado et al. (2023) rejected the null hypothesis of the regression equation using fixed effects model which proved significant impact of foreign equity investment on local economic growth but also highlights substantial contributions from domestic investment and exports. Gholipour et al. (2014) checked the integration order for variables, as different cointegration tests are valid only if variables have the same integration order. They conducted unit root tests, including the Fisher-type test, Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Im, Pesaran Shin (IPS) tests. Subsequently, Pedroni, and Johansen Fisher methods were employed for testing long-term cointegration relationships between variables. Cointegration among variables was also examined by Gholipour et al. (2014) and Falk and Hake (2008) through panel Granger causality. The results of the Granger causality test which enable individual approach to economies, was also used by Bačić, et al. (2004) imply that the growth rates of three open and small economies – the Slovak Republic, Slovenia and Lithuania – have been positively influenced by FDI. Garibaldi et al. (2001) considered the extensive array of (potentially correlated) factors influencing capital flows to transition economies, with a key challenge in any econometric analysis which is to strike a balance between simplicity and accuracy, avoiding the misrepresentation of the model. The regression results show that the cross-country pattern of foreign direct investment can be explained reasonably well by standard macroeconomic fundamentals, including institutional indicators. Lovrinčević et al. (2005) employed the Hausman test to investigate endogeneity in the model. This test involves two phases.

Firstly, an auxiliary regression analysis is conducted with the contentious variable set as the dependent variable, secondly, the analysis reverts to the initial regression model. If the regression coefficient for this variable significantly differs from zero, the null hypothesis, asserting the consistency of both analysis methods (with and without instrumental variables), is rejected. In general, the versatility of panel data aligns with its application in FDI studies, allowing for a comprehensive analysis of cause-and-effect relationships over specific events or periods, crucial for understanding the delayed effects of economic policies (Wooldridge, 2013; Xu et al. 2007). The advantages of panel data, such as accurate parameter estimation, increased degrees of freedom, and lower collinearity between variables, are particularly beneficial for FDI studies. The complexities of panel data calculations are counterbalanced by its effectiveness in discerning impacts and controlling for heterogeneity among entities in research (Devčić et al. 2022), it helps distinguish the specific effects of FDI from the broader economic context. As researchers investigate the duration and adaptive dynamics of FDI, panel methodology proves to be a valuable tool, allowing for a more nuanced understanding of the temporal aspects of foreign investments. However, it is crucial to acknowledge the challenges associated with panel research, such as non-representativeness, financial resource requirements, and issues related to data collection, non-response, and attrition (Devčić et al. 2022). Another challenge in macro-level panel data analysis is cross-sectional dependence, which is becoming more present due to the increasing globalization of trade and capital flows, and especially in the context of regional economic integration, such as in the European Union (Derado et al. 2023). Despite these challenges, the benefits of panel data, especially in the context of FDI research, underscore its significance in providing a comprehensive understanding of the dynamics and impacts of foreign direct investments over time.

## 5. CONCLUSION

In this paper, we did an overview of the research in the field of foreign direct investments using panel data analysis. Based on our literature review, it is evident that panel data analysis serves as a valuable instrument for quantification of the dependence of individual variables that attract FDI. Through longitudinal perspectives, it identifies trends, patterns, and changes in FDI behaviour, providing insights crucial for informed decision-making. Despite challenges such as endogeneity and heteroscedasticity, the robustness of panel data analysis proves invaluable in uncovering the nuanced relationships between FDI and various economic indicators. By examining historical patterns and relationships, panel data can be used to develop econometric models that forecast the future impacts of FDI. This study could contribute to ongoing discussions and informs future research directions in the realm of international investments.

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## IMPROVING QUALITY OF LIFE IN INDIVIDUALS THROUGH PHYSIOTHERAPY

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### **ABSTRACT**

*Low back pain has a negative impact on aspects of the physical and mental health (Husky et al., 2018), subsequently diminishing the quality of life. Furthermore, the most commonly described risk factors are related to age, gender, physical activity, and work overload (frequent bending, twisting, lifting, pushing, static posture, and vibrations), obesity, smoking, socioeconomic status and level of education, job monotony and job dissatisfaction, depression, anatomical variations of the spine. One of the most common rehabilitation methods is physical therapy prescribed by the Croatian Health Insurance Fund. However, the problem in objectively assessing the effect of physical therapy in the treatment and rehabilitation of patients with back pain is the small number of well-conducted clinical trials (Luijsterburg et al., 2007). Therefore, the aim of this study was to examine how physical therapy can improve the quality of life and the physical and mental health of people in the modern era. The study involved 15 participants. The SF-36 (Short Form 36) questionnaire, a broadly applicable health status survey comprising 36 questions, was employed to assess overall quality of life. The questions cover eight dimensions of health: 1. physical health, 2. limitations due to physical difficulties, 3. limitations due to emotional difficulties, 4. social functioning, 5. mental health, 6. energy and vitality, 7. body pain, and 8. general health perception. A total of 15 physical therapy treatments were conducted over a three-week period, approved by the Croatian Health Insurance Fund. The paired-samples T-test was used to determine the statistical significance of differences between the initial and final measurements of the physical and mental health of the participants. The results obtained from this research indicate a significant effectiveness of physical therapy in the domain of the physical health of people with back pain, while there are no significant improvements in mental health.*

**Keywords:** *quality of life, back pain, physical health, mental health, physiotherapy*

### **1. INTRODUCTION**

Chronic back pain is the leading cause of global disability (Hoy et al., 2014) and results in a decline in the quality of life and a continuous rise in healthcare costs (Andrew et al., 2014). Low back pain is defined as pain, muscle tension, and discomfort in the area of the body between the lower ribcage and the lower gluteal fold, with or without radiating to the leg (Vora, 2010). It increases as a consequence of the aging population and global population growth (Clark & Horton, 2018). Since 1990, disability due to low back pain has increased by 50 percent, particularly in low-income countries, resulting in poorer quality of life (Hartvigsen et al., 2018). In developed countries, the highest risk of back pain occurs in the working population aged 45 to 64 years, regardless of gender (Latza et al., 2004). Furthermore, the most commonly described risk factors are related to age, gender, physical activity, and overexertion (frequent bending, twisting, lifting, and pushing, static posture, and vibrations), obesity, smoking, socioeconomic status, and level of education, job monotony, job dissatisfaction, depression, and anatomical variations of the spine (Grazio & Buljan, 2009). Low back pain has a negative impact on both the physical and mental aspects of contemporary human well-being (Husky et al., 2018), thereby reducing the quality of life (Kovacs et al., 2004). Despite ongoing advancements in modern technology for diagnosing and treating low back pain, functional disability due to low back pain has been on the rise in recent decades (Deyo et al., 2014).

There are numerous methods available to address this issue. One of the most common methods is physical therapy prescribed by the Croatian Health Insurance Fund. However, the challenge in objectively assessing the impact of physical therapy in the treatment and rehabilitation of patients with low back pain is the limited number of well-conducted clinical trials (Luijsterburg et al., 2007). Therefore, the aim of this study was to precisely examine how physical therapy influences the improvement of the quality of life and the well-being of both physical and mental health.

## **2. METHODS**

In the study, 15 participants were involved (age:  $51.4 \pm 5.07$  years; body weight:  $89.8 \pm 18.37$  kg; height:  $170.53 \pm 11.24$  cm). Inclusion criteria for the study were as follows: diagnosed lumbar pain syndrome lasting at least three months and a pain intensity equal to or greater than 4 on the visual analog scale (VAS). Exclusion criteria for participants in this study pertained to the following conditions: diagnosed malignancy within the past five years, inflammatory rheumatic diseases, inability to control bowel and bladder, severe cardiovascular disease, significant neurological disorders, previous physical therapy for the lumbar spine in the last three months, disc extrusion, and pregnancy. These criteria were verified by reviewing the medical records of each participant. Before participating in the study, all participants were informed about the objectives, the study procedures, and potential risks and provided their consent to participate in the research.

### **2.1. Research protocol**

For the assessment of overall quality of life, the SF-36 (Short Form 36) questionnaire was used, representing a widely applicable health status survey with 36 questions. The questions cover eight health dimensions: 1. physical health, 2. limitations due to physical difficulties, 3. limitations due to emotional difficulties, 4. social functioning, 5. mental health, 6. energy and vitality, 7. body pain, and 8. perception of general health. As a result, it is expressed as a standardized value ranging from 0 to 100 for each health dimension, with a higher score indicating a better result. By combining these dimensions, it is possible to calculate a measure of physical health SF-36 PH (Physical Health Common Score) and a measure of mental health SF-36 MH (Mental Health Common Score). The reliability of the eight questionnaire scales and its two summary measures can be examined in two ways: using the internal consistency method and the test-retest method (Ware et al., 1996), with reliability results typically ranging around 0.70, which is considered satisfactory. The Croatian version of SF-36 can be used as a valid and reliable measurement instrument for assessing subjective health. The reliability coefficients for the eight scales range from 0.78 to 0.94, which is similar to other countries (Maslić Seršić and Vuletić, 2006). Research by Chapman et al. (2011) indicates that the SF-36 questionnaire is the most commonly used measurement instrument in quality-of-life assessments. Testing with the SF-36 questionnaire was conducted at the following two time points: 1) immediately before the start of the rehabilitation program - initial measurement (SF-36 In), 2) immediately after the completion of the rehabilitation program - final measurement (SF-36 Fin).

### **2.2. Therapy protocol**

A total of 15 physical therapy sessions were conducted over a three-week period, approved by the Croatian Health Insurance Fund. Each individual therapy session included the use of specific physical agents, 25 minutes of electrotherapy, five minutes of therapeutic ultrasound, and 15 minutes of stabilization exercises to strengthen the abdominal and back muscles (m. rectus abdominis) and stretching of the lumbar region (m. erector spinae, m. quadratus lumborum).

An experienced physiotherapist with over 20 years of work experience, maintained documentation for each participant, and the therapy was prescribed by a specialist in physical medicine and rehabilitation.

### 2.3. Data analysis

The data were statistically processed using the Statistica 13.3 software package. Standard statistical methods were employed in data analysis to determine basic descriptive parameters. The Shapiro-Wilk test was used to assess the deviation level of the empirical distribution from normal. The paired-samples T-test was used to determine the statistical significance of differences between the initial and final measurements of physical and mental health in participants suffering from low back pain. The level of statistical significance for all analyses was set at  $p < 0.05$ .

## 3. RESULTS

The normal data distribution in all measurement points for both tests allowed for the use of parametric methods (Tables 1 and 2). T-test was used for the paired-samples to determine the statistical significance of differences between the initial and final measurements of physical and mental health.

	AS $\pm$ SD	Min - Max	Shapiro – Wilk W / p
SF36 PH In	637 $\pm$ 139,55	345– 875	0,92 / 0,26
SF36 PH Fin	1478 $\pm$ 337,67	980 – 1900	0,91 / 0,18

*Table 1: Descriptive statistical parameters for the physical health questionnaire (SF36 PH)*

	AS $\pm$ SD	Min - Max	Shapiro – Wilk W / p
SF36 MH In	575,7 $\pm$ 229,99	210 – 900	0,93 / 0,30
SF36 MH Fin	624,67 $\pm$ 271,23	310 – 1120	0,9 / 0,10

*Table 2: Descriptive statistical parameters for the mental health questionnaire (SF36 MH)*

Variable	t - value	p - value
SF-36 PH	-5,37	0,00
SF-36 MH	-1,05	0,31

*Table 3: The difference between initial and final measurement of physical and mental health*

Table 3 displays the significance of the t-value and p-value. P-value is less than 0.05 for the variable of physical health, indicating that the participants achieved a significant improvement in physical health between the first and second measurements for the physical health variable. The significance of the p-value for the variable of mental health is greater than 0.05, meaning there are no statistically significant improvements between the first and second measurements.

## 4. CONCLUSION

The results of this study suggest the effectiveness of physical therapy in achieving significant improvements in physical health following prescribed physical therapy. However, the same cannot be claimed for the domain of mental health, where no significant improvements were achieved through the application of physical therapy.

A study by Noormohammadpour et al. (2018) indicates a significant improvement in the quality of life of nurses who performed body stabilization exercises for 8 weeks compared to those who did not. In this research, the SF-36 questionnaire was used as the measurement instrument, the sample consisted of 36 participants, and they used Pilates ball and balance boards to enhance core muscle activation during exercises. The reason for the significant improvements in the study by Noormohammadpour et al. (2018) may be attributed to the inclusion of aids as a Pilates ball and balance boards, while the participants in this study performed exercises without such aids. Similar results were obtained in a study conducted by Ota et al. (2011). They conducted research that shows a significant improvement in the quality of life of 18 patients with low back pain who performed exercises to activate the intraabdominal muscles from a quadruped position. It's important to note that in their study, the quality of life was assessed using a questionnaire developed by the Japanese Orthopedic Society. The limitations of this study encompass a relatively small sample size and the absence of a control group. Further research in this area are needed to gain a clearer understanding, and the author suggest to conduct comparisons between the rehabilitation model used with other methods, extending the post-rehabilitation monitoring period, and evaluating the impacts on a larger number of participants.

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## EXAMINING RESIDENTS' PERCEPTION OF SUSTAINABLE SMART DEVELOPMENT OF URBAN DESTINATIONS

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### ABSTRACT

*Today, urban tourist destinations face numerous challenges such as population growth, uncontrolled development, traffic congestion, waste management, energy consumption, and lack of resources. To address these issues, more and more cities are turning to smart, digital solutions and thus becoming smart cities. A smart city is not only limited to the use of smart technologies but also focuses on the needs of residents and tourists, sustainable economic development, better governance, and the sustainable use of resources. This paper aims to show how the use of smart solutions and modern approaches to the organization of urban areas can encourage sustainable development and improve residents' quality of life. It also aims to examine residents' perceptions of the most commonly used smart solutions in the city as well as the biggest challenges residents face. The research was conducted in the city of Rijeka using a survey questionnaire. The city of Rijeka was declared the best smart city in Croatia in 2020 and 2021. Univariate and bivariate statistical methods were used for the statistical analysis. The results show that most of the surveyed residents are familiar with the concept of a smart city and believe that the use of smart solutions can improve the quality of life of residents. Among smart solutions, the most commonly used are parking and public transport applications. This paper contributes to the body of knowledge on sustainable smart destinations and can provide a platform for further research in destinations that want to base their development on sustainable development and the use of smart solutions. The results can be useful for decision-makers in other urban destinations when creating strategies and policies for smart sustainable development and for local communities.*

**Keywords:** Croatia, local residents, smart solutions, sustainable development, urban destinations

### 1. INTRODUCTION

Today, more than 60% of the world's population lives in urban areas and, according to predictions, the growth trend is continuous and accelerated (United Nations, 2014). With the increase in the number of inhabitants in urban areas, various challenges and problems arise, from increasing traffic congestion and high energy consumption to environmental pollution (Chandan & Kumar, 2019). Sustainable development is needed to prevent the problems that cities face. Various organisations, policies and programmes are focused on the sustainable development of cities. The European Urban Agenda and the Agenda 2030 of the United Nations recognized the key role of the cities as hubs of economic, social, and cultural life that can simultaneously address multiple sustainability goals and offer faster and more practical responses to urban challenges (Kaika, 2017). Goal 11 of the 2030 Agenda for Sustainable Development promotes the accessibility, integration, security and sustainability of cities (United Nations, 2015).

Cities should strive to satisfy their residents' needs, providing them services that have more quality and are more efficient; at the same time, they have to take care of the environment and seek to ensure sustainable development (Vaquero-García et al., 2017). More and more cities are turning to smart and digital solutions and thus becoming smart cities. However, a smart city is not only limited to the use and spread of smart technologies, but also observes people and community needs, focuses on sustainable development and sustainable use of resources. It is said that a city is smart when it improves its traditional institutions and services with new technologies, with the aim of improving the lives of its residents; smart solutions in the field of urban planning, mobility, communication, energy supply and management increase the quality of life in cities (Mohatny et al. 2016). Smart solutions optimize decision-making, improve the management (functioning) of the city system and solve current urban problems faster (Jurlina Alibegović et al., 2018). Smart solutions play an important role in the sustainable development of the city, and offer improvements in the quality of life for its residents. Therefore, the concept of smart cities goes beyond technological issues, including the concern for the well-being of residents (De Guimarães et al., 2020). In Croatia, more and more cities have begun the transition from ordinary urban centres to urban centres that use smart solutions in everyday life. Although they lag behind the cities of the European Union, a large number of Croatian cities have adopted the strategy for smart and sustainable city development and recognized the importance of smart services for achieving strategic goals. The city of Rijeka was declared the best smart city in Croatia in 2020 and 2021. Rijeka has integrated its focus on smart city development into an overall strategic document, the Development Plan of the City of Rijeka for the period from 2021 to 2027, in which smart solutions appear in each of the strategic goals of development as a horizontal strategic goal. This shows that in Rijeka digital transformation and smart solutions are seen as an integral part of development. Thus, the aim of this paper is to examine whether the use of smart solutions and modern approaches to the organization of urban areas can improve residents' quality of life. It also aims to examine residents' perceptions about the concept of a smart city, the most commonly used smart solutions and the biggest challenges that residents face. The paper has five sections. After the introduction, the second section reviews the available literature. The third section describes the data and research methodology. The fourth section presents the research results and the discussion, and the final section draws the conclusions. The final section also details the limitations of this research and provides guidelines for future research.

## **2. LITERATURE REVIEW**

Rapid urbanization, globalization, new habits of the population, the development of technology and an accelerated way of life have created the need to design new solutions to facilitate and adapt the lives of residents in cities. In order to keep pace with modern times, cities are adapting and a city management concept called the smart city concept is emerging. Smart cities can reduce energy consumption, water consumption, carbon emissions, transportation requirements, and city waste. In the literature, there are several definitions of a smart city. The smart city concept often refers to the ability of a city to meet the various needs of its resident in as efficient and timely a manner as possible. According to Lombardi et al. (2011), several smart city definitions emphasize the use of modern technologies in everyday urban life, resulting in innovative transport systems, infrastructures, logistics, and green and efficient energy systems. Caragliu et al. (2011) claim that a city is smart when "investments in human and social capital, as well as traditional transport and modern ICT infrastructure, are sustainable, with present economic growth and high quality of life, and wise management of natural resources, through participatory management". According to Harisson et al. (2010), a smart city is a city that connects physical infrastructure, IT infrastructure, social infrastructure and business infrastructure to leverage the collective intelligence of the city.

From the perspective of sustainable development, the application and use of smart technology should be appropriately introduced in the city, based on the goals of urban development, regional conditions, and social acceptance (Choi and Song, 2022). The introduction of smart technologies that meet the city's sustainable development goals should be prioritized. Based on the work of Giffinger et al. (2007), Giffinger and Gudrun (2010) and Giffinger (2015), the essential dimensions of the smart city concept are smart economy, smart people, smart governance, smart mobility, smart environment, and smart living. Smart economy emphasizes the achievement of the city's competitive advantage. It strives to develop entrepreneurship based on innovative ideas and approaches. It includes indicators such as economic image and trademarks, productivity, flexibility of labour market and ability to transform (Giffinger and Gudrun, 2010). Smart people are prone to lifelong learning, and are flexible and creative, open to change, active and eager to participate in public life. According to Madakam and Ramaswamy (2014) a key element in the development of smarter cities is the participation of smart residents in city activities in various roles. Smart governance is focused on fostering digital, open and transparent administration, mutual cooperation and the participation of citizens in decision making (Giffinger et al., 2007). Smart mobility implies that different intelligent transport systems are used within the city in order to solve and reduce many traffic problems. Smart environment is focused on the protection of nature and natural resources, abatement of air and water pollution, economical use of resources and preservation of the natural beauty of the city. Resources are limited, so the use of smart technology is crucial to increase sustainability and better manage natural resources (Chourabi et al., 2012). Smart living implies the availability of cultural facilities, health services, housing quality, education facilities and social cohesion, aimed at improving the quality of life of residents. Smart city transitions represent a socio-cultural and organizational process (Lee et al., 2023). Such processes can differ, depending on the specific conditions of cities: economic issues, institutional characteristics, available resources and infrastructure. One of the prerequisites for implementing changes and transforming a traditional city into a smart city is a well-developed smart city development strategy. Being smart entails strategic directions (Nam & Pardo, 2011). Local governments must incorporate the term *smart* into their policies, strategies, regulations for targeting sustainable development and economic growth. Good cooperation and partnership between the government, the private sector, associations and the population is very important in order to realize smart initiatives (Odendaal, 2003). Furthermore, the human factor is the second precondition in the context of a smart city. Creativity is recognized as a key driver of a smart city, and thus people, education, learning and knowledge are of central importance to the smart city (Nam & Pardo, 2011). Finally, information technology was identified as the third essential prerequisite for the implementation of the smart city concept. IT infrastructure and applications can offer new opportunities to residents and improve the management and organization of cities. What is important to emphasize is that the creation of a smart city must be rooted in the ideas of local self-government and citizens (Castelnovo et al., 2016). Based on the above theoretical research basis, this paper explores whether the use of smart solutions can improve residents' quality of life. The research was conducted using a survey questionnaire in the city of Rijeka, which was declared the smartest city in Croatia.

### **3. DATA AND METHODOLOGY**

The city of Rijeka was taken as the study area for empirical research. The City of Rijeka Development Plan 2021-2027 emphasizes the importance of investing in new, digital technologies and smart solutions. One of the goals is investing in improving the city's ICT infrastructure, developing new and improving existing digital services for residents and the business sector, raising awareness and digital participation of residents in city activities, providing education for residents and small and medium-sized enterprises about digital

technologies, and digitalizing tourist services. In addition, the city of Rijeka was declared the smartest city in Croatia for two years in a row (2020 and 2021). Therefore, the residents of Rijeka were selected as the target group to examine the extent to which they are satisfied with certain aspects of the city, whether they use the smart solutions that the city offers them, whether they think that smart solutions improve the quality of life, and what are the main challenges they face. For the purpose of obtaining data, a survey was conducted among the residents of Rijeka, in the period from January to March 2023. The questionnaire, as a data collection instrument, was distributed in online form, by posting a link in a major Facebook group connecting the residents of Rijeka.<sup>1</sup> The questionnaire consisted of four parts. The first part referred to the socio-demographic characteristics of the respondents. The second part of the questionnaire was related to satisfaction with the development of the city and different aspects in the city, where a 5-point Likert scale was used. The third part included questions related to the concept of a smart city and the use of smart solutions. In the fourth part of the questionnaire, data were collected relating to the biggest problems/challenges that residents face. A total of 99 usable questionnaires were collected and analysed, and the results are presented in the following section.

#### 4. RESULTS AND DISCUSSION

Table 1 presents key information on socio-demographic variables (N=99).

		N	%
Sex	Male	31	31.3
	Female	68	68.7
Age	15-25	53	53.5
	26-35	28	28.3
	36-45	14	14.1
	46-55	4	4.0
	55+	-	-
Education level	Elementary school	14	14.1
	High school	48	48.5
	College, Master's degree or PhD	37	37.4

*Table 1: Socio-demographic profile of respondents  
 (Source: authors' research)*

Table 1 shows that more female than male respondents filled out the questionnaire. About half of the respondents (53.5%) belong to the youngest age group and 48.5% have completed high school while 37.4% have a Bachelor's, Master's or PhD degree. The next table (Table 2) presents information on the satisfaction of residents with various aspects of city development and with overall city development.

*Table following on the next page*

<sup>1</sup> The questionnaire was created for the needs of the master's thesis "Smart cities as the key to the economic development of the Republic of Croatia" by student Ivana Lesac in the academic year 2022/2023.

	Minimum	Maximum	Mean value	Std. Deviation
Communal infrastructure	1.0	5.0	2.889	.9782
IT infrastructure	1.0	5.0	3.101	.9636
Traffic infrastructure and public transport	1.0	5.0	2.707	1.0522
Waste management	1.0	5.0	2.808	1.0849
Economic situation	1.0	5.0	2.859	.9898
Tourism development	1.0	5.0	3.323	.9880
Efficiency of city services	1.0	5.0	2.980	.9581
Healthcare	1.0	5.0	3.192	.9441
Communication with the local self-government	1.0	5.0	2.909	1.0111
Schools and other educational facilities	1.0	5.0	3.475	.8961
Sports infrastructure	1.0	5.0	3.414	1.0001
Overall satisfaction with the development of the city	1.0	5.0	2.747	.8846

*Table 2: Satisfaction of residents with various aspects of city development (N=99)  
 (Source: authors' research)*

The residents are not very satisfied with the overall development of the city (mean value = 2.747). They are most satisfied with education and educational institutions, as well as with sports infrastructure and opportunities for practicing sports, while they expressed the least satisfaction with traffic and communal infrastructure. Residents rated their satisfaction with the development of tourism in the city area with a high average rating (3.323). The city of Rijeka has witnessed an increase in the number of tourist arrivals and overnight stays from year to year. Although the majority of arrivals still take place in the summer months, tourist traffic is growing both in the pre-and mid-season. Numerous activities developed by the city of Rijeka throughout the year contribute to the development of the city as a tourist destination and especially to the development of urban tourism. In the last few years, the city of Rijeka has significantly improved administrative procedures and the degree of their efficiency, as well as the availability of service information on the city's website. A step forward was also made in the level of unified payment services in the city, open budget and participation of residents in decision making through digital platforms. The following table shows how familiar residents are with the term *smart city*, how much they use smart solutions in their daily lives, and which smart solutions they use the most.

*Table following on the next page*

			N	%
Familiarity with the term <i>smart city</i>	Yes		68	68.7
	No		31	31.3
Using smart solutions	Yes		50	50.5
	No		49	49.5
Most frequently used smart solutions	Parking application	Yes	73	73.7
		No	26	26.3
	Public transport application	Yes	81	81.8
		No	18	18.2
	E-governance, e-administration	Yes	44	44.4
		No	55	55.6
	Free Wi-Fi signal	Yes	73	73.7
		No	26	26.3
	E-bike application	Yes	17	17.2
		No	82	82.8

Table 3: Familiarity with the smart city concept, and using smart solutions (N=99)  
 (Source: authors' research)

A large share of the respondents (68.0%) are familiar with the term *smart city*. Slightly more than half of the respondents use smart solutions in their everyday life. Regarding the question of which smart solutions they use most often, more than 80% of respondents answered that they mostly use the public transport schedule application, followed by the parking application (73%), while about 44% of the respondents use e-government applications. A T-test was used to test the research question and determine whether the use of smart solutions affects the quality of life of residents. The results are shown below.

#### Group Statistics

	Using smart solutions	N	Mean	Std. Deviation	Std. Error Mean
Quality of life	Yes	50	3.500	.8864	.1254
	No	49	2.898	.7970	.1139

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Quality of life	Equal variances assumed	2.086	.152	3.551	97	.001	.6020	.1695	.2656	.9385

Table 4: T-test results  
 (Source: authors' research)

T-test results ( $t = 3.551$ ,  $df = 97$ ,  $p < 0.001$ ) reveal that residents who use smart solutions in their daily lives have a higher level of satisfaction with their quality of life. This test confirms the research question. According to the respondents, the greatest problem in the city of Rijeka is traffic, congestion and poor transport infrastructure (22% of responses), followed by an insufficient number of parking spaces (11% of responses) and problems in public transport such as lack of bus lines and delays (10% of responses). The respondents also recognize large amounts of waste on the streets as a major aesthetic and environmental problem of the city on windy days. These responses are related to residents' low rating for transport and communal infrastructure. Among other challenges, they pointed out: demographic change (according to the latest population census, Rijeka has 16% fewer inhabitants than in 2011), resource management in the city, high flat rental prices, the inability to find work and long-term employment, and the Žabica bus station as an example of an outdated and poorly maintained infrastructure. When asked whether they want to participate in the future planning of the city's development, the creation of strategic documents and the further development of the city of Rijeka as a smart city, 52.5% of respondents answered affirmatively. The obtained results support the notion that using smart solutions positively affects the quality of life of residents. Smart solutions provide long-term benefits, and ensure a balance between the availability of modern intelligent solutions and the sense of security among residents (Bjørner, 2021). In addition, the results indicate that residents want to act, participate in solving the challenges and problems the city faces and be involved in the design, adoption and evaluation of the city's policies and documents. This is in line with conclusions of Engelbert et al. (2019) who highlight the relevance of the role of residents for the development of smart cities, emphasizing their active participation in the governance process. Transparency and accountability of the decision-making process, together with the engagement of residents and other urban stakeholders, increase residents' trust in policy makers and public administration (De Guimarães et al., 2020; Savoldelli et al., 2014). Therefore, a clear strategic vision, along with residents' participation, is fundamental for the smart city concept.

## 5. CONCLUSION

The aim of this research was to determine whether the use of smart solutions affects the quality of life of residents, as well as to examine whether residents are satisfied with the development of the city, which smart solutions they use and what are the biggest urban challenges. The results of empirical research confirm that the introduction and use of smart solutions in the city affects satisfaction with the quality of life. Those residents who use smart solutions are more satisfied with their quality of life than those who do not. Likewise, research has shown that a large number of respondents are familiar with the concept of a smart city, and they want changes and the implementation of various forms of smart technologies in their city. The dimensions of the smart city concept can help in finding solutions to the everyday issues of a city and to the concerns of its residents. Modern technological solutions are useful tools in cities because their use and the information they provide help users to save resources and time and to gain easier access to information. Cities, as burgeoning urban areas with consistently growing populations, need to find a way to keep pace with the times and to exploit and implement all available technological novelties to make a city a harmonious place for people to live and the economy to develop. The smart city concept provides a solution to city issues by not only improving the quality of life of residents but also by helping to build a city's image and enhancing its competitiveness on a global level. Becoming a competitive city means unlocking a city's full potential to ensure that its economic development is sustainable and long-term. Hence, the smart city concept is becoming a global priority in urban development. One of the limitations of this study lies in the research sample that mostly consists of younger residents. Therefore, it is recommended to conduct a survey on a larger sample and try to cover more age groups.

In terms of future research, there is potential for comparative study of the perceptions of residents in other smart cities, using the same research instrument in order to compare the results.

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## IMPLEMENTATION OF THE FAIRNESS PRINCIPLE IN THE ENFORCEMENT PROCEEDINGS

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### ABSTRACT

*In this paper, the author strives to show the way of implementing the principles of legality and fairness in the enforcement proceedings<sup>1</sup> with the reference to the special conditions for determining real estate enforcement (Article 80.b of the Enforcement Act), as defined by the 2017 Amendments to the Enforcement Act<sup>2</sup> and redefined by amendments to the Enforcement Act from 2020<sup>3</sup>, thus representing a relatively new institution of the Enforcement Act. In addition to the constitutionally prescribed and default framework for making court decisions determined by Article 115 of the Constitution of the Republic of Croatia<sup>4</sup>, according to which the courts judge on the basis of the Constitution, laws, international treaties and other valid sources of law in the enforcement proceedings, the concept of fairness appears as a category that has not been given an original interpretation based on the Constitution of the Republic of Croatia or any other legal regulation, although the Constitution of the Republic of Croatia itself in guarantees the right to a "fair" trial in the Article 29, paragraph 1. The implementation of coercion, which is present in the enforcement proceedings, also leads to the forced encroachment of the legal sphere of the person against whom it is applied. It is precisely for this reason that the assumptions as well as the court's procedures are strictly determined by law. Strict forms of procedure in the enforcement proceedings also serve to prevent any kind of arbitrariness, while the introduction of "fairness" as a special category in the enforcement proceedings in a peculiar way redefines and softens the strict legal framework of the procedure. This paper tries to look at the criteria for the implementation of the principle of fairness in the enforcement proceedings, as well as the objective possibility of implementing that principle, since the enforcement proceedings is a non-litigation proceeding that applies strictly formal rules of evidence and in which the principle of strict formal legality plays a dominant role. The principle of strict formal legality dominating the enforcement, contrary to the principle of free evaluation of evidence dominating the litigation, refers both to the legitimization for initiating those proceedings and to the question of the existence of a claim that is enforced or secured and its specific characteristics. The aforementioned principle also applies to certain properties of the document on the basis of which enforcement or insurance may be required.<sup>5</sup> The principle of fairness between the interest of the debtor and the creditor and how to estimate it plays the key role when the court has to decide about the enforcement on the only real estate of the debtor. **Keywords:** legality, right to a fair trial, fairness, proportionality test, principle of strict formal legality, the ownership, the home*

***"Ius est ars boni et aequi"*<sup>6</sup>**

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<sup>1</sup> Enforcement Act, consolidated text of the Act, Official Gazette No. 112/12, 25/13, 93/14, 55/16, 73/17, 131/20, 114/22.

<sup>2</sup> Official Gazette No. 73/17

<sup>3</sup> Official Gazette No. 131/20 in force from November 28, 2020

<sup>4</sup> Constitution of the Republic of Croatia, Official Gazette No. 56/90, 135/97, 08/98, 113/00, 124/00, 28/01, 41/01, 55/01, 76/10, 85/10, 05/14.

<sup>5</sup> See DIKA, M. (2007): *Gradansko ovršno pravo, I. knjiga* (English: *Civil enforcement law, book I*, Official Gazette, June 2007, pages 52, 53, and further pages from 44 to 81

<sup>6</sup> Law is the art of being good and just. The definition of law, formulated by the classical jurist Celsus, according to Justinian's Digests (Digesta 1, 1, 1, pr.).

## 1. INTRODUCTION - CONCEPT OF LEGALITY IN GENERAL

In the broadest sense, the principle of legality is the requirement that legal acts and all actions of legal entities comply with the law. The principle of legality appears as a central point in the analysis of different understandings of the "rule of law" principle.<sup>7,8</sup> The principle of legality has two aspects - formal legality, which mandates that a lower legal act has to be passed by the organ which authority has been created by a higher legal act and that it has passed the procedure and the form also determined by the higher act, and - material legality, which mandates that the content of the lower legal act has to be harmonized with the higher one.<sup>9</sup> The legality of general legal acts is first of all examined and controlled by the constitutional courts,<sup>10</sup> while the legality of individual legal acts is protected by means of legal remedies submitted by the parties in court and administrative proceedings. This control, and thus the protection of the rights of the parties, is performed by a court that is hierarchically higher than the one that made the decision at a lower level, in such a way that the higher court decides on violations of procedural and substantive law committed by lower courts. In the case of violations of procedural law, the higher courts examine the formal legality, and in the case of violations of the substantive law, they examine the substantive material legality.<sup>11</sup> As the principle of legality is one of the general principles of the legal system, it could be concluded that the argument of legality should be one of the arguments of general principles, and an independent argument used by judges of higher courts when justifying violations of rights committed by lower courts.

## 2. MEANING OF LEGALITY IN THE PHILOSOPHY OF LAW

Philosophy of law shapes the main characteristic of the legality. Perić distinguishes three categories of legal principles. He calls the first type of principles general principles of law. By them he understands those principles that appeared during legal history and have remained until today, especially among those nations that had a noticeable level of legal development. "Such principles are a deep sediment of legal experience and skill, legal philosophy and logic, they are the most valuable treasure of legal thinking and reasoning." They are often called *Dicta et regulae iuris*. He calls other principles general principles of a specific legal system and order of a specific state. Under this term he considers all those principles that are regularly stated in the fundamental legal branch of every legal system - constitutional law. Legality is generally taken to be a legal value. It is, together with justice, peace, legal certainty, completeness and coherence of the system of legal norms - a specific legal value - in contrast to non-specific legal values, which, apart from law, also operate in other normative orders such as life, health,

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<sup>7</sup> Basically, there are two fundamental conceptions: the English idea of Rule of Law, or the American idea of Government Under Law, on the one hand, and the continental European, actually German idea of *Rechtstaat*, or the French idea of *État du droit*, on the other.

<sup>8</sup> Bačić, A. *Vladavina prava i institucije kontrole ustavnosti zakona* (English: *The rule of law and the institution of control of the constitutionality of laws*), in: Crnić, J./N. Filipović (ed.) (2000) *Ustavni sud u zaštiti ljudskih prava. Interpretativna uloga Ustavnog suda* (English: *The Constitutional Court in the Protection of Human Rights. Interpretive role of the Constitutional Court*), Organizer, Zagreb, p. 29. and others.

<sup>9</sup> Visković, N. (2006) *Teorija države i prava* (English: *Theory of the state and law*), II. amended and add. ed., Birotehnika, CDO, Zagreb, p. 182., 183.

<sup>10</sup> This control depends on whether it is about the control of the constitutionality of the law or the control of the constitutionality and legality of sub law acts. At the same time, the differences between countries with an Anglo-American or European tradition are highlighted.

In the Republic of Croatia, with the entry into force of the Law on Administrative Disputes on January 1, 2012 (currently valid law published in the Official Gazette No. 20/10, 143/12, 152/14, 94/16, 29/17, 110/21) assessment the legality of general acts of a legal entity that has public authority and a legal entity that performs a public service is under the jurisdiction of the High Administrative Court of the Republic of Croatia.

For the determination of a general act, the Law on Administrative Disputes has accepted as the basic criterion of the adopter of the act (the so-called norm on competence). The Constitutional Court in decision No. U-II-5157/2005 et al. dated March 5, 2012 ("Official Gazette" number 41/12.) listed the criteria for determining "second regulation" in the sense of Article 125, paragraph 2 of the Constitution after the entry into the force of the Law on Administrative Disputes on January 1, 2012.

<sup>11</sup> Harašić Ž. (2010) *Zakonitost kao pravno načelo i pravni argument* (English: *Legality as a legal principle and legal argument*), Proceedings of the Faculty of Law in Split, vol. 47, 3/2010, p. 745-767.

freedom, personal security, family, truth, work, education, etc...<sup>12</sup> Legality is also in a special relationship with justice. Kelsen maintains that the concept of justice can enter jurisprudence only in the sense of legality. Fairness means legality in the sense that it is fair to apply a general rule to all cases to which, according to its content, it should be applied. It is unfair to apply it in one case and not in another. Fairness in the sense of legality is a characteristic that refers to the application, not the content of the positive order. Justice in this sense can be brought into harmony with any positive legal order.<sup>13</sup> Legality and legal certainty are closely related. Namely, it is considered that legality is one of the means to achieve legal certainty.<sup>14</sup> Alexy points out that in cases where the decision cannot be fully covered by legal norms, rules of legal method and doctrines of legal dogmatism, discretion should be given to the decision maker.<sup>15</sup> However, some other authors such as Cappelletti, Merryman and Perillo point out that against the expansion of the discretionary power of judges there is a struggle for the principle of legality (and security), because discretion is considered to lead to judicial arbitrariness.<sup>16</sup> They point out that experience has shown that judicial arbitrariness is much more dangerous than legislative arbitrariness.<sup>17</sup> On the other hand, Triva and Dika believe that in situations where the law does not determine any rules of procedure and the court is left with a free choice of working methods, one cannot speak of a system of arbitrary treatment. Namely, the judge must justify his choice in the explanation of his decision. Parties may criticize his choice. The higher court has the right to cancel the decision when it finds that the lower court, when choosing procedural methods, used those that are not in accordance with the spirit of the procedural system.<sup>18</sup>

### 3. CONCEPT OF FAIRNESS IN GENERAL

For the need of this paper, the author limits herself to the aspect of the right to a fair trial and fairness in civil rights, while the aspects of the right to a fair trial in criminal law cases are not the subject of review and analysis. The concept of fairness is not defined by the Constitution or by any positive legal regulations. Likewise, the Enforcement Act itself, which introduces its application during enforcement of the debtor's real estate, has not defined the meaning of the term that would have to be implemented in the enforcement proceedings. The Constitution of the Republic of Croatia<sup>19</sup> and the Courts Act<sup>20</sup> know the term "right to a fair trial"<sup>21</sup>, while some other laws recognize the concept of fairness, such as the Civil Obligations Act<sup>22</sup> which emphasizes "fairness" in several of its norms<sup>23</sup> as a legal institute, as well as the Ownership and Other Proprietary Rights Act<sup>24</sup>.

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<sup>12</sup> The division of legal values into specific and non-specific is given by Visković, N., *Pojam prava (English: Concept of Law)* (1981) 2nd amendment. and add. ed., Logos, Split, p. 134.

<sup>13</sup> Kelsen, H. (1951) *Opšta teorija prava i države (English: General Theory of Law and the State)*, Archive for Legal and Social Sciences, Belgrade, pp. 26-28.

<sup>14</sup> Visković, N., Theory, op. cit., p. 149.

<sup>15</sup> Alexy, R. (1989) *A Theory of Legal Argumentation. The Theory of Rational Discourse as Theory of Legal Justification*, Clarendon Press, Oxford, str. 5.

<sup>16</sup> Cappelletti, M. et al. (1967) *The Italian Legal System. An Introduction*, Stanford University Press, Stanford, California, p. 154.

<sup>17</sup> Loc.cit.

<sup>18</sup> Triva, S et al. (2004) *Građansko parnično procesno pravo (English: Civil litigation procedure law)*, 7th amendment. and add. ed., Narodne novine, Zagreb, p. 119.

<sup>19</sup> Constitution of the Republic of Croatia, Official Gazette No. 56/90, 135/97, 08/98, 113/00, 124/00, 28/01, 41/01, 55/01, 76/10, 85/10, 05/14.

<sup>20</sup> Article 4 of the Courts Act, Official Gazette No. 28/13, 33/15, 82/15, 82/16, 67/18, 126/19, 130/20, 21/22, 60/22, 16/23

<sup>21</sup> See Article 29 of the Constitution of the Republic of Croatia.

<sup>22</sup> Civil Obligations Act, Official Gazette No. 35/05, 41/08, 125/11, 78/15, 29/18, 126/21, 114/22, 156/22.

<sup>23</sup> See articles 346, 369, 624, 628, 775, 819, 1060, 1072, 1082, 1100-1104, 1109, 1132 of the Civil Obligations Act, Official Gazette No. 35/05, 41/08, 125/11, 78/15, 29/18, 126/21, 114/22, 156/22.

<sup>24</sup> Article 103, paragraph 3 and Article 137, paragraphs 3 and 4 of the Ownership and Other Proprietary Rights Act, Official Gazette No. 91/96, 68/98, 137/99, 22/00, 73/00, 114/01, 79/06, 141/06, 146/08, 38/09, 153/09, 90/10, 143/12 and 81/15 - consolidated text), 94/17.

Although from a series of decisions of the Constitutional Court<sup>25</sup> it follows that the "right to a fair trial" belongs to a procedurally guaranteed human right, and taking into account that the Civil Obligations Act, which refers to "fairness" by its nature, is a substantive law, the question arises whether the very fact that fairness is incorporated into one substantive law implies that the concept of "fairness" is not an exclusive privilege of procedural law, but can also have a certain material-legal significance.<sup>26</sup> In that sense the Constitutional Court in its decision dated on May 13, 2021, number: U-III-3378/2019 pointed out that the constitutional right to a fair trial guarantees procedural, not material fairness."<sup>27</sup> On the one hand, the meaning of the concept of fairness can be seen through the philosophy of law as a meta-legal science that deals with the construction of concepts and the logical analysis of legal language, and on the other hand, through the definitions of the Constitutional Court of the Republic of Croatia and the European Court of Human Rights, and positions taken in judicial practice.

#### 4. MEANING OF FAIRNESS CONCEPT IN THE PHILOSOPHY OF LAW

The philosophical concept of fairness was analysed in the time of ancient Greece, so Aristotle himself found the meaning of the concept of fairness as justice that goes beyond the written law. Aristotle claims that positive law is incomplete or limited due to its generality, and that there must be some kind of correction or supplement to the law. He finds the cure in fairness. He thinks that fairness is just because it serves as a remedy for what is legally just. So, unlike his predecessors (Socrates and Plato), Aristotle was the first to introduce flexibility into justice with the concept of fairness. The key distinction between these two terms is their method: under the idea of equality, we include both justice and fairness, but fairness starts from a general principle according to a particular case, while the starting point of fairness is an individual case. Thus, the fairness is defined as a corrective to positive law. We find certain vestiges of such an idea in the Swiss Civil Code, where there are powers given to the judge that, if he/she finds that there is a legal gap, to fill it according to customary law, and where customary law is not enough, to include his own rule "which he/she, as a legislator, would set".<sup>28</sup> According to Vuchetich, the concepts of morality and justice are separable, where the concept of justice, a special type of morality, is the most important of all types. The relationship between morality and law is equal to the relationship between justice and law, so they are inseparable. According to the same author, the concepts of justice and fairness differ, and although they are equal in content, they are different in function and application.<sup>29</sup> There is a clear distinction between the concepts of justice and fairness, and fairness must always be linked to something *in concreto* so that fairness is manifested in judgments that are of an individual character, for example a certain court verdict. Therefore, Vuchetich considers it more accurate to talk about a fair judge, a fair decision, a fair verdict, a fair procedure... According to the same author, fairness presupposes a certain ability to decide or act justly. On the other hand, there is that level *in abstracto*, which is inherent in the concept of justice. The word justice has a double character: it denotes the principle, but also the totality of fairness within a community. The term fairness, on the other hand, means the ability of an individual or an organization to use the principle of fairness in real situations and thereby fulfil the goal of giving the individual or organization

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<sup>25</sup> See infra-ad 3.

<sup>26</sup> Bukovac Puvača M., *Funkcije pravične novčane naknade u hrvatskom odštetnom pravu (English: Functions of fair monetary compensation in Croatian tort law)*, Collection of papers of the Faculty of Law at the University of Rijeka (1991) v. 37, no. 1, 155-173 (2016), page 159

<sup>27</sup> Similarly, the decisions of the Constitutional Court No. U-III-1976/2019 as of January 15, 2020, U-III-2350/2019 as of February 12, 2020, U-III-5116/2019 as of September 16, 2020, U-III-5339/2020 as of May 19, 2021 and others.

<sup>28</sup> Vuchetich L., (1991) *Pravednost i pravičnost u filozofiji prava (English: Justice and fairness in the philosophy of law)*, Pravnik, vol. 41, no. 85, 2007, p. 53. <https://hrcak.srce.hr/33850>. Quoted on 25.06.2022 referring to J. Metelko, Succession of States, Faculty of Law, University of Zagreb, Zagreb, 1999, especially pages 178-181.

<sup>29</sup> Vuchetich, L., Rm.cit. in note number 17, p. 47-76

what belongs to him/her, in order to create a just community.<sup>30</sup> According to Visković, the principle of fairness can be summarized in the following formulation: people who are equal should be given equal goods and burdens, and people who are unequal should be given unequal goods and burdens in proportion to their inequality.<sup>31</sup> According to the author Dario Đerđa, the court's decision and actions should be brought closer to ideal fairness, as it was understood in ancient times. This principle is called the proportionality principle.<sup>32</sup> The proportionality in making individual decisions means that the rights of individuals can be limited only to protect the rights of other persons and the public interest, and the public authority can limit individual freedoms guaranteed by law only to the extent necessary to protect the public interest.<sup>33</sup> On the other hand, it is necessary to ensure that a fair decision is made, which depends on the specific circumstances of each case, which the legislator could not foresee by regulation or bring under the adopted legal provision.<sup>34</sup> According to the author Vladimir Tamaš, fairness as a legal category is a complex phenomenon and primarily means acting in the same cases in the same way, but it also means acting that is logical, economically expedient, morally and politically necessary, and if not always together. Too much fairness can lead to a more unfair solution than with the strict application of the letter of the law. The solution is to find a fair middle ground, so the court should go one step beyond the law, but not without the law.<sup>35</sup> According to the author Šejla Maslo Čerkić, fairness as one of the models for harmonizing law and reality is present throughout history in all major legal systems. Roman *aequitas*, which got its concrete realization through the activity of the praetor and acting in accordance with the principles of bona fides and *aequitas*, English *equity law*, developed as a parallel system of law and judiciary under the jurisdiction of the lord chancellor, and the Mazalim institution as a form of distribution of universal justice in Islamic state, have their common characteristics, but also specificities.<sup>36</sup> The representative of classical German idealism, Gottfried Wilhelm Friedrich Hegel, used a pejorative expression about justice when he concluded that "justice contains the 'mutilation' of formal law that takes place from moral or other considerations."<sup>37</sup>

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<sup>30</sup> Vuchetich L., Rm.cit. in note number 17, p. 73-74.

<sup>31</sup> Visković, N., (2001) *Teorija države i pravo* (English: *Theory of State and Law*), Birotehnika, Zagreb, p. 141.

<sup>32</sup> Đerđa D., (2016) *Načelo razmjernosti u donošenju upravnih odluka* (English: *Principle of proportionality in making administrative decisions*), Collection of papers of the Law Faculty of Law, University of Rijeka, 2016, 37, 175 - 200 Journal article, Published version,

Permanent link <https://urn.nsk.hr/urn:nbn:hr:118:142655> Rights/Prava: In copyright (accessed on June 25, 2022).

<sup>33</sup> Đerđa D., Rm.cit. in note number 21, p. 186.

<sup>34</sup> Đerđa D., Rm.cit. in note number 21, p. 187.

It is the choice of one of the several alternatives offered in the legal norm that constitutes an essential feature of free evaluation, which represents a necessary requirement for the effective protection of individual rights and distinguishes free evaluation from an arbitrary decision.

<sup>35</sup> Tamaš V., (2009) *Primena načela pravičnosti u pravnim shvatanjima i odlukama Vrhovnog suda Srbije* (English: *Implementation of the principle of fairness in the legal understandings and decisions of the Supreme Court of Serbia*), *Pravo – Teorija i praksa* (English: *Law – theory and practice*, 2009, vol. 26, no. 11-12. pp. 3-14

<http://scindeks.ceon.rs/article.aspx?artid=0352-37130912003T> (accessed on June 25, 2022).

<sup>36</sup> Maslo Čerkić, Š., *Koncept pravičnosti kao univerzalni model usklađivanja prava i stvarnosti* (English: *Concept of fairness as a universal model of aligning law and reality*).

[https://www.prf.unze.ba/Docs/Anali/AnaliPFZEbr12god6/godina\\_6broj\\_12\\_10.pdf](https://www.prf.unze.ba/Docs/Anali/AnaliPFZEbr12god6/godina_6broj_12_10.pdf)

(Accessed on June 25, 2022)

<sup>37</sup> Hegel, G.W.F. *Grundlinien der Philosophie des Rechts* (English: *Basic principles of the philosophy of law*), published by vG Lasson, 2nd edition Felix Meiner, Leipzig, 1921 p. 432; GWF Hegel, *Basic features of the philosophy of law*, VM, Sarajevo, 1964, p. 420

## 5. GUARANTEE OF THE RIGHT TO A FAIR TRIAL ACCORDING TO THE EUROPEAN CONVENTION FOR THE PROTECTION OF HUMAN RIGHTS AND FUNDAMENTAL FREEDOMS AND THE CONSTITUTION OF THE REPUBLIC OF CROATIA

According to article 6.1. of the European Convention for the Protection of Human Rights and Fundamental Freedoms<sup>38</sup> the right to a fair trial is guaranteed.<sup>39</sup> According to Article 29, Paragraph 1 of the Constitution of the Republic of Croatia<sup>40</sup> everyone has the right to have a legally established and impartial court decide fairly and within a reasonable time on his rights and obligations, or on suspicion or accusation of a criminal offense. According to prof. Alan Uzelac, in the practice of the European Court of Human Rights (hereinafter referred to as the Court), and taking into account the systematics from modern comments and doctrinal interpretations of the Convention, the following elements or aspects of the right to a fair trial can be stated: right to access to court (*access to court*), right to legal aid (*legal aid and advice*), right to procedural equality (*equality of arms*), right to a public and adversarial trial (*public hearing*), right to hearing (*fair hearing*), right to proof (*right to proof*), right to public pronouncement of judgments (*public pronouncement of judgments*), right to a tribunal established by law (*tribunal established by law*), right to impartiality and independence in the trial (*impartiality and independence*), right to a trial in a reasonable time (*reasonable time*), right to effective enforcement of judgments (*effective enforcement*), prohibition of arbitrary conduct (*arbitrariness*).<sup>41</sup> According to the author of this text, and considering the decision of the Constitutional court of the Republic of Croatia U-III-5239/2013 as of June 3, 2016, the right to a fair trial would include also the right to an effective legal remedy.<sup>42</sup>

## 6. POSITIONS OF THE EUROPEAN COURT OF HUMAN RIGHTS

In its decisions, the European Court of Human Rights considers, among other things, the lawful interference of the state in the rights of individuals and a fair balance between the conflicting general interests of the community and the requirements for the protection of the fundamental rights of individuals. The Court takes the position that the member States have an obligation to organize their legal systems in such a way to avoid the adoption of contradictory judgments. The stated point of view should not be understood in such a way that the existing jurisprudence could not be changed, since the change of jurisprudence is characteristic of all legal systems, and the development of law itself, as well as harmonization with social changes, also require a change in jurisprudence itself. According to the practice of the Court, domestic courts have discretionary powers that allow them to change judicial practice when it is not arbitrary or obviously unreasonable, and this is especially the case in countries that have a system of written law in which courts are not bound by previous judgments.<sup>43</sup> Although the application of Article 80b of the Enforcement Act of the Republic of Croatia was not directly considered by the Court,

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<sup>38</sup> (European) Convention for the Protection of Human Rights and Fundamental Freedoms, consolidated text MU 18/97, 6/99, 14/02, 13/03, 9/05, 1/06, 2/10, 13/17.

<sup>39</sup> Article 6 of the European Convention on human rights  
[https://www.echr.coe.int/documents/convention\\_eng.pdf](https://www.echr.coe.int/documents/convention_eng.pdf) (accessed on 28.06.2022).

<sup>40</sup> Constitution of the Republic of Croatia (Official Gazette No. 56/90, 135/97, 08/98, 113/00, 124/00, 28/01, 41/01, 55/01, 76/10, 85/10, 05/14)

<sup>41</sup> Uzelac, A. (2009) *Pravo na pravično suđenje u građanskim predmetima: nova praksa Europskog suda za ljudska prava i njen utjecaj na hrvatsko pravo i praksu* (English: *Right to a fair trial in civil cases: new practice of the European Court of Human Rights and its impact on Croatian law and practice*), <https://hrcak.srce.hr/file/75273> (accessed on July 15, 2022).

<sup>42</sup> In its decision U-III-5239/2013 as of June 3, 2016, the Constitutional Court of the Republic of Croatia states: "The Constitutional Court therefore considers that the contested decision of the Supreme Court violated the very essence of the applicant's right to an effective legal remedy, as an integral part of the right to a fair trial guaranteed by Article 29, Paragraph 1 of the Constitution."

<sup>43</sup> Gović-Penić I. (2022), *Izabrana praksa Europskog suda za ljudska prava i građanski postupci pred Hrvatskim sudovima* (English : *Selected practice of the European Court of Human Rights and civil proceedings in front of Croatian courts*), Organizator, p. 619.

the Court in any case took a position in relation to the protection of property rights (real estate) and the legality of state's interference in such a right as well as in relation to the right to the home. Ownership in the sense of the Convention is an autonomous concept and includes existing property and assets, including claims, in relation to which the applicant can claim to have at least a legitimate expectation. Ownership includes rights "in rem" and "*in personam*". This term includes immovable and movable property and other ownership interests.<sup>44</sup> Interference must meet certain criteria: it must comply with the principle of legality and pursue a legitimate aim in a manner that is reasonably proportionate to the aim sought to be achieved.<sup>45</sup> In all cases, it must be in the public interest, must meet the conditions provided by the law and must pass the fair balance test. Proceedings related to a civil dispute between private parties do not in themselves lead to state liability. The mere fact that the state, through its judicial system, provides a forum for deciding a private law dispute does not lead to state interference in the right to property<sup>46</sup> even if the material result of a judgment adopted by a civil court leads to the loss of certain property. However, it is part of the duty of member States to establish a minimum legislative framework, including an appropriate forum, which will enable persons who claim that their rights have been violated to effectively exercise their rights and to obtain the enforcement of those rights. If it does not, the state would not fulfill its obligation to protect the rule of law and prevent arbitrariness.<sup>47</sup> The right to a home finds its starting point in Article 8 of the Convention, as one of the most important rights guaranteed by the Convention, which article guarantees the right to respect for personal and family life. Here, too, the court gives an autonomous interpretation of the meaning of home, so that through its practice it defines home as premises or places with which an individual has achieved a sufficiently strong, real and permanent (continuous) connection, regardless of whether he inhabits them legally or without authorization.<sup>48</sup> A home is not limited to legally owned and legally occupied premises<sup>49</sup> It doesn't have to be an apartment or a house - a home can, for example, be a caravan or other space if an individual justifiably considers it his home and uses it as a home. Business premises also enjoy protection based on Article 8.<sup>50</sup> Home is a factual, not a legal term and does not depend on definitions given in law.<sup>51</sup> When a party, during proceedings in front of a civil court, objects to interference, encroachment, interference with his right to respect for his home (or it can be inferred from his statements), it must be ensured that an independent court evaluates the proportionality and reasonableness of such a proposed measure, regardless of its existence or non-existence legal basis. Non-consideration of the party's complaint about the violation of the right to home by the domestic courts is in itself a violation of the right to respect the home. Exceptions to the prohibition of interference are prescribed in Article 8, paragraph 2 of the Convention. In order to determine whether any of the prescribed exceptions can justify interference, it is necessary to carry out a test of proportionality to the circumstances of the specific case. So far, the Court's decisions in cases of eviction of unauthorized users refer exclusively to cases where the eviction of unauthorized owners was requested by the state or local government units.<sup>52</sup> The same applies to commercial companies owned by the state, because they are considered a state in the sense of the Convention.

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<sup>44</sup> Office of the Representative of the Republic of Croatia to the European Court of Human Rights - Guide to Article 1. Protocol No 1 to the European Convention on Human Rights  
<https://uredzastupnika.gov.hr/UserDocsImages//dokumenti/Edukacija//Vodič%20kroz%20članak%201%20protokola%20br.%201.pdf> (access on 15 July 2022)

<sup>45</sup> *Beyeler v. Italy*, paragraphs 108 - 114.

<sup>46</sup> *Kučař and Štis v. Czech Republic*, Commission decision.

<sup>47</sup> *Kotov v. Russia*, paragraph 117.

<sup>48</sup> *Bjedov v. Croatia*.

<sup>49</sup> *Orlić v. Croatia*.

<sup>50</sup> *Zahi v. Croatia*.

<sup>51</sup> *Paulić v. Croatia*.

<sup>52</sup> *Škrtić v. Croatia*; *McCann v. United Kingdom*.



In eviction lawsuits, the proportionality test actually answers the question: Would an order to evict an unauthorized user constitute an unjustified interference with his right to a home?<sup>53,54</sup> The proportionality test is carried out using three elimination questions, where a negative answer to any question means that the eviction is against the Convention, that is, unjustified. The first question is whether the interference is based on the law? The second question is whether the interference is aimed at achieving a "legitimate goal"? The third question is whether interference was necessary in a democratic society?<sup>55</sup>

## **7. PRINCIPLE OF CONSTITUTIONALITY AND LEGALITY IN ENFORCEMENT PROCEEDINGS**

In the enforcement proceedings, the principle of constitutionality and legality is established in two basic senses. First of all, as a requirement that enforcement and insurance be carried out with strict compliance with the norms of enforcement procedural and material law – courts judge on the basis of the Constitution and laws (Article 117/3 of the Constitution of the Republic of Croatia). Constitutionality and legality in the application of enforceable procedural law should ensure the substantive legal regularity of results in the provision of enforceable legal protection. In its second sense, viewed from the aspect of enforcement of the function of enforcement justice in general, this principle requires that in the enforcement procedure, instrumental conditions are ensured for the uniform application of enforcement law and the equality of legal entities within the entire legal order.<sup>56</sup>

## **8. INTRODUCTION OF THE PRINCIPLE OF FAIRNESS IN THE ENFORCEMENT ACT OF THE REPUBLIC OF CROATIA**

The current Enforcement Act was adopted in 2012.<sup>57</sup> The original text of the Enforcement Act does not introduce the concept of fairness in its first version. The concept of fairness was introduced by the Amendments to the Enforcement Act from 2017<sup>58</sup> which amended the Article 75 and introduced the Article 80.b of the Enforcement Act. Based on the Act on Amendments to the Enforcement Act from 2017<sup>59</sup> (hereinafter: AAEEA/17) there was a significant intervention in Enforcement Act/12 for the second time in order to protect the position of the debtor, and to incorporate the views of the European Court of Human Rights, especially taking into account the decision of the European Court of Human Rights in the case Vaskrsić v. Slovenia.<sup>60</sup> By adopting AAEEA/17 the legislator intervened in Article 75<sup>61</sup> and added article 80.b<sup>62</sup> of the original text of Enforcement Act/12, and introduces the concept of fairness, requiring the court to apply the above-mentioned principle when deciding on the creditor's

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<sup>53</sup> Jadranko Jug, PhD, *Primjena pravnih načela u odlukama Vrhovnog suda Republike Hrvatske* (English: *Application of legal principles in decisions of the Supreme Court of the Republic of Croatia*)

[http://www.vsrh.hr/custompages/static/hrv/files/jugj\\_primjena-pravnih-nacela-u-odlukama-vsrh.pdf](http://www.vsrh.hr/custompages/static/hrv/files/jugj_primjena-pravnih-nacela-u-odlukama-vsrh.pdf)

(access on 25 June 2022): Unlike the ECHR, which does not regulate the legal principle of proportionality, the same is regulated in the Constitution of the Republic of Croatia in Article 16, paragraph 2.

<sup>54</sup> Constitution of the Republic of Croatia (Official Gazette 56/90, 135/97, 08/98, 113/00, 124/00, 28/01, 41/01, 55/01, 76/10, 85/10, 05/14, article 16, paragraph 2: (2) Any restriction of freedom or right must be proportionate to the nature of the need for restriction in each individual case.

<sup>55</sup> *Gustovarac v. Croatia*, § 37-40: when the possession of the apartment is based on the criminal act of a third person of which the applicants knew, then their eviction is proportionate.

<sup>56</sup> See DIKA, M. (2007), Rm.cit. in note number 6 p. 44.

<sup>57</sup> The Enforcement Act was adopted on September 21, 2012 and disclosed in the Official Gazette No. 112/2012

<sup>58</sup> Act on Amendments to the Enforcement Act, Official Gazette No. 73/2017

<sup>59</sup> Official Gazette 73/2017 as of 26.07.2017

<sup>60</sup> See *Vaskrsić v. Slovenia*.

<sup>61</sup> Article 12 of the Act on Amendments to the Enforcement Act, Official Gazette 73/2017.

<sup>62</sup> Article 15 of the Act on Amendments to the Enforcement Act Official Gazette No. 73/2017 (new Article 80.b).

proposal to determine enforcement on the debtor's real estate. Thus, the Article 75, paragraph 5 of Enforcement Act/12 was replaced by a wording that for the most part actually contradicts the earlier wording of the same article, all with the aim of protecting the right to a home, that is, the real estate where the debtor lives. Article 75, paragraph 5 of AAEA/17 states that considers that the only property in which a debtor who does not perform a registered activity resides is necessary for the satisfaction of the basic life needs of the debtor and the persons whom he is obliged to support by law, unless the debtor, at the time of entering into the legal transaction by which he undertakes the obligation, has stated that he agrees that it is for the purpose of settlement the creditor's claims can be enforced on his only real estate. Consent that, in order to settle the creditor's claim, enforcement may be carried out on the debtor's only real estate must be given in writing and is effective if the debtor's signature is certified by a notary public or another person or body with public authority. The consent from this paragraph is valid if there is a change of creditor or if the debtor acquires a new real estate. Pursuant to paragraph 7 of the same article, the creditor is obliged to submit the consent of the debtor or a final judgment, a public or private document that has the meaning of a public document, which proves that the debtor or the person he is obliged to support by law has another real estate for housing, together with the proposal for enforcement on the real estate. The legislator continues to have a different treatment of real estate for the performance of business activities, for which he states in paragraph 8 that such real estate is not considered to be necessary for the performance of an independent activity that is the main source of livelihood of the debtor, unless otherwise provided by law. In the newly introduced paragraph 6 of Article 75 according to AAEA/17, the concept of fairness is introduced, and the legislator prescribes that when fairness requires it, the court will determine and carry out enforcement on the only real estate of the debtor if the debtor's obligation originates from a non-contractual obligation. Therefore, a deviation from the principle of protection of the home, i.e., the only real estate of the debtor who does not perform a registered activity, where it will not necessarily result in its exemption from enforcement, is possible if the following conditions are met: a) that it is a non-contractual obligatory relationship, and b) that the same is required by fairness. The legislator does not prescribe the test criteria here; however, it remains to be concluded that they should be within the criteria prescribed in the Article 80.b of AAEA/17. By adopting AAEA/17, the legislator did not intervene in the provision of Article 77 of the Enforcement Act/12 on the protection of creditor, which remained unchanged and in a certain way inconsistent with the new legal solution of Article 75, paragraph 5, which prescribes the manner of giving the consent of the debtor and aims at his protect.<sup>63</sup> According to the opinion of the author of this text, it should still be considered that the rules prescribed in Article 75 apply as a special provision in relation to the form of consent that the debtor gives to the creditor for enforcement on his only real estate. The newly introduced article 80.b of AAEA/17<sup>64</sup> determines special (additional) conditions to determine the enforcement on the real estate while later AAEA/20 will only increase the value of the claim. Thus, enforcement on real estate for the purpose of realizing a monetary claim cannot be requested, that is, the court must reject the proposal for enforcement (arg. ex-article 80.b of AAEA/17) if the principal amount of the claim for the purpose of which the enforcement is requested does not exceed the amount of HRK 20,000.00 (or HRK 40,000.00 according to AAEA/20, now EUR 5,300.00<sup>65</sup>), unless the proposal is submitted for the purpose of compulsory realization of a claim for legal maintenance or a claim for compensation for damage caused by a criminal offense. The aforementioned article therefore also applies to contractual relationships, since application is not explicitly excluded in situations where the debtor has previously in a contractual relationship given consent to enforcement on a certain real estate,

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<sup>63</sup> Article 77 of the Enforcement Act/12 "Protection of the creditor"

<sup>64</sup> Rm.cit. note number 42

<sup>65</sup> Act on Amendments to the Enforcement Act, Official Gazette No. 114/2022

as well as in cases where it is the real estate that is considered necessary for the satisfaction of basic the life needs of the debtor and persons whom the debtor is obliged to support by law in the sense of Article 75, paragraph 5 of AAEA/17.<sup>66</sup> If the claim exceeds the amount of HRK 20,000.00 (i.e., HRK 40,000.00 according to AAEA/20, now EUR 5,300,00), the court may (but not necessarily) reject the proposal for enforcement after evaluating the "circumstances of the case" and especially taking into account the guidelines or the five criteria set by the legislator (which are listed with an open end), meaning if it judges that the sale of the real estate would violate the fair balance between interests of the debtor and the interest of the creditor. In order to carry out the "proportionality test", i.e., to determine whether the fair balance between the interests of the debtor and the interests of the creditor has been violated, the legislator gives guidelines to the court and prescribes that the court will take into account the circumstances of the case, and in particular the following circumstances:

- whether the value of the claim to be settled is disproportionately lower than the value of the real estate on which enforcement is proposed,
- whether the creditor made it likely that the enforcement in other cases of enforcement was unsuccessful, that is, that there are no other suitable possibilities to settle the claim in full or in most part,
- whether the real estate serves for housing and meeting the basic life needs of the debtor, and whether the debtor has other real estate or other possibilities to meet his needs<sup>67</sup>,
- whether the creditor has a particularly justified interest in the urgent settlement of the claim in order to achieve his own maintenance or other important reasons,
- whether the debtor, by a statement contained in a public document or a certified private document, has expressly agreed to the fact that the creditor, in order to settle a specific claim, requests settlement through the sale of a specific real estate.<sup>68</sup>

The legislator does not give clear guidelines when (at what stage of the procedure) and in what way (through which means of evidence) the court should determine the fair balance. In particular, it should be borne in mind that the enforcement proceedings is not intended as a cognitive procedure, and the principle of hearing the parties suffers from significant limitations, so the proposal for enforcement does not necessarily need to be submitted to the debtor for a response (arg. ex-article 42 of amended Enforcement Act). As a result of the above, the debtor can raise objections from Article 75 or Article 80.b for the first time only by filing an appeal against the decision on enforcement.<sup>69</sup>

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<sup>66</sup>Decision of the County Court Split under the business no. Gž Ovr-655/18-2 dated May 27, 2019, CC Split under the business no. Gž Ovr 1660/2017-2 dated April 06, 2018, CC Bjelovar under the business no. Gž Ovr 40/2018-2 dated June 29, 2018, CC Šibenik under the business no. Gž Ovr 26/2018-2 dated February 16, 2018, CC Pula under the business no. Gž Ovr 167/2018-2 dated March 20, 2018, CC Pula under the business no. Gž Ovr 210/2018-2 dated April 5, 2018, CC Pula under the business no. Gž Ovr 250/2018-2 dated April 11, 2018, CC Rijeka under the business no. Gž Ovr 1670/2017-2 dated April 18, 2018, CC Split under the business no. Gž Ovr 448/2018-2 dated April 24, 2018, CC Split under the business no. Gž Ovr 131/2018-2 dated June 4, 2018, CC Rijeka under the business no. Gž Ovr 153/2019-2 dated May 3, 2019, CC Zadar under the business no. Gž Ovr 131/2018-2 dated April 20, 2018, CC Split under the business no. Gž Ovr 182/2018-2 dated July 26, 2018, CC Split under the business no. Gž Ovr 816/2018-2 dated October 16, 2018, CC Zadar under the business no. Gž Ovr 154/2019-2 dated April 5, 2019, CC Rijeka under the business no. Gž Ovr 305/2019-2 dated April 25, 2019, CC Zadar under the business no. Gž Ovr 190/2019-2 dated April 29, 2019, CC Slavonski Brod under the business no. Gž Ovr 213/2019-2 dated May 23, 2019, CC Rijeka under the business no. Gž Ovr 993/2018-2 dated May 23, 2019, CC Varaždin under the business no. Gž Ovr 552/2018-2 dated July 19, 2019.

<sup>67</sup>Here, the legislator instructs that when conducting the proportionality test, it is taken into account whether it is the only real estate within the meaning of Article 75, paragraph 1 of the Enforcement Act, as one of the important criteria of the test (arg. ex 75 paragraph 1 and 80. b of AAEA /17).

<sup>68</sup>Here, the legislator instructs that during the implementation of the proportionality test, the granting of consent for enforcement in the sense of Article 75, paragraph 1 of the Enforcement Act should be taken into account as one of the important criteria of the test (arg. ex 75 paragraph 1 and 80.b of AAEA/17).

<sup>69</sup>On this topic: Dika, M. Rm.cit. note No. 6, p. 51: In enforcement proceedings and insurance proceedings, the court decides on the proposal for enforcement or insurance, as a rule, before the opponent is given the opportunity to state his opinion on the

The very fact that the court is obliged to reject the proposal for enforcement on the real estate if the value criterion is not met in relation to the amount of the claim, but also the possibility that the court rejects the proposal for enforcement if the value criterion is fulfilled, but the court evaluates that the sale of the real estate would violate the fair balance between the interests of the debtor and the interests of the creditor points to the conclusion that the court would be obliged to determine the value of the claim and conduct a proportionality test already when examining the admissibility and merits of the submitted proposal for enforcement on the real estate, i.e., based on that proposal itself. This would actually put the creditor in the situation of submitting additional evidence with the proposal for enforcement on the real estate of the debtor, with which he proves his interest in carrying out the enforcement on the real estate of the debtor, and which obligation of the creditor is not prescribed anywhere nor does it derive from the Enforcement Act itself (arg. ex. Article 39 of the amended Enforcement Act and Article 42 of the amended Enforcement Act). In the case of real estate enforcement, it would certainly be necessary to take into account additional prerequisites for determining real estate enforcement, i.e. the consent of the debtor from Article 75, paragraph 7, which the creditor is obliged to submit already when submitting the proposal for enforcement, but Article 80.b of the Enforcement Act itself does not stipulate that the creditor would be obliged when submitting a proposal for enforcement to submit to the court the appropriate means of evidence by which he suggests carrying out the test of fairness in his favour.<sup>70</sup> If the debtor succeeds in questioning the existence of a fair balance with the strength of his arguments presented in the appeal (as well as the submitted evidence), the second-instance court, by accepting the appeal, would return the case to the first-instance court for the purpose of conducting a fairness test. It is only at this stage that the creditor himself would be obliged to submit evidence supporting him. A kind of freedom in the choice of evidence that will be presented to the court in order to carry out the test of fairness, as well as the fact of uncertainty when it should be carried out, in the opinion of the author of this text, greatly encroaches on the previous principle of strict formal legality as one of the main features of the enforcement proceedings and leads to certain legal uncertainty. The aforementioned solutions of AAEA/17 were retained in the current Enforcement Act, which was last amended in 2022<sup>71</sup> and AAEA/20 makes a minor intervention in Article 80.b paragraph 1 of AAEA/17 in such a way that the value assessment of the creditor's claim is increased from HRK 20,000.00 to HRK 40,000.00<sup>72</sup>, now EUR 5,300.00 (AAEA/22) Transitional and final provisions of AAEA/17, i.e. Article 44, paragraph 1 prescribe that the procedures initiated before the entry into force of that Act will be completed by applying the provisions of the Enforcement Act ("Official Gazette", No. 112/12, 25/13, 93/14 and 55/16 – Decision of the Constitutional Court of the Republic of Croatia).<sup>73</sup> Furthermore, paragraph 3 of the same article expressly stipulates that Article 12, paragraph 1<sup>74</sup> of that Act (which refers to the presumption that the only real estate of the debtor is necessary to satisfy the debtor's basic life needs) applies to legal affairs that arise after the entry into force of AAEA/17. In this regard, there is a different treatment of enforcement proposals depending on when the enforcement proposal (or insurance) was submitted, i.e., depending on the period from which the

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proposal (see §§91, 92)... The reasons for such suppression of the principle of hearing the parties in the enforcement proceedings, on the one hand, to look in the circumstances that in the previous cognitive procedure from which the document on the basis of which enforcement is sought was already given the opportunity to defend himself, and therefore the risk of abuse is reduced, and on the other hand, in the need to prevent the possibility that previously informed the debtor prevents the fulfilment of the purpose of enforcement, for example by hiding or destroying property, etc.

Page 304: In the case of a motion for enforcement, the court usually decides before allowing the person to be executed to make a statement about it (see § 14/5).

<sup>70</sup>Arg. ex-article 75 paragraph 5 in relation to article 75 paragraph 1 and article 80 b. of the Enforcement Act (OZ).

<sup>71</sup> Enforcement Act, Official gazette no. 112/12, 25/13, 93/14, 55/16, 73/17, 131/20, 114/22.

<sup>72</sup> Article 8 of the Act on Amendments to the Enforcement Act, Official Gazette No. 131/2020

<sup>73</sup> Remark of the author, the aforementioned Act entered into force on 03.08.2017

<sup>74</sup> Article 12, paragraph 1 of ZIDOZ/17, see note 41

enforcement deed on the basis of which it is proposed to carry out enforcement proceedings on the real estate of the debtor originates. The Article 290 of the Enforcement Act was amended by the amendment to the Enforcement Act AAEA/20<sup>75</sup>, where the legislator removed earlier doubts in practice as to whether it is permissible to determine insurance on the real estate in conditions when the value criteria of the claim for enforcement on the real estate are not met, thus allowing insurance of the creditor's claim, although in the specific case there would be no conditions for its forced settlement by enforcement of the real estate.

## 9. CONCLUSION

The enforcement procedure is functionally and organizationally directed towards the fundamental goal, i.e. the forcible realization of the creditor's claim, the existence of which (and thus the suitability for the debt to be forcibly collected) was previously verified in a cognitive judicial or administrative procedure, or in another undoubted and qualified way in the framework of the procedure that results in a public document of enhanced, presumptive evidential force, which is the legal basis (*titulus executionis*) for the determination and implementation of enforcement. The principle of strict formal legality excludes proving disputed decisive facts by means of a free evaluation of evidence, but only on the basis of criteria predetermined by law, which exclude the need to prove and evaluate its results. Precisely for this reason, disputed facts are established through the institution of referring the debtor to the litigation, because the debtor cannot prove his allegations in the enforcement proceedings. Legality is generally taken to be a legal value. It is, together with justice, peace, legal certainty, completeness and coherence of the system of legal norms - a specific legal value - in contrast to non-specific legal values, which, apart from law, also operate in other normative orders such as life, health, freedom, personal security, family, truth, work, education, etc. The concept of fairness is not defined by the Constitution or by any positive legal regulations. Although from a series of decisions of the Constitutional Court it follows that the "right to a fair trial" belongs to a procedurally guaranteed human right, and taking into account that the Civil Obligations Act, which refers to "fairness" by its nature, is a substantive law, the question arises whether the very fact that fairness is incorporated into one substantive law implies that the concept of "fairness" is not an exclusive privilege of procedural law, but can also have a certain material-legal significance. The philosophical concept of fairness was analysed in the time of ancient Greece, so Aristotle himself found the meaning of the concept of fairness as justice that goes beyond the written law. The institute of fairness in enforcement proceedings introduced by AAEA/17 can be seen as the legislator's intention to use this "*sui generis*" institute, depending on the circumstances of the specific case, to reject a proposal for enforcement on the real estate of the debtor when he estimates that such enforcement would lead to a disturbance in the balance between interests of the debtor and interests of the creditor. The fair balance test is not carried out consistently in decisions of the county courts in Croatia, and at the same time it encounters different opinions of judges and the consideration of a number of different criteria that depend on each case. Enforcement Act does not define in which phase of the process the court should make the fair balance test. The creditor is not obliged to submit additional evidence along with the enforcement proposal itself, with which he proves his interest in carrying out the enforcement on the real estate of the debtor (arg. ex. Article 80.b of EA). The only additional requirement that the creditor is obliged to fulfil already when submitting a proposal for enforcement on the real estate of the debtor is the delivery of the consent of the debtor to carry out the enforcement on his only real estate if the claim arises from a contractual relationship, that is, a certain legal transaction.

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<sup>75</sup> Article 19 of the Act on Amendments to the Enforcement Act, Official Gazette No. 131/20 which amended the article 290 of EA.

However, no arguments can be found that would prevent the court from ordering the recording of the submitted proposal in the land register, and then calling a hearing on the matter and conducting evidence in order to conduct a fairness test, even before passing the enforcement decision itself if the court already at the initial stage of the proceedings considered that such a test should be carried out. In the case the debtor raised the objection of fair balance for the first time in the appeal, the second-instance court should have cancelled the first-instance decision and ordered the first-instance court to evaluate the statements of the debtor in the repeated proceedings and state the reasons whether (or not) there was a violation of the balance between the interests of the debtor and the interests of the creditor.<sup>76</sup> A kind of freedom in the choice of evidence that will be presented to the court in order to carry out the fair balance test, as well as the fact of uncertainty at which stage such a test should be carried out, greatly encroaches on the existing principle of strict formal legality as one of the main features of enforcement procedure and therefore the application of the principle of fairness in the enforcement procedure, at least in these beginnings of its application, leads to certain legal uncertainty. The decision of the Constitutional Court of the Republic of Croatia U-III-4507/2020 dated June 8, 2021, which adopted two constitutional lawsuits (U-III-4507/2020 and U-III-4508/2020) opened a Pandora's box related to the discussion of the relationship between civil proceedings as cognitive proceedings and enforcement proceedings in which the principle of strict formal legality is valid and the duty of the enforcement court to pay attention to the objection of invalidity of the enforcement document ex officio in the enforcement procedure itself. In addition to the aforementioned decision of the Constitutional Court, two opinions of three judges of the Constitutional Court were singled out, from which it follows that there are conflicting views of the judges of the highest instance in the country regarding the scope of legal remedies in the enforcement procedure itself and the rights and duties of the enforcement court in relation to the institute of the right to a fair trial. These separate opinions point out significant differences between cognitive and enforcement proceedings and note the need for a clear distinction between the aforementioned procedures. The use of fairness principle in the enforcement proceedings pushes the previous strict boundaries and the clear distinction between the cognitive proceedings and the enforcement proceedings demanding the extensive jurisdiction of the enforcement courts which decisions have to be harmonized with the points of view of the European court on Human Rights.

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## IMPACT OF AGE, LEVEL OF EDUCATION AND EMPLOYMENT SECTOR ON THE RISK OF UNEMPLOYMENT AND INDIVIDUAL CREDIT RISK OF A BORROWER

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### ABSTRACT

*Commercial banks use a variety of methods to assess the borrower's individual credit risk based on the evaluation of borrower's financial situation, credit history and other individual parameters that influence the borrower's individual credit risk. Level of education and employment sector are very important factors affecting the individual credit risk, that should be taken into consideration during the evaluation of the borrower's individual credit risk. The level of education plays a decisive role in the borrower's competitiveness in the labor market, the amount and stability of income, considering the cyclical nature of the economy. The authors have concluded that evaluation of unemployment risk of the individual borrower in financial institutions is still general. A more precise and nuanced evaluation of the borrower's individual credit risk would improve credit risk management in commercial banks and allow them to offer a more appropriate loan terms for individual borrowers. Based on statistical analysis, the authors conclude that the risk of unemployment is significantly affected by the level of education - people with higher education are less likely to become unemployed than those with vocational or vocational secondary education, as well as those with general secondary education and primary education. Analyzing the impact of the type of employment on the unemployment risk, it can be concluded that there are significant differences by type of activity in the last job. Consequently, the type of employment must be an important parameter of individual credit risk during creditworthiness analysis.*

**Keywords:** *Econometric modelling, Financial planning, Borrower's individual credit risk, Non-performing loans*

### 1. INTRODUCTION

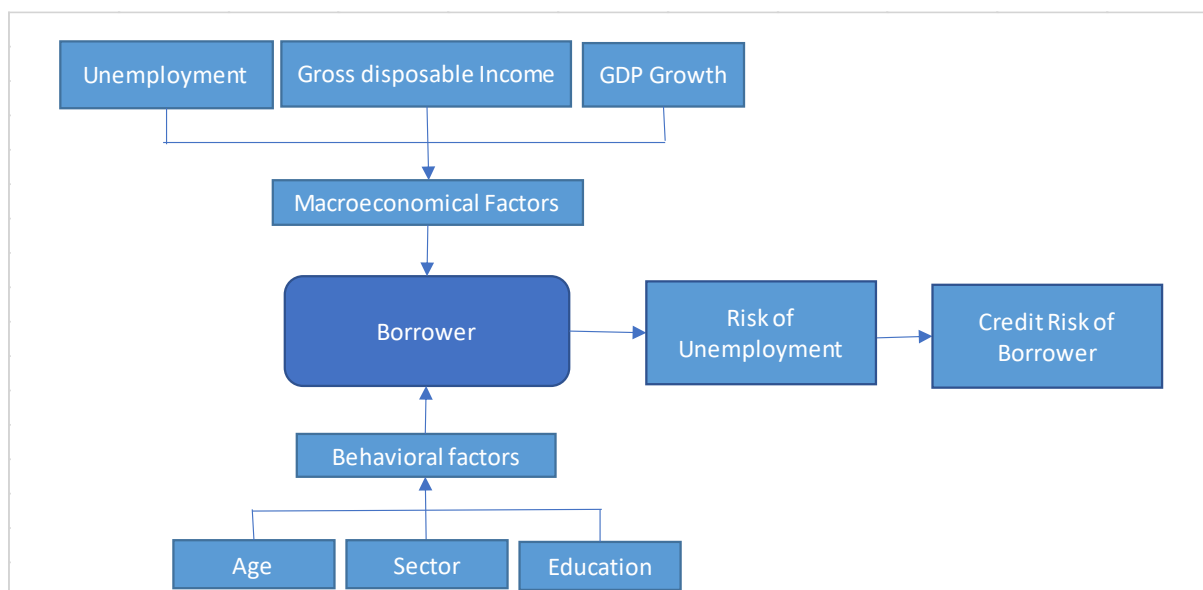
Today, in an increasingly consumption-based society, individuals are acquiring higher levels of personal debt than ever before. Rising housing prices (Eurostat, 2022) and the inevitable downturn in the economy (European Commission, 2022) and in the real estate market at some point in the future, mean that one of the priorities of retail lending policy should be promoting the use of appropriate financial instruments, that increase the level of financial security among the borrowers, as well as stimulate the development of responsible lending policies in the financial institutions. The comprehensive use of additional instruments that contribute to financial security in retail lending should be recognized as an important task, considering the risks and potential losses that borrowers may face when considering borrowing, as well as credit institutions during retail lending as one of their core business activities. Household debt is an asset of increased relevance in the balance sheets of financial institutions, reaching more than

100% of the GDP in several developed countries (OECD, 2021). Households are required to service their consumption needs and accumulated debt obligations using a budget composed of current income, past savings, plus new debt contracts available from commercial banks and other financial institutions. Lenders offer a menu of contracts according to the level of risk of the household and lenders' funding costs, with loans differing in terms of interest rates, maturity and the debt amount available for the borrower (Madeira, 2018). The household sector is exposed to the following risks: inflation, unemployment, changes in income and interest rates, which subsequently causes the increase in the fragility of the financial sector (Nurhuda and Zulkefly, 2021). Disposable income of the household is determined by gross household income, size of mortgage payments, and the number of persons in the household. For households with more than one adult, the above cannot be unambiguously observed in situations where the second adult seeks or continues to work when the first adult faces redundancy or ill health (Pryce and Keoghan, 2002). Families' income is a subject to cyclical shocks of labour income and unemployment. Some categories of borrowers are more vulnerable to cyclical economic shocks and to changes in credit conditions than the others. It is the interaction between shocks to household income processes and the debt contracts available to them, that leads some households to the loss of borrowing possibilities, becoming insolvent and unable to pay their debts. (Madeira, 2018). The impact of unemployment on the borrower's income and the borrower's individual credit risk is highly cyclical, but it is temporary (Quercia, et al., 2014). Therefore, it is important to use correct credit risk mitigation tools that, in a crisis situation, could reduce this negative impact of risks (e.g., unemployment) on the borrower's solvency and, consequently, borrower's ability to meet long-term obligations. Due to cyclical economic shocks, the possibilities of using the secondary source of loan repayment - collateral, due to its low liquidity in crisis and the decrease in value, will also decrease. This, in turn, can lead to liquidity problems in credit institutions in the event of major economic problems as well as significantly worsening household borrowing opportunities in the future. Liquidity shocks are important for both, banks, and borrowers, with increases in banks' funding costs, sudden credit limitations or a shortening of debt maturities leaving a significant impact on access to credit and default rates. (Madeira, 2018).

## **2. FACTORS AFFECTING THE BORROWER'S INDIVIDUAL CREDIT RISK**

The authors raise the question whether policymakers should be concerned about private debt. If households take on too much debt, they may decide to rebalance their balance sheets through bankruptcy and distressed sales. A massive selloff can lead to a decline in prices (Garriga et al., 2017). As the experience of many countries shows, this leads to deep economic problems that require significant public resources to solve them. These economic problems leave a negative impact on households with moderate debt level and households that are not active borrowers as well. These problems are depriving resources from economic development projects, that negatively impacts development prospects of the country. During the underwriting process of the loan, financial institutions assess credit risk using information on a range of risk factors that potentially affect or predict repayment behaviour. These factors include the current and past payment behaviour of the borrower and loan characteristics including loan type, loan purpose, the loan-to-value (LTV) and debt-to-income (DTI) ratios as well as the characteristics and value of the property serving as collateral for the loan (Avery et al., 1996; Haughwout et al., 2008; Mayer et al., 2009; Fout et al., 2020). In this study, the authors have divided the factors influencing the risk of borrowers into two main categories: Economical factors and Behavioral factors. These two risk categories represent a typical division of risk classification into risk groups, both in terms of the sources of risk and the ability of the risk owner to influence them. In this specific study, the authors have analysed both Economical factors that affect individual credit risk of a borrower, such as GDP, household income and unemployment, and

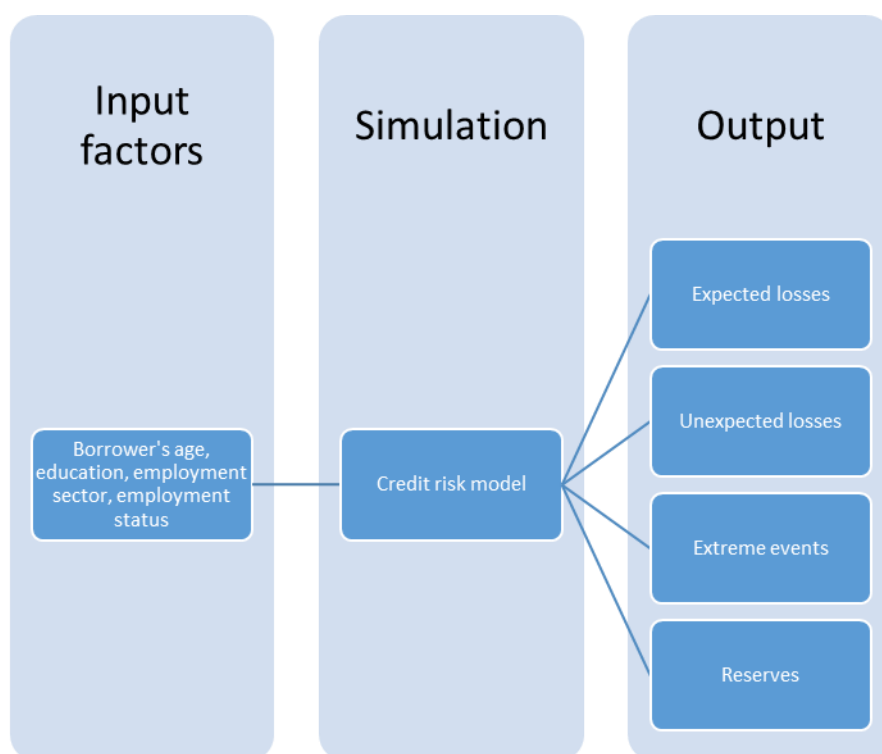
Behavioral factors. The focus of the study is on Behavioral risk factors, i.e., factors that can be directly influenced by the borrower himself - the age of the borrower, the education (level) of the borrower, the scope of the borrower's employment. In the practical research part of the work, the authors evaluate and analyse the influence of these factors and their combinations on the risk of unemployment as a consequence of the main risk. Further along the chain of influence, unemployment automatically provokes a decrease in the borrower's cash flow, which, in turn, is crucial for the borrower's ability to repay the loan taken. Factors affecting the borrower's individual credit risk can be conditionally divided into two groups - borrower's behavioral factors and macro economical factors.



*Figure 1: Factors affecting credit risk level of the household  
 (Source: Created by authors)*

Individual factors of the borrower characterize and allow to predict the borrower's potential behavior in the situations of solvency problems. Credit factors make it possible to assess and quantify the credit risk of a potential loan, taking into account the results of the assessment of the borrower's individual creditworthiness and the parameters of the type of loan.

*Figure following on the next page*



*Figure 2: Structure of credit risk model  
 (Source: Created by authors)*

Traditional credit risk models are used to quantify the expected future performance of mortgage and other loans based on the information available at origination. A traditional approach in modelling mortgage credit risk involves estimating a logit model to explain some binary outcome of loan performances e.g., 90 or more days delinquent within two years since origination based on the data observed at underwriting (Fout et al., 2020). In addition to the literature on credit risk models, there is a separate strand of the literature that focuses on prepayment and default risk of low- and medium-income borrowers' (LMI) loans. Archer et al. (1996) finds that LMI are less likely to sell their home and move when facing an income or life event shock. Firestone, Van Order and Zorn (2003) find that default responses to negative equity are similar across higher income and low to medium income neighbourhoods and the small differences in defaults can be explained by omitted credit history. Deng et al., (1996, 2000). Deng and Gabriel (2006) and Firestone et al. (2007) find slower voluntary prepayment speed among LMI. In particular, Deng et al. (1996) have investigated a set of loans purchased by Freddie Mac between 1976 and 1983 and create a loan-level set of LMI indicators. They present evidence within a competing hazards framework that default risks decline as household income rises and also that LMI households are more likely to default when faced with negative equity than are higher income households (Fout et al., 2020). Modern credit risk management in financial institutions addresses three levels of credit risk: expected losses, unexpected losses, and extreme events. Expected losses that are long-term average losses of financial institutions are covered by proper credit risk pricing and profitability management. Possible unexpected losses in lending that are generally higher than long-term average losses and they are usually covered by capital reserves. Extreme unexpected losses above the severity level shall be rare by definition and hence it is not efficient to keep reserves for them continuously. However, the credit institutions should foresee impact of extreme events which could evolve from current situation, and they must have a plan for each such event to mitigate its impact if it evolves (Kadeřábek et al., 2008). Kadeřábek et al. (2008) consider two types of credit risk factors affecting probability of default: global (systemic) and individual (idiosyncratic).

Individual factors are specific for each transaction and are averaged in diversified portfolio. Global factors are common to all transactions in the portfolio and can be interpreted as the macroeconomic conditions (Kadeřábek et al., 2008). For individuals with no mortgage debt (or with sufficient home equity), the decrease of credit portfolio balance can be partially explainable with decline in income. Understanding deleveraging behavior is critical for individuals with significant mortgage and home equity debt combined with the risk of income reduction (Garriga et al., 2017). The transaction-specific drivers of sensitivity to the stress were identified to be instalment of income ratio (IIR), savings to income ratio (SIR) and for mortgages also time to maturity. IIR determines sensitivity to the stress in real annuity, which is either given solely by the price level stress for the fixed nominal annuity or contains also nominal annuity change depending on the interest rate stress and time to maturity. SIR expresses sensitivity to the stress of price level. Although clients with high SIR are more sensitive to the stress, they are less risky. Potential allowing for higher IIR and maturity length for mortgages in the granting process should be treated carefully (Kadeřábek et al., 2008). Madeira (2018) finds that banks could reduce the default rate and covariance risk of their loan portfolio by choosing customers that suffer less unemployment risk and fewer shocks during economic downturns. Madeira also finds that both the probability of getting consumer credit and the loan amount decline with the household's covariance risk, showing that lenders treat such clients as having higher credit risk even after other factors are considered. Furthermore, the probability of households being credit constrained (borrowers who wanted a consumer loan, but were rejected) increases with covariance risk, confirming that the increased credit restrictions come from the lenders side (Madeira, 2018). Pryce and Keoghan (2002) stress that in addition to the unemployment risks faced by mortgage borrowers, an important determinant is the financial resources at the mortgagor's disposal relative to the regular expenses and mortgage payments. A single person with a small mortgage and sufficient savings is more likely to survive a short period of unemployment without financial problems than someone with a large mortgage and small savings. The ability to save is generally determined by disposable income of a person or a household (Pryce and Keoghan, 2002). The influence of age and education in relation to bank loans in the Slovenian business environment was researched by Slavec (2014), stating that education plays a much more important role in bank loans than the age of entrepreneurs (Slavec, 2014), (Belas et al., 2018). Wilson found that age, race, education, and net worth, but not risk tolerance, have a significant impact on the ratio of credit card balances to income for women (Wilson, 2008). Aller and Grant find that university educated households are much less likely to borrow (Aller & Grant, 2018). Wilson's research shows that as the level of education increases, the risk tolerance level of the individual also increases, indicating that higher education gives individuals the training to assess the risks and rewards of an investment decision more fully (Wilson, 2008). University educated households experienced a decline in borrowing volume. The increasing tendency to apply for loans is compensated by an improvement in repayment behavior among the borrowers. Non-university educated households see larger changes overtime: they reduced the borrowing volume from 10.4% to 9.6% in 2005, and increased their arrears to 11.0% in 2008 and then, more substantively to 13.3%, in 2011. Rate of loan applications increased in 2005. It fell in 2008, but increased again in 2011. A small reduction in the rate of acceptances has been observed over time. However, most of the changes in the overall borrowing rate in 2005 and 2008 was due to changes in the borrowing volumes on the whole, which fell in 2005, but increased in 2008. In 2011, increases in applications, in borrowing volumes among borrowers, and in characteristics all caused similarly large increases in the overall change in borrowing among non-college educated households which was only partially counter balanced by a reduction in credit acceptances by lenders (Aller & Grant, 2018). According Belas, younger and less educated entrepreneurs use more external funding for their growth as older and more educated (Belas et al., 2018).

Change in the behavior of actual borrowers is driving the arrears rate of households, rather than changes in the type of households that borrow. Guiso et al. (2013) claim that borrowers became more willing to borrow regardless of their circumstances (Guiso et al., 2013). Since applications and acceptances fell when borrowing volumes increased, this increase cannot be attributed to a change in the composition of borrowers with new borrowers being higher credit risks since the results of the study by Aller and Grant showed that fewer households were borrowing (Aller & Grant, 2018). Although the decomposition exercise cannot explain the reason for the increased willingness to default which Guiso et al. (2013) suggest, it can be believed that it is consistent with a decline in the stigma attached to default over time, and an increase in the sympathy with which the civil courts deal with debtor households (Guiso et al., 2013). Aller and Grant have concluded that the overall picture of the level of debt masks substantial variation in the lending experience among different types of households. The results of their study show, that an increase in the level of debt was not observed among the oldest households, while for some of the younger households had increased their debt substantially. Middle-income households had also increased their level of debt, although the richest and poorest households had not. Unemployed households have higher level of debt. (Aller & Grant, 2018). The research of Wilson indicates that risk, education, and the net worth of the borrowers are all highly significant factors in determining the ratio of credit card balances to income. The increase in risk tolerance, an increase in years of education, and a decrease in net worth all positively influence the ratio of credit card balances to income. An increase in risk avoidance and net income decreases the ratio of credit card balances to income, whereas additional education increases the ratio (Wilson, 2008). The results of the research of Wilson (2008) show that higher levels of formal education are related to higher credit card balances relative to income at the one percent level, with the coefficient estimates ranging from 0.189 to 0.02. This result might indicate that those with lower levels of income do not have access to the same amount of credit as those with higher incomes. It also suggests that those with higher incomes might be more knowledgeable about the uses of credit and are using credit cards as a part of their spending and consumption strategy (Wilson, 2008). According to Belas et al. (2018) education is an indirect part of the impact of the family and social environment, and it affects the characteristics and the behavior of the borrower (Belas et al., 2018). Results of the study of Aller and Grant (2018) show that university educated households had slight change in their rate of the debt, but poorly educated households both had higher level of debt, and it had increased substantially through the research period (Aller & Grant, 2018). Butkus, et al. (2020) estimated sensitivity of unemployment by age and education level to economic cycle phases (Butkus et al., 2020). Rising unemployment may leave a negative impact on the credit market overall. Negative long-term effects on future labour market prospects –, social and political unrest, and growing inequality in the long run are important factors as well (Matsumoto et al., 2012), (Borsi, 2018). Yet, linkages between credit markets and unemployment dynamics have received a little attention in the scientific literature (Borsi, 2018). According to Borsi, important relationship between disruptions in the credit market and unemployment fluctuations exist (Borsi, 2018). Increased unemployment rates result in raising number of non- performing loans and default payments among households, leading to a rapid worsening of banks' balance sheets. Periods of mortgage credit are often linked with economic cycles and its' subsequent influence on economic factors such as GDP, interest rates and inflation (Nurhuda & Zulkefly, 2021). In case of unemployment borrowers suffer labour income shocks and they are forced to choose from a menu of loans contracts, defaulting on debt commitments when unable to finance minimum consumption standards (Madeira, 2018). Ampudia argues that unemployment and low wealth are among the most important determinants of default (Ampudia et al., 2016). Wasmer and Weil (2004), and more recently, Petrosky-Nadeau and Wasmer (2013) have analysed the financial accelerator that results from the complementarity between search frictions in credit

and labour markets. They show that imperfections in the credit market increase the negative effect of labour market frictions on unemployment, but high levels of competition in the credit market enlarges the favourable effect of labour deregulation (Borsi, 2018). Despite the increasing number of studies investigating the linkages between financial markets and labour market performance, empirical works addressing the topic on the aggregate level are limited (Borsi, 2018). According to U.S. aggregate data and newly assembled U.S. industry-level and cross-country panel datasets, the relation between unemployment and credit risk is strong and positive (Bai, 2021). Bai (2021) has observed tight relation between the Baa-Aaa credit spread and the unemployment rate, with the credit spread widening as unemployment rises and vice versa. The correlation between the two series is 0.812. Most conspicuously, the extraordinarily high levels of unemployment during the Great Depression are accompanied by unusually high credit spreads (Bai, 2021). The increasing duration of forced unemployment can be explained by hysteresis effects operating through various mechanisms; for instance, unemployed workers become both less attractive (Ball, 2009) and more discouraged (Krueger et al., 2011) over time, as unemployment lasts longer. These observations are also in line with some concerns that structural unemployment has risen in many OECD countries following the global financial crisis, and the increase could persist even when the economies recover e.g., (Furceri et al., 2011) (Borsi, 2018). For most groups, repayment behavior among borrowers drove these changes in arrears, although there is some evidence that lenders reduced credit to low-income households. The research shows that all income groups increased their application rate during the crisis. At the same time highest income group borrowers and middle-aged households had reduced their willingness to borrow. The results of the study highlight an important question: why lenders do not react by reducing lending more substantively? Given that the income and unemployment characteristics are not driving the change in arrears among borrowers, it cannot be explained why borrowers did change their behavior (Aller & Grant, 2018). All the above-mentioned shows that unemployment risk is a significant factor influencing the borrower's individual credit risk. The inclusion of unemployment risk in the borrower's individual credit risk assessment models and complex borrower unemployment risk assessment in the bank's total retail loan portfolio, will allow credit institutions to assess the overall credit risk level more accurately. More accurate borrower's individual credit risk assessment will lead to more appropriate loan pricing and application of other loan conditions. Unfortunately, traditional credit risk models do not treat unemployment risk as a separate factor, which in authors' point of view, lowers the quality of customer's creditworthiness analysis and quality of risk evaluation in the credit institutions on the whole.

### **3. MACROECONOMIC DEVELOPMENT AND IMPACT ON MORTGAGE NPL**

In order to assess the expected credit losses from mortgage portfolio in the context of a deteriorating macroeconomic situation, it is important to assess with sufficient accuracy the relationship between macroeconomic factors and the share of non-performing loans. Authors have used historical data available in Eurostat database for the period 2014-2021. The inability of borrowers to meet their commitments, as well as the limited possibilities of refinancing due to sharply falling housing prices in Baltics during years 2008 to 2010, led to a rapid increase in non-performing loans (NPL). Analysing causes of NPL's increases the authors concluded that most relevant factors where "external circumstances", such as:

- 1) unemployment (correlation rate of 0.8334 for Latvia, 0.8361 for Lithuania over the period 2014 - 2021 highlight a strong positive association and 0.5148 average strong for Estonia);
- 2) adjusted gross disposable income of households in real terms per capita (percentage change on previous period) (-0.1213 for Estonia, -0.2413 for Latvia and -0.0803 highlight a weak negative association);



- 3) GDP growth (-0.3129 for Estonia, 0.0872 for Latvia and -0.3033 for Lithuania indicates a weak negative association). See Figure 3.

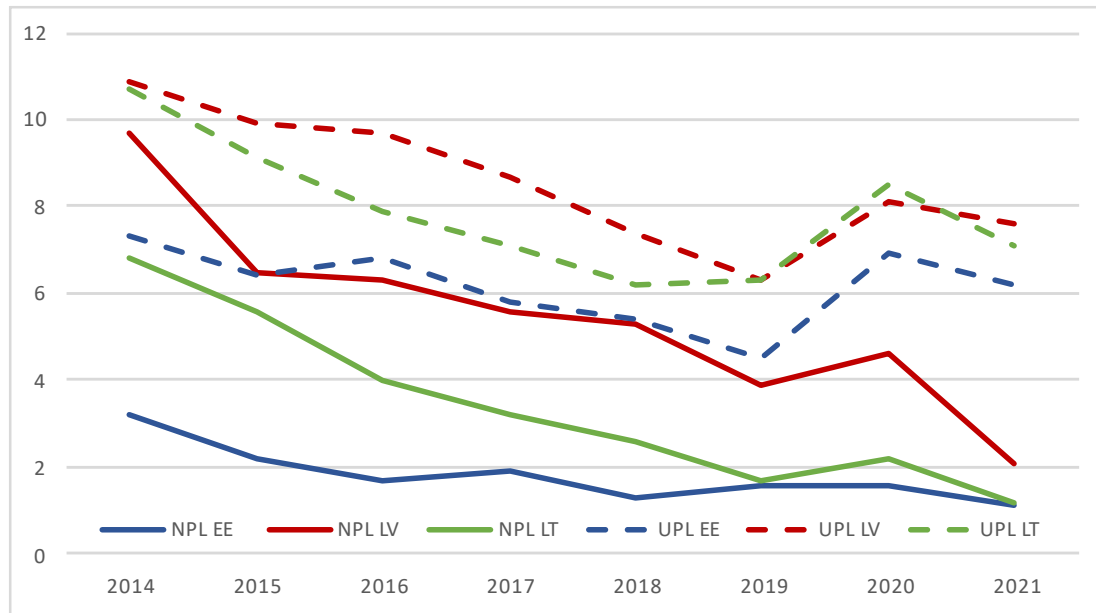


Figure 3: NPL and unemployment development in Estonia, Latvia and Lithuania  
 (Source: Calculated by authors, based on Eurostat data)

Taking into account that among macroeconomic factors, NPL has the strongest correlation with unemployment rate, in order to assess the impact of macroeconomic factors, the authors have put forward the following hypothesis:

- H1: an increase in the unemployment rate causes an increase in NPL.

To test hypothesis H1, a regression models were developed that describes the relationship between the independent (unemployment) and dependent (NPL) variables. Based Eurostat data on NPL statistics and unemployment in Baltic countries (Eurostat, 2022), several linear and non-linear regression models were calibrated, of which the best fit ( $p$ -value  $< 0.01$ ) was as follows:

$$y = 1.1765 \cdot x - 5.2841 \quad (1)$$

where  $y$  – NPL level,  
 $x$  - unemployment rate.

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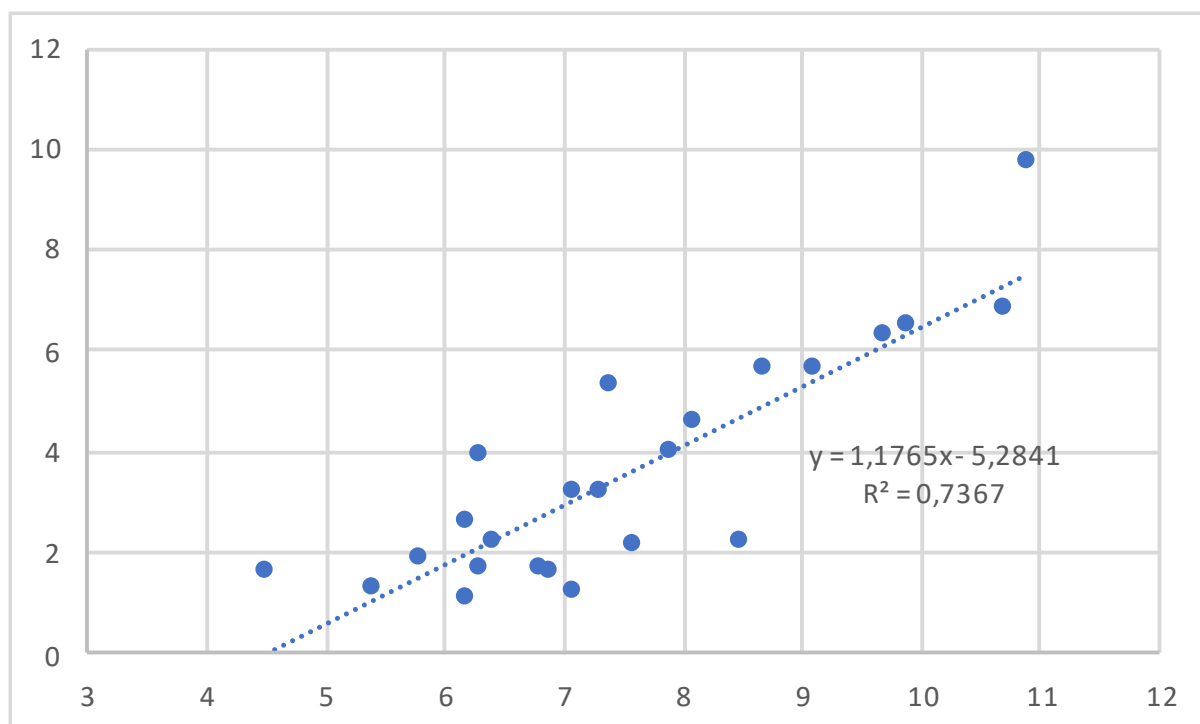


Figure 4: Residential mortgage loans NPL and unemployment rate relationships and regression line

(Source: Calculated by authors, based on Eurostat data)

Best fit regression model (1) is statistically stable at confidence level 0,999 ( $F$ -statistic = 61.55) and regression coefficient  $t$ -statistic (7.85)  $\gg t_{crit}$  (2.06) provides strong evidence to conclude that there is strong relationship between NPL level and unemployment rate. The value of the regression coefficient determines that with an increase in unemployment by one percent, NPL will increase by an average of 1.1765 percent. Coefficient of determination of 0.737 shows that 73.7% of NPL rate variations can be explained by changes in unemployment rate and related factors. See Table 1.

Variable	Coeff.	Std.Error	$t$ -stat	$p$ -value	Lower CI95%	Upper CI95%
Intercept	-5.2841	1.1556	-4.5728	0.0001	-7.6806	-2.8876
Unemployment	1.1765	0.1500	7.8452	8e-08	0.8655	1.4876

Table 1: Regression model 1 statistics,  $p$ -values and regression coefficients 95% confidence intervals

(Source: Calculated by authors, based on Eurostat data)

#### 4. INDICATORS CHARACTERIZING UNEMPLOYMENT AND INFUENCING FACTORS OF UNEMPLOYMENT IN LATVIA

As IFRS9 (IFRS, 2022) requires commercial banks to assess expected credit losses at the level of an individual borrower based on literature analysis and theoretical considerations, a number of individual characteristics that could affect household's likelihood of becoming unemployed at different stages of the economic cycle were considered, for example:

- 1) age;
- 2) level of education;
- 3) employment sector.

The following hypotheses were put forward during the research:

- H2: the age has a significant effect on the probability of becoming unemployed during the economic cycle;
- H3: the level of education has a significant impact on the possibility of becoming unemployed during the economic cycle;
- H4: The employed sector has a significant impact on the likelihood of becoming unemployed during the economic cycle.

The authors used data from the Eurostat database (Eurostat, 2022) and Central Statistical Bureau of Latvia (CSB, 2022) for the period from 2004 till 2021 to test formulated hypothesis. The unemployment statistics were grouped by age groups, that traditionally used by banks to group their credit clients and that are also more frequently mentioned in studies such as Bell and Blanchflower (Bell and Blanchflower, 2011). Age groups up to 20 and over 64 years have not been included in the study since their proportion in the housing loans portfolio is not significant. The authors assessed the likelihood of unemployment within age group using the following formula:

$$LoU_{i,t} = \frac{Uc_{i,t}}{E_{i,t}} \quad (2)$$

where  $LoU_{i,t}$  - likelihood of unemployment within age group  $i$ , during year  $t$ ;

$Uc_{i,t}$  - unemployment cases within age group  $i$ , during year  $t$ ;

$E_{i,t}$  - employed within age group  $i$ , in year  $t$ .

Figure 5 shows the trends for the likelihood of unemployment by age groups for the period from 2004 till 2021 in Estonia.

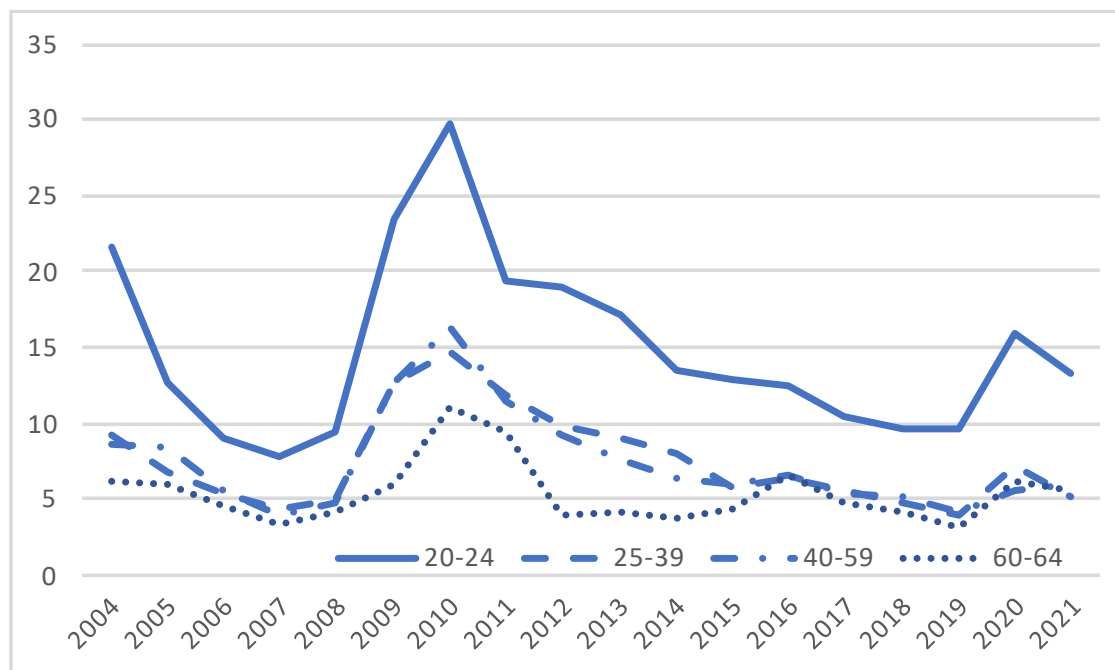


Figure 5: Likelihood of unemployment by age groups in Estonia 2004-2021  
 (Source: Calculated by authors, based on Eurostat data)

Descriptive statistics on unemployment rates by age groups in Estonia are shown in Table 2.

Factor - Age	Count	Sum	Average	Variance
20 - 24	18	266.6	14.8111	34.6646
25 - 39	18	135.3	7.5167	9.5509
40 - 59	18	133.1	7.3944	10.6382
60 - 64	18	96.3	5.3500	4.2709

Table 2: Average unemployment rates and variances by age groups in Estonia  
 (Source: Calculated by authors, based on Eurostat data)

For formulated hypothesis H2 testing for Estonia authors used Two-Factor ANOVA and results are shown in Table 3.

Source of variation	SS	df	MS	F-stat	F-crit	p-value
Age	929.7793	3	309.9264	75.1196	2.7862	1.01e-18
Years	794.6790	17	46.7458	11.3289	1.8271	7.03e-12
Error	210.4382	51	4.1262			
Total	1934.8965	71				

Table 3: Two-Factor ANOVA test summary statistics on unemployment rates by ages and years in Estonia (Source: Calculated by authors, based on Eurostat data)

As  $F_i > F_{crit}$ ,  $F_t > F_{crit}$  and  $p$ -values for both are very low we have statistically significant evidence at  $p < 0,001$ , that likelihood of unemployment is dependent on age group and year in Estonia.

Figure 6 shows the trends for the likelihood of unemployment by age groups for the period from 2004 till 2021 in Latvia.

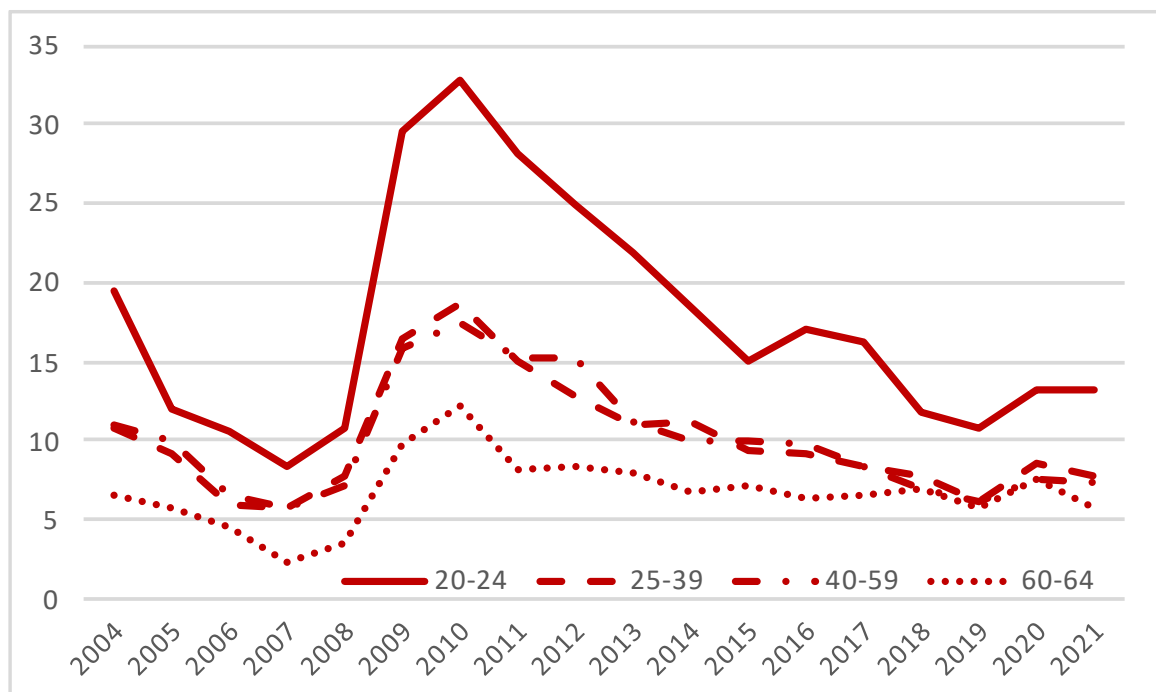


Figure 6: Likelihood of unemployment by age groups in Latvia 2004-2021  
 (Source: Calculated by authors, based on Eurostat data)

Descriptive statistics on unemployment rates by age groups in Latvia are shown in **Error! Reference source not found.**

Factor - Age	Count	Sum	Average	Variance
20 - 24	18	313.9	17.4389	53.1237
25 - 39	18	181.6	10.0889	12.9905
40 - 59	18	181.7	10.0944	13.3770
60 - 64	18	121.6	6.7556	5.0097

Table 4: Average unemployment rates and variances by age groups in Latvia  
 (Source: Calculated by authors, based on Eurostat data)

For formulated hypothesis H2 testing for Latvia authors used Two-Factor ANOVA and results are shown in Table 5.

Source of variation	SS	df	MS	F-stat	F-crit	p-value
Age	1099.6033	3	366.5344	63.8253	2.7862	2.80e-17
Years	1143.6328	17	67.2725	11.7143	1.8271	3.75e-12
Error	292.8817	51	5.7428			
Total	2536.1178	71				

Table 5: Two-Factor ANOVA test summary statistics on unemployment rates by ages and years in Latvia (Source: Calculated by authors, based on Eurostat data)

As  $F_i > F_{crit}$ ,  $F_t > F_{crit}$  and  $p$ -values for both are very low we have statistically significant evidence at  $p < 0,001$ , that likelihood of unemployment is dependent on age group and year in Latvia.

Figure 7 shows the trends for the likelihood of unemployment by age groups for the period from 2004 till 2021 in Lithuania.

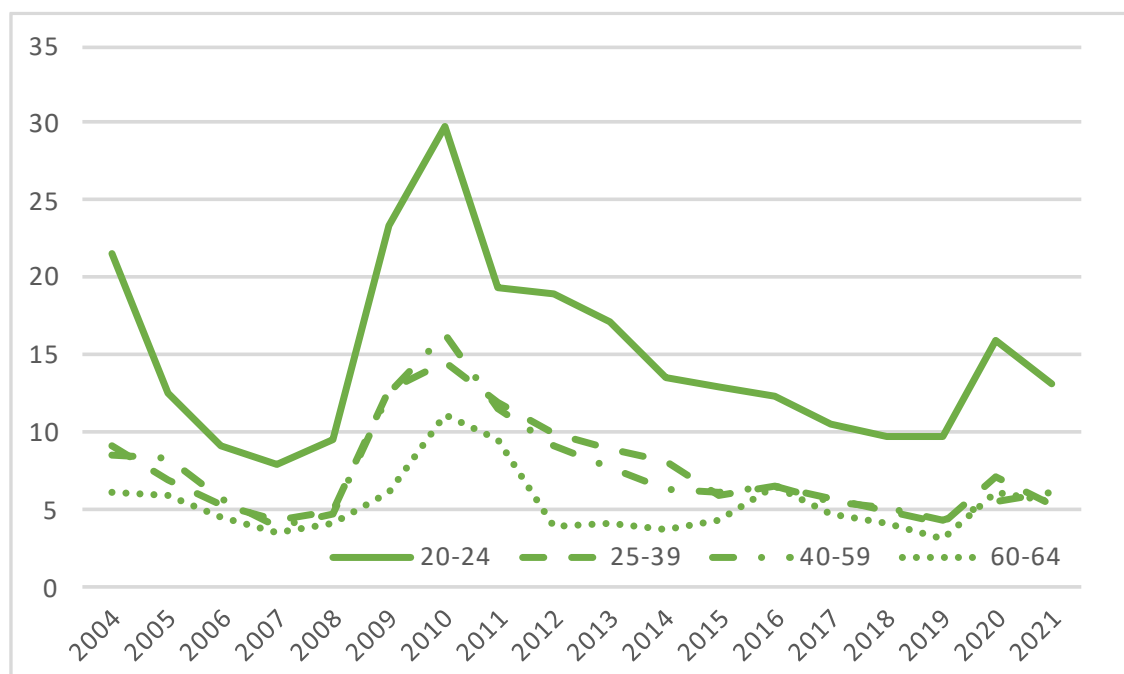


Figure 7: Likelihood of unemployment by age groups in Lithuania 2004-2021  
 (Source: Calculated by authors, based on Eurostat data)

Descriptive statistics on unemployment rates by age groups in Lithuania are shown in Table 6.

Factor - Age	Count	Sum	Average	Variance
20 - 24	18	315.0	17.5000	57.1576
25 - 39	18	154.0	8.5556	14.8508
40 - 59	18	165.1	9.1722	10.6280
60 - 64	18	124.0	6.8889	2.7775

*Table 6: Average unemployment rates and variances by age groups in Lithuania  
 (Source: Calculated by authors, based on Eurostat data)*

For formulated hypothesis H2 testing for Lithuania authors used Two-Factor ANOVA and results are shown in Table 7.

Source of variation	SS	df	MS	F-stat	F-crit	p-value
Age	1216.4504	3	405.4835	48.3291	2.7862	6.18e-15
Years	1024.1463	17	60.2439	7.1804	1.8271	1.91e-08
Error	427.8921	51	8.3900			
Total	2668.4888	71				

*Table 7: Two-Factor ANOVA test summary statistics on unemployment rates by ages and years in Lithuania*

*(Source: Calculated by authors, based on Eurostat data)*

As  $F_i > F_{crit}$ ,  $F_t > F_{crit}$  and  $p$ -values for both are very low we have statistically significant evidence at  $p < 0,001$ , that likelihood of unemployment is dependent on age group and year in Lithuania.

The authors assessed the likelihood of unemployment within education group using the following formula:

$$LoU_{j,t} = \frac{Uc_{j,t}}{E_{j,t}} \quad (3)$$

where  $LoU_{j,t}$  - likelihood of unemployment within education group  $j$ , during year  $t$ ;

$Uc_{j,t}$  - unemployment cases within education group  $j$ , during year  $t$ ;

$E_{j,t}$  - employed within education group  $j$ , in year  $t$ .

Figure 8 shows the trends for the likelihood of unemployment by education groups for the period from 2009 till 2021 in Estonia.

*Figure following on the next page*

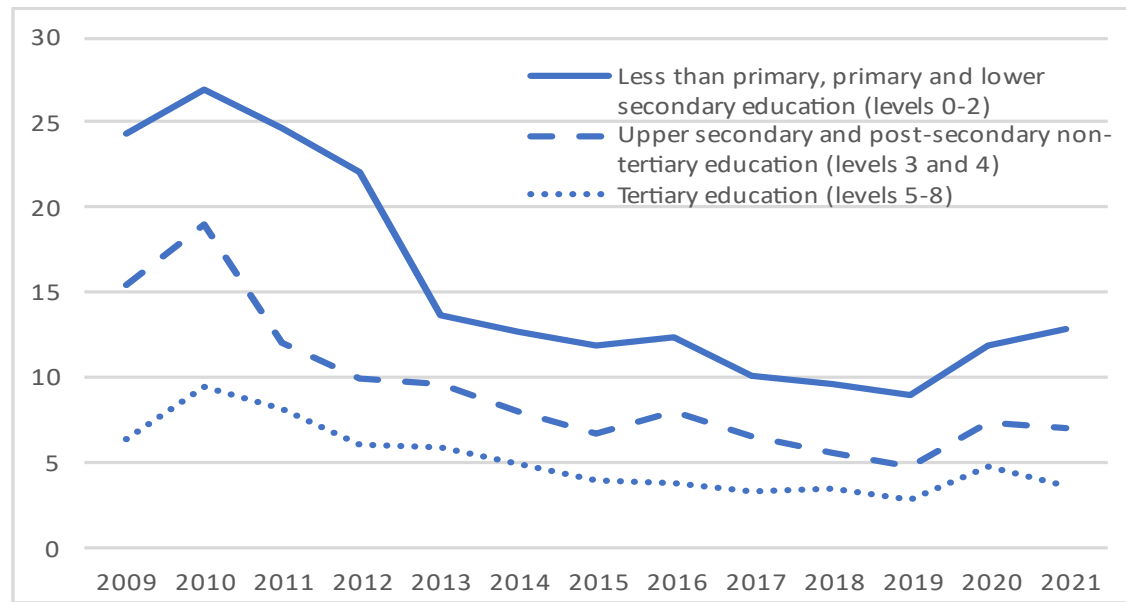


Figure 8: Likelihood of unemployment by education groups in Estonia for the period from 2009 till 2021

(Source: Calculated by authors, based on Eurostat data)

Descriptive statistics on unemployment rates by education levels in Estonia are shown in Table 8.

Factor - Education	Count	Sum	Average	Variance
Less than primary, primary and lower secondary education (levels 0-2)	13	201.8	15.5231	41.3003
Upper secondary and post-secondary non-tertiary education (levels 3 and 4)	13	120.0	9.2308	16.7456
Tertiary education (levels 5-8)	13	66.3	5.1000	3.9833

Table 8: Average unemployment rates and variances by education groups and years in Estonia

(Source: Calculated by authors, based on Eurostat data)

For formulated hypothesis H3 testing for Estonia authors used Two-Factor ANOVA and results are shown in Table 9.

Source of variation	SS	df	MS	F-stat	F-crit	p-value
Education	716.2867	2	358.1433	57.9286	3.4028	6.52e-10
Years	595.9708	12	49.6642	8.0330	2.1834	8.84e-06
Error	148.3800	24	6.1825			
Total	1460.6374	38				

Table 9: Two-Factor ANOVA test summary statistics by education groups and years in Estonia

(Source: Calculated by authors, based on Eurostat data)

As  $F_j > F_{crit}$ ,  $F_t > F_{crit}$  and  $p$ -values for both are very low we have statistically significant evidence at  $\alpha < 0,001$ , that likelihood of unemployment is dependent on education group and year in Estonia.

Figure 9 shows the trends for the likelihood of unemployment by education groups for the period from 2009 till 2021 in Latvia.

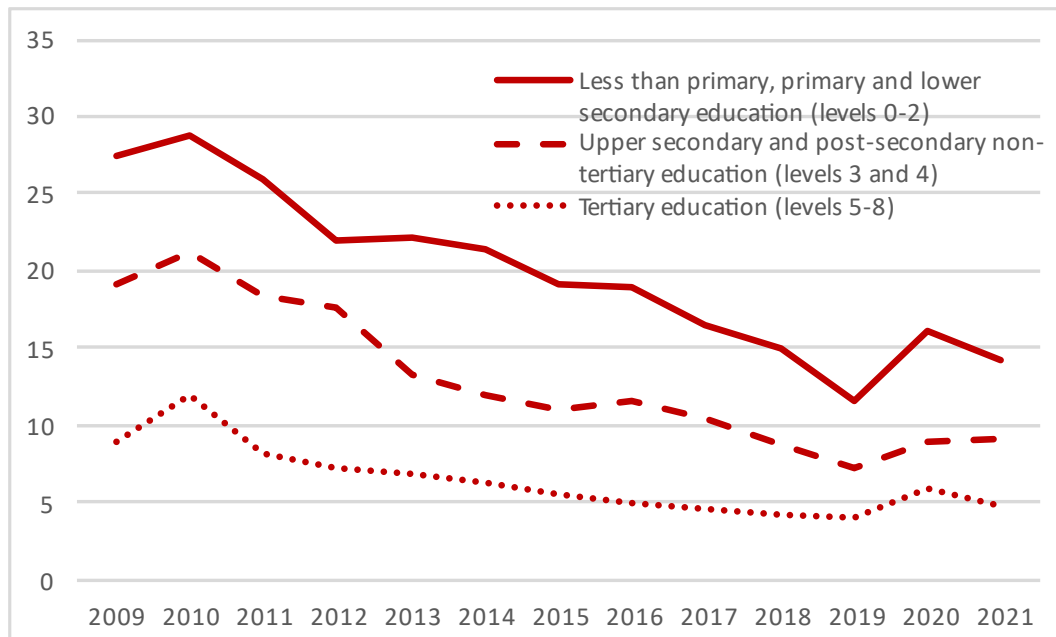


Figure 9: Likelihood of unemployment by education groups in Latvia 2009 till 2021  
 (Source: Calculated by authors, based on Eurostat data)

Descriptive statistics on unemployment rates by education levels in Latvia are shown in Table 10.

Factor - Education	Count	Sum	Average	Variance
Less than primary, primary and lower secondary education (levels 0-2)	13	259.1	19.9308	27.9690
Upper secondary and post-secondary non-tertiary education (levels 3 and 4)	13	168.9	12.9923	21.0658
Tertiary education (levels 5-8)	13	83.4	6.4154	5.1331

Table 10: Average unemployment rates and variances by education groups and years in Latvia (Source: Calculated by authors, based on Eurostat data)

For formulated hypothesis H3 testing for Latvia authors used Two-Factor ANOVA and results are shown in Table 11.

Source of variation	SS	df	MS	F-stat	F-crit	p-value
Education	1187.6097	2	593.8049	170.9948	3.4028	6.32e-15
Years	566.6703	12	47.2225	13.5984	2.1834	6.51e-08
Error	83.3436	24	3.4726			
Total	1837.6236	38				

Table 11: Two-Factor ANOVA test summary statistics by education groups and years in Latvia

(Source: Calculated by authors, based on Eurostat data)

As  $F_j > F_{crit}$ ,  $F_t > F_{crit}$  and  $p$ -values for both are very low we have statistically significant evidence at  $\alpha < 0,001$ , that likelihood of unemployment is dependent on education group and year in Latvia.

Figure 10 shows the trends for the likelihood of unemployment by education groups for the period from 2009 till 2021 in Lithuania.



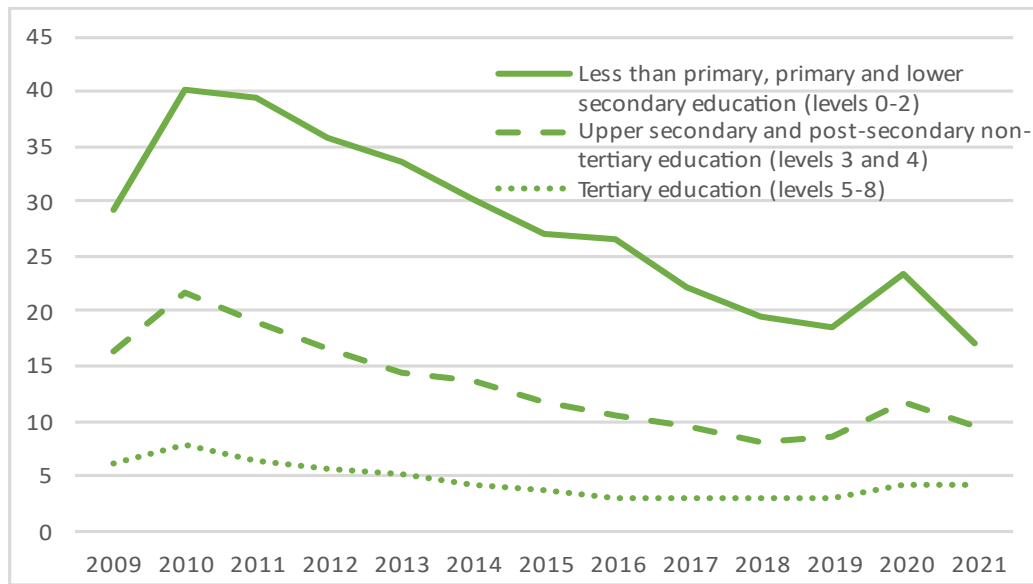


Figure 10: Likelihood of unemployment by education groups in Lithuania 2009 till 2021  
 (Source: Calculated by authors, based on Eurostat data)

Descriptive statistics on unemployment rates by education levels in Lithuania are shown in Table 12.

Factor - Education	Count	Sum	Average	Variance
Less than primary, primary and lower secondary education (levels 0-2)	13	362.6	27.8923	59.2474
Upper secondary and post-secondary non-tertiary education (levels 3 and 4)	13	172.0	13.2308	17.8223
Tertiary education (levels 5-8)	13	59.4	4.5692	2.3940

Table 12: Average unemployment rates and variances by education groups and years in Lithuania (Source: Calculated by authors, based on Eurostat data)

For formulated hypothesis H3 testing for Lithuania authors used Two-Factor ANOVA and results are shown in Table 13.

Source of variation	SS	df	MS	F-stat	F-crit	p-value
Education	3613.7785	2	1806.8892	165.6505	3.4028	9.02e-15
Years	691.7764	12	57.6480	5.2850	2.1834	2.65e-04
Error	261.7882	24	10.9078			
Total	4567.3431	38				

Table 13: Two-Factor ANOVA test summary statistics by education groups and years in Lithuania (Source: Calculated by authors, based on Eurostat data)

As  $F_j > F_{crit}$ ,  $F_t > F_{crit}$  and  $p$ -values for both are very low we have statistically significant evidence at  $\alpha < 0,001$ , that likelihood of unemployment is dependent on education group and year in Lithuania.

The authors assessed the likelihood of unemployment within specific sector using the following formula:

$$LoU_{k,t} = \frac{Uc_{k,t}}{E_{k,t}} \quad (4)$$

where  $LoU_{k,t}$  - likelihood of unemployment within specific sector  $k$ , during year  $t$ ;  
 $Uc_{k,t}$  - unemployment cases within specific sector  $k$ , during year  $t$ ;  
 $E_{k,t}$  - employed within specific sector  $k$ , in year  $t$ .

**Error! Reference source not found.** Figure 11 shows the trends for the likelihood of unemployment by sectors for the period from 2008 till 2021 in Latvia.

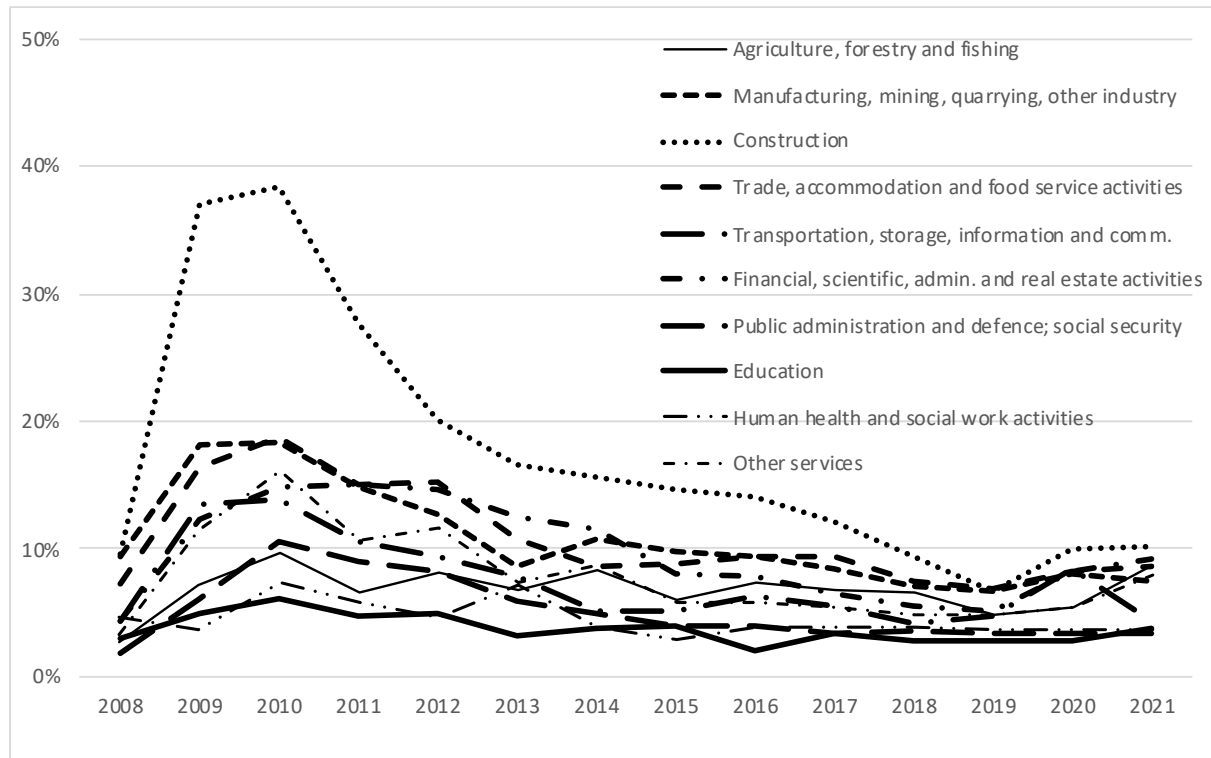


Figure 11: Likelihood of unemployment by sectors in Latvia 2008 till 2021  
 (Source: Calculated by authors, based on Eurostat data)

Descriptive statistics on unemployment rates by sectors and years in Latvia are shown in Table 14.

Table following on the next page

Source of variation	Count	Sum	Average	Variance
Sector				
Agriculture, forestry and fishing	14	95.5018	6.8216	3.0401
Manufacturing, mining, quarrying, other industry	14	149.6694	10.6907	14.9999
Construction	14	241.7799	17.2700	102.0853
Trade, accommodation and food service	14	151.1038	10.9731	14.8769
Transportation, storage, inform. and comm.	14	102.9718	7.3551	11.3327
Financial, scientific, admin. and real estate	14	135.5877	9.6848	14.1230
Public administration, defence and social security	14	71.8014	5.1287	6.5944
Education, human health and social work	14	57.3270	4.0948	1.0946
Other services	14	109.4818	7.8201	12.6518
Year				
2008	9	46.6712	5.1857	8.2348
2009	9	126.5901	14.0656	94.9530
2010	9	147.0588	16.3399	83.5941
2011	9	114.7654	12.7517	44.1413
2012	9	104.9449	11.6605	21.3632
2013	9	81.4190	9.0466	13.0270
2014	9	77.6923	8.6325	13.8581
2015	9	65.9335	7.3259	12.4157
2016	9	66.9209	7.4357	11.0235
2017	9	61.2666	6.8074	7.9752
2018	9	51.7653	5.7517	4.0805
2019	9	46.3135	5.1459	1.9058
2020	9	60.3969	6.7108	5.8234
2021	9	63.4863	7.0540	6.5030

Table 14: Average unemployment rates and variances by sectors and years in Latvia  
 (Source: Calculated by authors, based on CSB data)

For formulated hypothesis H4 testing authors used Two-Factor ANOVA and results are shown in Table 15.

Source of variation	SS	df	MS	F-stat	F-crit	p-value
Sectors	1716.7803	8	214.5975	24.4072	2.0286	1.0e-20
Years	1435.9729	13	110.4595	12.5631	1.8154	4.5e-16
Error	914.4081	104	8.7924			
Total	4067.1613	125				

Table 15: Two-Factor ANOVA test summary statistics by sectors and years in Latvia  
 (Source: Calculated by authors, based on CSB data)

As  $F_k > F_{crit}$ ,  $F_t > F_{crit}$  and  $p$ -values for both are very low we have statistically significant evidence at  $\alpha < 0,001$ , that likelihood of unemployment is dependent on education group and year.

## 5. RESULTS AND DISCUSSION

The results obtained in the study confirm that unemployment is the most important factor influencing the risk of housing loans - coefficient of determination of 0.803 shows that 80.3%

of NPL rate variations can be explained by changes in unemployment rate and related factors. This result largely coincides within other studies, e.g. Gerardi et al. (2018); Gyourko & Tracy (2014); Quercia et al. (2016); Spilbergs (2020), proven. As the demand decreases, the chance of finding a new occupation will worsen for those who have lost their jobs, and the time to search for a new job will also increase. Rising unemployment is also usually associated with a decrease in wage growth or even a fall in an economic crisis. Economic recession is associated with tightening of credit conditions, which can be verified in studies, e.g., Adams et al. (2021) and Kiley (2022), which impairs the ability to restructure or refinance the debt. However, it should be taken into account that the risk of unemployment is not homogeneous - the sensitivity of the less qualified in the economic downturn is significantly higher, for example, the risk of becoming unemployed is 2.2 times lower for an employee with a higher education than with a vocational or professional secondary education. For an employee with vocational or professional secondary education, the risk of becoming unemployed is on average 1.4 times lower than with general secondary education, but for an employee with general secondary education, the risk of becoming unemployed is on average 1.2 times lower than with basic education. This shows that the less qualified lose their jobs first, but highly qualified specialists are less threatened, because their number is always more limited and employers, taking care of further development, must always expect that attracting the desired specialists during the period of economic growth will be a big challenge, moreover, will be associated with increased costs. Similar results are confirmed by studies on the GFC and other economic crises, e.g., Butkus et al. (2020); Hall (2016); Li et al. (2022), Mitra & Xu (2020); Pompei & Selezneva (2021) - the sensitivity of less qualified employees against economic shocks is significantly higher. On the other hand, with regard to the influence of the age structure of employees on the risk of unemployment, the result of the study is slightly different - only among young people, the risk of unemployment is significantly (on average twice) higher than in other age groups, but the differences in other groups are not statistically significant. This difference is explained both by less experience in the labour market and partly also by incomplete studies in this age group. The results obtained in other studies, e.g., Butkus et al. (2020), Doku et al. (2019), Mitra & Xu (2020) are similar. The result of the study regarding the cyclicity of sectors shows that the lowest unemployment risk is for those working in education, human health and social work (EHS) sectors, and the highest for those working in construction (more than 9 times higher than EHS). Manufacturing, mining, quarrying, other industry and trade, accommodation and food service (c.a. 3.7 times higher than EHS), financial, scientific, administration and real estate activities should also be added to sectors with increased risk of unemployment (c.a. 3.6 times higher than EHS), other services (c.a. 3.4 times higher than EHS), transportation, storage, information and communication (c.a. 3.2 times higher than EHS). Other studies such as Chen (2019) Mitra & Xu (2020), confirm the heterogeneity of sectoral cyclicity.

## 6. CONCLUSION

The results of the study show that unemployment and related macroeconomic indicators are important factors determining the individual credit risk of a borrower. However, the risk of unemployment is not homogeneous, there are significant differences, at least according to borrowers' characteristics such as education, age and employment, which should not be ignored. It is necessary to include the mentioned factors in the borrower's credit risk assessment models and use them both in credit decision-making and in the monitoring process throughout its entire loan life cycle. This would allow to ensure more complete compliance of both macroprudential supervision, incl. CAD IV and international financial reporting standard, incl. requirements of IFRS 9. In addition, a more accurate assessment of borrowers' credit risk can reduce risk, both by not issuing loans above the bank's risk tolerance level, by applying appropriate risk mitigation conditions, such as credit risk insurance, and by reasonably pricing transactions.

On the other hand, by applying reasonable assessments of probabilities of default to the loans in the portfolio, it is possible to reasonably evaluate the bank's assets at their fair value and to reserve an adequate amount of capital to cover unexpected losses. Consequently, the risk of bank insolvency can also be reduced. It should also be taken into account that when the operating environment both in the labour market and in the financial field changes, the manifestations of both macroeconomic factors and borrowers' socio-economic and behavioral factors may change, so it is necessary to regularly validate and, if necessary, recalibrate the borrowers' individual credit risk monitoring models. The lack of financial literacy among people of all ages and nationalities, combined with increasing responsibility for financial planning being placed on these individuals, has been the topic of worldwide discussion in both the financial services industry and educational circles. Experts claim that most individuals have received little formal financial education, thus their debt and saving behaviors are not consistent with their long-term financial needs (Wilson, 2008).

**ACKNOWLEDGEMENT:** *We would like to express our sincere appreciation to all those who contributed to the development and completion of this article. First and foremost, we extend our gratitude to the researchers and experts whose work in the fields of credit risk assessment, macroeconomics, and financial literacy provided the foundation for our analysis. Your valuable insights and contributions have been instrumental in shaping the content of this article.*

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# **JOB ROTATION IN THE MANAGEMENT OF AUTOMOTIVE COMPANIES: SYSTEMATIC LITERATURE REVIEW**

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## **ABSTRACT**

*As part of a systematic literature review (SLR) this study is to analyse literature on job rotation in the management of automotive companies in order to show the routine differences between automotive firms and to create and develop a possible common path from their best practices. The job rotation strategies of the automotive branch will be examined, which could be seen as a paragon. Therefore, a further aim is to collect the "best practices" of job rotation of some automotive companies and provide a deeper analysis of them from various aspects, such as efficiency, cost and fluctuation. Moreover, it is vital to recognize and collect the negative experiences (e.g. loss of specialized skills, decrease in productivity, stress and anxiety, etc.) and the ways of learning from them. The analysis of the information, collected interpretation, interview results, as well as the critical analysis of the HR models, may result in a process for job rotation. This might be useful for all automotive companies and can give the best results for them under all circumstances. Our hypothesis is that there is no literature dealing with job rotation of managers, as most authors focus on production line and office workers, leaving out management.*

**Keywords:** *sense-making, job rotation, automotive companies, terminus technicus*

## **1. INTRODUCTION**

Automotive companies rotate management jobs. Various economic sectors have different needs (e.g. compact, premium, sport, super-premium, etc.). Market changes alter management's expectations (Weick, 2015). (How quickly a manager can grasp new workplace terminology, etc.). Automotive company managers use sensemaking to make sense of a changing market (Matilis, 2014). (2005) Generational collaboration is crucial (Singh, 2014). Generation Z is working (Smith, 2014). They need HR, motivation, and management tools as employees and bosses. Generational differences effect labor rotation. Rotation is also influenced by founders' and executives' nationalities (Boone, Hendriks, 2009). Some rotating elements are expensive, therefore economics may be crucial (Ortega, 2001). Cost- Benefit Analysis (CBAs) are important. This study summarizes, analysis, and synthesizes work rotation research SLR. A literature review contrasts study outcomes, say Grant and Booth (2009). Author finds research gaps using SLR. The author managed worldwide enterprises. He's had various jobs due to diverse business cultures. Purchasing, tooling, and bodywork-engine-quality assurance were rotated at the manufacturer. Job rotation in automotive company management is rare.

## **2. THEORETICAL FRAMEWORK**

The main goal of this SLR is to demonstrate how little job rotation in the management of automotive companies is discussed in academic literature and to suggest alternative solutions. The SLR was carried out in accordance with the following research question:

*How does reasoning/sensemaking help in successful job rotation?*

To build the SLR, the authors included the methodologies and recommendations from Kitchenham and Stuart (2007), Grant and Booth (2009), Butler et al. (2005), and Bartucz et al. (2023). Provide the literature and terminology related to SLR preparation before performing an SLR. An automaker's employment rotation is covered in this article. The next section outlines systematic literature review, search methodology, assessment standards, article selection, and quality evaluation.

### 3. REVIEW METHODOLOGY

As stated by Kitchenham and Stuart (2007), Grant and Booth (2009), and Butler et al. (2005), defining the SLR's aim is the first step in developing one. The objectives of the study, including the difficulties and areas of inquiry. Before finishing an SLR, Kitchenham and Stuart suggest creating a review method to describe the approach and its components (2007). The review process should include the backdrop of the study, the research question, the selection criteria, the search plan, and the method for compiling the findings. The basis of the paper is the study subject from the preceding section. Sections describe the many steps in the review process.

#### 3.1. Inclusion and exclusion standards

Criteria for inclusion and exclusion depend on the topic. When designing the review process, specify the criteria to prevent bias. As the SLR is being designed, these requirements could change. English journal and conference papers from 1972 to 2022 were taken into account for this SLR. Based on the availability of the complete text or conference proceedings, the article was assessed. Topic restriction was another factor. The search excluded several irrelevant fields. Table 1 lists the inclusion and exclusion standards for SLR.

<b>Inclusion standards</b>	<b>English was used to write the article.</b>
	There is a full text version of the article accessible.
	The article may be found in the Scopus and Web of Science databases.
	Articles from 1972 until 2022.
	The article is pertinent to the inquiry.
	This article falls under the category of job rotation.
<b>Exclusion standards</b>	The article is not currently accessible online.
	Subject does not relate to the area being scrutinized.
	The information is not relevant.
	There is no English in the article.

*Table 1: Inclusion and exclusion standards*

#### 3.2. Article search strategy

In this SLR, automated search was the only type of search used. The automatic search was based on the Scopus and Web of Science databases and employed a specific combination keyword search strategy on keywords and article abstracts. Since job rotation is mentioned in a variety of situations in the scientific literature, the keywords and keyword combinations that are most likely to be relevant to it were chosen. The AND Boolean operator was used to the items in Table 2.

Basic level	Second level	Third level
<b>job rotation</b>	<i>job rotation:</i> burnout, motivation	<i>job rotation:</i> monotony, turnover/fluctuation, continuity, blue-collar/white-collar
<b>automotive company</b>	<i>automotive company:</i> management in production, corporate culture of multinational companies, organizational behavior	<i>automotive company:</i> leader/manager, performance/pressure, Anglo-Saxon vs. continental type, regulation
<b>terminus technicus</b>		<i>terminus technicus:</i> how to learn (wordbook or storytelling), knowledge management, generation, learn to learn
<b>sensemaking</b>		<i>sensemaking:</i> common sense, written-unwritten rules, logical, emotional

Table 2: List of searchable key phrases

The results list for the combined keyword category has been retrieved using the Scopus and Web of Science databases. Since they were irrelevant to the study, the sciences of medicine, biology, chemistry, physics, agriculture, education, health, mining, pharmacy, nursery, and veterinary medicine were also eliminated. The following figure (Figure 1) displays the procedure described in the study protocol as well as how the results evolved at each stage.

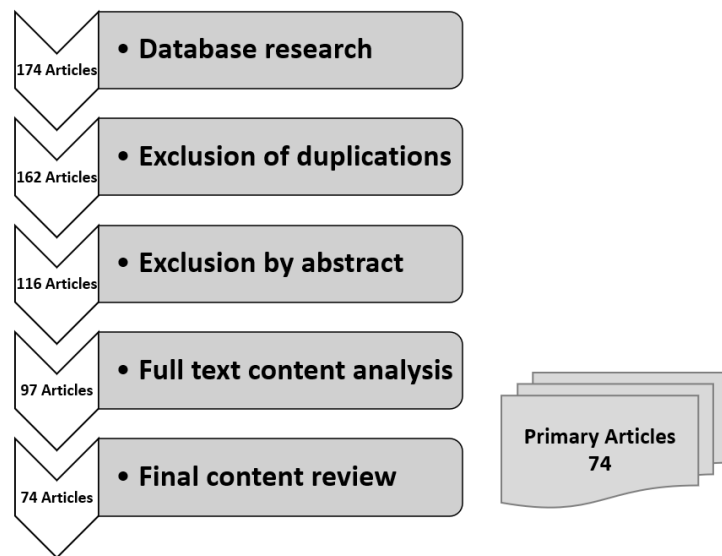


Figure 1: Diagram of the search and selection process  
 (Source: Bartucz et al. (2023) and authors' own figure)

### 3.3. Article selection

The whole keyword search turned up 174 articles. Out of the 174 studies, 5 were duplicates, 3 were cases where the article could not be found or downloaded, and 1 was deleted because it appeared in a sense-making journal. The analysis of abstracts, the next step in the process, began with 165 articles getting hits.

When evaluating the abstracts, it was necessary to establish whether the article's summary applied to job rotation and sense-making, i.e., whether it genuinely addressed the study issue and met the inclusion-exclusion criteria. 92 articles were removed using this process, leaving 74 articles for the study of the entire text content.

### 3.4. Content analysis

In article content analysis, iterative procedures are utilized. At this stage of the process, authors specify the articles to be disregarded and the exclusion criteria or standards, as stated by Kitchenham (2004), Grant and Booth (2009), and Bartucz et al. (2023). Each article was assessed while taking into consideration the list created by the writers of this article (Table 3).

<b>Question 1</b>	<b>Does the article scrutinize job rotation?</b>
<b>Question 2</b>	Does the article examine sensemaking, management and organizational culture or terminus technicus?
<b>Question 3</b>	Does a combination of Question 1 and Question 2 apply?
<b>Question 4</b>	Does the paper go at the topic of job rotation in the automobile industry?

Table 3: Examination issues

The articles in this SLR have been categorized by the authors according to their content. The following four categories were used by the authors to group the papers: 1) Job rotation; 2) Sensemaking; 3) Management and organizational culture; 4) Terminus technicus. We counted how many times each article's author used the words job rotation, sense-making, management, terminus technicus. The following 4 groups were determined based on their quantity: 1)**none**, which used no words at all; 2)**minimal**, which used fewest words possible (1–5); 3)**moderate**, which employed a negligible number of words (6-15); and 4)**maximum**, which used most words possible (more than 16). Concerns about the content in relation to the research issue were raised throughout the iterative re-reading process, which called for an examination of the frequency of these word usage. The frequency, context, and wording made it easier to decide to eliminate the article. After the aforementioned measures led to the removal of an additional 23 articles, the SLR search-selection stage produced these 74 items as the final product. After a comprehensive review of the literature, 74 articles that met the study question and additional criteria based on their content were selected. Despite the fact that the research spans the years 1963 to 2022, the 74 selected papers, as shown in Figure 2, cover the years 1972 to 2022.

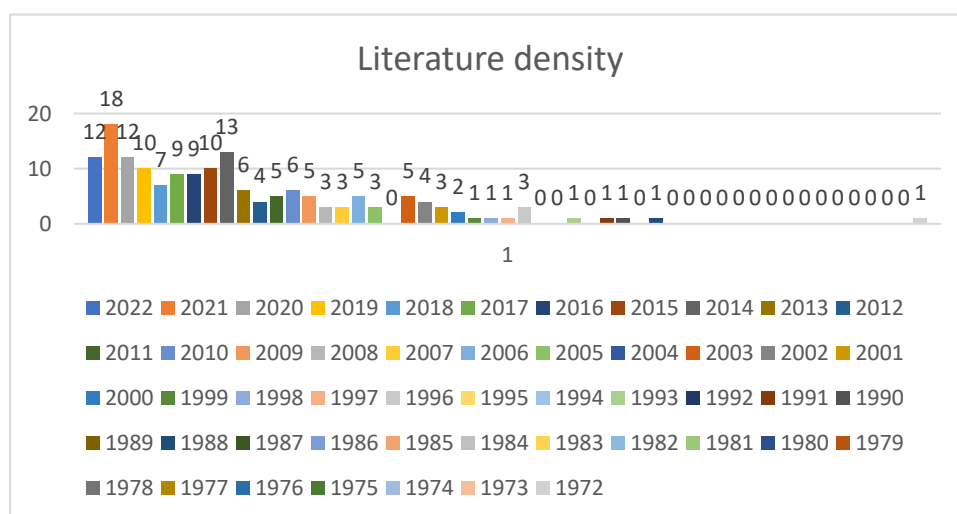


Figure 2: Distribution of articles by year  
 (Source: author's own figure)

## **4. RESEARCH RESULTS**

### **4.1. Job Rotation**

The first category of the SLR consists of material related to the topic of job rotation (JR), Dr. M. Saravanan was conducted to determine the impact of job rotation on employees' performance in the banking industry Saravanan et al. (2017) The results suggest that job rotation improves bank employees' performance in Nilambur Taluk, Malappuram District. Motivation, productivity, job happiness, and competency, skills, and departmental cooperation are all increased. It reduces worker boredom. The most important effective impact on performance and effectiveness of businesses, which is mediated by job satisfaction (JS) and skill diversity, is job rotation (JR), which is a very effective policy for expanding employees' horizons and empowering them. Multiple departments provide you greater managerial and technical skills. A manager will be more productive and motivated if they can tackle typical problems in specific occupations and develop regular working practices. JR is performed with careful planning to achieve organizational goals, and repetitive chores wear out workers to the point where they can't fulfill their duties in line with the organization's goals. The purpose of Chipso Nyammwena-Mukonza was to identify the critical factors that would affect the adoption of a job rotation strategy by according to the study, implementing a job rotation strategy by the registrar's environment will boost job satisfaction if certain factors are considered (Mukonza et al., 2018). Using an approach and methodology that were different from those that had previously been used in this context, Ronnie E. S. Santos identified evidence regarding the advantages and disadvantages of job rotation in software engineering practice (Santos et al., 2019). When rotating employees between software projects and teams, practitioners should consider these aspects. No contradictory results were found, bolstering the evidence so far. This shows the need of employing multiple methodologies to analyze a complex issue. These variables make software engineering job rotations challenging. This process will be researched using both qualitative and quantitative data. Kokila Mohan has added to our understanding of how job rotation patterns and employee development, particularly for nurses working in hospitals in the Vellore district, are related. Job rotation is the best and most affordable training method, and any organization can use it to give their employees a better life. Decreased monotony, increased knowledge, competence, and nurse socialization will boost staff growth and motivation (Mohan and Gomathi, 2015). In an SLR Ronnie E. S. Santos conducted a thorough assessment of the literature on the practice of job rotation in the software engineering industry. This is the first systematic study of software engineering job rotation literature, to our knowledge. But P2P rotations meet individual requirements for task diversity while fostering job specialization (Santos et al., 2016).

### **4.2. Sensemaking**

The second and largest group of SLR presents resources on different aspects of sensemaking. Conference paper Sensemaking has been defined as "the ongoing retrospective development of plausible images that rationalize what people are doing" (Weick, Sutcliffe and Obstfeld, 2005). Weick et al. (2005) present the process of sensemaking in an everyday context. Sensemaking recommends that it is more relevant to keep moving than to hesitate, because the tide of experience in which an action is placed does not pause. Sally Maitlis et al. (2014) present Organizational actors use story and metaphor as sensemaking tools and local and situational narrative practices to generate intersubjective meaning. As questions get more complicated, methods should change, the authors argue. Jaime Ortega (2001) links sensemaking to work rotation. When comparing job rotation and assignment policy, his argument is that existing evidence on rotation supports the "firm learning theory" rather than theories of employee motivation and employee learning. In his concept, the focus is on intrafirm mobility, which is most common in the automobile industry, and people change jobs in a predefined way so the

firm may get useful information that helps improve job assignments. Firms rotate employees to help them learn new skills, says the employee learning idea. If it were true, tenure and rotation in innovative firms or a company that just debuted a new technology would be negatively correlated. Ortega's model and actual evidence show that job rotation is a better learning mechanism than specialization. Suchan demonstrates semantic vision's potential for autonomous driving, a field with long-term AI and ML implications. The establishment of a systematic, modular, and all-encompassing visual sensemaking technique opens many technical avenues, including tracking by detection, commonsense, and ambiguity handling. However, tracking-focused variations and expansions of this method need more research. The current study addresses low-level object tracking uncertainty using a naive strategy, which is suitable for the tasks at hand. A full-scale systematic formalization of a probabilistic model has not been attempted. Human factors in autonomous driving are studied using behavioral and computational methodologies. The authors' ongoing objective is to create a novel dataset emphasizing (visuospatial) semantics and (commonsense) explainability, in addition to the ongoing (already described) technical breakthroughs in computational cognitive vision relevant to the integration of "vision & AI" (Suchan, 2021). Women comprehended and coped with job growth hurdles by personalizing them, reducing them to a personal problem rather than a company-wide issue (Hamel, 2009). In the "Sensemaking, Sense-censoring and Strategic Inaction: The Discursive Enactment of Power and Politics in a Multinational Corporation" article Andrea Whittle responds to Balogun et al. (2011) and explains why possible subsidiary "resistance" (Clark and Geppert, 2011; Balogun et al.) is thwarted before it even manifests. The study demonstrates how "prospective preclusion of actions in taken-for-granted situations" was influenced by the discursive enactment of power and politics as "social facts" (Weber and Glynn, 2006: 1651). Or may this be an expansion of the social mechanisms that underlie Hymer's "power retention" thesis, where "headquarters retain the power to structure the corporation in suitable ways to reduce its federative nature" (Yamin & Forsgren, 2006: 174)? Neither hypothesis explains the study's results. Future research could examine the role of sense-censoring in the ideological processes by which MNC players and those effected by MNC behavior become complicit in their own dominance and subjugation (Willmott, 2013). By questioning, criticizing, and reframing the types of behaviors and qualities – or category predicates – typically associated with the Top Management Team, such as "healing" organizational flaws and "driving" strategic change, the leader creates a vision and plan for strategic change. Although categorization is a linguistic technique, it is not "just talk." The provision of categories and the formulation of category predicates may be aided by leaders, but this is not a solitary activity; rather, it is achieved inter-subjectively through social interaction (Edwards, 1994; Wodak et al., 2011; Iszatt-White, 2011) (Whittle et al., 2016). According to Reinecke the ability of companies to deal with ethical complexity is a major challenge. Different normative foundations are put forth by moral theories to define what is ethical. Principle-based approaches favor standardized rules on one end. Sensemaking moves the attention to how plausible arguments form in practice, as opposed to deliberative approaches, which concentrate on the normative conditions in which communicative rationality can establish intersubjective agreements through "the power of the better argument" (Reinecke and Ansari, 2015). Weber aims to further explore the function of context from Karl Weick's sensemaking viewpoint. Temporality in sensemaking, institutional change, and reproduction can be conceptualized differently. Initial research on how institutions affect sensemaking revealed synchronic and diachronic linkages, (Weber and Glynn, 2006). Rydén contributes four mental models of managers' business-customer connections and social media sensemaking. When business-to-customer and business-from-customer mental models were dominant, managers used social media to enhance product sales. Better broadcasting or customer information helped achieve this (Law, Lau, and Wong 2003).

Such thinking may change when the mismatch between mental model structures and environmental feedback is too severe to ignore (Ringberg and Reihlen 2008), but the informants hadn't reached this level of comprehension. The communal mental model is still in its infancy in the corporate setting, but its appearance in managers' narratives indicates how they can make great strides. This analysis shows that mental models change the fundamental principles that underlie managers' logical decision-making, affecting social media's strategic performance (Rydén et al 2015). As a result of team procedure and outcome treatment Quinetta M. Roberson's findings shed some light on the nature of team sensemaking. According to studies, a reference point (such as other team members, other teams, etc.) is used to evaluate decision-making fairness (Adams, 1965; Folger & Cropanzano, 1998, 2001). Unfavorable results may have focused attention to the team's collective identity, focusing on the team's outcomes relative to other teams (rather than within-team comparisons) to evaluate the team's experience and develop justice evaluations. This study identifies justice cues that stand out in diverse team dynamics. Teams that underwent negative outcome therapy were more likely to have outcome-focused talks (Roberson, 2006). To deepen our understanding of impact investing in the renewable energy (RE) sector, Tongyu Meng has combined elements from the electro-discharge machining (EDM) literature with ethical sensemaking in this article. This research addresses a major gap in the ethical sensemaking discourse in the impact investing area. The approach of generating ethical sensibility involves practical action, introspection on one's own motivations and thoughts, and foreseeing various outcomes. This will help impact investing policy and practice expand, hopefully while remaining critical and ethical (Meng et al. 2022). Lene Jørgensen, in order to shed light on issues like legitimation, identity construction, and politicking that can't be fully addressed by more conventional, positivist approaches, a rising field of inter-organizational research examines discursive sensemaking processes. Combinatory research can help make disparate case studies "talk to each other," for example, by comparing the influence of neoliberal, patriotic, humanistic, and entertainment discourses across various local contexts and eras (Vaara et al., 2006). This article is the first in a series of articles exploring the role of representation technologies in organizational development and co-ordination. (Jordan & Mitterhofer, 2010). Using this study's methodology, several inter-organizational sensemaking research routes are described. The methodology on mediating tools gives prospects for further research in interorganizational connections, enhancing our understanding of hybrid organizing (Miller et al., 2008; Williamson, 1991, Jørgensen et al., 2012). Luis Felipe Luna-Reyes's Feedback mechanisms are the interplay between project-related artifacts and intangible human traits like individual comprehension and group involvement. They are significant, yet understudied, in project management and digital government literature. The study explores processes originating from the combination of tangible and immaterial accumulations documenting project activities. (Culmsee & Awati, 2012; Shenhar & Dvir, 2007) Complex interorganizational issues require power-imbalance-aware facilitation. Government agencies increasingly deploy untested, complex technology (Choi & Chandler, 2020, Luna-Reyes et al., 2022). In order to create design insights, a two-step method is presented by Anet Aselmaa for integrating sensemaking into the development of HIS software. Designers may use a two-step approach to comprehending the sensemaking procedure and determining sensemaking-friendly design criteria. C-SM featured the following information: task familiarization, action, and evaluation; data processing, contouring, etc. Twenty-four examples' interaction logs revealed four navigation interactions and five sequence patterns. In order to examine interaction cross-cultural business connections from an individual level perspective, a qualitative research approach is presented (Aselmaa et al., 2016). According to Maria Ivanova-Gongne, a sensemaking technique is combined with story and metaphor analysis to create the suggested "cultural sensetranslation" paradigm. As trust remains a hot topic in organizational studies, researchers are asked to construct more integrative models that consider dispositional

and situational factors (Sitkin and Pablo, 1992). Given that most trust-building is cognitive, the cognitive side of the trust ledger must be emphasized (Good, 1988; Blomqvist, 1997; Ivanovna-Gongne and Törnroos, 2017). Henry Adobor's findings indicate a strong correlation between trust and expectations. Once respondents found their peers hadn't met their expectations, they were less disturbed by their initial feelings. The negligible result may be an artifact. Comparing expectations and met expectations at different stages may yield different results. Steven J. DeKrey explained a manager's sense-making process and backed Ancona's sense-making aspects (2011). A study has shown how a new manager can keep a strong sense of self while carefully communicating with company stakeholders (Adobor, 2005)

#### **4.3. Management and Organizational Culture**

The SLR's third section covers management, leadership, and organizational culture. Organizations and organizational practice indicators have been studied extensively (Bartlett and Ghoshal, 1989, Doz & Prahalad, 1995, Edstrom & Galbraith, 1977, Ghoshal & Bartlett, 1988, & Ghoshal & Bartlett, 1993). The study of cultural factors that inhibit or stimulate organizational practice adoption could benefit from incorporating national and firm-level influences into the analysis. Olumide Ijose may help : 1. Cultural differences in cognitive value systems affect managers' attitudes and orientations (Kanungo and Wright, 1983). 2. Even for long-term market leaders, industry and competitive dynamics will reduce national and company culture's influence on organizational practices. Michael Czinkota describes a Delphi study with policy, commercial, and academic professionals from industrialized and developing countries and global megamarkets. The findings point to sectoral changes, trade environment and institution changes, and company adjustment techniques. These occurrences can have varying effects and occur in different places (Czinkota and Ronkainen, 2005). Lead exposure and the perpetuation of low socioeconomic status examines whether disadvantaged groups are more sensitive to long-term lead exposure. According to Joseph Ferrie, Air Corps recruits from cities with lead water pipes show the expected non-monotonic association with poor educational and employment outcomes, according to a new study. The Army Air Corps received the most brilliant and disciplined recruits during World War II, hence it represents economic outcomes (Ferrie, Rolf and Troesken, 2015). According to Judy N. Muthuri, companies in Kenya show varied levels of CSR expertise and dedication through the issues they prioritize and the CSR practices they apply. Unlike Carroll's (1991) CSR pyramid, Kenya gives generosity more weight than legal requirements. According to Mirvis and Googins' (2006) Kenya's government regulations are insufficient to stimulate CSR. Some organizations utilize more established versions of CSR as a tactical reaction to normative and cultural-cognitive pressures. Investigating the connections between organizational commitment, job involvement, organizational culture and the process of employee voluntary turnover led to some interesting conclusions (Muthuri and Gilbert, 2011). Donna E. Fletcher says that adhocracy has adaptability, creativity, and entrepreneurship as its major traits. Counterculture employees express weaker organizational engagement, job involvement, and perceived obligation. Policy, process, and norm bonding emphasizes stability, smooth operations, and predictability (Fletcher, 1998). Economic reforms and international competition allow Indian and Thai automakers to evaluate manufacturing's strategic significance. According to T. Laosirihongthong, companies in both nations place a high priority on maintaining and increasing the quality of their processes and products. These organizations appear to be attempting to compete by increasing their investments in the training of human resources, altering organizational culture, and improving product quality. (Hayes and Wheelwright 1984; Hill 1987). Additionally, it has been noted that Thai automakers are spending more on CNC than their Indian competitors.



Data were obtained from 68 and 54 automotive manufacturing companies in India and Thailand with 21.7% and 21.8% response rates (Laosirihongthong and Dangayach, 2005). Regarding to Naresh the HRD managers in the 21st century must understand the company's business plan. Human resources must be arranged so that talents may be easily integrated and deployed. CSR is popular in corporations nowadays, especially multinationals. Innovation and Financial Performance are influenced by several factors outside the scope of this study. (Harris, 2017). CSR helps firms with a positive reputation attract and retain skilled, dedicated, and valuable employees (Naresh et al., 2016). Ultimately, J.W. Lee reveals that all examined automakers (Peugeot, BMW, Ford, Hyundai, Toyota) give CSR a high priority. CSR best practices are necessary in the competitive business environment, therefore Peugeot, BMW, Ford, Hyundai, and Toyota should plan their business actions and managerial reactions accordingly, strive for continuous improvement, and uphold their high CSR standards. Stefan Schmid, Philipp Grosche Strategy, Structure, and Culture Establishing centers of excellence will effect subsidiary management in numerous ways. Companies who neglect this won't benefit from these centers. Executives must choose the correct coordination tools. All of a company's centers of excellence must be integrated by assimilating host-country culture into its corporate culture (J.W. Lee, 2019). Regarding to Nunes the design for recycling and disassembly are two solutions to overcome landfill limits and new ELV rules. Green operations management's main priorities are life-cycle assessments and efficiency gains. The key limitation is the selection of companies based on output volume and provenance, rather than provenance. According to this viewpoint, our classification of "green operations practices" will assist companies in making environmentally conscious decisions and expanding their initiatives outside the realm of production. The conceptual model of six analytical links between regulatory efforts to increase safety and reduce operator accidents, (Nunes and Bennett, 2010). A conceptual model of the relationships and a discussion of implications are Nævestad's key contribution. Regulations' practical ramifications: The analysis of the petroleum studies shows that it is possible to argue that safety culture is an inappropriate regulatory notion since "checking companies' compliance" may be challenging (e.g. Kringen, 2009; Antonsen et al., 2015; Naveh and Katz-Navon, 2015; Patankar, 2019). Should regulatory initiatives to change safety culture be broad-based or targeted? This study shows that using safety culture as a regulatory instrument is difficult, with high uncertainty and many potential for failure or unexpected results at each point of our hypothetical causal chain (Nævestad et al., 2020). According to Carroll, the change requires direct management participation on teams, which was more likely at the best-respected facility. Building troop trust hinges on officers' behaviour and the strict separation of information from personnel evaluation. Some factory managers and senior managers set new values and conditions, but many people improvised new learning procedures and insights. Team reports acted as a storehouse for organizational learning, and talks about them reduced gaps between managers and team members. (Argyris et al., 1985; Crossan et al., 1999; Weick et al., 1999). Understanding the factors that underlying alliance instability and how they differed for partners from various national cultures was managing instability in cross, J Gill's main goal. The Japanese place a lot of importance on these. There could be some unique restrictions on this study. First, for organizational partners from three different national cultures, the relative significance and interactions of trust, reliance, and conflict in joint venture instability have been determined. Second, interviews with people from "high context" cultures, such those in Asia where face-saving and innuendo are significant communication tools, may not disclose much more than stereotypical responses, or *tatemae* as the Japanese call them (i.e. facade story). Cross-checking archival data can help counter some of these difficulties, although retrospective study is challenging (Carroll et al., 2002). De Freitas's model shows how sensemaking affects computer technology in schooling. Weick et al. (2005) equate sensemaking and organization. In the cases, e-learning technology reveals two organizational views.

Sensemaking affects how managers reduce cultural incongruity and integrate e-learning or isolate it within the institution. According to the literature, the individual sensemaking mechanism is key to understanding how people embrace (or reject) new technology (Gopal & Prasad, 2000; Griffith, 1999; Hinds, Roberts, & Jones, 2004; Hsiao et al., 2005; Orlikowski & Gash, 1994; Prasad, 1993). The literature has not offered empirical support for sensemaking in e-learning, except for Heilesen & Josephsen's (2008) assertion that it is a function. We avoid making broad predictions. This empirical investigation includes context characteristics that help applying its findings easier. This study's symbolic method focuses on how people interpret events and circumstances (De Freitas and Bandeira de Mello, 2012). Wang presents a theoretical model of the process by which managers first become aware of a new organisational information technology (OIT) that is mentioned in alerting messages before the management starts to make sense of the OIT. On the basis of this approach, research ideas clarify when and how OIT aspects affect noticing. These concepts contribute to studies on IT adoption, corporate vision, managerial cognition, and opportunity perception (Wang, 2020). A theory of emotion in/as sociocultural practice was put out by Veal, which sees emotion as practices (such as emoting, emotion work, etc.) that are also connected to other types of practice. In order to see the contextual and reciprocal linkages between feeling, sense-making, and practice that give emotion social significance for learning, this perspective requires a change from perceiving emotions as inherent, internal states to viewing emotions as emotional configurations. Second, this paper expands the range of alternatives for thinking about learning power. However, power is squarely in the crosshairs of DxE practices, which try to mold specific emotional configurations in response to ideas of "violence," to human uses of animals, and to "grievability" (Butler, 2004). The results support Philip et al (2017)'s assertion that adopting a "affective stance" during conversation can aid in securing a contested ideological position. The investigation showed that this emotional affordance was being exploited. Research shows that when people evaluate innovation projects, there are systematic disparities that might be attributed to department orientation, mental models, or thought worlds (Veal, 2020). Röth's research has shown that a project's perceived risk is affected by the individual's reluctance to change, and that this reluctance moderates the impact of the project's innovativeness on its perceived risk. Framing changes the degree and direction of the moderation effect: a perceived opportunity reduces perceived hazards and a perceived threat confirms hazards, (Röth and Spieth, 2019). Regarding to Ruff a foresight unit must provide future-related information and embedded services that complement corporate, marketing, or product strategy. It must also contribute to innovation and strategy. Deep integration in strategy and innovation processes and positive appraisal by internal clients are necessary at the automotive companies, (Ruff, 2015). Jane Ann Reukauf analysis intrinsic and extrinsic job satisfaction correlations. According to the alternative approach, independent variables and turnover intent are connected. Multicollinearity, outliers, normalcy, homoscedasticity, and residual independence were tested. Extrinsic motivation was inversely associated to turnover intention, whereas intrinsic motivation was not. Compensation, employment stability, and rewards are extrinsic motivators. Despite being unexpected, the null hypothesis was rejected (Reukauf, 2018).

#### **4.4. Terminus Technicus**

The last segment is a summary of the literature on terminus technicus. Szép talks about the part that term semantic analysis can play in translator training. First semester of Eszterházy Károly University's translator training program focuses on terminology theory. In the third and fourth semesters, economic and legal terminology lectures are offered. Such analyses are beneficial for future expert translators since they learn to handle sources with caution. They also love tracking term meaning changes (Szép, 2018).

According to Imre if quality is required, human translators are used to create new terms and handle them properly, including adding them to earlier databases, continuously verifying for consistency and spelling, and removing repetitive portions. Even though some traditions, such as translating only into one's mother tongue or only into and for one's nation of residence, are no longer required to be followed (Imre et al.,2013).

## 5. DISCUSSION AND IMPLICATIONS

This article's main goal is to respond to the research question: *How does reasoning/sensemaking help in successful job rotation?* The authors used an SLR research as their method of analysis to obtain an answer to this question. An examination of 174 papers was the end result of the review procedures. 4 categories were used to group the 174 articles. Although each group had a distinct perspective on the subject, they were all founded on the topic of sense-making, job rotation, management and organizational culture, terminus technicus. Moreover, only 74 articles (42,5%) address the topic of sense-making, job rotation, management and organizational culture ,terminus technicus, out of the initial hits. The authors' hypothesis is that there is only a few literature dealing with job rotation of managers, as most authors focus on production line and office workers, leaving out management, has been confirmed. Consequently, the SLR did not answer the research question. Sensemaking is important for organizational and personal exploration. The more we examine sensemaking, the better we can adapt to uncertain, ever-changing individual, team, and organizational circumstances. Information analysis and interpretation may lead to job rotation. This can help all automobile companies in all situations.

## 6. CONCLUSIONS

New company life and HR challenges have emerged. COVID-19 has produced new, previously unforeseen, and severe concerns, such as employee mental health, managing remote work, corporate communication, and employee engagement. Job rotation is included. COVID-19 has affected the automotive sector, especially rotation, as is well-known. This perspective could help analyze important changes. Global coronavirus outbreak is a health and economical disaster. Multinational organizations may take a range of tactics to cope, including rotational issues. Before implementing the changes needed to weather the COVID-19 storm, multinational businesses will want to establish the framework for employee "buy-in" as we approach the "new normal." Despite all the bad repercussions, the pandemic has had benefits that international organizations and their employees can use. In the spirit of the new normal, we should regard them as positive and creative changes to advance. The authors performed a systematic literature review (SLR) of the relevant literature in order to understand how reasoning/sensemaking helps in successful job rotation. A set of keywords based on the internet databases Scopus and Web of Science was used to perform the SLR. Statistics of the study findings were offered, and the theoretical framework chapter provided a detailed explanation of the research procedure. 174 articles were subjected to content analysis by the authors throughout SLR. The 74 publications were categorized into 4 sections based on their content, including Job rotation, Sensemaking, Management and organizational culture and Terminus technicus. The procedure was used to evaluate the articles in each group in order to find an answer to the research question. The SLR results did not answer the research question. The results confirm that the authors' hypothesis that managerial rotation has not been the focus of scientific society until now is correct. The authors are considering a questionnaire survey and its evaluation at their current workplace and at Automobili Lamborghini as a future research opportunity. Once the questionnaires have been evaluated, the authors will verify the validity of the results by conducting in-depth interviews with the management.

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## OVERVIEW OF BUSINESS BANKRUPTCY MODELS

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### ABSTRACT

*The issue of bankruptcy is still relevant. Academics, as well as practitioners in the business environment, are devoted to it. In their studies, they apply different features as well as wide range of bankruptcy prediction methods. A frequently asked question is which features to choose for bankruptcy prediction and which methods to apply when building bankruptcy prediction models. The effort is to find such model, the application of which will ensure the best possible classification accuracy. The aim of the paper was to provide a comparison of performance results of various bankruptcy prediction methods and to select the most appropriate one. Bankruptcy prediction methods applied in this research include Multiple Discriminant Analysis, Logistic Regression, Data Envelopment Analysis (DEA), Malmquist index based on the DEA approach, Neural networks, Naive Bayes, Decision trees, Gradient Boosted Decision Trees, AdaBoost Decision Trees, Graph theoretical approach, and Support Vector Machines. Two samples of companies were analyzed, one from the Slovak heating industry and the second one from the Slovak construction industry. Performance of the models was evaluated with the use of classification accuracy measures as well as Area Under the Receiver Operating Characteristic Curve (AUC). Significantly better results were achieved in the construction industry, however, the sample of analyzed enterprises in this industry was significantly larger. The best overall classification accuracy was achieved by artificial intelligence models. The benefit of the paper is the application of wide range of bankruptcy prediction features and models and comparison of their classification accuracy. Added value is the proposal of the most appropriate bankruptcy prediction method with the highest classification accuracy.*

**Keywords:** *bankruptcy, features, model, prediction*

### 1. INTRODUCTION

Prediction models have experienced significant historical development, particularly in terms of applied prediction methods. During the early stages of their evolution, discriminant analysis (DA) gained considerable popularity. Beaver (1966, 1968) employed univariate discriminant analysis. However, the multidimensional nature of a company's financial health, which was not adequately captured by Beaver's approach, was addressed by Serrano-Cinca and Gutiérrez-Nieto (2013). Consequently, Altman (1968) introduced the multiple discriminant analysis, a method subsequently utilized by various authors such as Wilcox (1973), or Norton and Smith (1979). The implementation of multiple discriminant analysis necessitates the satisfaction of several assumptions, with the first being the requirement of multivariate normality of the probability distribution of the explanatory variables. Another prerequisite is the equality of the variance-covariance matrices.

In the utilization of discriminant analysis, addressing multicollinearity and outliers is essential (Meloun et al., 2017). However, these assumptions are also integral when employing alternative methods. Despite the need to satisfy these prerequisites, discriminant analysis remains a frequently applied method even in the contemporary period. Recent studies employing multiple discriminant analysis as a prediction method include works by Jaki and Cwiek (2020), or Sari et al. (2022). The results obtained from discriminant analysis were compared with outcomes from other bankruptcy prediction methods in studies conducted by Du Jardin (2017), or Hosaka (2019). In the 1980s, the emergence of bankruptcy prediction models utilizing conditional probability models became notable. Linear probability models (LPM), introduced by Meyer and Pifer in 1970 for bankruptcy prediction, were based on a linear regression model utilizing the method of least squares. However, this method faced criticism because the predicted LPM probabilities did not fall within the range of 0 and 1 (Bhutta and Regupathi, 2020). Consequently, logistic regression (LR) models replaced these linear probability models. Logistic regression, an extension of linear regression, is primarily employed for identifying binary or multicategorical dependent variables. Given that the dependent variable is discrete, it cannot be directly modeled using linear regression. Therefore, instead of predicting whether a phenomenon will occur or not, a model is constructed to predict the probability of its occurrence (Olson et al., 2012). In comparison to traditional multiple regression and discriminant analysis, logistic regression offers several advantages. As previously mentioned, the resulting predicted probabilities exclusively fall within the interval  $\{0,1\}$ . Additionally, the Logit model doesn't necessitate a normal distribution of the values of independent variables, allowing the inclusion of indicators that might be unsuitable for parametric discriminant analysis. The logit model also doesn't require equality of variance-covariance matrices (Gundová, 2015). However, the main weaknesses of Logit models include their high sensitivity to multicollinearity, outliers, and missing values (Hassan et al., 2017). The LR method was initially employed for predicting bank bankruptcy by Martin (1977), and Ohlson (1980) was the first to use it for businesses. Other authors who applied the LR model include Tian et al. (2015) or Pacheco et al. (2022). Another conditional probability model is the Probit model, first applied by Zmijewski (1984). Recent studies using the Probit model for predicting insolvency and bankruptcy include the works of Arnis (2018) and Correia et al. (2022). In the next period, more than 30 different methods were created, which largely use mathematical programming and artificial intelligence when predicting the bankruptcy of companies. In the next paragraph, we will focus more closely on the selected methods. One of the most well-known and frequently utilized methods is neural networks (NN). Artificial neural networks (ANN) constitute a group of learning statistical models inspired by biological neural networks. They are employed for estimating or approximating functions that may depend on a large number of inputs and are generally unknown (Zhu et al., 2021). Neural networks can address both classification and prediction tasks. According to Cisko and Klieštík (2013), neural networks are often referred to as a "black box" because understanding their internal structure in detail is impossible. Neural networks have been applied in predicting bankruptcy by Tsai (2008), Tsai and Wu (2008), Olson et al. (2012). From more recent studies, authors such as Hosaka (2019) or Qian et al. (2022) can be mentioned. Another well-known method employed in the domain of bankruptcy prediction is decision trees (DT), which, according to Chou et al. (2017), ranks among the most reliable prediction methods. A decision tree is a non-linear discriminative method that utilizes a set of independent variables to iteratively divide the sample into smaller subgroups. The procedure is iterative, and in each branch of the tree, the objective is to select the independent variable that exhibits the strongest association with the dependent variable according to a specific criterion (Michael and Gordon, 1997; In Chen, 2011a). The most frequently used types of decision trees include: ID3, C4.5, C5, CART (Classification and Regression Trees), Best First Decision Tree, and AD Decision Tree (Olson et al., 2012).



Decision trees have been employed in bankruptcy prediction by Frydman et al. (1985), Chen (2011a), Olson et al. (2012), or Staňková and Hampel (2018). In 2001, Sarkar and Sriram developed Bayesian network (BN) models for early detection of bank failures. Their findings indicated that the naïve Bayesian classifiers and the composite Bayesian inference model achieve comparable performance to the well-known classification algorithm of the induced decision tree (Sun and Shenoy, 2007). The naïve Bayesian classifiers, a statistical technique (Zhou and Lai, 2016), has proven successful in various fields for classification and prediction tasks (Sun and Shenoy, 2007). It relies on conditional probabilities, incorporating historical data and utilizing Bayes' theorem to calculate the probability of the occurrence of a phenomenon, given the probability of another phenomenon that has occurred in the past (Serrano-Cinca and Gutiérrez-Nieto, 2013). The advantage of Bayesian network models lies in their lack of constraints on attribute probability distributions and applicability to datasets with missing data. In comparison to other machine learning techniques like neural networks, Bayesian network models offer greater transparency and intuitiveness as the relationships between variables are explicitly represented by a Directed Acyclic Graph (DAG) (Kononenko, 1990; In Sun and Shenoy, 2007). Bayesian network models were used in bankruptcy prediction in studies by Zhou et al. (2012) or Cao et al. (2022). At the turn of the 20th and 21st centuries, other methods such as Rough Set Theory or genetic algorithms were also used in the field of bankruptcy prediction. Genetic algorithms, formulated by Holland in 1975, constitute search and optimization procedures grounded in the principle of biological evolution, specifically the survival of the fittest. Diverging from conventional search methods, they operate with a population of viable candidates. The decision variables of a problem are encoded into alphanumeric strings with a specified cardinality and finite length. These strings, deemed proficient candidates for problem resolution, are referred to as chromosomes, with the individual elements known as genes and their values designated as alleles. To achieve an optimal solution through natural selection, the identification of criteria to differentiate between good and poor solutions becomes imperative. This can manifest as an objective function, embodied by a mathematical model or computer simulation, or a subjective function where human judgment determines the superior solution. The aim is to establish the relative suitability of a candidate, which the genetic algorithm employs to guide the evolution of proficient solutions (Sastry et al., 2005). Genetic algorithms have been employed in bankruptcy prediction across various studies, including Varetto (1998), Etemadi et al. (2009) or Bateni and Asghari (2020). In a study by Back et al. (1996), the failure prediction of 37 Finnish companies was undertaken, utilizing 31 financial ratios. The study compared the results of three bankruptcy prediction techniques—discriminant analysis, logistic regression, and genetic algorithms. Notably, genetic algorithms demonstrated the most effective prediction outcomes. Varetto (1998) employed genetic algorithms for bankruptcy prediction and contrasted their performance with that of linear discriminant analysis. Genetic algorithms yielded superior results for bankrupt companies, while linear discriminant analysis exhibited higher classification ability for financially healthy companies. Rough set theory, introduced by Pawlak in 1982, is a machine learning approach focused on classifying and analyzing information and knowledge that is inaccurate, uncertain, or incomplete (Rissino and Lambert-Torres, 2009). Applied to diverse financial decision analysis challenges, this method has demonstrated predictive accuracy ranging from 76% to 88% in bankruptcy prediction (Shi and Li, 2019). Notable studies utilizing rough set theory in predicting bankruptcy include Ahn et al. (2000) or Wang and Wu (2017). Support vector machine, developed by Vapnik and Vapnik in 1998, stands out as one of the most renowned machine learning methods, applicable to both classification and prediction tasks (Bhutta and Regupathi, 2020). This method distinguishes between linear and non-linear support vector machines. In non-linear classification tasks, non-linear kernel functions are often employed to transform input data into a new multidimensional

space, enhancing their separability. In this transformed space, an optimal hyperplane is constructed to separate classes and designate which points belong to each class. The points closest to the hyperplane, or those with the smallest distance between them, are termed support vectors (Ravi Kumar and Ravi, 2007; Olson et al., 2012; Bhutta and Regupathi, 2020). Support vector machines have been utilized in bankruptcy prediction studies by Tsai (2008), or Staňková and Hampel (2018). A comparative analysis conducted by Shin et al. (2005) pitted the performance of neural networks against support vector machines in predicting bankruptcy, ultimately concluding that support vector machines exhibited higher classification ability. The case-based reasoning method operates on the principle of problem-solving through the analysis of analogous cases from the past, drawing upon the expertise of professionals to discern the most fitting solution. In the context of business failure, this approach proves valuable by referencing instances of businesses that have previously encountered failure due to comparable characteristics, thereby offering a rationale for such failures (Ravi Kumar and Ravi, 2007; Bhutta and Regupathi, 2020). This method has been applied in bankruptcy prediction studies by various authors: Li and Sun (2011); Sartori et al. (2016). The data method is gaining prominence in the prediction of a company's bankruptcy, with Data Envelopment Analysis (DEA) taking center stage, leveraging linear programming principles. Falling within the realm of multi-criteria decision-making methods, DEA assesses the relative efficiency of evaluated units (Staňková and Melecký, 2011). The initial notion of employing DEA for bankruptcy prediction was introduced by Simak (1997), who pioneered the comparison of its outcomes with Altman's Z-score results. At that time, the application of DEA models in conjunction with bankruptcy prediction was groundbreaking. This research unfolded various potential applications. Other scholars exploring bankruptcy prediction through DEA include Cielen et al. (2004), utilizing the radial DEA model and contrasting its results with those of discriminant analysis. In the same year, Paradi et al. (2004) employed both additive and radial models, incorporating the peeling technique. Remarkably, the model achieved a 100% success rate in predicting bankrupt businesses. Moving forward, Premachandra et al. (2009) utilized an additive DEA model, contrasting its outcomes with those of logistic regression. The research yielded a commendable rate of accurately predicting bankruptcies, although the precision in predicting financially healthy enterprises was comparatively lower. Sueyoshi and Goto (2009) applied the additive DEA model, determining the threshold for bankrupt firms and subsequently comparing the results with the DEA-DA approach. In 2011, Premachandra et al. integrated radial and additive DEA models, devising a DEA evaluation index. Shetty et al. (2012) applied the DEA model to ascertain the bankruptcy likelihood of the analyzed sample of companies, culminating in the proposal of indicators deemed suitable predictors of bankruptcy. Classic (static) DEA models are designed for a single time period. However, there is a growing interest among many researchers in understanding efficiency changes over time, which proves particularly valuable for anticipating financial distress (Li et al., 2017). These authors expanded cross-sectional DEA models to incorporate the temporal dimension, introducing the Malmquist Index (MI) based on the DEA method. Their analysis involved data from 742 Chinese publicly listed companies tracked over a span of 10 years. The findings indicated that MI provides valuable insights into a company's competitive position and enables accurate predictions of financial distress based on efficiency measures derived through DEA. Shahwan and Habib's (2020) study, utilizing MI, marked one of the initial endeavors to assess the relative effectiveness of corporate leadership and the adoption of intellectual capital practices and their influence on financial distress. Moreover, MI has been applied in bankruptcy prediction studies by Li et al. (2022) and Mousavi et al. (2022). In line with the above-mentioned, the aim of the paper was to provide a comparison of performance results of various bankruptcy prediction methods and to select the most appropriate one.

The structure of the rest of the paper is as follows: In the "Materials and Methods" section, research samples from two analysed industries are characterized and bankruptcy prediction methods applied in the paper are described. The "Results and Discussion" section lists the classification accuracy results of applied bankruptcy prediction methods and offers the comparison of these results with other studies in the given field. The "Conclusion" section offers conclusions, limitations and future research.

## 2. MATERIALS AND METHODS

In this paper, the results of several bankruptcy prediction models built during our research were compared. These bankruptcy prediction models were built for two Slovak industries – Heating industry and Construction industry. Both industries were selected due to their high importance for the Slovak economy. Data from the financial statements of companies doing a business within these industries were provided by Slovak Analytical Agency CRIF - Slovak Credit Bureau, Ltd. (CRIF, 2023). In the case of the heating industry, the research sample consisted of 497 businesses. The heating industry holds significance not only economically but also socially, playing a crucial role in the daily lives of communities and consumers. Enterprises in this sector are typically localized systems providing central heating. Some of these entities enjoy a monopoly in specific geographical areas. Although sharing certain features with other energy sectors, thermal energy, as a commodity, differs in that it cannot be exchanged between countries. The substantial heat losses during transmission and distribution further restrict the trading of heat between networks in distinct locations. The overall characteristics and configuration of the thermal energy sector, along with the approach to supplying heat and hot water, are shaped within specific geographical areas by a range of factors. These factors include climate conditions, territorial fragmentation, historical development, demographic considerations, territorial divisions, characteristics of residential, commercial, and industrial construction, economic activities, and the availability of fuel sources for heat production. These diverse elements result in distinct structures and heat supply systems in each significant city or village. Additionally, each system is comprised of its unique array of thermal devices (Antimonopoly Office of the Slovak Republic 2013). These identified factors lay the groundwork for external risk factors that influence the financial health and performance of the analyzed companies. The origins and distribution networks for heat in these enterprises evolved in tandem with the development of urban agglomerations. These systems are designed to efficiently utilize various energy sources generated within the city, encompassing renewable sources, waste heat, and more. Functioning as energy infrastructure integrators, these systems effectively connect production and consumption, enabling the storage of energy (in the form of heat) during periods of excess. In the realm of independent heat production, approximately 54% of heat is currently generated through combined production (Janiš, 2018). The energy efficiency targets outlined in the European Commission's energy package, along with emerging energy trends, present both new opportunities and challenges for the heating industry. Once again, these facts lay the groundwork for the emergence of external risk factors that impact the performance and competitiveness of the analyzed companies. When creating bankruptcy prediction models for construction industry, two research samples were used. First research sample consisted of 2 660 companies doing a business within SK NACE 41 – Construction of buildings, second one included 383 businesses from SK NACE 42 – Engineering constructions. The construction sector holds significant importance not only for the Slovak economy but also for economies globally. This assertion is supported by Hafiz et al. (2015), who highlight that the construction industry plays a pivotal role in the economic landscape of any country, despite facing a high rate of business failures within this sector. Štrba (2020) further underscores the significance of the construction industry for the Slovak economy, suggesting that while it may not have been the primary pillar before the crisis—compared to the automotive industry—

current expert consensus holds that the construction sector can play a crucial role in driving economic recovery during times of recession. The construction industry serves as the primary executor of buildings and structures, playing a vital role in the investment landscape and the formation of gross fixed capital within the Slovak economy (MTSR, 2019). It serves as a crucial indicator of the cyclical development of the overall economy, exhibiting close ties to fluctuations and trends in economic activity. With a rapid response to changes in the economic cycle, the construction industry exerts a multiplier effect on the growth of other sectors. This implies that investments in construction initiate a cascading demand for goods and services across related sectors in the national economy, fostering positive impacts, particularly in economic activities, employment, and subsequently, in the balance of public budgets. The construction sector utilizes significant quantities of diverse energy sources, mineral raw materials, and various materials. Conversely, it generates a substantial volume of construction waste, demolition materials, and emissions. Considering this interplay between construction activity and the environment, and the imperative of sustainable development, adhering to the principles of sustainable development becomes paramount for the construction industry. Since the inception of the independent Slovak Republic, there has been a profound shift in the ownership structure of the construction industry. Presently, private enterprises, displacing former state entities, hold a predominant position. Particularly in the realm of building construction, encompassing both residential and non-residential sectors, there has been a gradual reduction in the workforce, notably within sizable construction firms. Conversely, these companies have experienced growth in terms of capital. Noteworthy contributors to investments in this market include not only foreign investors but also domestic companies and developers, who have undertaken a substantial number of projects in the recent period (MTSR, 2019). The outcomes of the construction industry serve as a vital gauge of the cyclical evolution of the overall economy, demonstrating a close correlation with fluctuations and trends in economic conditions. It promptly reacts to shifts in the economic cycle and exerts a multiplier effect on the growth of other sectors. This implies that investments in the construction industry set in motion a comprehensive chain of demand for goods and services in related sectors of the national economy, fostering positive impacts, particularly in the realms of economic activities, employment, and subsequently, the equilibrium of public budgets. The construction sector utilizes significant quantities of diverse energy sources, mineral raw materials, and materials. Conversely, it generates substantial amounts of construction waste, demolition materials, and emissions. From this perspective, the connection between construction activities and the environment, on one hand, and sustainable development, on the other, holds paramount importance. Adhering to the principles of sustainable development is consequently of great significance for the construction industry. Euler Hermes' 2019 analysis of the Slovak construction industry highlights adverse trends within the sector. Key issues include a notable proportion of insolvencies (reaching 26.8% in 2018) and a deteriorating payment ethic among debtors. Despite frequently established payment terms of 90/120 days, obligations are typically settled 7-30 days past the due date. The construction industry, alongside the service sector, contributes significantly to the highest volume of bad debts in the economy (Krokoš, 2019). Models compared in this paper were built with the use of wide range of mathematical and statistical methods: Multiple Discriminant Analysis (MDA), Logistic Regression (LR), Data Envelopment Analysis (DEA), Malmquist index based on the DEA approach (MI), Neural networks (NN), Naive Bayes (NB), Decision trees (DT), Gradient Boosted Decision Trees (GBDT), AdaBoost Decision Trees (ABDT), Graph theoretical approach (GTA) and Support Vector Machines (SVM). Their performance was compared with the use of overall classification accuracy, classification accuracy for bankrupt businesses (sensitivity) and classification accuracy for non-bankrupt businesses (specificity).

Area under the ROC curve (AUC) was also calculated to compare performance of prediction models for construction industry, This measure is more appropriate for samples analysed in this paper because of their unbalanced structure.

### 3. RESULTS AND DISCUSSION

Results of bankruptcy prediction models for heating industry as well as construction industry are listed in table 1 and table 2. These models were built with the use of features stated in the second column of Table 1 and Table 2.

Prediction model	Features	Overall classification accuracy	Sensitivity	Specificity
<b>MDA</b>	Current ratio, Average collection period, Inventory turnover, Creditors payment period, Total assets turnover ratio, Return on assets, Return on costs, Interest coverage ratio, Equity to debt ratio, Equity to fixed assets ratio, Cost ratio	84%	15.4%	98.9%
<b>NN</b>	Current ratio, Average collection period, Inventory turnover, Creditors payment period, Total assets turnover ratio, Return on assets, Return on costs, Interest coverage ratio, Equity to debt ratio, Equity to fixed assets ratio, Cost ratio	95.9%	86.7%	98.3%
<b>LR</b>	Current liabilities/ total assets, net income/ total assets, working capital/ total assets, EBIT/ interest expenses, Equity/ debt	95%	45%	99%
<b>DEA VRS</b>	Total debt/ total assets, current liabilities/ total assets, cash flow/ total assets, net income/ total assets, working capital/ total assets, Current assets/ total assets, EBIT/ Total assets, EBIT/ interest expenses, Equity/ debt	91%	41%	96%

*Notes: MDA – Multiple Discriminant Analysis, NN – Neural Network, LR – Logistic Regression, DEA VRS – Data Envelopment Analysis Variable Returns to Scale*

*Table 1: Prediction models for heating industry  
 (Source: authors)*

The best overall classification accuracy among bankruptcy prediction models built for heating industry achieved Neural Network followed by Logistic Regression (see Table 1). The most balanced results of classification accuracy for bankrupt and non-bankrupt businesses were obtained by neural network. Other three models achieved significantly lower classification accuracy for bankrupt businesses. Especially if we compare NN and MDA, within which the same features were applied, it is obvious that NN achieves a better classification accuracy, especially for bankrupt companies. This is due to the assumptions that need to be met when applying MDA and these were not met. All applied models achieved excellent classification accuracy in the classification of non-bankrupt businesses. Differences occur in the classification of bankrupt businesses. The reason, however, is not the selection of features, since the same features were applied in the case of MDA and NN. The problem is probably in determining the assumptions for bankrupt businesses, resp. in the classification accuracy of the applied model. In this case, NN is the clear winner. These results can be compared with the results of other authors and studies, e. g. Khemais et al. (2016), who achieved 76.3% classification ability for healthy businesses and 76.5% classification ability for failing businesses. Mihalović (2018) in his study achieved 45.61% classification ability for bankrupt businesses and 81.97% classification ability for non-bankrupt businesses. Among other studies, it is possible to mention Nur (2019), who achieved 88% classification ability for non-bankrupt companies using MDA. In the case of bankrupt companies, it was 61%. Nur (2019) built also LAR and NN model. His LR model achieved 89% predictive accuracy for non-bankrupt businesses and 61% predictive accuracy for bankrupt businesses. In the case of NN, the predictive accuracy was 89% for non-bankrupt businesses and 80% for bankrupt ones.

Prediction model	Features	Overall classification accuracy	Sensitivity	Specificity	AUC
<b>DEA VRS DK1</b>	Total revenues/ total assets, Short-term assets/ short-term liabilities, Net working capital to total assets, Return on assets with EAT, Return on equity, Netto cash flow to liabilities and Liabilities to total assets.	79.63%	97.01%	78.72%	0.93
<b>DEA VRS LASSO1</b>	Liabilities to total assets, Return on costs, Return on equity, Short-term liabilities to total assets, Net working capital to total assets, Netto cash flow to total assets, and Total assets turnover ratio	86.29%	79.10%	86.66%	0.91
<b>DEA VRS DK2</b>	Current ratio, Working capital/ total assets, EBIT/total assets, EAT/ equity, EBIT/ total assets, EAT/Equity, EAT/Sales, Total sales/ total assets, Retained earnings/ total assets, cash flow/liabilities, cash flow/ assets, Liabilities/ total assets, Debt to equity ratio, Collection period ratio, Credit period ratio, Inventory turnover ratio	70.34%	95.24%	68.63%	0.85
<b>DEA VRS LASSO2</b>	Working capital/total assets, Total sales/total assets, Inventory turnover ratio, EAT/Equity, Retained earnings/total assets, Liabilities/total assets, Debt to equity ratio, EAT/Total Assets, Eat/costs, Current liabilities/ total assets	76.15%	61.90%	77.12%	0.71
<b>MI DK</b>	Current ratio, Working capital/ total assets, EBIT/total assets, EAT/ equity, EBIT/ total assets, EAT/Equity, EAT/Sales, Total sales/ total assets, Retained earnings/ total assets, cash flow/liabilities, cash flow/ assets, Liabilities/ total assets, Debt to equity ratio, Collection period ratio, Credit period ratio, Inventory turnover ratio	86%	52%	88%	0.62
<b>MI LASSO</b>	Working capital/total assets, Total sales/total assets, Inventory turnover ratio, EAT/Equity, Retained earnings/total assets, Liabilities/total assets, Debt to equity ratio, EAT/Total Assets, Eat/costs, Current liabilities/ total assets	75%	67%	75%	0.69
<b>GTA</b>	Current assets/ Short-term liabilities, EBIT/ Total assets, Total sales/ Total assets, Total debt/ Total assets, Short-term liabilities/ Sales	95.16%	72.22%	97.62%	0.85
<b>DT</b>	Total debt/ total assets, EAT/ costs, EAT/ equity, Net working capital/ total assets, Short-term liabilities/ total assets, Netto cash flow/ total assets, Total sales/ total assets	98.88%	85.27%	99,6%	0.92
<b>GBDT</b>	Total debt/ total assets, EAT/ costs, EAT/ equity, Net working capital/ total assets, Short-term liabilities/ total assets, Netto cash flow/ total assets, Total sales/ total assets	99.07%	94.07%	100%	0.97
<b>ABDT</b>	Total debt/ total assets, EAT/ costs, EAT/ equity, Net working capital/ total assets, Short-term liabilities/ total assets, Netto cash flow/ total assets, Total sales/ total assets	99.07%	94.07%	100%	0.97
<b>NN</b>	Total debt/ total assets, EAT/ costs, EAT/ equity, Net working capital/ total assets, Short-term liabilities/ total assets, Netto cash flow/ total assets, Total sales/ total assets	97.04%	69.23%	98.44	0.84
<b>NB</b>	Total debt/ total assets, EAT/ costs, EAT/ equity, Net working capital/ total assets, Short-term liabilities/ total assets, Netto cash flow/ total assets, Total sales/ total assets	96.66%	84.62%	97.28%	0.91
<b>SVM</b>	Total debt/ total assets, EAT/ costs, EAT/ equity, Net working capital/ total assets, Short-term liabilities/ total assets, Netto cash flow/ total assets, Total sales/ total assets	97.77%	61.53%	99.61%	0.81
<b>LR</b>	Total debt/ total assets, EAT/ costs, EAT/ equity, Net working capital/ total assets, Short-term liabilities/ total assets, Netto cash flow/ total assets, Total sales/ total assets	97.77%	53.84%	100%	0.70

Notes: *DEA VRS DK* – Data Envelopment Analysis Variable Returns to Scale with features selection based on Domain knowledge, *DEA VRS LASSO* - Data Envelopment Analysis Variable Returns to Scale with features selection based on Least Absolute Shrinkage and Selection Operator, *MI DK* – Malmquist index with features selection based on Domain knowledge, *MI LASSO* - Malmquist index with features selection based on Least Absolute Shrinkage and Selection Operator, *GTA* – Graph theoretical approach, *DT* – decision tree, *GBDT* – Gradient Boosted Decision Tree, *ABDT* - AdaBoost Decision Tree, *NN* – Neural Network, *NB* – Naïve Bayes, *SVM* – Support Vector Machine, *LR* – Logistic Regression

**Table 2: Prediction models for construction industry**  
 (Source: authors)

The second analyzed sample from the construction industry shows better results in predicting bankrupt and non-bankrupt enterprises. GBDT and ABDT models achieve the best overall classification accuracy, followed by DT, SVM, LR, NN, NB, GTA, DEA. It clearly follows that the classification accuracy is determined by the applied model and not by the selection of features, while artificial intelligence methods are clearly leading. DT seem to be the best models for predicting corporate bankruptcy. However, these models have significantly higher classification accuracy for non-bankrupt enterprises. Probably the problem is how the assumption for dividing businesses into bankrupt and non-bankrupt enterprises is established. The GBDT and ABDT models achieved the best classification accuracy for bankrupt companies, the LR model achieved the worst. In the case of non-bankrupt enterprises, the GBDT and ABDT methods achieved the best results again, however, in this case the LR method equaled them. The achieved results of the NN application can be compared with the study of Rafiei et al. (2011) who achieved 98.6% classification accuracy, which is comparable to the result achieved in this study. Tsai and Wu (2008) achieved the following overall classification accuracy of NN models for three selected datasets: 97.32%, 78.97%, and 87.94%. Anandarajan et al. (2001) achieved 89% classification accuracy of NN, while the classification accuracy for bankrupt companies was 70% and for non-bankrupt companies it was 93.83%. Study of Anandarajan et al. (2001), similar to this study, confirmed that a better predictive accuracy can be achieved when predicting non-bankrupt enterprises. Authors compared the results of NN with those of MDA and found significant differences. In the case of MDA, the classification accuracy was 55%, while the accuracy for bankrupt businesses was 22%. Horak et al. (2020) achieved the best classification accuracy of the neural network 82.82%, the classification accuracy for non-bankrupt businesses was 93.79% and classification accuracy for bankrupt businesses was 56.20%. In the case of SVM, they achieved total classification accuracy 76.08%, for non-bankrupt enterprises 99.39% and for bankrupt enterprises 8.22%, which is a very low classification accuracy. Authors who used decision trees include, for example, Aoki and Hosonuma (2004), who achieved a classification accuracy of 91.2%. This is a lower value compared to the classification accuracy of DT in this study. Zibanezhad et al. (2011) achieved 94.5% classification accuracy of the DT model. Chen (2011b) obtained the following results: the overall classification accuracy of DT model was 84.91%, the classification of DT model for non-bankrupt enterprises was 100% and for bankrupt enterprises 71.42%. In this study a higher classification accuracy for bankrupt enterprises was achieved (85.27%) compared to Chen (2011b). In the case of the NN application, Chen (2011b) achieved the following predictive accuracies: the overall classification accuracy of the model was 90%, the highest classification accuracy for bankrupt enterprises was 94.28%. This value exceeds the results of the NN model within this study. Aydin et al. (2022) in their research on the prediction of corporate bankruptcy achieved the following results in the case of the NN application: 85.7% of enterprises were confirmed as non-bankrupt, 100% of enterprises as bankrupt, while the overall classification accuracy was 89.5%. Aydin et al (2022) also applied the DT method and achieved the following results: the overall classification accuracy of the model was 87.9%, the classification accuracy for bankrupt enterprises was 92.9% and for non-bankrupt enterprises 86.4%. The authors confirmed that the results depend on the applied sample of enterprises, the number of enterprises, the sector from which the sample of enterprises is. The selection of bankruptcy features is also important. However, it was clearly confirmed that artificial intelligence models achieve better classification capabilities. The results of the estimation accuracy achieved in our research when applying DEA model can also be compared with the results of the previous studies. Mendelová and Bielíková (2017) achieved 22% accuracy for companies in financial distress and 96.7% accuracy for financially healthy companies. Several authors also reached better results of the classification accuracy of the DEA model for non-prosperous enterprises - we can mention the research by Mendelová and Stachová (2016) with a classification accuracy

10-42.86%, the study by Premachandra et al. (2009) with a classification accuracy 84.89%, or research by Cielen et al. (2004), who achieved a classification accuracy 74.4-75.7%. In our research, we achieved a high classification accuracy for bankrupt companies, especially in the case of the application of DK indicators. The achieved results were as follows: the classification accuracy for bankrupt companies was 97.01%, resp. 95.25%. The overall classification accuracy was 79.63%, resp. 70.34%. In the studies of the above-mentioned authors, we found a similar or lower result of the overall classification accuracy - Premachandra et al. (2009) reached 75%–77%, Mendelová and Stachová (2016) 88%–95% and Cielen et al. (2004) 85.1–86.4%. These results are comparable to those achieved in this study.

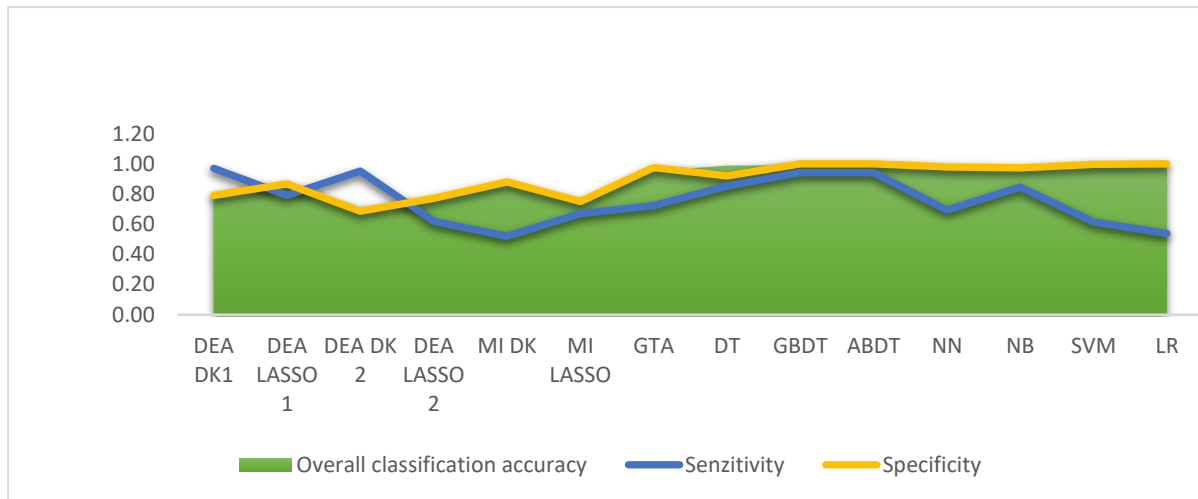


Figure 1: Classification accuracy of prediction models for construction industry  
 (Source: authors)

The best sensitivity is achieved by both DEA DK models. This proves that it is not only the prediction method that is important, but also the choice of features. The specificity mostly replicates the overall classification accuracy. In the case of DEA DK models, it is worse compared to other methods.

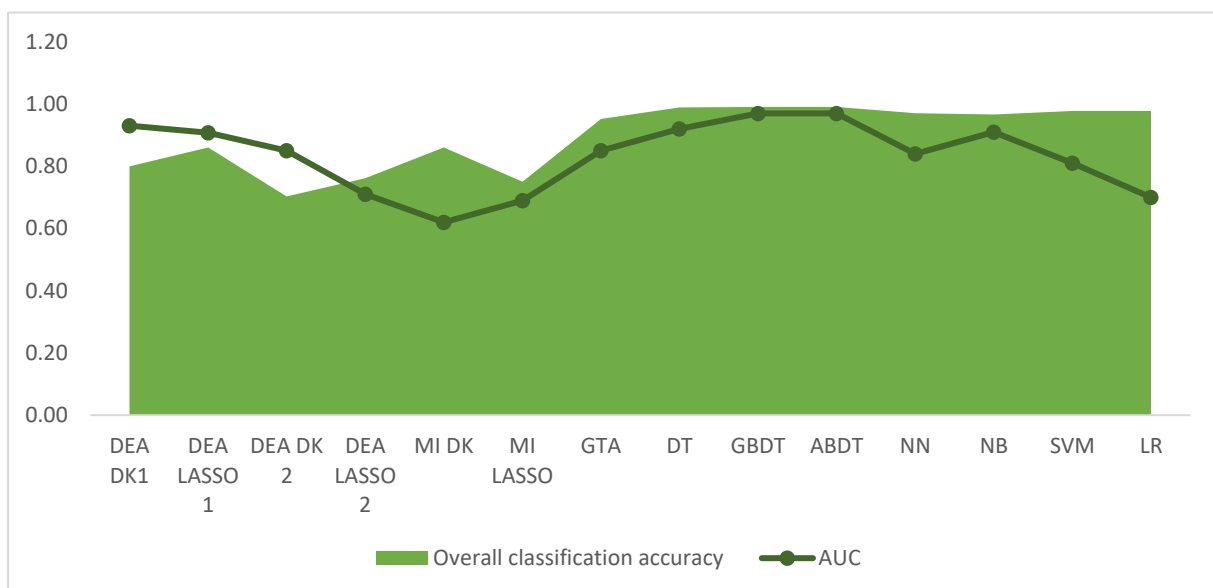


Figure 2: Comparison of overall classification accuracy and AUC of prediction models for construction industry  
 (Source: authors)



Figure 2 shows a comparison of overall classification accuracy and AUC. AUC is a more appropriate measure for unbalanced samples. The highest AUC was achieved by GBDT, ABDT and DT models. We can also see that the AUC for the DEA DK models was significantly higher than the overall classification accuracy. From the figure 1 we can also see that DEA DK models achieved the best sensitivity – classification accuracy for bankrupt companies. On the other hand, GBDT, ABDT and DT models achieved lower classification accuracy for bankrupt businesses compared to DEA DK models. To conclude, all analysed models achieved relatively high specificity, i.e. classification accuracy for non-bankrupt businesses and, in connection with that, a high overall classification accuracy. If we focus on bankruptcy prediction, the DEA model with the selection of indicators using the DK method works best. From the point of view of non-bankrupt companies, better results were achieved by decision trees that reach specificity values of up to 100%, thus achieving high values of overall classification accuracy.

#### 4. CONCLUSION

In this paper, the results of several studies carried out in the area of predicting the bankruptcy of selected companies were compared. Two samples of companies were analyzed, one from the Slovak heating industry and the second one from the Slovak construction industry. The sample of companies from heating industry consisted of data of a smaller number of enterprises compared to construction industry. This was also reflected in the achieved results. While overall classification accuracy and specificity achieved reasonable values, sensitivity achieved lower values. This could be due to sample size, incorrectly set bankruptcy assumption or incorrectly chosen bankruptcy prediction features. Significantly better results were achieved in the construction industry, but the sample of analyzed enterprises was significantly larger. The best overall classification accuracy was achieved by artificial intelligence models. Limitation of the given research is lack of available data to create a sufficiently large balanced sample of prosperous and non-prosperous companies from the analysed industries. Future research will be focused on the analysis of the possibilities of creating a sufficiently large and balanced sample of enterprises.

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## FACTORS INFLUENCING ATTITUDES ON SUSTAINABLE FASHION

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### ABSTRACT

*The concept of sustainability encompasses the blend of economic and social progress with environmental preservation and, in recent years, has a strong link to the fashion industry. Sustainable fashion, a concept widely acknowledged by the fashion industry, holds great social significance as it seeks to address environmental concerns and also cater to consumers who prioritize eco-consciousness, social responsibility, and ethical principles. Sustainable fashion is characterized by clothing designed for extended use, produced within an ethically structured manufacturing framework that employs environmentally friendly resources and fair labor practices. This approach often incorporates eco-labeled and/or recycled materials. Consumer behavior, environmental sustainability on a global scale, the individual's quest for self-expression through clothing and brand symbols, and the necessity to make purchase decisions underscore the need to identify the factors influencing attitudes towards sustainable fashion. This study addressed the respondents' views on sustainable fashion, indicating that several elements come into play. The research findings shed light on the determinants of sustainable fashion attitudes in Croatia, including gender, age, and wealth in terms of monthly fashion shopping budget. This insight can contribute to formulating effective strategies for contemporary sustainable fashion brands, aligning them with consumers' specific needs and preferences.*

**Keywords:** *sustainable fashion, sustainable attitudes, consumer behaviour, Croatia*

### 1. INTRODUCTION

In recent years, an increasing number of researchers have turned their attention to sustainable fashion and consumer behavior in this context. Amidst this overarching context of change, the fashion industry's environmental footprint has come under scrutiny. More than ever, consumers are showing an interest in sustainable fashion, encouraging the industry to introduce eco-conscious clothing and improve its environmental integrity. However, a noticeable gap exists between the ethical values consumers espouse and the purchasing decisions they make. Various socio-demographic factors, such as age, gender, income, and values, play a pivotal role in shaping consumer attitudes and behaviors toward sustainable fashion. Achieving sustainable behavior and attitudes necessitates significant shifts in consumer preferences and choices. It's not always the case that attitudes accurately predict consumer behavior, especially when it comes to sustainable fashion. Various factors come into play that can influence this relationship, and this research aims to explore these factors. To date, there has been no research conducted in Croatia that delves into the connection between consumer socio-demographic factors and attitudes towards sustainable fashion. Therefore, this study aims to fill this research gap by investigating the potential influence of specific factors on consumer attitudes towards sustainable fashion in Croatia, and identifying which of these factors might be correlated with positive attitudes toward environmentally friendly fashion.



By unravelling these dynamics, it aims to contribute to the broader discourse on sustainable fashion, providing valuable insights to businesses and policymakers looking to stimulate eco-conscious consumer behavior.

## 2. LITERATURE REVIEW

Sustainability, as articulated by the World Commission on Environment and Development (WCEDB) in the Brundtland Report of 1987, is defined as a concept where sustainable development caters to present needs without jeopardizing the resources available to future generations to meet their own needs (United Nations Report of the World Commission on Environment and Development: Our Common Future, 1987). Additionally, sustainability can be described as a harmonious blend of environmental, economic, and social principles and values, all aimed at fulfilling immediate needs without compromising the capacity of future generations to satisfy their requirements (Odrowaz-Coates, 2021). Sustainability plays a pivotal role in creating peaceful conditions (Candelaria et al., 2023) and raises fundamental questions, such as whether it's feasible for humanity to live within the Earth's ecological limits. Indeed, global consumption, particularly in the realm of food and other resources, is emerging as a linchpin of future sustainability (Schøning et al., 2023). The prevailing evidence from scientific research and everyday life clearly indicates that we are depleting natural resources faster than they can be renewed, resulting in the unsustainable exploitation of nature and the exacerbation of climate change. These issues underscore the need for a comprehensive study integrating quantifiable indices (Cai et al., 2023) and emphasize the necessity of transitioning toward a sustainable future marked by profound changes in production and consumption mechanisms. This shift towards sustainability is imperative across all sectors, but it is worth noting that consumers' behaviors and lifestyles are evolving at a slower pace (Lee et al., 2023). The fashion industry's significant environmental footprint, coupled with growing consumer interest in sustainability, is compelling this sector to develop sustainable clothing options and enhance ecological integrity (Dangelico et al., 2022). Consumers increasingly express interest in sustainable consumption and eco-friendly products. However, translating these intentions into actual shopping behavior and fashion choices is not always straightforward (Park & Lin, 2020). Although consumers may embrace the values of environmental consumerism and express a desire for sustainable consumption (Maduku, 2024), their beliefs do not always align with their purchasing decisions, giving rise to an "ethical purchasing gap" in the realm of fashion products. Bridging this gap and understanding green consumption are vital for the economic and environmental sustainability. When it comes to sustainable fashion products, the distinction between environmentally-conscious and non-environmentally-conscious consumers is often contingent upon factors like demographic variables and subjective norms (Park & Lin, 2020). Despite notable progress in encouraging green consumption (Li et al., 2023) and heightened awareness of ethical fashion, younger consumers tend to gravitate towards non-ethical products, prioritizing affordability and quality over sustainability (Park & Lin, 2020). Nevertheless, previous research reveals that consumers' environmentally-conscious behaviors and attitudes significantly influence their environmental awareness and preference for sustainable clothing. Sustainable consumerism has undergone remarkable social development, reflecting a growing societal concern for the environment and an increased awareness of the consequences of environmental neglect. Sustainability holds the promise of impacting society positively (Glausiusz, 2009), especially as emerging economies play a pivotal role in global economic development and exhibit an inclination towards ethical consumption and production. Companies aspiring to develop sustainable marketing strategies can benefit from assessing customer preferences for sustainable purchasing and leveraging strategies, standards, and instruments to promote environmental values and social responsibility (Jastram & Schneider, 2015).

Public environmental awareness provides a robust opportunity for companies to promote and expand the distribution of environmentally sustainable products. Sustainable fashion is undeniably gaining traction as a concept centered on creating fashion apparel that promotes social responsibility and minimizes environmental impact throughout the production process, ultimately fostering positive change (United Nations Sustainable Fashion COMMUNICATION STRATEGY 2021-2024, 2020). In essence, sustainable fashion exerts a profound influence on society and the planet and plays a vital role in enhancing the sustainability and durability of clothing (Bicho et al., 2024). The ultimate aim is to produce socially responsible, ecologically sound, and economically sustainable fashion items. This involves a commitment to sustainable fashion policies that emphasize the use of materials sourced responsibly, including organic and natural materials obtained without harmful pesticides (biodegradable materials). It extends to responsible production practices that reduce energy consumption and waste while incorporating renewable energy sources. The promotion of responsible distribution and consumption entails ethical supply chains and ethical working conditions for laborers, culminating in the creation of durable, long-lasting garments and a reduction in excessive consumption (United Nations Sustainable Fashion COMMUNICATION STRATEGY 2021-2024, 2020).

The construct of sustainable fashion can be delineated into eight dimensions:

- Recycled: Clothing crafted from recycled materials sourced from used garments;
- Organic: Products created from natural sources without toxic raw materials, elements, or pesticides;
- Vintage: Involves all used (second-hand) and remodelled clothing given new life;
- Vegan: All products devoid of genuine leather or animal components;
- Artisan: Products that carry on traditional ancestral skills;
- Locally made: Products contributing to local communities and economies with minimal transportation impact;
- Custom-made: Personalized designs that promote quality fashion design over mass production of disposable fashion;
- Fair Trade certified: Products created by companies that prioritize and respect their employees' human rights (Shen et al., 2013).

In conclusion, companies engaged in sustainable production within these dimensions must prioritize workers, human rights, and environmental protection. The growing consumer awareness of the impact of their purchases on the fashion industry, as well as their ethical responsibilities toward workers and working conditions, underscores the importance of this commitment to sustainability.

## **2.1. Factors leading to Attitudes and Sustainable (Consumption) Behaviour**

This section aims to provide an overview of the connections between factors like consumers' age, gender, income, and their attitudes and behaviors concerning sustainable consumption. Sociodemographic characteristics are recognized as important factors influencing actual sustainable fashion consumption as they play a direct role in shaping behavior and environmental concern, leading to the development of positive attitudes toward eco-friendly fashion (Panzone et al., 2016). Researchers widely believe that demographic variables, such as age, gender, and income, exert significant moderating effects on consumer behavior and attitudes. Attitudes toward sustainable fashion vary across different age groups of consumers. The age factor is particularly noteworthy and needs further research, as some studies have shown that there are similarities and differences in the perceptions between younger and more mature consumers, but also findings that younger consumers are more concerned with environmental issues and sustainable garment consumption (Manley, Seock & Shin, 2023;

Musova et al., 2021). Thus, the age of customers may be a key variable in examining attitudes and sustainable consumption, although these inconsistencies warrant further research (Dimitrova et al., 2022). Environmental knowledge and highly valued personal beliefs are also seen as strong drivers of consumer attitudes toward sustainable fashion. Gender of consumers significantly impact their attitudes toward sustainable fashion and their decisions to purchase sustainable fashion items and products. Female consumers, in particular, tend to express stronger emotions regarding environmental issues, recycling, sustainability, and the purchase and wearing of sustainable fashion products (Johnstone & Lindh, 2022). It is evident that attitudes toward sustainable fashion differ between men and women (Castagna et al., 2022). Therefore, factors such as age, gender, income, and more play a pivotal role in shaping attitudes toward sustainable fashion (Wu et al., 2016). If fashion is seen as a form of artistic expression for consumers and coupled with the adoption of sustainability trends and attitudes toward sustainable fashion, the fashion industry inevitably experiences growth and an increasingly sustainable trajectory. This aligns with existing and future environmental and social challenges while integrating prominent business models (Johnstone & Lindh, 2022). Lastly, the fundamental principle of the circular economy in fashion is to maximize the value of the original product throughout its lifespan and extend that lifespan as long as possible through sustainable fashion practices. This approach advocates for waste reduction via organic waste collection and reuse, emphasizing sustainability and recycling practices (McGill University Climate & Sustainability Strategy 2020-2025, 2020) as a crucial step in closing resource cycles within the circular economy. Consequently, consumers play a pivotal role in driving the circular economy. Hence, comprehending the factors that influence consumer attitudes toward sustainable fashion is vital, though further research is needed (McQueen et al., 2022). Furthermore, new directions are required to address global trends in resources, digitization, and environmental issues (Fatimah et al., 2023).

## **2.2. What is Fast Fashion vs. Slow Fashion and its Environmental Impact?**

The term "fast fashion" emerged in the 1980s and refers to the production of inexpensive, trendy garments rapidly sold in stores to capitalize on current trends (Herold & Prokop, 2023). The term implies a dominant business strategy centered on increased demand, production, consumption, and disposal (Garcia-Ortega et al., 2023). Fast fashion is characterized by short product lifecycles with a focus on profit maximization (Herold & Prokop, 2023). It encompasses rapid design, production, distribution, and marketing of garments (Yoo, 2023). Retailers flood the market with diverse products, offering consumers a wide variety of fashion choices almost instantly. However, this rapid cycle also generates significant waste and pollution, contributing to the perception of the fashion industry as the second-largest environmental polluter (Gomes de Oliveira et al., 2022). Fast fashion has several adverse impacts on the environment, including the emission of greenhouse gases, depletion of non-renewable resources, and excessive energy and water consumption (Cesarina Mason et al., 2022). Synthetic fibers, such as nylon, acrylic, and polyester, commonly used in fast fashion, decompose very slowly over long periods, sometimes taking several hundred years (Wren, 2022). This has contributed to the textile industry being recognized as one of the fastest-growing waste-producing industries on the planet (Cesarina Mason et al., 2022). Furthermore, the process of converting plastic fibers into textiles is energy-intensive, consuming significant amounts of oil and releasing acids and volatile particles. Cotton, another common material in fast fashion clothing, also poses environmental challenges due to the use of pesticides in its cultivation, which presents health risks to farmers. To mitigate the waste caused by fast fashion, seen as a phenomenon enabling a low-cost, resource-exhaustive, and high-concentration market (Herold & Prokop, 2023), the industry needs to transition to more sustainable fabrics like organic cotton, linen, lyocell, and wild silk (Wang et al., 2020).

In addition to its environmental impact, the fast fashion industry creates significant social issues (Peters et al., 2021), particularly in developing economies. These problems include the exploitation of a cheap labor force, predominantly young women working in industrial facilities, the presence of forced labor and child labor, an insufficiently defined legislative framework, significant tax incentives, and neglect of environmental regulations. Fast fashion prioritizes sales and profits over workers' rights, well-being, and working conditions (Oral, 2019). The rapid acquisition of clothing is associated with the production of textiles and garments that are both socially and environmentally harmful. Consumers continue to promote fast consumption through their behavior, attitudes, and decisions, leading to high levels of unsustainable pollution and a production status that largely violates human rights and creates a social problem (Joyner Armstrong et al., 2016). Consumers' environmental awareness is increasingly significant, and they better understand the impact of fashion textiles on nature and the environment. They also exhibit interest and concern for ethical practices in the fashion industry's production processes. These factors have given rise to a new approach to fashion based on principles aimed at extending the lifecycle of products, reducing the volume of consumer purchases, and raising ethical awareness in production and sales methods. Slow fashion encourages consumers to prioritize ethics and longevity in their fashion choices over rapid consumption of novelties and low prices (McNeill & Snowdon, 2019). Slow fashion, a movement initiated in 2008 (Gomes de Oliveira et al., 2022), is largely a response to the negative environmental impact, overproduction, complex supply chains, and thoughtless consumption associated with fast fashion. It centres on production that respects people, nature, and living beings. As awareness of climate change grows, the fashion industry and companies should invest in business models that promote clothing reuse and maximize product lifespans (Castagna et al., 2022). Models like buying used clothes, renting clothes with options for keeping, exchanging, or returning items, and then purchasing personalized equipment are highlighted as key factors for reducing rapid consumption and the fashion industry's environmental impact (Centobelli, 2022). In terms of slow fashion and sustainable fashion, it's not just about altruistic attitudes and behaviors; it raises the question of whether, ultimately, less is always more.

### **2.3. Sustainable fashion: current research and research directions**

The fashion industry is a leading environmental polluter (Styles, 2014; Castagna et al., 2022; Ellen MacArthur Foundation, n.d.). However, it also plays a significant role in the global economy, characterized by well-known brands competing in a dynamic market (Garcia-Ortega et al., 2023). Nevertheless, as consumers become more environmentally conscious and seek sustainable consumption patterns, thrifty shopping and slow fashion are emerging as responses to the negative impacts of fast fashion. Companies play a crucial role in adapting to consumer demands for sustainable practices, and those who do are more likely to achieve long-term success (Castagna et al., 2022). The fashion industry, despite its economic benefits in trade, income, and employment worldwide, ranks among the top polluters due to factors such as high consumption of raw materials and energy and extensive waste generation. However, increasing awareness and environmental concerns have led to the adoption of circular economy principles within production processes (Castro-Lopez et al., 2021). The textile industry, including the fashion sector, shows a growing interest in implementing the circular economy as a way to reduce environmental impact and mitigate business risks (Palm et al., 2021). The circular economy aims to minimize waste generation, emphasizing that companies and producers bear the responsibility for collecting and managing waste from their products at the end of their lifecycle. Addressing the lack of knowledge about clothing failure, adopting innovative approaches, and implementing new technologies are essential for textile companies to minimize textile waste (Cooper & Claxton, 2022).

To preserve natural resources like water and energy while reducing pollution and waste from the textile industry, companies, individuals, consumers, and society as a whole must take action. The approach should be holistic and driven by values and ethics (Niinimäki, 2015). Sustainable fashion, while addressing these concerns and issues, proves to be beneficial not only for consumers and producers but also for the environment and the planet (De Brito et al., 2008). The European Union has developed a Strategy for Sustainable and Circular Textiles to transform the textile sector. The strategy aims to stimulate progress within the industry and among consumers, creating a sustainable ecosystem for textiles by 2030 at the latest. It calls for changes in production and consumption processes and encourages the development of sustainable business models, innovations, and strategies (Kozłowski et al., 2019). These changes include producing more durable textile products that allow for repairs and recycling, enabling reuse and repair services for all, and holding manufacturers responsible for their products throughout the supply chain (European Commission EU Strategy for Sustainable and Circular Textiles, 2022). The textile industry, a major environmental polluter, generates excessive waste, and a substantial portion cannot be recycled. Approximately 25% to 40% of used textiles worldwide end up as waste or scrap, with many being exported to Asia and Africa, ultimately contributing to uncontrolled waste streams and landfills. The European Union aims to reduce excessive textile production and consumption while limiting the export of textile waste and holding textile producers responsible for their products after sale (European Commission EU Strategy for Sustainable and Circular Textiles, 2022). Microplastics released from synthetic fabrics into the environment, particularly during washing, pose risks as they enter the food chain. The European Union supports research on microplastics and their environmental effects, seeking ways to prevent their release. The abundance of environmental efficiency labels makes it challenging for consumers to discern their significance, with over 200 labels circulating in the European Union. Some labels lack clarity, reliability, or comprehensibility, leading to consumer confusion and a misleading impression of their environmental benefits, a practice known as "greenwashing." Educating consumers on making sustainable choices is crucial. In March 2023, the European Union proposed collective criteria to counter misleading environmental claims and greenwashing, requiring companies to substantiate their environmental assertions and implement reliable environmental labels (EU Ecolabel). This initiative aims to promote greater economic and environmental performance, social inclusiveness (Claxton & Kent, 2020), eliminate unfair competition, and increase companies' competitiveness. Given the substantial negative effects on the environment, including pollution, climate change, resource depletion, and biodiversity loss, measures and programs are underway to make the textile sector more sustainable and circular (European Commission EU Strategy for Sustainable and Circular Textiles, 2022).

### **3. METHODOLOGY**

Quantitative research was conducted in January 2021 using the Google Forms platform to create an online questionnaire. Respondents were engaged through virtual snowball sampling via email, social networks, and personal contacts. The questionnaire was not publicly accessible or promoted. The study focused on the attitudes of adult Croats toward sustainable fashion. The target group consisted of working-age adults residing in Croatia. As there was no standardized questionnaire available for assessing the impact of sustainable fashion on consumer clothing purchase decisions, the researchers designed the questionnaire based on previous work by Shen et al. (2013) and Ceylan (2019). The questionnaire comprised 15 questions. The first six questions aimed to gather information about the respondents' socio-demographic profiles, including gender, age, and fashion shopping budget. These questions were used to form independent variables: gender, age, and the monthly fashion shopping budget of the respondents.

The remaining nine questions were closed-ended and inquired about their attitudes and behaviors regarding various aspects of sustainable fashion. Respondents could select their answers using a 5-point Likert scale or, in some cases, by choosing a statement that best represented their attitude. The 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) was chosen because it is a commonly used tool for assessing respondent attitudes, and the participants were familiar with it. The section of the questionnaire containing questions related to attitudes toward sustainable fashion included the following statements, which were combined into one dependent variable, "Sustainable Fashion Preferences," and used to test the hypotheses: I prefer to buy clothing from fashion brands that have a sustainable clothing line.

- I find it important that a fashion brand uses organic materials in the clothing production.
- I find it important that a fashion brand uses recycled materials in the clothing production.
- I find it important that a fashion brand uses recycled and/or biodegradable packaging (bags, boxes, etc.).
- I find it important that a fashion brand uses environmentally friendly colours in the clothing production.
- I find it important that a fashion brand has a line of sustainable clothing that is clearly marked.

The research formed the following null hypotheses based on previous findings and relevant literature:

- Null Hypothesis 1 ( $H_{01}$ ). There is no difference in Sustainable Fashion Preferences between female and male respondents.
- Null Hypothesis 2 ( $H_{02}$ ). There is no difference in Sustainable Fashion Preferences between among age group means of the respondents.
- Null Hypothesis 3 ( $H_{03}$ ). There is no difference in Sustainable Fashion Preferences between group means of respondents with various spending budgets on fashion.

To test the hypotheses and determine whether each of the independent variables – age, gender, and spending budget, significantly influence the dependent variable – Sustainable Fashion Preferences, the adequate analysis for each hypothesis will be employed. In particular, the hypotheses will be tested using t-test or ANOVA, depending on number of groups, to compare group means and determine whether the differences between the groups are statistically significant.

#### 4. RESULTS

The first part of the questionnaire collected socio-demographic data as follows. A total of 263 individuals voluntarily participated in the survey, comprising 66.8% women and 33.2% men. The initial segment of the questionnaire focused on gathering socio-demographic information about the respondents. The age distribution is structured as such: 31.2% of respondents fall within the 18–26 age category, while 28.5% belong to the 27–35 age group. For remaining age categories, the distribution is as follows: 20.5% are in the 36–44 age group, and 19.8% are 45 or over years of age. Furthermore, the majority of respondents reported spending a monthly budget on clothing of up to HRK 500 (EUR 66.8), accounting for 74.5% of the sample. Another group falls within the budget range of HRK 501–1000 (EUR 66.9–133.5), making up 18.6% of the respondents. A smaller percentage, only 6.8%, has a monthly budget exceeding HRK 1001 (EUR 133.6). In the subsequent section of the questionnaire, participants were asked to indicate their level of agreement or disagreement with the previously mentioned statements regarding their preference for fashion brand sustainability factors using a five-point Likert scale, where 1 indicated 'strongly disagree' and 5 indicated 'strongly agree'. These statements were consolidated into a single variable called Sustainable Fashion Preferences.

To test the  $H_{01}$ , t-test was used, and the null hypothesis is rejected. Meaning, the t-test analysis has showed that there is statistically significant difference in Sustainable Fashion Preferences between female and male respondents. This study found that female respondents had statistically significantly higher Sustainable Fashion Preferences (Mean = 3.63) compared to male respondents (Mean=3.26),  $t(261) = -3.308$ ,  $p=0.001$ . The descriptive data are visible in Table 1.

*Table 1: Descriptive data of t-test*

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Sustainable Fashion Preferences	Male	87	3.2605	0.91735	0.09835
	Female	176	3.6250	0.80050	0.06034

*Source: own research data*

To test the  $H_{02}$ , an ANOVA test was used, and the null hypothesis is accepted. There was not a statistically significant difference in Sustainable Fashion Preferences between age groups of respondents, as determined by one-way ANOVA ( $F(1.281) = 2.812$ ,  $p = 0.281$ ). A post-hoc test was not conducted, since the significance level is higher than needed ( $p > 0.05$ ). Still, the oldest group has the highest mean (Mean=3.69), although the increase of the means between the groups is not linear. The descriptive data of the age groups are visible in Table 2.

*Table 2: Descriptive data of ANOVA analysis age groups*

Age group	N	Mean	Std. Deviation	Std. Error
18 - 26 y.o.	82	3.5142	.90427	.09986
27 - 35 y.o.	75	3.3911	.86407	.09977
36 - 44 y.o.	54	3.4691	.86879	.11823
45 or more y.o.	52	3.6891	.74024	.10265
Total	263	3.5044	.85660	.05282

*Source: own research results*

To test the  $H_{03}$ , an ANOVA test was used, and the null hypothesis is accepted. There was no statistically significant difference in Sustainable Fashion Preferences between group means of respondents with various spending budgets on fashion, as determined by one-way ANOVA ( $F(0.574) = 0.846$ ,  $p = 0.564$ ). A post-hoc test was not conducted, since the significance level is higher than needed ( $p > 0.05$ ). Still, the group with the highest budget has the highest mean (Mean=3.71), while the increase of the means between the groups is almost linear. The descriptive data of the age groups are visible in Table 3.

*Table 3: Descriptive data of ANOVA analysis fashion budget groups*

Fashion budget groups	N	Mean	Std. Deviation	Std. Error
up to 500HRK	196	3.4915	.86392	.06171
from 501HRK to 1000HRK	49	3.4796	.82330	.11761
more than 1001HRK	18	3.7130	.88526	.20866
Total	263	3.5044	.85660	.05282

*Source: own research results*

## 5. DISCUSSION

To this point, no research in Croatia has explored the link between consumer socio-demographic factors and attitudes toward sustainable fashion. Therefore, this study seeks to address this gap by investigating how certain factors might influence the attitudes of Croatian consumers toward sustainable fashion. The results of this research contribute to the broader understanding of sustainable fashion attitudes among consumers in Croatia and highlight the influence of various socio-demographic factors. The findings align with previous research, in the sense that gender plays a significant role in shaping sustainable fashion preferences. The study showed that female respondents exhibit higher Sustainable Fashion Preferences than their male counterparts, a result consistent with numerous studies (Johnstone & Lindh, 2022; Castagna, et al., 2022). This supports the idea that women tend to express stronger emotions towards environmental and sustainability issues in the context of fashion. However, the study also uncovered some insights into age and spending budget. Unlike some previous research, this study found no statistically significant difference in Sustainable Fashion Preferences among different age groups. While prior studies have produced conflicting results, this research underscores that age may not be a critical determinant of sustainable fashion attitudes in the Croatian context, implying the potential for unique regional influences (Dimitrova et al., 2022; Park & Lin, 2020; Zhang et al., 2021). Still, the oldest age group has the highest mean value for Sustainable Fashion Preferences, although this finding was not found to be statistically significant, which might be due to the smaller number of respondents in each of the age groups. Likewise, there was no statistically significant difference in Sustainable Fashion Preferences between respondents with various spending budgets on fashion. This outcome suggests that in Croatia, consumer attitudes toward sustainable fashion may not be significantly influenced by their fashion budget. Previous research has established a connection between higher income levels and greater support for sustainable fashion (Wu et al., 2016). It has also been shown that a willingness to spend more has a positive impact on the inclination to purchase from sustainable fashion brands (Wijaya & Paramita, 2021). Although the means of the groups have shown that Sustainable Fashion Preferences grow with a higher budget, the two groups with a higher budget are still small, which suggests that the results might be different if a larger sample size were used. These results demonstrate the need for more research to discern the complex dynamics at play in different cultural and economic settings. The limitations of this study encompass several aspects, including the relatively modest sample size, gender, and age distribution, as well as variations in budget for clothing spending. Furthermore, individuals might exhibit reluctance to share their views on sustainability and ethical behaviour, even though the survey guarantees anonymity. Additionally, like much of marketing research, this study was conducted only within a specific time frame. Nevertheless, it is essential to acknowledge that these limitations, while present, do not diminish the valuable contribution this research makes to the ongoing discourse on this topic.

## 6. CONCLUSION

This research is significant as it addresses the shortage of studies exploring the relationship between consumer socio-demographic factors and attitudes towards sustainable fashion in Croatia. It provides valuable insights into the specific context of this country and highlights the factors that are important drivers of Sustainable Fashion Preferences. By understanding these dynamics, policymakers, fashion industry stakeholders, and sustainability advocates can develop more targeted strategies to promote sustainable fashion in the region, with the potential to further develop strategic models with the aim of wider application beyond the specific region. Moreover, the findings of this research emphasize that the relationship between socio-demographic factors and sustainable fashion attitudes is multifaceted and context-dependent.



While gender emerged as a critical factor, age and spending budget did not show a significant impact on attitudes, suggesting that consumer behavior in Croatia differs from trends observed in other regions. This study acts as a reminder of the importance of considering local cultural and economic nuances when addressing sustainability issues and thus provides the possibility of recognizing the overview that potentially appears in the present, concrete time, but also quotes towards the future. It is expected that this study will be a stimulus for further research in the field of sustainable fashion, and related to various factors that influence behaviors related to sustainability, consumption, and sustainable fashion. As we look to the future, it is evident that further research in this area is essential, especially considering the growing need for sustainability in the textile and fashion industry, which has prompted the adoption of a range of strategies with technological implications, not only regionally but also globally. A more extensive and diverse sample, along with longitudinal studies, can provide a more comprehensive understanding of how sustainable fashion attitudes evolve. Investigating other potential influencing factors such as cultural factors, or geographic location may offer additional insights. The findings presented here are a valuable step towards promoting sustainability in the fashion industry and can serve as a foundation for more targeted research to inform policy and practice in this part of the European Union. However, as stated, this study should be a significant stimulus for further research in the field of sustainable fashion and the correlation of various factors that influence behaviors related to sustainability, consumption, and sustainable fashion, and in the long term, it is possible to contribute to the development of different, more innovative sustainable business models and approaches in the textile and fashion industry.

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## THE IMPORTANCE OF ENERGY: A HISTORICAL AND GEOPOLITICAL OUTLOOK

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### ABSTRACT

*Energy is the sine qua non of our everyday life. Before the Industrial Revolution in England, humanity relied practically upon renewable energy sources. It is the recourse to fossil fuels (coal, oil and gas), which has radically transformed the way of life on earth. Access to fossil fuels became crucial in the great power competition at the beginning of the 20th century. Although the goal of (re)turning to a world relying on renewable energy sources has been officially proclaimed and espoused at the global level, the question arises whether the main world powers are willing to loosen their grip on fossil fuels at their disposal and thereby risk a decrease in their political and economic influence in international affairs.*

**Keywords:** *Energy, History, Geopolitics, International relations, Geopolitical conflicts, Global economy*

### 1. INTRODUCTION

This article is divided into three parts. The first part refers to the importance of energy for the development of humanity. The second part is focused on the geo-economic aspect of energy policy, that is, on the role of energy in the global geopolitical competition, especially between the Americans and the Russians on the European continent. In the third part, we will address the perspectives of a global reshuffle of energy supplies.

### 2. THE IMPORTANCE OF ENERGY FOR THE DEVELOPMENT OF HUMANITY

In his study "Dunamis i energeia u Aristotela (Dunamis and energeia in Aristotle)", Zvonimir Čuljak points to the role of the terms *energeia* (ἐνέργεια, i.e., actuality) and *dynamis* (δύναμις, i.e., potentiality) in Aristotle's criticism of Plato: "One of the strongest objections to the theory of ideas is addressed precisely by means of the terms δύναμις and ἐνέργεια" (1989, p. 1358). He then refers to Aristotle himself, who asserted in his *Metaphysics*: "If, therefore, there are [...] ideas, there must be something much more knowing than knowledge-itself and [more] mobile [kinoumenon] than movement; for these are more actualities, and those [knowledge- and motion-themselves] are potentialities for these" (1985, p. 75). Aristotle thus concludes: "That actuality, then, is prior both to potentiality and to every origin of change, is evident" (ibid., p. 76). "Energy" in the sense of actuality (or reality) is, therefore, the foundation, it is the *conditio sine qua non*. Switching to our contemporary understanding of "energy", according to James L. Sweeney, there are basically two approaches to define it: "In physical science terminology, 'energy' is the capacity for doing work, e.g., lifting, accelerating, or heating material. In economic terminology, 'energy' includes all energy commodities and energy resources, commodities or resources that embody significant amounts of physical energy and thus offer the ability to perform work. Energy commodities – e.g., gasoline, diesel fuel, natural gas, propane, coal, or electricity – can be used to provide energy services for human activities, such as lighting, space heating, water heating, cooking, motive power, electronic activity. Energy resources – e.g., crude oil, natural gas, coal, biomass, hydro, uranium, wind, sunlight, or geothermal deposits – can be harvested to produce energy commodities" (2011, p. 4513). Having in mind the structure of today's world, we can easily conclude from these two definitions that energy (in line with our contemporary understanding) is an indispensable element, a foundation of our economies and societies.

This energy of ours is still largely (82 percent at the world level) generated from fossil fuels (oil, gas, coal). However, how did the world look like some ten thousand years ago in regard to energy use? In his book *How the World Really Works*, Vaclav Smil, a Canadian scientist with Czech roots, states that “Domestication of working animals, starting with cattle some 9,000 years ago, supplies the first extrasomatic energy other than that of human muscles – they are used for field work, for lifting water from wells, for pulling or carrying loads, and for providing personal transportation. And much later come the first inanimate prime movers: sails, more than five millennia ago; waterwheels, more than two millennia ago; and windmills, more than a thousand years ago” (2022, p. 15). According to Smil’s estimate, even until five hundred years ago, “more than 90 percent of all useful mechanical energy was provided by animate power, roughly split between people and animals, while all thermal energy came from the combustion of plant fuels (mostly wood and charcoal, but also straw and dried dung)” (ibid., p. 16). Mankind basically lived in a world without fossil fuels. Things started to change in the 17th century. Namely, “an island society” began to burn increasingly “coal, a fuel produced by photosynthesis tens or hundreds of millions of years ago and fossilized by heat and pressure during its long underground storage. The best reconstructions show that coal as a heat source in England surpasses the use of biomass fuels around 1620 (perhaps even earlier); by 1650 the burning of fossil carbon supplies two-thirds of all heat; and the share reaches 75 percent by 1700” (ibid.). Vaclav Smil concludes that, in regard to the use of fossil fuels, England was in the vanguard: “all the coalfields that make the UK the world’s leading 19th-century economy are already producing coal before 1640. And then, at the very beginning of the 18th century, some English mines begin to rely on steam engines, the first inanimate prime movers powered by the combustion of fossil fuel” (ibid.). How much more advanced England was around the year 1800 than the rest of the world is shown by the fact that coal extraction in several European countries and the United States represented a small part of British production. Namely, until 1800, 98 percent of heat and light in the world was generated by green fuels, and 90 percent of mechanical energy was generated by the muscle mass of animals and people. The first hydroelectric power plants in the world, at Niagara Falls in the US and on the Krka River (Jaruga) in Croatia, were put into operation in 1895. At that time, diesel engines with internal combustion had already started to be used. Around 1900, machines, that is, inanimate prime movers, generated 50 percent of the world’s mechanical energy. In just one hundred years, great changes had taken place. Half a century later, in 1950, three quarters of primary energy in the world was generated by fossil fuels (mostly coal), while 80 percent of mechanical energy was produced by machines driven by internal combustion engines. At present only 5 percent (!) of mechanical energy in the world is generated by human and animal muscles. The level of human development today, especially in the countries of the West, implying specifically the expansion of well-being and the extension of human life, is correlated with progress in the area of energy use. Put more explicitly, life in our contemporary world is the result of an energy revolution based on the use of fossil fuels. Vaclav Smil estimates that the efficiency of using fossil fuels has increased a spectacular 3500 times from 1800 to today and that the average inhabitant of the globe currently has 700 times more energy at his disposal than his ancestors at the beginning of the 19th century (Smil, 2022, p. 19). The rapid increase in the number of inhabitants on our planet is also largely the result of the use of fossil fuels: the world population rose from one billion in 1800 to 1.6 billion in 1900 and 3 billion in 1960. In 2000 it exceeded 6 billion. Today, there are more than 8 billion inhabitants on our planet. And how do we stand today in regard to dependence on fossil fuels? At the world level, dependence on fossil fuels (oil, gas, and coal) amounts to approximately 82 percent, Europe itself somewhere approximately 70 percent, and Pacific Asia, which includes China and India, approximately 85 percent. Croatia is at the level of the European average.

In the case of Germany, which has the largest economy in Europe, dependence on fossil fuels amounts to 76 percent, which is above the European average. Despite hundreds of billions of euros invested in renewable energy sources over the past twenty years, within the framework of the *Energiewende* (i.e., energy transition), between 2000 and 2019 dependence on fossil fuels was reduced by only 6 percent: "If continued, this rate of decline would leave fossil fuels still providing nearly 70 percent of the country's primary energy supply in 2050" (Smil, 2020, p. 23). The large share of renewable energy in Germany refers to the production of electricity (approximately 50 percent). However, industry in Germany needs gas and coal, which cannot simply be replaced by renewables. In conclusion, our civilisation is so dependent on fossil fuels that the transition, i.e., the return to renewable energy sources, which is the proclaimed goal at the world level, will require a lot of time and a lot of money.

### 3. GEOPOLITICAL ASPECTS OF ENERGY POLICY

We already stated that England became a world superpower because it was the first country to use fossil fuels, that is, coal, on a large scale. The industrial revolution was based on the use of fossil fuels. Coal was also used as fuel in the British navy, the former "ruler of the seas". A major change in the British Navy was brought about by Winston Churchill, who in 1911 was appointed its political leader (*First Lord of the Admiralty*). Faced with the strengthening of the military power of the German Empire, especially its navy, he decided, as Daniel Yergin writes in his book *The Prize: The Epic Quest for Oil, Money, and Power*, "that Britain would have to base its 'naval supremacy upon oil' and, thereupon, committed himself, with all his driving energy and enthusiasm, to achieving that objective (1991, p. 12). Churchill was insightful: oil is much more efficient in energy conversion. Later it turned out, still according to Yergin, that oil "meant mastery throughout the twentieth century" (ibid.). In the Second World War access to oil was crucial. Germany, which under the leadership of Hitler started the largest military conflict in the history of mankind by attacking Poland, was not self-sufficient in terms of energy. The troops of the Third Reich were successful when operations were relatively short-lived, for example, against Poland in 1939 and against France in 1940. The attack on the Soviet Union in June 1941 showed very quickly that Germany had energy problems, that is, it did not have enough oil. Or as Walter Godfried Jensen formulates in the article "The Importance of Energy in the First and Second World Wars": "The whole German position was handicapped by lack of oil. Europe is, on the whole, a non-producer of oil and, in wartime, Germany could not procure supplies from her usual peacetime sources" (1968, p. 548). The production of domestic synthetic fuel was not sufficient for German military needs. "The experience of the second World War", Jensen concludes, "can therefore be said to have amplified the experience of the first World War. The harnessing of the internal combustion engine to warfare meant a war of movement, and a military power with insufficient oil at its disposal could not wage war for long against an equal power or powers with ample petroleum resources" (ibid., p. 554). That power was America, which supplied oil to, amongst others, Britain and the Soviet Union, the hardest nuts to crack for the German armed forces. What we are witnessing today is a great energy battle between the United States and Russia, especially in regard to the European continent. As a result of Russia's 2022 invasion of Ukraine, a strong "narrative" emerged, partly in Germany itself, that the Germans had made a crucial mistake by contracting Russian gas in the long run. Realistically speaking, not only the Germans but also many others in Europe had acted quite rationally. They tended to acquire energy resources at the lowest possible prices. Had the Americans been able to provide them with the necessary energy resources, the Germans and other Europeans might have bought them in the United States. In fact, it is only quite recently that things could start to change in this respect. Approximately ten years ago, shale oil and shale gas began to be extracted on a large scale in the United States.

Having practically become energy self-sufficient, the Americans developed a strategy to expand the distribution of their liquefied natural gas to Europe to counter Russia's status as a privileged energy supplier of the Europeans. However, the current American-Russian energy conflict is not something new. It is basically the fourth major conflict between the West and Moscow in the last hundred years. The first major confrontation took place after the Great War and the coming of the Bolsheviks to power in Russia. The Soviets expropriated Western companies that had been pumping oil in Russia. The Western companies demanded compensation for lost property, to which the Soviets did not agree. Instead, they accepted technological cooperation with the West. As stated by Jeronim Perović in his article "Energieflüsse und Embargos: Ost-West-Beziehungen im 20. Jahrhundert (Energy Flows and Embargoes: Relations between East and West in the 20th Century)": "As early as 1924, based on American plans, the Soviet Union built production facilities that could produce themselves some of the technology necessary for oil production, including drilling rigs, pumps for deep drilling and rotary drilling systems. Nevertheless, the proportion of material imported from abroad was significant: approximately one-fifth of the equipment delivered in 1925/26 to the Soviet state oil companies (trusts) Asneft and Grozneft was of foreign origin. At that time, Americans, British and Germans were the main suppliers to the Soviet oil industry. Companies from these countries were particularly active in modernising production facilities and building pipelines and refineries. With the help of technology, knowledge, and investments from abroad, the Soviet Union succeeded within a few years in repairing the oil industry and ramping up production. By the end of the 1920s, the Soviet Union had become one of the most important international suppliers of oil and, thanks to its cheap oil, quickly gained a significant market position in Great Britain, Germany, Italy, and other countries" (2021, p. 64). The second major confrontation occurred in the early 1960s, when the Soviet Union was already producing more oil than Venezuela and represented the second largest oil producer in the world, behind the United States. At that time, it seemed that the "State Department basically knew that Soviet oil exports posed no real threat to Europe [...]. However, because it was still not in Washington's interest for the Soviet Union to gain access to foreign currency and thus to technology from the West through oil deliveries, the American strategy deliberately aimed at politicising Soviet oil exports. Members of the US administration then emphasised the security threat posed to the West by the Soviet Union" (ibid., p. 68). To prevent the construction of the more than 4,000-kilometer-long Druzhba pipeline, which was supposed to connect the oil fields in Western Siberia with the communist Soviet satellite states in Eastern Europe, the United States managed within NATO to impose the adoption of a secret resolution with the aim of preventing its member states from exporting pipes to the USSR. Indeed, as pointed out by Jae-Sung Lee and David Connolly in their paper "Pipeline Politics between Europe and Russia: A Historical Review from the Cold War to the Post-Cold War", the (Western) Germans "complied with the resolution but faced a political crisis at home for doing so" (2016, p. 110). However, in the end the embargo failed because of the Italians and the British having preferred to view the resolution as a recommendation rather than a directive. Hence the Soviet Union succeeded in building the Druzhba oil pipeline – with technological support from NATO member countries. The third major energy conflict took place twenty years later, in 1981 and 1982, when the US government under the leadership of President Ronald Reagan tried to "torpedo the construction of the first international pipeline for the export of gas between the large West Siberian gas fields and Europe" by applying sanctions (Perović, p. 59). In the end, the Americans gave in because they could not provide the necessary gas to Western Europe. Thus, the Bratstvo gas pipeline was nevertheless constructed, and it is still in operation today. The fourth energy confrontation between the US-led West and Russia is underway. It started, as we already pointed out, a decade ago.



In this context, it is noteworthy to mention a study published in 2014 by the American think tank Atlantic Council under the title "Completing Europe: From the North–South Corridor to Energy, Transportation, and Telecommunications Union", which gave rise to the Three Seas Initiative. It continued with the American effort to prevent the construction of the Nord Stream 2 pipeline and culminated in sanctions against Russia due to its military incursion into Ukraine. Again, why have Americans become so self-assured? Because they have practically become self-sufficient in terms of energy and put up an impressive capacity to export gas and oil, as it is said in the introduction of the study of the Atlantic Council, co-signed by general James Jones, President Barack Obama's National Security Adviser and former Supreme Allied Commander Europe: "it is absolutely essential to phase out outdated US restrictions on exports of crude oil and natural gas, in order to increase liquidity and enhance Europe's energy security. Supporting the [North–South] corridor is also a direct way for Washington to help strengthen Central Europe's resilience against Russian intimidation and aggression" (2014, p. 2).

#### **4. PERSPECTIVES OF A GLOBAL RESHUFFLE OF ENERGY SUPPLIES**

How will things develop in the future? In November 2022 in Indonesia at the meeting of the G20 Group, a forum that brings together nineteen countries and the European Union as such, and that represents approximately 85 percent of the world's economy, over 75 percent of world trade and two-thirds of the world's population, the present leaders reiterated their "commitment to achieve global net zero greenhouse gas emissions/carbon neutrality by or around mid-century, while taking into account the latest scientific developments and different national circumstances" (p. 4). Thus, the fight against climate change has gained global legitimacy. The Paris Agreement, a legally binding international treaty on climate change, was reached at the end of 2015 under the auspices of the United Nations with the aim of limiting the increase in the average temperature at the world level to well below 2 °C, i.e., up to 1.5 °C in relation to the preindustrial period. To put it simply, an agreement was reached at the world level that humanity should give up fossil fuels (coal, oil and gas) and "return" to a life in which we will obtain energy from renewable sources. If the "world community" truly wants to achieve this goal, then it needs to accept several things: (i) investing enormous financial resources in the exploitation of renewable energy sources, (ii) having recourse to nuclear energy, (iii) abandoning the social and economic model based on the principle of indispensable growth, and (iv) what particularly concerns some countries that have risen to power on the basis of fossil energy self-sufficiency, for example, the US, Russia or Canada, accepting the possibility of changes in the world order to their detriment.

#### **5. CONCLUSION**

The Global Commission on the Geopolitics of Energy Transformation, which was formed in 2018 within the framework of the International Renewable Energy Agency (IRENA), states in its 2019 report "A New World: The Geopolitics of the Energy Transformation", the following: "The accelerating deployment of renewables has set in motion a global energy transformation that will have profound geopolitical consequences. Just as fossil fuels have shaped the geopolitical map over the last two centuries, the energy transformation will alter the global distribution of power, relations between states, the risk of conflict, and the social, economic and environmental drivers of geopolitical instability" (p. 12). Bearing in mind that the states that are self-sufficient in terms of fossil fuels (coal, oil, and gas) are threatened with the loss of influence in regional and world affairs due to the proclaimed transition to renewable energy sources, inevitably, the question arises as to why they would just give up their geopolitical trump. Only a "higher force" can force them to do so. This is what history teaches us. A person changes his habits only if he or she is forced to do so. So do states. Interesting times are ahead of us.

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## THE RELATION BETWEEN MOTIVES FOR WOMEN ENTREPRENEURSHIP AND THE MACROLEVEL DETERMINANTS IN SELECTED EU COUNTRIES

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### ABSTRACT

*The factors that determine women's decisions to start a business are many. They are related both to the characteristics of women as individuals and to the surrounding external environment. The purpose of the paper is to explore the main motivations for starting a business by women and to examine the interrelationship between them and certain macro-environmental factors. From the values of the correlation coefficients presented in the correlation matrix, a statistically significant relationship between the factors and motives was found only for one of the four motives included in the study. The main hypothesis tested in the study is that with the increase in the values of the factors GDP, Human Capital and Knowledge Creation, the share of women who start a business for the reason to earn a living because jobs are scarce decreases. Simple and multiple regression are applied for the purpose. The results confirm the expected influence when using simple regression models. The research covers 15 EU member states, and the data for the variables are for the year 2021.*

**Keywords:** *Women entrepreneurship, Entrepreneurial motives, GDP, Human Capital and Knowledge Creation*

### 1. INTRODUCTION

In today's world, managerial attention is increasingly directed towards female entrepreneurs due to the potential they possess. It is believed that women, who make up almost half of the human population, are a resource that has not yet been fully used for the benefit of economic development. Data shows that the proportion of female entrepreneurs is lower than that of men, a difference stemming from various factors related to both the specific characteristics of women and a range of environmental circumstances and factors. According to GEM 2022/23 Women's Entrepreneurship Report (GEM, 2023), one in six women declared intention to start a business in the near future, while among men, one in five men declared such an intention. An interesting fact is that these intentions were highest for women in low-income countries and lowest in high-income countries. Additionally, women from lower-income countries tend to offer more innovative products compared to those from higher-income countries. On a global scale, there is a difference in the motives for starting a business between women and men (Zahariev, Simeonov, & Zaharieva, 2021). About 5% more women start businesses due to job scarcity compared to men. Another dominant reason for women to start a business is to make a difference. Two other main reasons cited for starting a business are building wealth and continuing family traditions. Alongside the motives for starting a business, of interest are the factors underlying them and their influence. The development of an individual's personality largely depends on the environment in which they are born and raised. Family environment, education, economic well-being, and communication all play significant roles (Bogdanova, 2019). Similarly, entrepreneurship largely depends on the conditions established by the state, including the entire regulatory framework, the economic, the educational, and the other infrastructure it has built. This defines the aim of this study, which is to examine the main motives for women starting a business and explore the interrelation between these motives and certain macro-environmental factors.

Our research is focused on the EU member countries, which, despite shared policies and regulations, differ in many aspects. We aim to establish how this heterogeneity influences the motives of female entrepreneurs.

## **2. MOTIVES FOR ENTREPRENEURSHIP in the literature**

The question of what motivates women to start businesses is of interest to many researchers. A review of the literature shows that they approach the issue from various perspectives. The motives for female entrepreneurship are analyzed through the lens of institutional and feminist theories, various motivational theories (Martínez-Canas, Ruiz-Palomino, & Jimenez-Moreno, 2023) (Roy & Manna, 2014), the specificity of different countries (Ahmad, Bakri, & Baharun, 2016) or groups of countries (Kaya, Erkut, & Thierbach, 2019) or from the viewpoint of specific economic sectors. A significant portion of publications is based on the push and pull theory to explain entrepreneurial motives. Push factors include external factors with negative impact such as unemployment, lack of career development opportunities, lack of higher education, job insecurity, and other. Pull factors, identified as positive, encompass desires for higher income, economic freedom, autonomy, market opportunities, business familial backgrounds, and other (van der Zwan, Thurik, Verheul, & Hessels, 2016) (Dhar, Farzana, & Ibne Abedin, 2022). Comparatively few studies delve into the factors that influence women's decisions to start a business within a macroeconomic context. A study of Tomak (Tomak, 2018) examines the effects of some macroeconomic factors on the dynamics of entrepreneurial activity in Turkey. The factors tested include foreign direct investment, unemployment rate, industrial production index, access to credit, economic confidence index. The study establishes a positive correlation with foreign direct investments, industrial production index and inflation. Other authors, Požega and Ribić confirm the hypothesis, that in economically more developed regions of Croatia, there are more students expressing a desire to become entrepreneurs compared to the less developed areas (Požega & Ribić, 2022). Vidal-Suñé and López-Panisello study the relationship between government policies and regulation, market dynamics, GDP per capita, unemployment, inflation and education and training in entrepreneurship and the perception of business opportunities (Vidal-Suñé & López-Panisello, 2013). They found that there is a positive relation between government regulation and the perception of business opportunities, negative between GDP and perception of business opportunities, and no relationship between entrepreneurship education and training and perception of business opportunities.

## **3. METHODOLOGY**

Based on the presented ideas and the availability of data, we will investigate the four motives for the decision to start a business, covered in the GEM 2021/22 Women's Entrepreneurship Report: *Motive 1. To make a difference in the world; Motive 2. To make a difference in the world; Motive 3. To build great wealth or very high income; Motive 4. To earn a living because jobs are scarce* (GEM, 2021). The determinants the impact of which we will examine are three: Gross Domestic Product per capita (GDP), Human Capital (Zaharieva, Zaharieva, Mihaylova, & Ivanova, 2022), and Knowledge Creation. GDP is a complex indicator (Zaharieva, et al., 2020) reflecting the state of the economy and the citizens' well-being. The source of GDP data is the World Bank, presented in thousands of international dollars per capita based on purchasing power parity. The other two factors are pillars within the comprehensive indicator in the Asian Index of Digital Entrepreneurship System (AIDES), based on the European Index of Digital Entrepreneurship Systems (EIDES) (Autio, Komlósi, Szerb, & Tiszberger, 2021). They are part of the Systemic Framework Conditions that describe the country's resource provision for entrepreneurship. Human Capital is determined based on multiple indicators such as the quality of the educational system, the quality of higher education, life-long learning, labor market conditions, employed ICT specialists, individuals with digital skills and other.

Knowledge creation and dissemination is related to Research and innovation capacity, quality of research institutions, technology and knowledge transfer, skillset of graduates, efficient use of talent, professionals, and researchers and others related to the digital part of the pillar. This two variables have score from 0 to 100. Our main hypothesis is that with the increase in the values of the three independent factors, the proportion of women starting businesses to earn a living because jobs are scarce will decrease. The database includes data for the year 2021 for all variables for 15 EU member-countries (Croatia, Cyprus, France, Germany, Greece, Hungary, Latvia, Lithuania, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain and Sweden). The limitation in the sample is due to the lack of data for some of the variables included in the study. To test the influence of the selected factors on women's individual motives, we will use the Pearson coefficient, which provides us with the strength and direction of the dependence between variables, as well as simple linear regression and multiple regression with spatial data. Simple regression will allow us to assess how the tested factors affect the dependent variable. On the other hand, multiple regression will enable us to investigate the cumulative impact of the selected factors on the motives for entrepreneurship. SPSS was used for the purposes of this study. The descriptive statistics of the collected data are shown in Table 1.

	To make a difference in the world	To build great wealth or very high income	To continue a family tradition	To earn a living because jobs are scarce	GDP	Human Capital	Knowledge_ creation
Mean	43.2	45.0	27.9	64.5	42.9	41.2	50.6
Standard Error	4.2	3.9	5.4	4.2	2.7	4.5	4.9
Median	44.5	44.3	23.9	68.9	40.8	37.2	43.6
Mode	12.0	24.0	10.5	45071.0	31.3	23.2	29.9
Standard Deviation	16.2	15.0	20.9	16.1	10.4	17.3	18.9
Sample Variance	261.8	223.6	438.0	260.3	107.5	299.3	357.3
Kurtosis	-0.4	0.3	10.2	0.9	-0.3	3.0	0.1
Skewness	-0.2	0.8	3.0	-1.2	0.9	1.7	1.2
Range	59.6	52.9	87.5	56.7	32.5	65.4	59.2
Minimum	12.0	24.0	10.5	25.5	31.3	23.2	29.9
Maximum	71.6	76.9	98.0	82.2	63.8	88.6	89.1
Sum	648.1	675.3	418.1	968.0	643.5	617.7	758.7
Count	15	15	15	15	15	15	15

*Table 1: Descriptive statistics  
 (Source: Authors' calculations)*

#### 4. RESULTS AND DISCUSSION

From the presented in the correlation matrix values of Pearson correlation, it was established that at a significance level of 0.01, there is a statistically significant and very strong correlation between *Motive 4. To earn a living because jobs are scarce* and Knowledge Creation (-0.930), as well as between *Motive 4* and Human Capital (-0.903). Additionally, there is a strong correlation between *Motive 4* and GDP (-0.859).

These correlation relationships are inverse (negative), and indicate opposite directions of change in the variables, as the values of the coefficients are negative (See Table 2).

		To make a difference in the world	To build great wealth or very high income	To continue a family tradition	To earn a living because jobs are scarce	GDP	Human Capital	Knowledge creation
To make a difference in the world	Pearson Correlation	--						
	N	15						
To build great wealth or very high income	Pearson Correlation	-.056	--					
	Sig. (2-tailed)	.842						
	N	15	15					
To continue a family tradition	Pearson Correlation	-.518*	-.425	--				
	Sig. (2-tailed)	.048	.114					
	N	15	15	15				
To earn a living because jobs are scarce	Pearson Correlation	-.250	.216	.208	--			
	Sig. (2-tailed)	.368	.438	.458				
	N	15	15	15	15			
GDP	Pearson Correlation	.240	-.051	-.319	-.859**	--		
	Sig. (2-tailed)	.389	.856	.247	<.001			
	N	15	15	15	15	15		
Human Capital	Pearson Correlation	.191	-.195	-.179	-.902**	.855**	--	
	Sig. (2-tailed)	.496	.485	.522	<.001	<.001		
	N	15	15	15	15	15	15	
Knowledge creation	Pearson Correlation	.195	-.197	-.214	-.930**	.960**	.931**	--
	Sig. (2-tailed)	.486	.483	.443	<.001	<.001	<.001	
	N	15	15	15	15	15	15	15
*. Correlation is significant at the 0.05 level (2-tailed).								
**. Correlation is significant at the 0.01 level (2-tailed).								

Table 2: Correlation matrix  
 (Source: Authors' calculations)

At the same significance level, a very strong statistically significant correlation is found between Knowledge Creation and GDP (0.960), as well as between Knowledge Creation and Human Capital (0.931), and a strong correlation between Human Capital and GDP (0.855). These relationships are direct (positive) and indicate a unidirectional change in the variables. Moderate correlation is also observed between the first and the third motives for starting a business at a significance level of 0.05.

Some of the examined relationships show moderately high values of correlation coefficients, such as those between GDP and the third motive or between the second and the third motives, but they are not statistically significant. The established statistically significant relationships provide us with a basis for further investigation through regression analysis to obtain additional information - to construct regression models of the studied relationships, check the adequacy of the models, and assess the statistical significance of the parameters of the regression equations. For that purpose, we will use single regressions between the independent variables (factors) GDP, Human Capital, Knowledge Creation, and *Motive 4. To earn a living because jobs are scarce*. The first dependency examines the relationship between GDP per capita and *Motive 4. To earn a living because jobs are scarce*. The descriptive statistics shows that the average income is 42.9 thousand for the examined countries, while the average percentage of women starting businesses due to the specified reason is 64.5. The coefficient of determination ( $R^2=0.738$ ) indicates that 73.8% of the variations in the percentage of women starting businesses for this reason can be explained by changes in income (See Table 3). Conversely, 25.2% of the variation in the percentage of women starting businesses is not due to income changes but rather to other factors that are not included in the model.

Model <sup>b</sup>	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.859 <sup>a</sup>	.738	.718	8.56
a. Predictors: (Constant). GDP				
b. Dependent Variable: To earn a living because jobs are scarce				

Table 3: Model summary with predictor GDP  
 (Source: Authors' calculations)

The analysis of variance (ANOVA) provides information on the statistical significance (Sig) of the correlation coefficient and whether the regression model is adequate (Fisher's criterion for model adequacy, F). In this case, the values of F (36.7) and Sig. (<.001) indicate that the model is both adequate and statistically significant (See Table 4).

Model <sup>a</sup>		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2690.8	1	2690.8	36.701	<.001 <sup>b</sup>
	Residual	953.1	13	73.38		
	Total	3643.9	14			
a. Dependent Variable: To earn a living because jobs are scarce						
b. Predictors: (Constant). GDP						

Table 4: ANOVA with predictor GDP  
 (Source: Authors' calculations)

The parameters of the regression model for the investigated relationship between GDP per capita and *Motive 4. To earn a living because jobs are scarce* are statistically significant. The coefficients for the constant term and GDP are statistically significant. The regression coefficient b ( $\beta$ ) is -1.4, indicating that an increase in income by a thousand dollars will decrease the percentage of women starting a business "To earn a living because jobs are scarce" by 1.4% (See Table 5). The constant term of the model represents the average value of the dependent variable (y) when the independent (factor) variable is zero. It is important to note that in regression analysis, the constant term does not hold substantive meaning and interpretation, hence the practical significance lies in interpreting the regression coefficient b. The interval for b indicates that at a 95% confidence level, the value of the constant term will be between 100 and 142, while for GDP, it will be between -1.8 and -0.86.

The mean error is zero, as are the Std. Predicted Value and Std. Residual, indicating no difference between Observed values and Predicted values.

Model <sup>a</sup>		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	121.9	9.79		12.537	<.001	100.9	142.9
	GDP	-1.337	.221	-.859	-6.058	<.001	-1.814	-.860

a. Dependent Variable: To earn a living because jobs are scarce

*Table 5: Coefficients estimation with predictor GDP*  
 (Source: Authors' calculations)

The second dependency examines the relationship between Human Capital and Motive 4. To earn a living because jobs are scarce. From the descriptive statistics, it is evident that the mean score of Human Capital is 41.2, with a standard deviation of 17.3. The correlation between Human Capital and Motive 4, as noted earlier, is strong and negative ( $r=0.902$ ). The coefficient of determination ( $R^2=0.813$ ) shows that 81.3% of the variations in the percentage of women starting a business can be explained by changes in human capital, while 18.7% of the variation in the dependent variable is caused by other factors not included in the model (See Table 6).

Model <sup>b</sup>	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.902 <sup>a</sup>	.813	.799	7.2415

a. Predictors: (Constant). Human Capital

b. Dependent Variable: To earn a living because jobs are scarce

*Table 6: Model summary with predictor Human Capital*  
 (Source: Authors' calculations)

The ANOVA data confirm that the model is statistically significant since Sig. (<.001) is smaller than 0.05. The parameters of the obtained regression model (regression equation) — the constant term and the regression coefficient b are statistically significant (See Table 7).

Model <sup>a</sup>		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2962.163	1	2962.163	56.488	<.001 <sup>b</sup>
	Residual	681.710	13	52.439		
	Total	3643.873	14			

a. Dependent Variable: To earn a living because jobs are scarce

b. Predictors: (Constant). Human Capital

*Table 7: ANOVA with predictor Human Capital*  
 (Source: Authors' calculations)

The regression coefficient b for the factor Human Capital is -0.841, indicating that an increase in the Human Capital score by 1 will lead to a decrease of 0.841% in women starting a business to earn a living because jobs are scarce. The interval for b indicates that at a 95% confidence level, the value of the constant term will be between 88 and 109.9, while for Human Capital, it will be between -1.08 and -0.599 (See Table 8). In this regression model as well, the mean error is zero, as are the Std. Predicted Value and Std. Residual, indicating no difference between Observed values and Predicted values.



Model <sup>a</sup>		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	99.159	4.972		19.944	<.001	88.417	109.900
	Human Capital	-.841	.112	-.902	-7.516	<.001	-1.083	-.599

a. Dependent Variable: To earn a living because jobs are scarce

*Table 8: Coefficients estimation with predictor Human Capital*  
 (Source: Authors' calculations)

The third dependency investigates the relationship between Knowledge creation and the Motive 4. To earn a living because jobs are scarce. From the descriptive statistics, it can be seen that the mean score of Knowledge creation is 50.6, and the standard deviation is 18.9. The correlation between Knowledge creation and the motive "To earn a living because jobs are scarce" is strong and negative ( $r=0.930$ ,  $b=-0.794$ ). The coefficient of determination ( $R^2=0.865$ ) shows that 86.5% of the variance in the percentage of women starting businesses for this reason is caused by changes in Knowledge creation, while 13.5% of the variation in the dependent variable is influenced by other factors not included in the model (See Table 9).

Model <sup>b</sup>	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.930 <sup>a</sup>	0.865	0.854	6.1560

a. Predictors: (Constant). Knowledge creation  
 b. Dependent Variable: To earn a living because jobs are scarce

*Table 9: Model summary with predictor Knowledge creation*  
 (Source: Authors' calculations)

The ANOVA data confirm that the results of the model are statistically significant as Sig. (<.001) is less than 0.05 (See Table 10).

Model <sup>a</sup>		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3151.226	1	3151.226	83.155	<.001 <sup>b</sup>
	Residual	492.648	13	37.896		
	Total	3643.873	14			

a. Dependent Variable: To earn a living because jobs are scarce  
 b. Predictors: (Constant). Knowledge creation

*Table 10: ANOVA with predictor Knowledge*  
 (Source: Authors' calculations)

The parameters of the obtained regression model – the constant term and the regression coefficient b, are statistically significant. The regression coefficient b for the Knowledge creation factor is -0.764, indicating that an increase in the score of Knowledge creation by 1 will lead to a decrease of 0.764% in women starting businesses to earn a living because jobs are scarce. The confidence interval for b shows that at a 95% confidence level, the value of the constant will be between 94.6 and 114.8, and for knowledge creation, it will range between -0.98 and -0.61 (See Table 11). In this regression model, the mean error is zero, too, as well as the Std. Predicted Value and Std. Residual, indicating no difference between Observed values and Predicted value.

Model <sup>a</sup>		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	104.679	4.681		22.364	<.001	94.567	114.791
	Knowledge creation	-0.794	0.087	-0.930	-9.119	<.001	-0.982	-0.606

a. Dependent Variable: To earn a living because jobs are scarce

*Table 11: Coefficients estimation with predictor Knowledge creation*  
 (Source: Authors' calculations)

The final step in examining the impact of the selected factors on women's decisions to start a business due to the mentioned reason involves applying a multiple regression model that includes the three independent factors. The results indicate that the coefficient of determination R Square is 0.882, and the adjusted R Square is 0.85 (See Table 12). The coefficient of determination R<sup>2</sup> shows that 88.2% of the variation in the percentage of women starting a business "To earn a living because jobs are scarce" can be explained by changes in the examined factors: GDP, Human Capital, Knowledge creation, while 11.8% of the variation in the dependent variable can be attributed to other factors not included in the model. The results obtained from the Analysis of Variance (ANOVA) confirm that the equation obtained from multiple regression is statistically significant, as Sig. (<.001) is below 0.05 (See Table 13).

Model <sup>b</sup>	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.939 <sup>a</sup>	.882	.850	6.2474	2.170

a. Predictors: (Constant), Knowledge creation, Human Capital, GDP  
 b. Dependent Variable: To earn a living because jobs are scarce

*Table 12: Multiple regression model summary*  
 (Source: Authors' calculations)

Model <sup>a</sup>		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3214.538	3	1071.513	27.453	<.001 <sup>b</sup>
	Residual	429.335	11	39.030		
	Total	3643.873	14			

a. Dependent Variable: To earn a living because jobs are scarce  
 b. Predictors: (Constant), Knowledge creation, Human Capital, GDP

*Table 13: Multiple regression ANOVA*  
 (Source: Authors' calculations)

From the data of the multiple regression model parameters, it is evident that only the constant term is statistically significant, whereas the obtained regression coefficients for the predictors are not statistically significant. This implies that they do not provide a significant unique contribution to predicting the outcome. This could be due to the multicollinearity of the factors, as indicated by the Tolerance values, which are below 0.1 (See Tabl 14).

Table following on the next page

Model <sup>a</sup>		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	95.676	11.004		8.695	<.001	71.457	119.895		
	GDP	.535	.623	.344	.859	.408	-.835	1.906	.067	14.952
	Human Capital	-.155	.287	-.166	-.539	.601	-.787	.477	.113	8.855
	Knowledge creation	-.944	.487	-1.105	-1.939	.079	-2.015	.127	.033	30.345
a. Dependent Variable: To earn a living because jobs are scarce										

*Table 14: Multiple regression coefficients estimation  
 (Source: Authors' calculations)*

The lack of statistical significance in the regression coefficients of the multiple linear model might be due to the small number of observations (n=15), limited by the volume of available statistical data. Additionally, this could be attributed to the possibility of the existence of a nonlinear relationship in some of the factors, lagged components, multicollinearity, and other related issues.

## 5. CONCLUSION

The motives for women to start a business vary and depend on numerous internal and external factors. Results obtained from statistical methods analyzing the relationships between entrepreneurial motives of women and GDP, human capital, and knowledge creation show a statistically significant link only between these factors and Motive 4: "To earn a living because jobs are scarce." The results from single regressions confirm our main hypothesis that with an increase in the values of the three independent factors, the proportion of women starting businesses to earn a living because jobs are scarce will decrease. However, the results from multiple regression indicate that the factors included in the model do not have a significant unique contribution to predicting the outcome.

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## EVOLUTION AND CONSUMER TRENDS REGARDING TERROIR PRODUCT'S RESEARCH IN THE MOROCCAN CONTEXT

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### ABSTRACT

*Unique local products, known as terroir products, are regarded as one of the richest heritages of Morocco. Blending cultural heritage with the natural bounty of the soil, Moroccan terroir products hold a significant place in the country's agricultural strategies. They are predominantly produced by cooperatives, fostering employment and serving as a bridge between rural and urban areas. Their production has not only an economic impact but also a social one, contributing to inclusion and the overall socio-economic fabric of the nation. This paper examines the emergence of Moroccan terroir products and the primary efforts made to promote them. A study was conducted to provide an overview of the evolution of research pertaining to terroir products and its consumption in Morocco, as well as to outline the research areas and trends surrounding the topic. The results indicate that in the past three years, there has been an increase in the number of papers published in this field. Nevertheless, the overall volume remains modest. There is a notable focus on specific products such as argan oil, with many researchers concentrating on the Souss-Massa region. This suggests a need for more extensive research efforts in the future.*

**Keywords:** *Terroir Product, Consumer, Moroccan Context, Research Evolution, Research Trends*

### 1. INTRODUCTION

The concept of 'terroir'—a term with its origins in French that defies direct translation into English—encapsulates the complex interplay between a unique set of environmental factors and the phenotypic characteristics of crops. More than a mere geographic indicator, terroir embodies the synergy of space, time, and savoir-faire: the collective knowledge and traditional practices that shape the production of a diverse array of goods, ranging from dairy and fermented beverages to oils, and even extending to the domain of cosmetics (Amilien, 2011; Bérard et al., 2004; Housni et al., 2023; Riviezzo et al., 2017). Within the contours of Morocco, terroir products transcend the status of simple goods; they are a manifestation of the country's rich biodiversity, a repository of traditional knowledge, and serve as the economic pillar for numerous rural communities. The vibrant palette of flavors they offer is as variegated as the Moroccan landscapes themselves, bearing the authentic legacy of the land. The escalating interest in these products has catalyzed not only local consumption but has also garnered international attention, positioning them as a cornerstone of Morocco's agricultural exports. The intricate bond between the indigenous land and its bounties narrates a commitment to sustainability and represents an emerging domain of scholarly interest that promises deeper

insights into the confluence of tradition, quality, and geographic specificity. This study is dedicated to meticulously mapping the emergence and trajectory of terroir products within the Moroccan milieu, shedding light on the deliberate efforts by the nation—most notably by the Agency for Agricultural Development—to nurture and promote these agricultural treasures. The research is structured around the following objectives:

- To chronicle the evolution of terroir products in Morocco;
- To examine the initiatives and strategies deployed by the Moroccan Agency for Agricultural Development to augment the visibility and marketability of terroir products;
- To evaluate the present state of scholarly inquiry on terroir products and their consumers in Morocco;

Guided by the overarching aim to delve into the multifaceted realm of Moroccan terroir products, this research will explore the following questions:

- How have terroir products emerged and been integrated into the Moroccan agricultural and cultural context?
- What are the main initiatives undertaken by the Moroccan Agency for Agricultural Development (ADA) to promote the terroir products?
- What is the evolution on time of research surrounding terroir products and their consumers in Morocco?
- What trends can be discerned from the analysis of the literature, and what are the future directions for research in this field?

## **2. THE EMERGENCE AND EVOLUTION OF TERROIR PRODUCTS IN MOROCCO**

In recent years, Morocco has embarked on a transformative journey to revolutionize its agricultural sector, a vital component of the national economy and a crucial element of the country's cultural heritage. Inaugurated in 2005 under the directives of His Majesty King Mohammed VI, the National Initiative for Human Development (INDH – Initiative Nationale de Développement Humain), has been a pivotal program in fostering societal development in Morocco. Its core objectives revolve around combating rural poverty and promoting social inclusion in urban areas, alongside nurturing the organization of production within, for, and by cooperatives (Elgozmir & Chouhbi, 2021). This landmark initiative has been instrumental in the emergence of cooperatives, which have become key producers of local production, such as “Terroir products”, in Morocco. This initiative underscores the strategic role of cooperatives in enhancing local product development and contributing to the socio-economic fabric of the country.

### **2.1. Local products at the heart of the Green Morocco Plan (GMP)**

The Green Morocco Plan (GMP), initiated in 2008 in Meknes by His Majesty King Mohammed VI, marks a significant stride in the development of the national agricultural sector. This ambitious strategy has successfully repositioned agriculture as a central pillar of the national economy. The GMP, known in French as Plan Maroc Vert (PMV), is designed to serve as a model for South-South cooperation, a key focus area for the Kingdom. By emphasizing sustainable development, inclusion, and equity, the initiative has injected a new dynamism into Moroccan agriculture (Essajide, 2018).

#### ***2.1.1. Main axes of the GMP***

Morocco's strategic geographical location has allowed it to experience a succession of civilizations that have significantly influenced the country, both in terms of its human and environmental aspects. This history and geography have turned Morocco into a rich reservoir of phylogenetic and animal resources.

The cultural diversity passed down through generations and the great biodiversity richness reflected by the multitude of ecological ecosystems have made Morocco a showcase rich in local products (terroir products), many of which are endemic. Recognizing and aiming to protect this potential, the Ministry of Agriculture and Maritime Fisheries has given a special place to terroir products in the agricultural development strategy, the Green Morocco Plan (GMP). This plan has been implemented, focusing on seven main principles (Hajjaji, 2009) as shown and explained in *Table 1*.

Principle	Focus Area
1) <i>Making agriculture the main lever of growth for the next 10 to 15 years</i>	Making agriculture the main engine of growth for the next 10 to 15 years by strengthening its contribution to GDP, creating jobs, and increasing the value of exports.
2) <i>Adopting aggregation as the organizational model for agriculture</i>	Focusing on aggregation as an organizational tool, encouraging a fair partnership between producers and commercial-industrial actors while safeguarding their interests through specific contracts.
3) <i>Ensuring the inclusive development of Moroccan agriculture</i>	Aiming to make agriculture accessible to all without exclusion.
4) <i>Promoting private investment</i>	Advocating for private investment and encouraging public-private partnerships.
5) <i>Adopting a contractual approach to implement the Green Morocco Plan</i>	Involving and collaborating with various stakeholders from different sectors is required for the implementation of the GMP.
6) <i>Ensuring the sustainable development of Moroccan agriculture</i>	Concerning the conservation of natural resources for sustainable agriculture, involving the preparation of programs in collaboration with international funds and supporting renewable energies in the agricultural sector.
7) <i>Preparing for the overhaul of the sectoral framework</i>	Planning a restructuring of the sector's framework, including the redesign of the Ministry of Agriculture and Maritime Fisheries and the creation of two new entities, the ADA (Agency for Agricultural Development) and the ONSSA (National Food Safety Office), to better meet the current and future needs of the agricultural sector.

*Table 1: Principles and Focus Area of Green Moroccan Plan (GMP)*  
 (Source: Authors)

According to the Ministry of Agriculture (2012), the GMP has been marked by a series of strategic and methodical steps aimed at revitalizing and enhancing the agricultural sector. A significant milestone was reached in June 2008 with the drafting and publication of Law No. 25-06, which established standards for the origin and quality of foodstuffs, agricultural, and halieutic products. This law set the foundation for maintaining quality and authenticity in Moroccan produce. In 2010, the focus shifted to conducting regional studies aimed at identifying various terroir products. These studies were not just about cataloging but also involved a thorough analysis of the value chains, characterizing the unique terroirs, and developing specific plans for each area's agricultural development. This was complemented by the launch of another pivotal study in the same year, aimed at formulating a plan for promoting and marketing terroir products both within Morocco and in international markets. This comprehensive study was completed in April 2011. The year 2011 also saw the implementation of the first batch of 14 Pillar II projects (related to the 3th principles of GMP).

These projects were specifically designed to develop and improve the offerings of terroir products, demonstrating a commitment to enhancing the quality and variety of goods produced under the GMP. Parallel to these developments, there was a concerted effort to strengthen the support and guidance programs for producers. This included initiatives to raise awareness among producers about the importance of product labeling, ensuring that the quality and origin of the products are clearly communicated to consumers. To ensure the effective realization of these plans, the Ministry established central and regional structures dedicated to overseeing, guiding, and steering the development of the sector. This involved setting up a division of terroir products and a labeling division within the Directorate of Production Sector Development. Moreover, 16 regional services were tasked with closely supervising the terroir product sector, ensuring that the initiatives were effectively implemented at the grassroots level. This structure was further bolstered by the creation of an entity, the Agricultural Development Agency, specifically focused on promoting and marketing terroir products, highlighting the Ministry of Agriculture's commitment to the strategic development of Morocco's agricultural sector.

### *2.1.2. Main achievements related to local products between 2008-2018*

The GMP, similar to the National Initiative for Human Development (INDH), represents a long-term strategic policy designed to extend at least until 2020. This plan categorizes agriculture into two distinct types: the first, with a productivity-focused approach, is known as Pillar I, and the second, referred to as “solidarity” agriculture, is termed Pillar II (Faysse et al., 2015). The Pillar I focuses on modern, high-value-added agriculture, particularly through enhanced irrigation techniques, while the Pillar II is dedicated to developing solidarity agriculture in mountainous regions, oases, and disadvantaged areas (ADA, 2014). These pillars form the basis of the GMP, which aims to inject new dynamism into the agricultural sector, contributing to the overall development of the country (Toumi, 2008). In this context, the GMP places special emphasis on the development of solidarity agriculture. This is achieved through the implementation of technically feasible, economically viable, and socially appropriate Pillar II projects. These projects provide close support and specific offerings to farmers in fragile areas, such as mountains, oases, semi-arid plains, and plateaus, which represent the majority of the country's farms (ADA, 2014). The information about the state of terroir products in Morocco comes from a graphic poster on the “*achdartleflaha.ma*” website, which emphasizes the importance of terroir products as a central pillar of solidarity agriculture in Morocco and represents the main achievements of the GMP related to terroir products from 2008 to 2018. These achievements are categorized into two main areas: (1) the diverse development of terroir products and (2) the support and training for these products. Under the first category, the focus is on the diverse development of local products, a testament to Morocco's rich national heritage, which boasts over 200 animal and plant products across 24 sectors. To protect this heritage, Morocco has enacted Law No. 25-06, which governs geographical indications and the quality of seafood and agricultural products. Among the terroir products, there are 62 with Geographical Indications (GIs). Out of these, 50 have Protected Geographical Indications, 6 have a Protected Designation of Origin (PDO), and 6 carry signs of agricultural quality. Since the initiation of the Green Morocco Plan (GMP) in 2008, there has been a notable increase in the number of cooperatives and economic groups devoted to terroir products, rising from 400 to over 2,100 by 2018. This expansion has been matched by a substantial rise in earnings: the average annual gross margin per cooperative has soared by 200%, from 190,000 dirhams in 2008 to 572,000 dirhams in 2018. The second measure pertains to the support and training for local products. Over 5,000 brands have been recorded in both modern and solidarity-based markets. Additionally, logistics and sales platforms have been launched in Meknès and Al Hoceïma, with a third platform currently being planned. In an effort to bolster the production of high-quality items, a biennial fair for terroir products has been established since 2016,



witnessing participation from 300 cooperatives, mutual societies, and economic groups. Moreover, 446 products have earned the right to bear the collective label “Terroir du Maroc”. Within the realm of training and skill development, support has been extended to 2,700 cooperatives and economic groups, among which 235 have showcased their products at international exhibitions. These initiatives are designed to elevate the profile of Moroccan terroir products and enhance their value in both local and global markets.



*Figure 1: Logos of the PGI and the Label “Terroir du Maroc”*

## **2.2. The Role of the Agricultural Development Agency (ADA) in Promoting Local Products**

The valorization of terroir products is a priority of the GMP, aimed at helping small farmers access local, national, and international markets (Ait Kadi & Brulhet, 2010). To achieve this, the Agricultural Development Agency (ADA) has implemented a strategy for the development and commercialization of terroir products, including redefining the marketing mix of the products, seeking new market access routes, and creating a win-win relationship between producers and distributors. To attain these goals, the ADA collaborates with professional partners and national and international institutions operating in the sector. Partnership agreements have been signed between the Ministry Delegate to the Head of Government in charge of General Affairs and Governance and major shopping centers, aiming to assist cooperatives in accessing large markets. A promotional operation for terroir products was launched by the ADA during Ramadan, in 10 Marjane stores (retail brand) located in 8 Moroccan cities. This operation involved about forty professional organizations and aimed to support the marketing of nearly 400 products and items from various Moroccan terroirs, such as honey, argan oil, olive oil, aromatic and medicinal plants (AMPs), dates, roses, saffron, couscous, etc. Promoters were deployed inside these stores to inform customers about the quality and characteristics of terroir products. Site ADA, Rapport annuel de 2016 et Site de l'Alliance coopérative internationale (Bouchouar et al., 2017). The Agricultural Development Agency (ADA) has three main missions focused on the promotion of local products in Morocco: (1) Commercialization in Retail Brands, (2) Commercialization in Solidarity Markets and (3) Labeling Products with the “Terroir du Maroc” Collective Label.

### *2.2.1. Commercialization in Retail Brands*

ADA plays a crucial role in assisting producers of terroir products to position their offerings within private label brands, such as supermarkets and retail chains. This involves negotiating and partnering with major retailers to incorporate terroir products into their assortments, thus broadening the visibility and market access for these items. This strategy enables cooperatives to tap into a larger customer base and solidifies the presence of terroir products in mainstream marketplaces. As of August 23, 2023, data (collected by authors) from the “Terroir du Maroc by ADA” website indicates that the distribution of local products in Morocco has grown significantly. This expansion is largely attributable to the successful alliances formed by the ADA with leading food distribution brands in the nation. The ADA's initiatives have been centered on establishing specialized sales points for terroir products within these retail outlets, increasing both their visibility and sales potential.

The central figures in Morocco's food distribution industry encompass six prominent brands: *Marjane*, *Carrefour Market - Label'Ve*, *AswakAssalam*, *Acima*, *Carrefour*, and *Bim*(Abbad et al., 2012). The ADA's collaborative efforts, especially with *Marjane*, *AswakAssalam*, and *Carrefour*, have been instrumental in enhancing the reach of terroir products.

- **The Marjane Group** stands out in this expanded distribution network with 63 outlets across 28 Moroccan cities, offering a substantial platform for the exposure of local products;
- **AswakAssalam** comes next, with 14 retail locations spread over 10 Moroccan cities;
- **Carrefour** has made its mark with 10 sales points in 6 cities throughout the kingdom.

In total, products labeled “Terroir du Maroc” are now present in 87 sales points in 29 cities across Morocco. This widespread distribution not only facilitates the sale and the marketing of these products but also significantly enhances their visibility among consumers. These developments underscore the ADA's successful strategy in integrating terroir products into mainstream retail channels, thereby providing a vital boost to local producers and contributing to the growth of Morocco's agricultural sector. The presence of these products in prominent retail outlets also helps in familiarizing the general public with the richness and diversity of Moroccan terroir, ultimately fostering a sense of pride and appreciation for local produce.

#### 2.2.2. Commercialization in Solidarity Markets

Another critical mission of the ADA is to facilitate the commercialization of local products in solidarity markets. These markets are typically geared towards supporting small-scale producers and cooperatives by providing them with direct access to consumers without the intermediation of large-scale distributors. This approach not only helps in ensuring fair prices for both producers and consumers but also aids in sustaining the livelihoods of small farmers and artisans by providing them a reliable platform to sell their products. In Morocco, the recent emergence of the term “fair trade” was born in parallel with the social and solidarity economy as part of the economic and social development policies adopted by the kingdom to offer agricultural cooperatives a space to market local produce, but also to raise awareness of the harmful impacts of international trade on small producers vulnerable in this trade cycle. Also, the weight and importance of fair trade in economic and social development, has prompted Morocco to launch the large solidarity market located in Casablanca and which is intended for terroir products in order to respect the fundamental rule of fair trade(Kobi & Oukassi, 2019).

#### 2.2.3. Labeling Products with the “Terroir du Maroc” Collective Label

The ADA oversees the “***Terroir du Maroc***” collective label, which guarantees the quality and origin of Moroccan terroir products. This label plays a significant role in establishing consumer trust and recognition for these products. By awarding this certification, the ADA provides a promise of authenticity and quality to consumers, thus boosting the appeal and value of the products in the market. Additionally, the label aids in protecting the cultural and traditional elements of Moroccan agriculture. These efforts by the ADA are pivotal in advancing the presence of Moroccan terroir products in the market, bolstering their marketability, and supporting the sustainability of the agricultural sector by aiding small-scale producers and cooperatives. The ADA has introduced the “***Terroir du Maroc***” collective label as a means to champion Moroccan terroir products. Accompanying this label are specific usage regulations that outline the terms and conditions for its application. It has been registered both nationally and internationally as a collective trademark under the ownership of the Ministry of Agriculture, with representation by the ADA.

The primary goals of this label are:

- Regulating the use of the term “Produits du Terroir Marocain” in English “*Moroccan Terroir Products*”;
- Establishing a collective tool for promoting local products at the national and international levels to improve the income of the small producers involved;
- Increasing the quality of their products and ensuring better visibility for Moroccan terroir products.

After the Approval Committee for the “*Terroir du Maroc*” collective label was set up in March 2016, it has convened on multiple occasions, with the most recent meeting occurring on May 2, 2019. As of this date, 409 products have been granted authorization for label use, provided by 118 producer groups which encompass 241 cooperatives(ADA, 2023). As per the latest data (collected by us, authors) from the *Terroir du Maroc website*, as of June 8, 2023, 44 cooperatives from all 12 Moroccan regions have been awarded the “*Terroir du Maroc*” collective label. These cooperatives are engaged in the production of terroir products that fall into 8 distinct categories, showcased on the Terroir du Maroc online marketplace (e-commerce). These products are divided into two main types: food products and well-being products(Housni et al., 2023).

Food Products	Well-being & Beauty Products
<ul style="list-style-type: none"> <li>• Honey, Amlou &amp; Jams</li> <li>• Semolina &amp; Flour</li> <li>• Spices &amp; Condiments</li> <li>• Edible Oils</li> <li>• Dried Fruits</li> <li>• Teas &amp; Herbal Teas</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrolats &amp; Huiles essentielles</li> <li>• Bien-être</li> </ul>

Figure 2: Different Terroir Products existing in Terroir du Maroc online marketplace  
 (Source: Authors)

### 3. THE PROGRESS AND RESEARCH TRENDS RELATED TO MOROCCAN TERROIR PRODUCTS

In this section, the study will concentrate on the various methods employed to focus on research pertaining to terroir products within the Moroccan context. The primary aim here is to provide an overview of the temporal evolution of this research domain in Morocco and to highlight the associated research trends.

#### 3.1. Research Methods

In this research, two tools are utilized to explore the progression and trends in studies concerning terroir products and their consumers. The first tool employed is “Publish or Perish 8”, a software application that collects and analyzes academic citation data. It provides valuable metrics such as the number of published papers, total citations, and the h-index to aid in evaluating the impact of scholarly work (Harzing, 2007). The Google Scholar database was selected for analyzing and obtaining a comprehensive view of the research progress and trends of terroir products in Morocco. The decision to use Google Scholar is not insignificant; it includes a vast range of databases and yields results for any journal, regardless of whether it is indexed, due to its extensive reach in research.

This makes it a particularly accurate choice for our study, which focuses on papers relevant to Morocco and its specific context. When it comes to bibliometric analysis, VOSviewer software is employed. VOSviewer is a specialized, cost-free software for bibliometric analysis. It has the capability to create maps of authors or journals using co-citation data or keyword maps based on co-occurrence data. The software also features an interface that allows for an in-depth examination of these bibliometric maps (Eck & Waltman, 2009).

In order to realize this research here are the 5-steps research process that we followed:

Step 1: Literature Search and Database Selection:

- Choosing Google Scholar as an academic databases.
- Utilizing the "Publish or Perish" software for extracting papers from the database. Research

Step 2: Query Formulation:

- Conducting searches using specific keyword :
- English query=("*terroir product*" OR "*product of terroir*") AND ("*consumer*" OR "*consumption*") AND ("*morocco*" OR "*moroccan*")
- French query= "*produit du terroir*" AND ("*consommateur*" OR "*consommation*") AND ("*maroc*" OR "*marocain*")

Step 3: Collection and Management:

- Exporting search results in CSV format for data manipulation.
- Cleaning the dataset by removing duplicates and irrelevant entries.
- Organizing the remaining papers manually in an Excel sheet, classifying them by field, paper type, methodology, etc.

Step 4: Data Analysis:

- Analyzing the curated data within Excel to identify patterns, trends, and gaps in the literature.
- Using analytical tools within Excel to aid in the synthesis of findings.

Step 5: Visualization and Interpretation:

- Importing the cleaned and analyzed data into VOSviewer or similar visualization software.
- Perform co-occurrence analysis on titles and abstracts to map out the research landscape.

### 3.2. Data Analysis & Results

The study encompasses a review of 44 papers. The analysis reveals a predominant focus on Economics and Business disciplines (see Figure 3), with a significant emphasis on marketing, particularly regarding consumer behavior towards terroir products. This focus is essential, as it offers valuable insights into consumer preferences and market dynamics, key factors for the development and promotion of terroir products in both local and international markets. The observed predominance of papers in Economics and Business is logical, considering the keywords selected for the Google Scholar search included terms such as “consumption” and “consumer,” which inherently steer the research towards these disciplines.

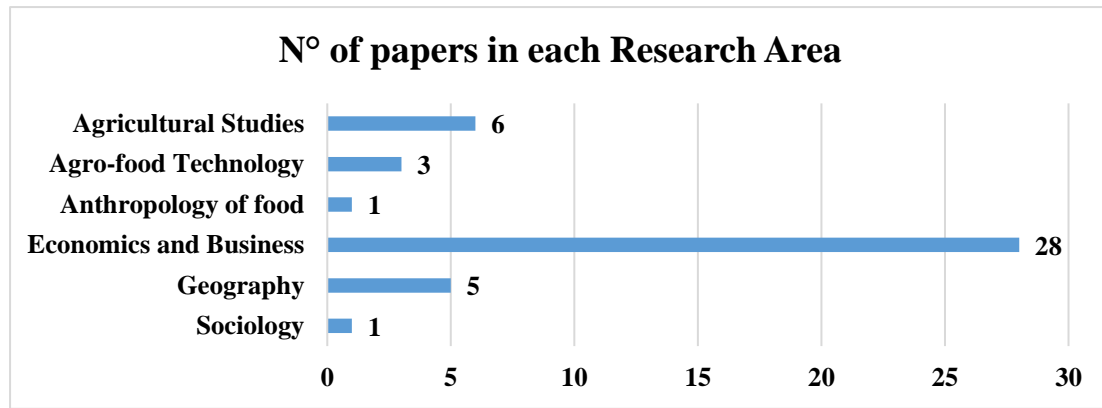


Figure 3: Research Area of Papers found in Google Scholar  
 (Source: Authors)

### 3.2.1. Evolution on time

To examine the temporal evolution of research related to terroir products and consumers, we identified two papers that were duplicated across both French and English research databases (so from 46 papers we worked with 44 papers). The data indicates an emerging interest in the subject starting from 2005, with a noticeable increase in research over the past three years. It's important to note that 2005 was known by the national initiative INDH, which encourage the creation of cooperatives. Upon reviewing the graph detailing the Evolution of Terroir Products Research in Morocco during the last two decades, several trends and observations are notable: Firstly, it is evident that interest in terroir product research has fluctuated over the years, with a discernible increase in activity in recent years. The graph shows that research in English saw a significant spike, peaking at 8 papers in 2022, which suggests a growing global or English-speaking interest in Moroccan terroir products. Conversely, research in French has remained relatively constant, with fewer overall publications, and does not exhibit the same sharp increase as its English counterpart.



Figure 4: Evolution of studies since 2005  
 (Source: Authors)

The total number of papers published in English on terroir products has experienced an overall upward trend, especially notable from 2018 onwards. In contrast, publications in French have seen a modest and steady output over the two decades, with a peak of 3 papers in certain years and periods of no papers published.

### 3.2.2. Research trends from Titles and Abstracts:

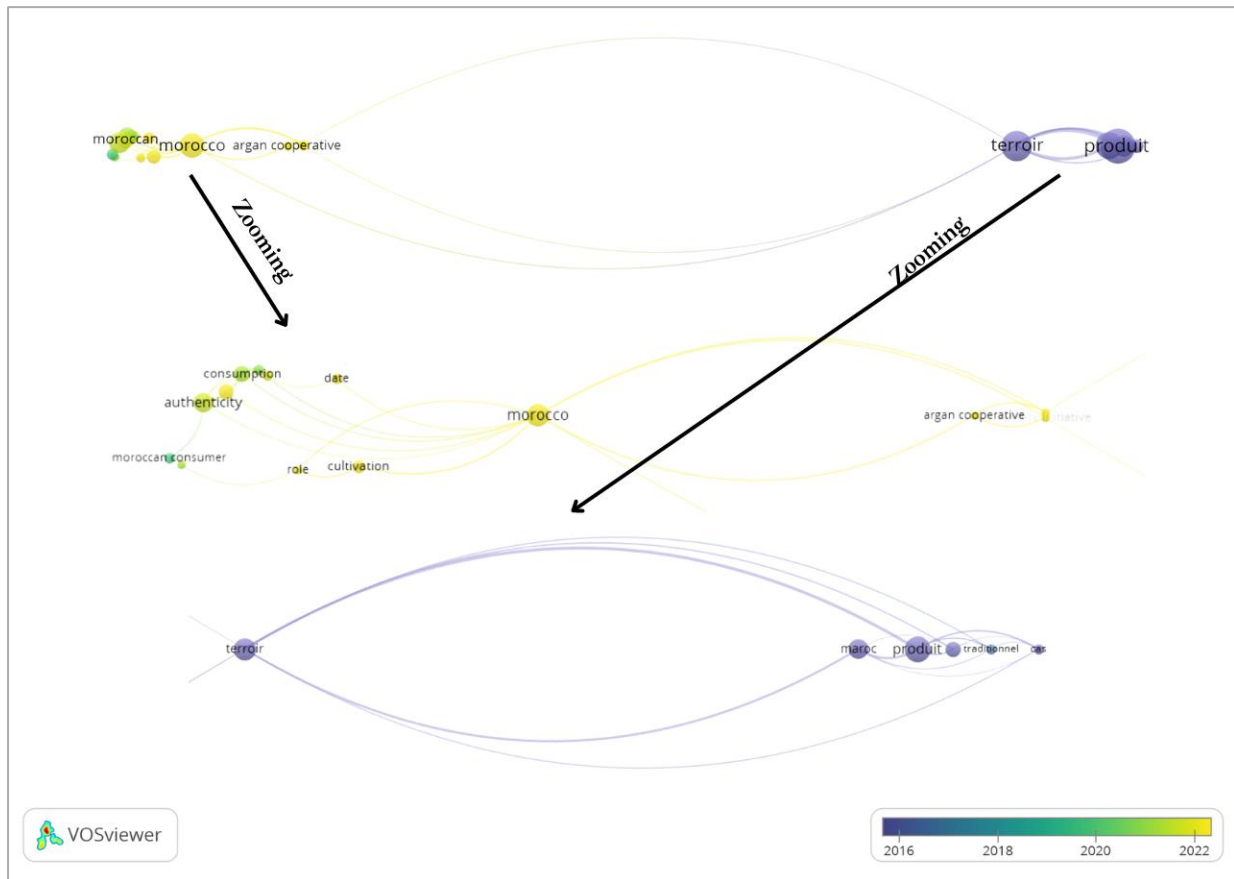
Using VOSviewer, we established a minimum occurrence threshold of 3 for the 431 identified terms, with 26 meeting this criterion. For these 26 terms, a relevance score was calculated to determine their significance. Typically, the 60% most relevant terms are selected by default; in this case, 20 items were chosen. The analysis shows that these 20 items are grouped into 4 clusters.

	Items	Keywords
<b>Cluster 1</b>	7 items	Authenticity, Consumption, Date, Local Product, Moroccan, Morocco, Research
<b>Cluster 2</b>	6 items	Case, Consumption, Morocco, Terroir, Product, Traditional
<b>Cluster 3</b>	4 items	Cultivation, Moroccan Consumer, Role, Typicality
<b>Cluster 4</b>	3 items	Argan Cooperative, Private Initiative, Valorization

*Table 2: Keyword Network Cluster Analysis*  
 (Source: Authors)

The co-occurrence Map (*Figure 5*), derived from titles and abstracts, indicates that research prior to 2016 primarily focused on consumption and case studies of terroir products as traditional goods. It is noted that many of these papers were written in French. However, more recent studies, particularly from 2020 onwards, are predominantly in English. Between 2018 and 2020, the research on terroir products centered on Moroccan consumers and explored the uniqueness and authenticity of these products. From 2020 to 2021, the papers expanded to cover consumption, authenticity, and local products more broadly. It is worth mentioning that the term “terroir product” is often used interchangeably with “local product” in some papers because “terroir” is a French concept that does not translate easily into other languages, such as English and Arabic. From 2021 to 2023, the research has shifted towards specific terroir products like “Argan” and “Date”. Argan oil is exclusively associated with Moroccan geography, particularly the Souss Massa region, and is recognized as a product uniquely indicative of Moroccan terroir. On the other hand, Morocco is renowned for its variety of dates, including types like Boufeggous and Majhoul, which originate from its oases. It is also important to acknowledge that the results may be biased due to the sample of papers being in two different languages. The analysis was based on titles and abstracts, and in some instances, abstracts were not translated into English. This language disparity is evident in the appearance of certain French words in the data map, such as “cas,” which translates to “case” in English. This factor could have influenced the findings and should be considered when interpreting the results.

*Figure following on the next page*



*Figure 5: Map of co-occurrence Analysis  
 (Source: Authors)*

#### 4. DISCUSSION, LIMITATIONS AND FUTURE RESEARCH

This study has offered a comprehensive examination of the progression and emerging trends in Moroccan terroir product research. Utilizing tools like “Publish or Perish 8” and VOSviewer, we've observed a dynamic and evolving research landscape. While the volume of research has fluctuated over the years, recent trends indicate an increase, especially in English language studies, which suggests a burgeoning international interest.

##### 4.1. Discussion

Our findings emphasize the significant concentration on Economics and Business in the domain of terroir research, especially concerning marketing strategies and consumer behavior. The rising trajectory of research publications corresponds with an increased global focus on origin-based products and their distinctive value to consumers. The cluster analysis we conducted elucidates the main themes within this research area, with a clear emphasis on authenticity and the methods of local production as central topics of interest. Our study also revealed a notable focus on specific regions and products, primarily the Souss Massa region and Argan Oil, highlighting the unique aspects of their terroir and production methods. This region-specific emphasis is reflected in the significant number of publications dedicated to exploring the distinctive characteristics and cultural importance of Argan Oil, an emblematic product of the area. Additionally, there is a growing body of research centered around dates and oasis ecosystems, underscoring their role in local economies and their contribution to the biodiversity and sustainability of these regions. These findings indicate a trend in terroir research towards more localized and product-specific studies, providing deeper insights into the intricacies of regional production and its impact on local communities and economies.

## 4.2. Limitations

First limitation of this study is the reliance on the Google Scholar database and the “Publish or Perish” software, which may not cover all existing research, particularly those not indexed in widely accessible databases. Additionally, the inherent linguistic bias towards English and French may have excluded relevant research in other languages, potentially skewing the trends observed.

## 4.3. Future research

Future research should aim to incorporate a more diverse range of databases and languages to achieve a more holistic view of the research landscape. There is also a need to delve deeper into the socio-economic impact of terroir products on local communities and how global market integration affects local production practices. Moreover, as seen in the co-occurrence analysis (Figure 5), there is a scope for exploring the role of private initiatives and valorization efforts in the promotion of terroir products like “Argan” and “Date”, which have significant cultural and economic importance in Morocco. Continuing to monitor the research trends and the impact of scholarly work on the ground will be crucial in understanding the long-term sustainability and success of Moroccan terroir products in the global market. Additionally, considering the nuanced differences between “terroir” and “local” products and how they are perceived in various cultural contexts would be a valuable aspect to explore. As the market for terroir products expands, these insights will be instrumental in guiding producers and policymakers in Morocco and similar economies. The bibliographic references compiled in this study could serve as a foundational base for a systematic literature review, providing a more comprehensive overview of the topic and potentially identifying gaps for future research.

## 5. CONCLUSION

This paper has presented a detailed exploration of the research trajectory on Moroccan terroir products over the last two decades, revealing an increasing interest and diversification in the topics studied. The strategic use of bibliometric tools has allowed us to identify significant patterns and shifts in the academic landscape, highlighting a surge in publications, particularly in the realms of Economics, Business, and consumer behavior towards terroir products. Our analysis underscores a heightened global recognition of the unique qualities and economic value that Moroccan terroir products bring to the market. The rise in English-language research points to an expanding international focus, suggesting that Moroccan terroir products are gaining prominence on the world stage. The cluster analysis has revealed that authenticity, consumer perception, and local production methods are central to current research themes. Such insights are invaluable for stakeholders in the agricultural sector, including producers, marketers, and policymakers, as they navigate the complex interplay between local traditions and global market demands. Throughout this paper, we have delved into the burgeoning field of terroir products in Morocco, tracing the evolution of research interest and pinpointing emergent trends within this niche. A focal point of our discussion has been the pivotal role of the ADA in the enhancement and promotion of terroir products both within Morocco and on the international stage. The ADA's efforts have been fundamental in certifying the quality and origin of these products, thus fostering trust and recognition among consumers worldwide. The emergence of Moroccan terroir products as a subject of academic interest reflects the broader global shift towards valuing the unique qualities of locally sourced goods. This paper has highlighted how the ADA's initiatives have successfully increased the visibility and marketability of Moroccan terroir products, contributing to the nation's cultural and economic narrative. As we conclude, it is evident that the promotion of terroir products has become a strategic economic and cultural endeavor for Morocco. The ADA's strategies, coupled with the research community's growing interest, underscore the importance of these products in



strengthening Morocco's agricultural identity and economic development. The bibliographic references provided herein lay the groundwork for further systematic literature reviews, offering scholars and practitioners alike a more profound comprehension of the complexities and opportunities that terroir products present. In anticipation of future developments, continuous research and strategic promotion will be key to leveraging the full potential of Moroccan terroir products. It is an endeavor that promises not only to preserve the rich tapestry of Moroccan culture but also to ensure that the benefits of this burgeoning sector reach the farmers and communities at the heart of production, thereby enriching Morocco's presence in the global market.

## LITERATURE:

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## MOTIVATION AS ONE OF THE KEY FACTORS IN LEADING SUCCESSFUL TEAMS

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### ABSTRACT

*Leading people is an extremely complex process and an extremely responsible management function. Behind every business strategy, goals and results are always people as the most important potential. Leadership determines success in results, depending on how employees are driven towards goals, and depending on what their motivation level is. The subject of research in this paper is motivating sales team members as one of the most important roles of the team leader. The goal of the research is to determine the significance and impact of leadership through motivating associates with the purpose of achieving team goals. The conducted survey will identify and evaluate some of the motivators of the members of the sales teams. Secondary data from the first part of the paper were obtained using the literature listed at the end of the paper, along with the classification and description methods used. The collected responses to the survey from the second part of the paper were analyzed according to the statistical method. Synthesis and the generalization method were used in the second part of the paper. The introduction in the first chapter of the paper presents the topic and objectives of the research with the research questions and the methods used. The second chapter is a whole that explains the conceptual characteristics of leadership through subchapters. The subchapters thus cover the differences between the concepts of management and leadership, general theories of leadership, and then describe some leadership models and styles from contemporary business practice – team leadership, empathic (emotional), transformational and situational leadership. In the third chapter, motivation in the function of leadership is considered, some substantive theories of motivation, and motivation in teams as a special subchapter. The fourth chapter presents the conducted research with a discussion of the objectives of the research questions and the obtained results. In the fifth chapter follows the conclusion based on the objectives of the research.*

**Keywords:** Leadership, Management, Motivation, Teams

### 1. INTRODUCTION

Leadership has always caused great attention in human communities, a call to action and reaction. Throughout history, many people have had the role of leader, which they achieved with varying degrees of dominance, influence and acceptance among followers. Not all leaders were always well-intentioned, the goals were not always fully acceptable, but the fact that follows strongly accepted leaders is the possibility of their influence through manipulating followers. That is why the issue of integrity, ethics and morality is a great responsibility that must be the primary focus of every leader. The ultimate goal, the vision to be followed must thus be acceptable and accepted at the same time.

Goals can be numerous and different, but in the business context within business organizations, the set goals are increasingly ambitious due to the ever-widening influence of competition and customer expectations. Leaders try to direct their associates to achieve such goals with their leadership skills, and one of the key functions and skills is also one of the most important competencies of every leader - motivation. Motivating as a component of leadership is also the topic of this paper

### **1.1. Research subject**

The subject of research in this final paper is motivating sales team members as one of the most important roles of the team leader.

### **1.2. Research goal**

The goal of the subject research is to determine the significance and impact of leadership through motivating associates with the purpose of achieving team goals. The conducted survey will identify and valorize some of the motivators of the members of the sales teams. In order to fulfill the goal of the research, the following research questions were asked:

- **IP1 – What are the strongest motivators for sales team members?**  
Colloquially, material compensations are very often attributed the most significant influence in terms of employee motivation. Survey questions will be used to investigate how important this motivator is to employees in the sales teams of the selected organization in relation to some of the other motivators listed.
- **IP2 – What is the influence of team leaders on the motivation of team members?**  
The survey question assesses the subjective experience of associates about the influence of leaders on their motivation, and the obtained results will provide an answer to the question in a relative sense.
- **IP3 – Are the associates in the sales teams of the selected large organization satisfied with the management and motivation of their managers?**  
The research examines the satisfaction of team members through several questions related to the competencies of team leaders. The research question will be answered with the answers obtained using the synthesis method.

### **1.3. Research methods and sources**

Secondary data from the first part of the paper were obtained using the literature listed at the end of the paper, along with the classification and description methods used. The collected responses to the survey from the second part of the work were obtained through the Microsoft Teams application, an application used internally by sales operations in the researched organization - through the Microsoft Forms form, and were analysed according to the statistical method, analysis and synthesis, and the generalization method.

## **2. LEADERSHIP – FUNDAMENTAL FUNCTION OF MANAGEMENT**

In the historical context of business organization and development of business organizations, when it comes to management, the circumstances in the internal and external environment of companies acted and act more and more prominently in a way to shape, promote and complement the functions of management, making it stronger and faster. Changes in the modern world require the ability to adapt at all levels, breaking down the resistance of employees to necessary changes, especially managers due to their direct responsibility for the functioning of the system. The theoretical frameworks of management are continuously expanded and supplemented depending on the application of new knowledge and the development of new managerial skills. From the perspective of leadership as a management function, leadership is viewed as a process, while leadership as a trait includes the manager's personal development

and his actions with constant interaction with the environment, which directly affects the outcome of the organization's perception, both internally and externally. Weihrich and Koontz (1994, p. 490) state that leadership is the only real and actually the most important function of management, for the reason that the success of the management function itself derives from the function of leadership. This very fact contributes to the determination of business success, as explained by Northouse (2010), who considers leadership as a very complex process with an influence on groups of people, and is always aimed at achieving goals. Furthermore, the same author conveys that leadership is "a transformational process that moves followers to achieve more than what is normally expected of them" (Northouse, 2010, p. 2).

### **2.1. The difference between the terms management and leadership**

In practice, it is not uncommon for the terms *manager* and *leader* to be equated, just like *management* and *leadership*. Essentially, it would be correct, among other things, that management as a process directs others to the execution of defined and structured goals and tasks, and leadership is a skill that influences the ability of others to execute them. Barbir (2020, p. 51-52) avoids specifying management as a term with a definition due to its very breadth and great complexity, but offers his reflections on management by stating the basic attributes:

- management is primarily a management process, not a one-time act
- permeates all business functions, systems and subsystems, structures and management levels of the organization and integrates them into a whole
- it can mean a certain group or team with the task of achieving and realizing certain goals
- key determinants for managers are independent decision-making and participation in the process of making strategic decisions, assuming business risk, prediction, creating and participating in changes, directing, motivating, controlling and evaluating employees, coordinating, integrating and controlling activities
- management achieves goals by activating, selecting, developing and directing human and capital potential
- management is a concept in which all employees identify with goals, and through personal development and personal goals participate in the development of the organization
- management is a scientific discipline of multidisciplinary character

Leadership is a part of management, that part of the process that mostly refers to the management of employees. Karlić and Hadelan (2011, p. 67), identifying leaders as managers in charge of these processes, state the following: "The leader's task is to direct and motivate employees to perform a task, to give them a sense of security, but also of freedom, so that with their thinking and actions they can contribute to the achievement of the company's goals. The most important task of a leader is to define the company's business vision and ensure that other employees accept and follow it." Miškulin, Brekalo and Penava Brekalo contrast the interests and actions of leaders with those of managers, and note the differences as follows: leaders chart the direction, as opposed to planning and creating budgets made by managers. Leaders coordinate people versus organizing and hiring staff, and motivating people as one of the basic functions of leading versus controlling them and solving business problems (Miškulin, Brekalo and Penava Brekalo, 2016, p. 179).

### **2.2. Leadership theories**

According to the name itself, the theory focuses on the characteristics of the leader, so in the first phase of this "traditional theory", as reported by Sikavica and Bahtijarević-Šiber (2004, p. 26), it was assumed that some people have the ability to lead, that is, that individuals are born with special qualities that predestinate them to be leaders. One of the most famous representatives of the theory according to which leaders are born is C. Levicki ("gene theory").

He asserted with his knowledge that the vast majority of successful leaders were born with a special talent, and he believes that only certain people are innately dominated by a dominant factor that affects their behavior, characteristics, intelligence and achievements as a leader. Furthermore, Yukl (2008, p. 179) adds to the theory of traits by stating that based on some traits and abilities, a thesis was advocated in the past about the possible prediction of whether a person will achieve the position of leader and be successful. The term traits refer to a number of individual attributes that include aspects of personality, temperament, needs, motives and values. Trait theory has often been referred to as the "theory of great men" due to the fact that desirable traits have been associated with truly great leaders throughout history. Filjak (2019, p. 65) writes about them that they are implicit theories that are based on the characteristics of a person, his personality traits and abilities, and their development dates back to the 50s of the 20th century, although their foundations are possible find far back in the past of leading armies and the history of warfare. So Sun Tzu said more than 2,400 years ago that being a commander means having virtues such as wisdom, honesty, benevolence and humanity, in addition to courage and demandingness, which he defined as strictness. The second phase of trait theory began to develop in the early fifties of the last century, and as stated by Buble (2006, p. 313), according to Hellriegel and Slocum, 1998, leaders are described by five key groups of traits: physical traits (good looks, attractive exterior), social background (educated in suitable schools and socially prominent or climbing the social ladder), personal characteristics (adaptable, aggressive, emotionally stable, dominant, self-confident), social characteristics (charming, tactful, popular and cooperative) and characteristics in relation to the task (forces emphasis, readily accepts responsibility, proactive, task-oriented, possesses good interpersonal skills). Soon, that phase was upgraded with new theoretical insights that were more significantly studied by Bennis, and it is a modern theory that focuses on the key groups of competencies necessary for leadership: management of attention, management of meaning, management of trust and management of oneself. Of course, according to all trait theories, it would be difficult, almost impossible to find a person who possesses all the ideal traits, so the framework of trait theory provides only one dimension of the whole picture.

### *2.2.1. Behaviorist theory*

This scientific theory began to develop in the 60s of the last century after scientific theorists began to focus more on the fact *that* leaders do their work, and less on their qualities. Thus, they began to identify the behaviors that contribute to success, that is, to distinguish the behaviors that are responsible for failure. According to behavioral theory, all successful leaders behave in a certain way

### *2.2.2. Contingency theory*

Jones and George state, quoted by Buble (2006, p. 324), that due to the large number of different situations in which managers and their companies find themselves, the facts that make a manager successful in a certain situation do not have to be valid, implying that they will necessarily make him successful in another situation. The success itself will therefore depend on the specific situation in which certain leadership is performed, from which the specific interaction of the leader and his followers results. The basic premise is that there is no unique leadership behavior that would suit every situation, so it should be interpreted as adapting the leadership style to the appropriate situation (Šikavica, Bahtijarević-Šiber and Pološki Vokić, 2008, p. 498). According to the contingency theory, traits and behaviors are not sufficient by themselves for a complete explanation of leadership, but a dimension of the situation in which the leader is found is added, and through the idea that leadership is a complex process, an attempt is made to provide a comprehensive presentation.

### **2.3. Team leadership**

For the team leadership model, it could be argued that it is a fairly "modern" form of people management and as such a frequent phenomenon in organizations. It is characterized by the concept of "soft boundaries" between subordinates and superiors, the formal hierarchical pyramid is almost erased. The leader in charge of leading the team is often in the role of moderator and coordinator, allocates tasks and articulates collective decisions. The basic premise is that the teams should be smaller in number so that communication and task solving itself would flow as quickly as possible, that is, so that the transfer of information would be as short as possible. As Barbir reports, "With the increase in acquired knowledge, abilities and skills of the employees, the level of maturity of the team members also increases and thus their ability to perform increasingly complex activities" Barbir (2020, p. 86). In this case, the leader's role is characterized by the use of "soft skills" such as delegation, developing relational ties and motivating co-workers. According to Brajša (2010), it is not enough to just talk a lot, but how we talk is also really important, for which he says that it is necessary to study and learn. The leader's task, in addition to his own development, is also the development of the team, transfer of knowledge and information, messages, continuous motivation for greater results. Turkalj, Fosić and Marinković have a comprehensive definition for a team: "a team can also be defined as the result of a combination of enviable skills and abilities of several individuals who complement each other's knowledge by working together in a pleasant atmosphere and harmonious mutual relations and at the same time carry out a series of activities with their own efforts to achieve a certain organizational goal" (Turkalj, Fosić and Marinković, 2012, p. 249).

### **2.4. Emotional (empathic) leadership**

Empathy is one of the key qualities of leaders, especially in today's age. Goldman (2004) summarized the reasons why empathy is important in leadership, namely: the pace of globalization, modern models of human resources management that imply the presence of a greater number of emotions in employees, and the constantly growing need to find new talents, which is becoming an increasing problem. According to Barbir (2020, p. 88), three types of empathy are important for empathic leadership:

- Cognitive empathy – cognitive, intellectual awareness of feelings, opinions and attitudes of cooperation;
- Emotional empathy – the ability to share emotional states, feelings and experiences;
- Sympathetic empathy – understanding of the problems and feelings of others, and willingness to help

### **2.5. Transformational leadership**

Transformational leadership as stated by Žugaj et al. (2004, pp. 87-88) implies the ability to influence the change of attitudes and beliefs, value systems of associates, whereby leaders encourage their followers, colleagues or clients to increase awareness of goals that are important to the organization. According to Barbir (2020, p. 91), leaders focus their activities on the search for motives based on which they find effective motivation of their followers, and in this way they develop followers to a level where they themselves can become empowered enough to lead. This is completely different from the transactional approach where the original idea, the order is just transferred, exchanged in the chain until the goal is reached. Transactional management, as explained by Miljković and Rijavec (2007, p. 86), implies continuous, daily communication between the responsible person and associates, which is necessary for the routine performance of work. Transformational, on the other hand, is most often appropriate for top management, which is responsible for conveying the organization's mission and vision, but it is not always exclusively so. For the success of the organizations themselves, a balanced combination of transactional and transformational leadership is optimal.

## 2.6. Situation management

The characteristics of situational leadership as considered by Northouse (2010, pp. 91-111) are dimensions of support and guidance that need to be appropriately applied in certain situations. According to Gotal (2013, p. 409), citing Northouse (2010), a leader should, in order to determine what is necessary in which situation, realistically evaluate his associates and determine their readiness and ability to perform a certain task. Depending on the assessment, it should vary the degree of guidance or support. Blanchard et al. (1985) as reported by Northouse (2010, p. 92) developed the *II situational leadership model*, which defines four leadership styles. The very dynamics in the picture shown below is determined by the development level of the subordinate associate and the associated required leadership style. Orientation is carried out by giving clear instructions, goals, setting deadlines and defining roles for performance. At the same time, the styles are explained through the four presented categories of guidance and support.

## 3. MOTIVATION AS A LEADERSHIP FUNCTION

Motivating is an integral part of the concept of leadership, and it is justifiably included in the fundamental functions of management along with leadership. Motivation is defined by Rheinberg (2004), and Barbir (2020, p. 113) conveys it as a state resulting from desire, effort, desire and hopes, i.e. the activation of directing current life actions towards a goal that is considered positive. According to Bakotić and Bogdanović (2013, p. 68), it answers the question of why someone behaves in a certain way, achieves or does not achieve a certain level of work performance. Miljković and Rijavec (2007, p. 56) mention two groups of theories within the framework of motivation theory:

- **Substantive (what?)** - they are primarily focused on the physiological and psychological needs of the individual, from which the task of the leader is to create an environment to satisfy them;
- **Process (why and how?)** - try to understand the thought processes that influence employee behavior and explain how needs lead employees to certain behavior depending on rewards and available work opportunities.

Based on their own research, Bakotić and Bogdanović bring an interesting fact in the conclusion of their work related to motivation, and it refers to employee training and the acquisition of new knowledge. Their work "established a statistically significant positive connection between the acquisition of new knowledge as a result of training and motivation, between a better understanding of work tasks as a result of training and motivation, and between self-confidence as a result of training and motivation for work" (Bakotić and Bogdanović, 2013, p. 70). Means of motivation can be of a very wide spectrum because not every person has the same motivators and the same motives. Thus, in the work of Tudor et al. (2010), the joint work of Goran Tudor and a team composed of eminent Croatian businessmen who offer their reflections based on extensive business experience insinuates that when asked by many managers in Croatia about the sources of motivation of their employees, the assumed answer would be that they are good pay, the possibility of advancement, job security, good working conditions. Experience further claims that the answer from the other side, i.e. from the subordinate employees themselves, would in many cases be that recognition for a job well done, challenging work, participation in decision-making and a dose of empathy from a superior are important to them. It is a really interesting fact that proper and high-quality motivation often does not require a lot of effort, resources and finances, while on the other hand it has the power to move people and processes that accumulate great value for organizations in the long term. This is exactly why the responsibility lies with the leaders, with their competences for quality leadership and motivation.



In accordance with their abilities in terms of motivation, it is possible to achieve greater overall goals and business results. Although the terms *motivation* and *satisfaction* in the context of work are often equated, Prahin and Katavić suggest that it is necessary to emphasize that there is an important difference. According to Buble (2006), as they further state, it is a practical possibility that employees are motivated but dissatisfied at the same time, that is, it is also possible the other way around, just like other combinations of the relationship between satisfaction and motivation (Prahin and Katavić, 2021, p. 12). The mentioned authors also did their own research on motivation factors. Admittedly, according to the results, they emphasize that the research was carried out within the system of state-owned enterprises that fall under regulated activity, and thus it is not completely free to create its own policy, but many important determinants are pre-determined and directed by managers who are mostly not educated for business. leadership, nor about motivation methods. This mainly supports the fact that it is possible to act systematically, that it increases the importance of managerial competences in terms of motivation management, especially within a system with organized organizations, organizational structures and cultures, and then they can come to the fore more (as it is actually a frequent example in excellent corporations) that *the intrinsic* factors of motivation are rated higher. Intrinsic factors will be further explained in the text through Herzberg's theory.

#### 4. MANAGEMENT OF MOTIVATION WITHIN TEAMS

One of the most important roles of almost every team leader is the establishment of relationships that open up space for raising the quality of the results of each individual, as well as the totality of the entire team. The prerequisite for building such relationships is a consequence of the leader's competencies and the power of his influence. Chapman and O'Neil (2003, p. 79) have an explanation for the sources of power in leaders, which according to them are role power (comes with position in the hierarchy), personality power (is a consequence of the built personality of the leader) and knowledge power (control of knowledge and skills). The essential difference between a manager and a leader is in the source of the power of influence. With managers, influence comes through the power of role, while with leaders, influence is dominant through the power of personality. His personal development level, which creates the perception of personality among followers, will also determine the degree of influence, and if the power of influence is greater, the motivational potential will keep pace with it. So, the assumption is that better motivational results will be achieved by leaders who are better perceived in their teams, they have a greater potential to influence the team and they are more trusted. As stated by Barbir (2020), a leader will achieve influence and respect by his own example, and depending on how he behaves, works and adheres to the values he proclaims, he will be evaluated by his colleagues.

Denny (2000) states, as quoted by Barbir (2020, p. 185), the principles of motivational leadership that enable a leader to succeed in leading and motivating are:

- setting achievable and purposeful goals
- A leader is always an example to his colleagues
- a leader must always and constantly work on himself and his development
- it is necessary to take time to think
- leading people should never be by coercion
- the leader evaluates based on the achieved results
- a leader must build self-confidence and be always ready for criticism
- he has to think about the future
- he must think like a winner.

## 5. RESEARCH OF THE EFFECTS OF MOTIVATION ON TEAM MEMBERS

The research conducted was done in a large Croatian manufacturing company with global influence, within the Sales sector, by surveying 111 members/collaborators of 16 sales teams - sales operatives. The age of the respondents is in the range of 24-65 years old, with work experience ranging from 1-37 years, 24 persons of the female gender and 87 persons of the male gender. The level of education of the respondents varies from the 1st degree (NKV) to the 7th degree (VSS).

### 5.1. Research goal

The goal of the research was to gather information that would confirm the importance of leadership and the effectiveness of motivation of team leaders through the experience of associates in sales teams, as well as the main motivators of sales team members. Their subjective experience is largely a reflection of the quality of leadership and motivational competencies of the managers/leaders of the sales service teams within the researched organization.

### 5.2. Description of the research

The poll was posted on April 11, 2023, year on the *Microsoft Teams* application (the company's internal business communication), in the form of a *Microsoft Forms* form, with the content of eleven survey questions, of which six questions could be selected from a range of five given descriptive answers, and five questions were answered numerically, in the range of grades from 1-5. The survey itself was not anonymous, but the questions were asked in such a way as not to expose the person being evaluated directly, but to suggest the general experience of the questioned person in order to collect as objective answers as possible. The answers used in the paper do not follow numerical order because they are part of a larger number of survey questions, not all of which are the subject of this research.

## 6. RESULTS AND DISCUSSION

Based on the knowledge obtained about the researched concepts of *leadership* and *motivation*, definitions, scientific claims and secondary research data, as well as through the results of the author's own research, the conditions for answering the research questions were obtained. By quantifying the data from the first survey question (graph 4.1), the importance of building a positive team atmosphere received the numerically highest rating from the respondents, while the second in importance is the possibility of improvement and advancement. The third in order is the importance of the culture of recognition of results, and material incentives and job flexibility were evaluated only in the penultimate and last place. There is a possibility that the respondents put job flexibility in the last places for the reason that their job as sales field staff is already very flexible in itself, and the material incentives are perceptually and realistically higher than the statistical average, but such assumptions should be further empirically proven. As shown in graph 4. 7. For 50% of respondents, the leader's influence on motivation is quite large, for 16% it is exceptional. Admittedly, for 30% of the surveyed associates, the influence is medium, which points to the possibility of improvement on the part of the manager, because as explained by the secondary data from the research, there are knowledge and skills that contribute to the development of the competences of leaders, and motivating is an important function of management in addition to leading, thus essential component to create success. 60% are quite strong and 21% extremely self-motivated associates (graph 4.6), which represents a strong potential for additional motivation through leadership. Working with co-workers who have a high degree of self-motivation is, in any case, an area that can be built in an organizational sense and lead to higher levels of job satisfaction. The satisfaction of associates with the level of leadership competencies is interpreted here based on the answers to several

structured questions: chart 4.2 illustrates the giving of praise for work (93 % of respondents receive praise *sometimes* or *often* , noting that the answer is *sometimes* mostly, in 58% of cases, and not to the end determined whether the praise is in line with the work performance of the associate, and therefore fully justified). Furthermore, satisfaction with professional support (graph 4.3) was marked as good, very good and excellent by 93% of respondents, which is an average very good result. 80% of respondents described the competence of creating challenges by leaders as good and excellent (graph 4.4) as an important motivator. *Frequently* and *constantly* is the answer in the percentage of 78% of associates to the frequency of feedback (graph 4. 5). It is possible to state that the vast majority of leaders continuously provide feedback to their associates. The objectives of the research were confirmed through the survey given that the responses of 111 employees within the sales teams were obtained as a reflection of their experience of the competencies of managers, their own motivators and team leaders as motivators, which was the goal of the research survey. With the obtained feedback, it is possible to answer the research questions. Three research questions were asked that are in line with the research objectives, and the results are presented in the following text.

- **IP1 – What are the strongest motivators for sales team members?**

In the researched sales teams, material incentives are the lowest rated motivator by the majority of associates. On the other hand, the team atmosphere was rated the highest numerically, which is also the best news for superiors - they are the most responsible and can influence this motivator the most. Quality management of professional development and careers of employees is also extremely important, as this is the second most powerful motivator for team members. It could be argued that the results point to the great importance of team leaders as first superiors, with a large scope for influence by non-material incentives.

- **IP2 – What is the influence of team leaders on the motivation of team members?**

There is an almost negligible number of responses that suggest a weak influence, while on the other hand, a very large influence is experienced by the largest number of respondents, which represents a great responsibility for managers, and on the other hand, a significant potential that can be managed. Influence often results from the way, style, skill of leadership, so it instructs managers who lead people to raise the level of the team they lead by working on themselves and their personal development.

- **IP3 – Are the associates in the sales teams of the selected large organization satisfied with the leadership and motivation of their managers?**

According to the obtained results, it is possible to state that the members of the surveyed teams are quite self-motivated employees, which is always a strong potential for additional building with "external" motivation - the motivation of the leader. In the research, questions were asked about the frequency of receiving praise, feedback, professional support, the challenge of tasks, and based on the collected answers, it is possible to conclude that the level of satisfaction is quite high. The fact is that it is always possible to improve quality and one's own level of competence - thereby influencing team members in a positive context, which is actually the basis for building a solid business structure and even better professional relationships. Although the surveyed level of satisfaction is high, there is always room for improving the competences of managers. The manager's responsibility is team management and it is manifested through team results, and the relationships within the team, the satisfaction of associates, the level of motivation, are all elements that can make the results better.

## 7. CONCLUSION

Leading people as collaborators in the business environment is part of the functions of management, according to numerous authors and scientists it is actually a fundamental function on which the totality of results depends, because people are involved in all business processes. Leadership therefore represents a process, but leadership, on the other hand, is also a characteristic of leaders by which they direct employees towards reaching the designed goals, with their personal inspiration inspiring followers to achieve more than their own personal expectations. Basically, this is also the difference between a manager and a manager-leader. In addition to the function of leadership, which in practice corresponds to the characteristics, behaviour and style of leaders, and the situations in which it manifests, and which is described in the paper, one of the key competencies of leaders is motivation. The concept of leadership is thus unimaginable without the function of motivating, which achieves the development of cooperation, their job satisfaction, and thus the effect on overall results. The performance of a satisfied employee, motivated to progressively invest knowledge and skills in the job with clearly proclaimed goals, useful information and instructions towards the goal and feedback on his own performance, is better, more valuable and of higher quality, more measurable. The company's aspiration is to create just such a potential in its employees, and the key factor with which it is possible to build and achieve this is leadership through motivation. With this idea, the research was done as a component of this work, and it was done in the system of a large Croatian manufacturing company, within the Sales sector. The purpose of the research was to gain insight into how the management of people within sales teams works in practice through feedback from team members. Limitations arising from this research are layered in terms of methods and technology for obtaining quality results. The surveyed respondents are part of only one system which, due to the number of similar other competitive systems, is not fully representative. It is a fairly organized system with great competitive advantages, which does not necessarily represent the average. Furthermore, the survey itself is of an internal nature, it is not anonymous, and therefore the reliability of the answers is not complete. The very structure of the question was intended to avoid directly stating the views of the superior person, which made it possible to obtain a subjective experience, but it is not a completely objective assessment of competences, as it represents only one angle of looking at things. Recommendations for possible further research could include several different systems, multidimensional research could also be done that would include leaders of superiors with their view and attitude about the competencies of team leaders. Additionally, questions could be added that target some other competencies in motivation management. In conclusion, leadership in motivating is one of the key factors in the development of sales teams with consequences for the creation of excellent, results-successful teams with satisfied associates who are ready to change and adapt. Followers will harmoniously and persistently follow a leader who knows how to show the way so that they themselves want to reach the goal. In sales teams, the result in relation to the plan is often the determinant of success, and the result comes as a result of the coordinated actions of all individuals. This is exactly why every leader should always look at the big picture, the broader context, and focus on the individual. The art of connecting as a synergistic factor contributes to the overall effect. Therefore, successful leaders often balance between set expectations from above and below, motivating associates to include the maximum potential for achieving goals. If they manage to bring all team members to the goal - they enjoy trust that grows into following.

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## ACQUISITION AND FRANCHISE AS STRATEGIES FOR EXTERNAL GROWTH OF THE COMPANY

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### ABSTRACT

*Every company wants to reach a specific goal with its operations. In the long term, many companies aim to expand their business and succeed in new, different markets. To achieve this goal, companies decide on a further step in their business - expansion to new, foreign markets. This paper discusses marketing strategies for external growth of companies with a particular focus on acquisition and franchise. A survey involving 207 participants was carried out to explore the concepts of acquisition and franchise. We aimed to assess the extent to which respondents were acquainted with acquisition and franchise strategies and their awareness of how the individual products and services they use are developed through these strategies. A field survey was conducted using an "online" survey questionnaire (as a research instrument). The research aims to answer three research questions. The respondents are very familiar with marketing strategies. Also, it is important to them what form the company will expand in the market where they buy.*

**Keywords:** *marketing strategies, market, acquisition, franchise, market research*

### 1. INTRODUCTION

What is the fundamental long-term goal of every company? Today, an increasing number of entrepreneurs decide to expand their business by entering foreign markets. Through this expansion, the company turns to new goals and growth strategies. It is important for the company to explore the various forms (i.e., strategies) of external growth and decide which strategy it would ultimately develop to align with the business objectives. Without a well-established strategy, the company may encounter numerous business problems, which eventually could lead to its failure. The definition of the work problem starts from the fact that today, there are many forms of external corporate growth and, consequently, numerous marketing strategies. However, which strategies are most commonly used? The challenge for the company is choosing the right marketing strategy and determining how to conduct market research (what needs to be researched and how). The ultimate goal is to select a strategy favorable to the market they aim to develop and ensure that it provides a long-term return on investment. This paper's research subject is market entry strategies with a specific focus on franchising and acquisition. Through a survey, the research investigates the extent to which respondents are familiar with the mentioned strategies, how many are aware that the products or services they use daily have been developed through acquisition or franchising, and to what

extent these strategies are perceived as 'important' by individuals and how much they trust their significance in the strategy selection process. The main objective of this study is to compare two highly complex strategies of external corporate growth. To explore this, it is necessary to address the following research questions: What is the difference between acquisition and franchise? How familiar are consumers in Croatia and other countries with strategies of external corporate growth, especially with acquisition and franchise strategies? How many companies (whose products or services consumers use daily) are known to have developed through acquisition or franchise? To what extent do consumers consider the strategy with which a company enters the market with the products or services they use to be important? After the theoretical section of the paper, the results of a survey conducted on a sample of 207 respondents are presented. Qualitative field research was carried out through an online survey questionnaire. The results were analyzed using the SPSS software, employing descriptive and inferential (chi-square test) statistics.

## 2. FOREIGN MARKET RESEARCH

The decision to enter foreign markets requires the management to invest time and effort in researching all potential challenges and opportunities facing the company. Before internationalizing operations, a company must fully understand the international marketing environment and the international trade system. Therefore, companies must research foreign markets (Kotler et al., 2006). The authors describe market research as a systematic collection, analysis, and interpretation of various data related to international marketing issues (Previšić et al., 2012). When a company decides to sell in other markets, it is aware of numerous risks, such as facing different trade restrictions like tariffs, quotas, and embargoes (Kotler et al., 2006). It is essential to recognize that access to specific markets is highly complicated, emphasizing the need to exchange key information. Decisive and coordinated action towards third countries helps European companies sustain growth and diversify export markets<sup>1</sup>. In market research and strategies for entering foreign markets, as well as the level of standardization or adaptation of the marketing program, entrepreneurs must analyze economic, political-legal, sociological, and cultural environmental factors (Krupka et al., 2021). Companies deciding to operate in international markets must study each country's economy. Two fundamental economic factors reflecting the attractiveness of a country as a market are the country's industrial structure and income distribution (Kotler et al., 2006). When deciding to enter foreign markets and research them, it is essential to consider the political and cultural environment, as countries significantly differ in these aspects. Thoroughly researching consumer habits is necessary to avoid expanding into markets with no prospect of growth and development (for example, trading in beef in the Indian market). Today, information is most easily obtained through the Internet, which has become an efficient medium for acquiring various helpful information and market research guidelines (Kotler et al., 2006). It is imperative to avoid errors in the research process. International market research is a complex and demanding task, making it crucial for management to designate who will lead international marketing research. The result of the research is a report that analyzes data within the market context and competitive conditions, providing insights valuable for decision-making in foreign markets. The markets under investigation are not identical, and each country has its specifics, requiring the researcher to ensure data accuracy and minimize potential errors (Previšić et al., 2012). When choosing an appropriate strategy for entering foreign markets, management establishes the framework for operations abroad within which the company can successfully develop its capabilities while exposing itself to various risks and uncertainties (Previšić et al., 2012).

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<sup>1</sup><https://izvoz.gov.hr/vijesti/market-access-day-koristenje-prakticnih-alata-europske-komisije-za-ulazak-na-treca-trzista/5981>;

### 3. FOREIGN MARKET ENTERING STRATEGIES

In the long term, many companies contemplate business internationalization – entering foreign markets. This decision triggers numerous questions and processes for all involved parties. As noted by Matić (2016), entering foreign markets should be aligned with the business strategy and goals of the company. From a company's perspective, increasing internationalization implies that the company must address some fundamental questions: What market position should we aim for in our country, our economic region, and globally? Who will be our global competitors, and what are their strategies and resources? Where should we produce and source our products? What strategic alliances should we form with other companies? (Kotler et al., 2006). Global marketing is paramount for a company that has turned to business internationalization. It is a crucial component of the overall business strategy for corporate organizations. Businesses have recognized the power gained by generating greater revenue in the global market. Today, dynamic global marketing strategies are seen as the degree to which a company globalizes its marketing behavior across different countries through the standardization of marketing activities and the integration of marketing steps in various markets. Such strategies aim to enhance the company's performance on a global scale (Rončević et al., 2021, p. 273)." The increasing development of the globalization processes in the world economy creates an objective need for transformations to enhance competitiveness and strengthen the strategic advantages of business structures (Androsova, Sogacheva, 2020). When entering foreign markets, companies manage their international marketing activities in at least three ways – initially establishing an export department with a sales manager and several assistants, then creating an international section or branch handling all international activities, and finally evolving into global organizations that develop plans for worldwide manufacturing facilities, marketing policies, financial flows, and logistics (Kotler et al., 2006). Direct and indirect methods of entering foreign markets have been developed in theory and practice. Companies wishing to sell goods and services in a foreign market should explore these two entry methods and decide which approach will ensure the best long-term results (Kotler et al., 2006, p. 229). In marketing theory, numerous strategies have been explored to assist a company in entering foreign markets. Based on complexity, these strategies can be categorized into three fundamental groups:

- Simple or classical strategies – export and import;
- Moderately complex strategies – international business collaboration (licenses, assembly production, cooperation, contract manufacturing, franchise, etc.);
- Complex strategies – joint ventures or wholly-owned subsidiaries abroad (Previšić et al., 2012)."

At the outset of entering a foreign market, a company needs to satisfy several key conditions related to finances, human resources, and the external environment. To ensure a competitive product in the market, the company must have surplus funds, an adequate workforce capable of producing a larger quantity of products, and favorable conditions in the external environment with minimal risks<sup>2</sup>. There is no one-size-fits-all approach for entering the target foreign market (delivering products or services); rather, this entry depends on various circumstances, the company's experience, and resources when planning to operate in a foreign market<sup>3</sup>. In practice, exporting is the most suitable organizational form for commencing business in foreign markets as it allows the acquisition of initial knowledge and experience, opening opportunities for transitioning to more advanced forms of market entry and expanding operations into newer markets (Matić, 2016).

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<sup>2</sup> <https://dnevnik.hr/vijesti/vjetar-u-ledja-hrvatskim-poduzetnicima-kako-izvoziti-vlastiti-proizvod-i-postati-konkurentniji-na-trzistu---642083.html>;

<sup>3</sup> <https://izvoz.hbor.hr/izvozni-vodic/ulazak-na-trziste/>;



#### **4. ACQUISITION AND FRANCHISING AS FORMS OF EXTERNAL BUSINESS GROWTH**

Acquisition is a term that denotes the purchase of an entire company or a part of it because it no longer exists independently (Hisrich et al., 2008). The state of 'non-existence' is a favorable indicator for companies intending to expand into new markets or strengthen their position in the existing market by approaching leadership. This involves acquiring financially weak companies that still maintain a good reputation in the market (Sopta & Knežević, 2019). The motives for mergers and acquisitions vary and differ from process to process. The most common motives include strengthening market position, representing strategic reasons, and improving business results as financial motives. Motives can be divided into two basic groups - internal and external motives. Internal motives include synergistic effects (operational and financial), cost reduction, revenue increase, economies of scale, improvement of production processes, tax synergies, diversification, human potential and intellectual capital enhancement, and managerial ego. External motives distinguish industrial concentration, globalization processes, industry life cycle, and changes in the macroeconomic environment (Rončević, 2006). In today's market conditions, acquisitions are often a key step towards quickly achieving the strategic goals of large corporations (Jurun & Laća, 2019). The ability to manage acquisitions plays a significant role in enhancing the overall integration of the acquiring company (Ramadhana et al., 2022). Franchise (or franchising) is an agreement in which the franchisor grants exclusive rights to the franchisee for local distribution in exchange for payment of royalties, i.e., income from intellectual property and adherence to standardized business practices (Hisrich et al., 2008). It is often compared with other business ventures such as licensing, authorized distribution, authorized agency, joint ventures, etc. (Erceg, 2020). In cases where franchise operations develop within a country, it attracts foreign direct investments that meet the company's needs for limited resources and enable them to improve the quality of their products and enhance competitiveness in the market (Prykhodko & Ohinok, 2019). Numerous studies reveal perceptual shortcomings, where many franchise providers have a much narrower view of brand advantages than franchisees, potentially posing a significant threat to the development of various brands (Ghantous & Christodoulides, 2020). Transitioning to a franchise business model is now seen as an identity transformation linked to socio-material processes (Mills & Jareemiah, 2021). Entering into franchise operations requires significant effort and investment, bringing numerous potential risks (Erceg & Vidić, 2020). Almost every contractual relationship involves various conflicts. Some conflicts escalate to legal disputes, while others are resolved through clarification, communication, and mutual agreement. In the case of acquisitions and franchises, some conflicts can serve in the long term to improve products and services, operational processes, and concepts (Perrigot et al., 2021). To define the differences between acquisition and franchise, a table has been created to present a comparative analysis of these two marketing strategies. The comparative analysis is conducted from the franchisor's perspective, or in the case of an acquisition, the company acquiring another company that will no longer exist independently.

*Table following on the next page*

<b>Marketing strategy</b>	<b>Acquisition</b>	<b>Franchise</b>
<b>Basic relationship (giving/acquiring a company)</b>	acquisition, merger and acquisition of companies	granting the right to operate under the same name, established marketing activities... (franchise agreement)
<b>Parties to a business venture</b>	a company that buys another company and one that will no longer exist independently	grantor and franchisee
<b>Compensation</b>	price of the acquired company, exchange of shares, payment to shareholders, proxy	receiving entry fees and franchise fees
<b>Development in the world</b>	+	+
<b>Development in Croatia</b>	+	+
<b>Relations with the donor/acquirer</b>	friendly or hostile	good relations needed

*Table 1: Comparative analysis of acquisition and franchise  
 (Source: Author's own work)*

In Table 1, a comparative analysis of franchise and acquisition can be observed. Each strategy is analyzed from one perspective – the company granting the franchise and the one acquiring another company (in the case of acquisition). The fundamental relationship in acquisition involves acquiring, merging, and merging companies. At the same time, the franchise entails signing a franchise agreement granting the right to operate under an established name, marketing structure, etc. Under this agreement, the franchisee enters the franchise network and commits to using the franchisor's business methods and techniques, with reciprocal payments, royalties, and other periodic, contract-defined payments (Kalkoshki & Abadi, 2019). In both strategies, there are two sides to the business – in the acquisition, it is the company buying another, and it will no longer exist independently, or in the case of full acquisition, it may cease to exist entirely. On the other hand, in the franchise, it is the company granting the franchise and the one receiving it. In franchising, both sides benefit, while in acquisition, only one does because the other side weakens in business due to stock sales or the sale of the entire company. The compensation in acquisition is the paid price for purchasing the company, exchanging stocks, or proxies. In contrast, franchising (for the franchisor) has substantial revenues in the form of entry fees and monthly franchise fees. Today, franchising and acquisition are highly developed worldwide, with examples also present in Croatia. In acquisitions, the relationships between parties can be friendly or hostile (if the management recommends accepting the takeover offer, it is considered friendly; in the reverse case, if the management officially rejects the offer, the takeover is considered hostile (Lezibat et al., 2006)). In franchising, a good relationship and collaboration are crucial because the franchisor specifies their rights and requirements for the franchisee through the contract, and the franchisee is obligated to respect the contract and operate accordingly. Proxy contests in acquisitions were once the primary weapon of hostile takeovers, allowing company management to secure their re-election before the shareholders' meeting by obtaining proxies for voting on the election of authorized management. This enables the acquisition of votes from shareholders by the proxy holder. Public data play a significant role in obtaining a list of shareholders from whom proxies will be obtained (Orsag & Gulin, 1997).

#### **4.1. Examples of the most significant acquisition and franchise companies in Croatia and the world**

Acquisition and franchise strategies have been developed worldwide, including in Croatia. Looking at acquisition, in Croatia, the acquiring companies are businesses from Slovakia, Poland, and the Czech Republic. They represent strategic investors. Atlantic Grupa d.d. has achieved a series of acquisitions (Cedevita, Neva, Interchem, Haleko, Sports Direct, Fidifarm/Dietpharm, Kalničke Vode Bionatura, and Droga Kolinska, Prodis, and Foodland). This has positioned Atlantic Grupa d.d. as one of the leading regional companies in distributing fast-moving consumer goods<sup>4</sup>. In the construction sector, one of the major 'acquirers' is the French company Bouygues, while in the pharmaceutical world, the most prominent 'acquirer' is the company Pfizer. In Croatia, companies such as Infobip (IT sector), Orbico (distribution and logistics), Mlinar, Podravka (food industry), Meteor (household products), and the previously mentioned Atlantic Grupa d.d. can be listed as the largest 'acquirers'. It is also noteworthy that one of the biggest 'acquirers' in Croatia at one time was Agrokor<sup>5</sup>. Companies such as Amazon, Microsoft, Apple, and Google have made some of the largest global acquisitions. In the world, most acquisitions occur in the IT sector (information technology and social networks). Furthermore, there is a greater inclination towards acquisition globally than Croatia, and unlike in Croatia, these transactions involve multimillion-dollar deals. Franchises have also been developed and are most prevalent in the food sector. The largest global franchises include: at the forefront, is McDonald's; in second place are hotel chains Marriott International, and in third place is the real estate agency Century 21<sup>6</sup>, along with Anytime Fitness (fitness center)<sup>7</sup>. Among successful global franchises, one can mention the Museum of Illusions, Lush (cosmetics), Diners Club International (banking), RE/MAX (real estate), Burger King (fast-food restaurant), and Hertz (car rental). Coca-Cola is cited as one of the largest companies engaged in franchising<sup>8</sup>. In Croatia, foreign franchises still dominate the franchise business. However, some domestic companies in Croatia have been successfully operating their franchises for a long time. The number of domestic franchises in Croatia is relatively low for several reasons. There needs to be a more robust understanding of the multiple advantages of franchising, and this business is often mistakenly associated with very high financial investments. Additionally, there needs to be a legislative framework for regulating franchise business, and financial products are specifically designed to finance franchise purchases. Examples of Croatian franchises include bio&bio (natural product store), News (newspapers), Body Creator (centers for obesity prevention and treatment and reshaping the female body), Lantea Grupa (a leading retail chain of textile products that introduced the brands Emporio Armani, Mango, Gerry Weber, Elena Mirò, Nike, Camel active, La Divina, Di Caprio, Muru, Triumph, and Levis to the Croatian market through franchising), Pek – Snack (food industry), Galeb (textile industry), Place2Go<sup>9</sup> (magazine). The franchise Tinker Labs, a center for children's education where children aged 4 to 16 engage in six programs involving chemical experiments, building robots, learning about human anatomy, and more, is also gaining prominence<sup>10</sup>.

#### **5. SURVEY RESEARCH**

The research on the topic 'Acquisition and Franchise as Strategies for the External Growth of Companies' was conducted using the survey method with an online questionnaire as the

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<sup>4</sup> <https://www.atlantic.hr/hr/o-nama/povijesni-razvoj>;

<sup>5</sup> <https://lidermedia.hr/preporuceno/tvrtke-koje-sire-trziste-akvizicijama-i-organskim-rastom-1-126337>;

<sup>6</sup> <https://hu-pf.hr/3-najvece-fransize-u-svijetu/>;

<sup>7</sup> <https://franchising.hr/clanak/1653/top-americke-fransize-za-2022/>;

<sup>8</sup> <https://www.nacional.hr/posao-s-najmanje-rizika-fransiza-najsigurniji-biznis-za-pocetnike/>;

<sup>9</sup> <https://www.hgk.hr/prvi-forum-fransiza-2019-najava>;

<sup>10</sup> <https://tinkerlabs.hr/tinker-labs-brzo-raste-u-jednu-od-najpopularnijih-obrazovnih-fransiza-u-hrvatskoj/>.

research instrument. The reason for choosing this form of research is that it has numerous advantages, such as the quick collection of data, being a cost-effective method, accessible to all respondents encountering the survey, and allowing respondents to participate at their convenience. The online survey used in the research was compiled by the author of the study based on the defined problem and research subject, as well as the research questions and objectives. The sole criterion for completing the survey was that respondents are adults. The research was conducted over a month, from May 8, 2023, to June 8, 2023. The survey was distributed through the social network Facebook and via email, making it accessible to all users. The intention was to have residents of other countries also participate in the research. Before the actual commencement of the research, participants were informed about the research procedure, and their anonymity was guaranteed, with the collected data used solely to write the article. The research was conducted on a sample of 207 respondents, and the sample is not considered representative.

### **5.1. Sample characteristics**

In the sample of 207 respondents, 57.5% (119 respondents) were female, while the remaining 42.5% (88 respondents) were male. Looking at age, the majority of respondents, 24.6% (51 respondents), were aged 38 and above. Furthermore, 21.7% (45 respondents) were in the age range of 23–27 years, while 20.8% of respondents (43 respondents) were in the age range of 28–32 years. The smallest number of respondents were in the age groups of 18–22 years and 33–37 years (16.4% each, or 34 respondents from each group). The majority of respondents, 81.6% (numerically 169 respondents), were from the Republic of Croatia, 17.9% (or 37 respondents) were from the Republic of Slovenia, and only one respondent (0.5% of the sample) was from Bosnia and Herzegovina. Most of the sample had completed a bachelor's degree (35.7% of the sample, or 74 respondents) or a master's degree (25.6% of the sample, or 53 respondents). A smaller portion of the sample had only completed high school (29.5% of the sample, or 61 respondents) or a postgraduate degree (8.2% of the sample, or 17 respondents). Only two respondents (1% of the sample) had completed only elementary school. No respondents without completed education or only completed elementary school grades 1–4 participated in the study. Looking at the employment status as a sociodemographic characteristic of the respondents, the majority of the sample, 78.3% or 162 respondents, were employed, 14% (29 respondents) were students, and 6.8% (or 14 respondents) were retired. Only 1% of the sample (or numerically, two respondents) were unemployed.

### **5.2. Results processing**

The following is the analysis of data related to the research questions using the following models:

- Descriptive statistics;
- Chi-square test (Chi-Square Test tables).

Below are tables presenting the results of consumer responses, or respondents, to the items related to the research questions posed in the introduction of the study:

- "1. How familiar are consumers in Croatia and other countries with external growth strategies of companies, especially with acquisition and franchise strategies?"
- "2. For how many companies (whose products and services they use daily) do they know that they have developed through acquisition or franchise?"

	N	Range	Min	Max	Mean	Std. Deviation	Variance
knowledge of strategies (all)	207	4	1	5	4,14	,946	,894
selection of strategies according to research	207	4	1	5	4,33	,887	,786
knowledge of the listed franchises	207	4	1	5	4,57	,700	,490
knowledge of the listed "acquirers"	207	4	1	5	4,36	,881	,776
Valid N (listwise)	207						

*Table 2: Descriptive Statistics (particles related to questions 1 and 2)  
 (Source: the author's own work according to the research conducted)*

Table 2 displays the results of descriptive statistics for four items on which 207 respondents responded on a scale from 1 to 5. The participants provided the following responses:

- For the item 'I am familiar with forms of external company growth, i.e., marketing strategies for entering foreign markets (franchise, acquisition, export, import, license, strategic alliances...),' respondents gave an average rating of 4.14, with a high standard deviation of 0.946 and a high variance of 0.894.
- For the item 'There are numerous forms of external company growth, and each company chooses a form based on various research (profitability, competitiveness...),' respondents answered with an average rating of 4.33, a low standard deviation of 0.887, and a high variance of 0.786.
- For the item 'I am familiar with how McDonald's, KFC, Coca-Cola, and Burger King operate as franchises,' respondents provided an average rating of 4.57, a low standard deviation of 0.700, and a moderate variance of 0.490.
- For the item 'I am familiar with how Facebook, Microsoft, and Google are among the major "acquirers" in the world,' respondents answered with an average rating of 4.36, a high standard deviation of 0.881, and a high variance of 0.776."

Respondents provided average ratings above 3 for the mentioned items, indicating that they know marketing strategies and that the companies whose products and services they use represent acquisitions or franchises.

Looking at the Chi-Square Test, the assumption entering the study was that there were no statistically significant differences between responses. From Table 3, it is evident that for the item 'I am familiar with forms of external company growth, i.e., marketing strategies for entering foreign markets (franchise, acquisition, export, import, license, strategic alliances),' the Asymptotic Significance (hereafter "AS") is less than 0.05 across all categories. This suggests statistically significant differences based on the sociodemographic characteristic of 'gender.' Differences exist within the sample, as some respondents are familiar with the strategies while others are not, as demonstrated by this research. Additionally, more women than men are familiar with these strategies, leading to the conclusion that women may have a greater awareness and confident attitudes towards marketing strategies for the external growth of companies.

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	25,397 <sup>a</sup>	4	,000
Likelihood Ratio	28,459	4	,000
Linear-by-Linear Association	9,838	1	,002
N of Valid Cases	207		

a. 4 cells (40,0%) have expected count less than 5. The minimum expected count is 2,55.

*Table 3: Chi - Square Tests (particles related to questions 1 and 2)  
 (Source: the author's own work according to the research conducted)*

Similarly, for the item 'There are numerous forms of external company growth, and each company chooses a form based on various research (profitability, competitiveness...),' the Asymptotic Significance (hereafter "AS") is less than 0.05 across all categories. It can be concluded that, for this item as well, there are statistically significant differences in responses based on the characteristic 'gender.' In this case, as with the previous item, women provided higher ratings in a larger percentage. This suggests that women may align more positively with the stated fact compared to men. The results are presented in Table 4.

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15,560 <sup>a</sup>	4	,004
Likelihood Ratio	18,394	4	,001
Linear-by-Linear Association	4,033	1	,045
N of Valid Cases	207		

a. 4 cells (40,0%) have expected count less than 5. The minimum expected count is 1,28.

*Table 4: Chi - Square Tests (particles related to questions 1 and 2)  
 (Source: the author's own work according to the research conducted)*

Furthermore, the analysis of the results continues through two models to address the last research question posed in the introduction of the study:

- "3. To what extent is the strategy with which a company enters the market with products and services that consumers use important to them."

*Table following on the next page*

	N	Range	Min	Max	Mean	Std. Deviation	Variance
ratio paid - received	207	4	1	5	3,70	,989	,978
the importance of the customer	207	4	1	5	3,92	,937	,877
better product/service quality	207	4	1	5	2,41	1,174	1,378
maximum customer satisfaction	207	4	1	5	4,33	,806	,649
satisfaction with acquisition and franchise	207	4	1	5	2,30	1,144	1,310
Valid N (listwise)	207						

*Table 5: Descriptive statistics (parts related to question 3)*  
 (Source: the author's own work according to the research conducted)

Table 5 presents the results of descriptive statistics for five items, to which 207 respondents responded on a scale from 1 to 5. The participants gave the following responses:

- For the item 'I don't care how a product and service developed in the market (i.e., the company's external growth strategy is not important to me), what matters to me is the value for money,' respondents answered with an average rating of 3.70, a high standard deviation of 0.989, and a high variance of 0.978.
- For the item 'I believe I am important as a customer for the decision to open/acquire a company,' respondents provided an average rating of 3.92, a high standard deviation of 0.937, and a high variance of 0.887.
- For the item 'I believe that the products and services I consume would be better if they were the result of a different marketing strategy for entering foreign markets (i.e., external company growth),' respondents answered with an average rating of 2.41, a high standard deviation of 1.174, and a very high variance of 1.378.
- For the item 'I believe it is important for a company to develop in the market with a marketing strategy that can provide maximum satisfaction to the customer,' respondents answered with an average rating of 4.33, a low standard deviation of 0.806, and a high variance of 0.649.
- For the item 'I believe that a product and service that developed through acquisition or franchise would not provide me with the same satisfaction as if it developed through another marketing strategy,' respondents provided an average rating of 2.30, a high standard deviation of 1.144, and a very high variance of 1.310.

Respondents gave average ratings above 3 for some items and below 3 for others, indicating that the strategy of external company growth is essential to consumers. Looking at the Chi-Square Test, statistically significant differences exist in responses to the item 'I believe that the products and services I consume would be better if they were the result of a different marketing strategy for entering foreign markets (i.e., external company growth).' Specifically, differences exist based on the characteristic 'gender.' Table 6 shows that the Asymptotic Significance (hereafter "AS") is less than 0.05 across all categories. It can be concluded that men predominantly responded with lower ratings to this item, while women predominantly responded with higher ratings.

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12,082 <sup>a</sup>	4	,017
Likelihood Ratio	12,512	4	,014
Linear-by-Linear Association	11,822	1	,001
N of Valid Cases	207		

a. 1 cells (10,0%) have expected count less than 5. The minimum expected count is 4,25.

*Table 6: Chi - Square Tests (part related to questions 3)*  
 (Source: the author's own work according to the research conducted)

For the item 'I believe that the products and services I consume would be better if they were the result of a different marketing strategy for entering foreign markets (i.e., external company growth),' statistically significant differences in responses exist based on the sociodemographic characteristic 'country of residence.' Specifically, most respondents answered this question with lower ratings, while respondents from the Republic of Croatia provided higher ratings. In contrast, respondents from the Republic of Slovenia and Bosnia and Herzegovina answered with higher ratings in a tiny percentage. Therefore, it can be concluded that respondents from Croatia believe in the specified item to a greater extent, while others believe in it to a lesser extent. This could be due to better awareness, experience with different strategies, etc. The results are visible in Table 7 (the Asymptotic Significance, hereafter "AS," is less than 0.05 across all categories).

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	30,149 <sup>a</sup>	8	,000
Likelihood Ratio	18,421	8	,018
Linear-by-Linear Association	5,885	1	,015
N of Valid Cases	207		

a. 6 cells (40,0%) have expected count less than 5. The minimum expected count is ,05.

*Table 7: Chi - Square Tests (part related to questions 3)*  
 (Source: the author's own work according to the research conducted)

Similarly, for the item 'I believe that a product and service that developed through acquisition or franchise would not provide me with the same satisfaction as if it developed through another marketing strategy,' statistically significant differences in responses exist based on the sociodemographic characteristic 'country of residence.' Table 8 shows that the Asymptotic Significance (hereafter "AS") is less than 0.05 across all categories. As with the previous item, respondents from the Republic of Croatia, to a greater extent, provided lower ratings for the specified item, while a certain percentage also gave higher ratings. Respondents from the



Republic of Slovenia and Bosnia and Herzegovina gave lower ratings, indicating disagreement in attitudes or beliefs about the item among residents of the three countries.

Indeed, the reasons are diverse, but better awareness, knowledge, and experience lead to different responses. Undoubtedly, respondents who have consumed products and services developed through acquisition and franchise have different impressions and satisfaction levels, contributing to diverse ratings and, ultimately, results.

#### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17,500 <sup>a</sup>	8	,025
Likelihood Ratio	22,610	8	,004
Linear-by-Linear Association	7,170	1	,007
N of Valid Cases	207		

a. 6 cells (40,0%) have expected count less than 5. The minimum expected count is ,04.

*Table 8: Chi - Square Tests (part related to questions 3)*  
 (Source: the author's own work according to the research conducted)

In the end, there are also statistically significant differences in responses to the item 'I believe that the products and services I consume would be better if they were the result of a different marketing strategy for entering foreign markets (i.e., external company growth).' Table 9 illustrates that the Asymptotic Significance (hereafter "AS") for the specified item is less than 0.05 across all categories, considering the sociodemographic characteristic 'level of education.' Most respondents who completed secondary school, undergraduate, graduate, and postgraduate studies gave low ratings (from 1 to 3) for the specified item, indicating that they do not fully believe in it. It can be concluded that there is a difference because most respondents with a higher level of education have a better understanding of strategies and know what they entail (advantages and disadvantages).

#### Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	41,009 <sup>a</sup>	16	,001
Likelihood Ratio	42,038	16	,000
Linear-by-Linear Association	6,797	1	,009
N of Valid Cases	207		

a. 12 cells (48,0%) have expected count less than 5. The minimum expected count is ,10.

*Table 9: Chi - Square Tests (part related to questions 3)*  
 (Source: the author's own work according to the research conducted)

From the above, it can be concluded that there are statistically significant differences in responses based on various sociodemographic characteristics. The reasons are numerous, including better awareness, knowledge, and satisfaction with marketing strategies.

### **5.3. Research Limitations**

A total of 207 respondents participated in the research. Some limitations were identified during the research. The first limitation is that the study was conducted only online (via Facebook and email). Due to the lack of direct contact ('face-to-face') with respondents, it is impossible to determine how focused the respondents were, how many read the questions with understanding, etc. Another limitation is the small number of respondents (207), and the sample needs to be more representative. The majority of respondents are from Croatia (81.6%), with a smaller number from Slovenia (17.9%) and Bosnia and Herzegovina (0.5%). The results would be more robust if respondents from other countries were included, given that franchises and acquisitions are present in almost every market. Despite these limitations, the mentioned research has provided specific insights and conclusions about the importance to consumers of the strategy a company adopts to expand in the market where they are consumers.

## **6. CONCLUSION**

The question that a company poses is what its long-term goal is. In the long term, many companies aim to develop internationally, i.e., penetrate foreign markets. They use various marketing strategies to enter foreign markets. In Croatia, companies can be found on the market that has developed with franchise, acquisition, license, etc. The most developed strategy in the Croatian market is export. Franchise and acquisition are also mentioned as strategies. In the world, there is a strong inclination and tendency towards these strategies, and in Croatia, there are companies developed with these strategies. Some well-known Croatian franchises include Pek – Snack, Bio&Bio, Lantea Group, and News, while the globally recognized franchises include McDonald's, KFC, and Marriott International. The world's most prominent "acquirers" are Microsoft and Google, while in Croatia, companies like Infobip, Podravka, Mlinar, and Adriatic Grupa d.d. are notable. As part of the research, a field survey was conducted with a sample of 207 respondents using an online questionnaire as a research instrument, and the results were analyzed using descriptive and inferential statistics. In answer to the research questions posed in the introduction, most consumers (respondents) in Croatia and other countries (from which respondents participated) are indeed familiar with strategies, concepts of acquisition, and franchise. They know that the products and services they use have developed through these strategies. According to the research, consumers care about a particular company's strategy to expand in the market where they make purchases. They do not believe the product/service would be better if developed using a different strategy. This perspective assumes that they are familiar with products designed through franchises, ensuring consistent service or product delivery at every location. Conversely, with acquisitions, there may be concerns about potential changes or discontinuation due to new ownership. All of this poses significant questions and opportunities for further research. Also, responses from respondents have statistically significant differences based on specific sociodemographic characteristics to particular questions. The reasons are diverse - better awareness, satisfaction with marketing strategies, knowledge, etc. The mentioned research has some limitations; however, it ultimately contributes to science by informing companies that it is crucial to understand the importance consumers place on the strategy a company adopts to expand in the market where they are consumers. In conclusion, it is suggested that the research continues, exploring which strategies respondents prefer, which ones they are dissatisfied with, and what their experiences are with products and services in other markets that have developed through a particular strategy (due to the potential for development on their market).

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## ATTITUDES OF PRIMARY AND SECONDARY SCHOOL PRINCIPALS ABOUT FUNCTIONS FROM ISLLC STANDARD

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### ABSTRACT

*The subject of this research is the views of principals of primary and secondary schools about the functions that principals must fulfill, which are listed in the ISLLC standard. The ISLLC standard is the oldest and most well-known competency standard for managers of educational institutions, and it covers six areas or standards. The fulfillment of one group of functions actually means the realization of the standard belonging to them, which indirectly means that the principal performs his job well. Research participants (N=46) voluntarily filled out a survey questionnaire constructed for this research. The results indicate that the principals agree to a greater extent with the stated functions, and they express the most agreement with the functions specified in the standard that envisages promoting the success of each student in such a way that the principal acts with integrity, justice and ethics. The least number of principals agree with the function that states the creation of a strict curriculum, which probably lies in the fact of the clumsy translation of the said wording from the English language. The research confirmed that there are no statistically significant differences in the attitudes of principals depending on their gender, the level of the school they lead, the size of the institution and the total length of service.*

**Keywords:** *Principals, School, Competence Standard, Functions of principals*

### 1. INTRODUCTION

In the modern world everyone for a longer or shorter time in their lives has been part of the educational system. In most developed democratic countries, primary school education is a legal obligation that parents or guardians are obliged to respect for their children. Most people remember their teachers and classmates from this period. The school is mostly marked by its teachers, but its principals also have an exceptional importance and influence on almost all processes that take place in the school. Most often, people from the shadows, whom few students visit or even know about, and are responsible for the entire work of teachers, professional services, administrative and technical staff, but also for the success and healthy upbringing and education of each student. In the last fifteen years, the Republic of Croatia has been continuously implementing reform processes with the aim of ensuring higher quality in the educational process. In its program from 2000 to 2004, the Government of the Republic of Croatia emphasizes the importance of education as a development priority for the overall development of Croatian society (Peko, Mlinarević, 2008). The Croatian National Educational Standard (HNOS) was launched in 2005, and according to Peko and Mlinarević (2008), its main goal was to initiate changes from the base - opening up space for teachers from school practice. After HNOS, a new education reform was attempted through the National Framework Curriculum. The education reform is still ongoing today and has never before been in the center of attention of the wider public, which can facilitate the reform process, but also stop it completely. Almost all of the mentioned changes were supposed to include the training, improvement and evaluation of the work of principals (Peko et al., 2009), but regardless of their importance, the role of school principals in Croatia has not yet been professionalized, nor have models for their professional training or licensing been developed.

Croatia is lagging behind in this compared to the rest of the European Union because most countries have some form of licensing of future principals. The strategy of education, science and technology, which was adopted by the Croatian Parliament in October 2014, in the list of objectives under number five, highlights as necessary the improvement of the quality of management of educational institutions. In considering this goal, the authors of the Strategy refer to two extremely important documents that talk about the role of principals and the management of schools. The European Commission in the 2012 document *Supporting the Teaching Professions for Better Learning Outcomes within the Strengthening school leadership* chapter states that, along with the role of the teacher, the role of the principal most strongly determines success student. Running a school should be understood as a role, not as a place in the structure of the educational system, the aforementioned document emphasizes. A year later, in 2013, the Organization for Economic Cooperation and Development (OECD) issued the document *Synergies for Better Learning: An International Perspective on Evaluation and Assessment* (on Evaluation and Assessment) which in the seventh chapter *The appraisal of school leaders: Fostering pedagogical leadership in schools* (eng. *The appraisal of school leaders: Fostering pedagogical leadership in schools*) highlights the contemporary role of management of educational institutions through taking responsibility for the so-called pedagogical management, which implies directly creating a more efficient environment for learning and teaching, and indirectly influencing better results achieved by students. Pedagogical leadership means responsibility for the quality of upbringing and education in the institution headed by the person. Resman (2001, according to Blažević 2014) emphasizes the need for professional development of principals not only in the direction of organizational issues of school management, but also in the direction of pedagogical management. Pedagogical guidance must be based on dialogue, not monologue (Evans, 1999; Macneill et al., 2005, according to Peko et al., 2009). A quality principal can contribute up to 20% to the strengthening of school achievements (Staničić, 2016). Both strategic documents, and that of the European Commission and the Organization for Economic Cooperation and Development, undoubtedly place management as one of the most important factors affecting the success of educational institutions. At no time in history did schools have such strong competition from other sources of knowledge as in the 21st century. The OECD warned of this fact in its 2010 report *Knowledge Management in the Learning Society*. Certainly, as a result of that document, research on modern school management arose. The ability, skill, but also the resourcefulness of the principal, along with the work of the teacher, mostly influence the achievement of school results, a thesis that is confirmed by numerous researches that have been conducted on this topic in the last few decades. "The quality of the school becomes more dependent on the administration, especially on the principal, his ability to organize the work of the school (management), his professional-pedagogical leadership, his personality traits and other potentials" (Peko et al., 2009, 68).

## **2. POSITION AND STATUS OF SCHOOL MANAGERS IN CROATIA - ACCORDING TO COMPETENCE STANDARDS**

The Act on education in primary and secondary schools is mostly dedicated to school principals in Article 125, which states that the principal is the executive and professional leader of the school institution responsible for the legality of the work and professional work of the school institution. The principal, among other things, proposes to the school board the annual work plan and program, the statute and other general acts, the financial plan and half-yearly and annual accounts, decides on the establishment and termination of employment, implements the decisions of professional bodies and the school board, visits classes and other forms of educational - educational work, analyzes the work of teachers, teachers and professional associates and ensures their professional training and improvement, plans work, convenes and

leads sessions of the teacher's or teacher's or educator's council, in cooperation with the teacher's or teacher's or educator's council proposes the school curriculum, undertakes measures prescribed by law due to non-performance of tasks or non-fulfillment of other obligations from the employment relationship, takes care of the safety of students, teachers, professional associates and other workers, cooperates with students and parents, cooperates with the founder, state administration bodies, institutions and other bodies, supervises timely and accurate data entry into the electronic register. Right after this article of the Law on education in primary and secondary schools follows an article that normatively lists the conditions that must be met by a candidate who wants to become a principal. Article 126 defines that the principal of a school institution must have completed studies of the appropriate type to work as a teacher, teacher or professional associate in the school institution in which he is appointed as principal, at least eight years of experience in schools or other institutions in the education system or in bodies of the state administration responsible for education, of which at least five years in educational work in school institutions. The aforementioned legal regulation defines the duties and conditions that must be met by the principal, but by no means provides a complete picture of the scope of work and responsibilities of the stated position. The strategy of education, science and technology envisages the redefinition of the role of principals in certain parts of the system such as kindergartens, primary schools, secondary schools and student dormitories. In addition to the above, the Strategy recognizes the importance of acquiring the appropriate competencies for the performance of the principal's managerial role. In measure 5.2.1. Create competence standards for principals under the jurisdiction of the Ministry of Science and Education and the National Council for Education. The strategy places the creation and adoption of standards, which will contribute to the professionalization of the principal's role. This measure is also related to the following two, which aim to institutionalize the education of future principals and create a program and licensing procedure for principals. The aforementioned measures were included in the Strategy because Croatia is one of the few European countries where there is no systematic or organized training for school principals to take over the aforementioned function (Fegeš, 2016), as well as no developed competence standards for either teachers or principals (Staničić, 2016). Staničić (2008) defines standards "as a result of the analysis of educational policy goals, on the one hand, and empirical research of principals in the function of achieving these goals in school practice, on the other hand." Standardization of each process is a guarantor not only of its realizability, but also of the quality of the realization process. "Not only do the standards determine what the principal should know and be able to do, but also how his knowledge can be reliably determined" (Staničić, 2008, 8). The Organization for Economic Cooperation and Development has published the document TALIS 2013 Results: An International Perspective on Teaching and Learning. The document in the chapter The Importance of School Leadership brings research on the educational, age and gender structure of principals, the level of satisfaction with the work they perform, and the ability to fulfill their daily tasks. In terms of the number of principals who have not received training related to the management of educational institutions, Croatia is next to Spain and Serbia, and about 45% of principals reported that their training for principals was none or weak. One of the oldest standards for school leaders is the American ISLLC standards (Interstate School Leaders Licensure Consortium). The Wallace Foundation, the Council of Chief State School Officers, the National Governors Association and other organizations from the United States of America, in collaboration with scholars and practitioners, have come together to develop standards for school principals. The standard has become the backbone for the training of future and existing school principals (Đaković, 2012). Like every strategic document, this one also required correction after some time in the direction of placing more emphasis on student achievements and pedagogical guidance, rather than exclusively on school management, and therefore underwent corrections in 2008.

ISSCL standards according to Staničić (2008) actually cover six areas, according to Đaković (2012) six claims, and Fegeš (2016) calls them six standards. Each of them is divided into several different functions that the principal must fulfill in order to achieve a particular standard. The first standard states how the principal promotes the success of each student by encouraging the development, articulation, implementation, and enforcement of a learning vision created and supported by the school community. The first standard includes five functions that the principal must fulfill in order to achieve it: collaborative development and realization of a common vision and mission, collection and use of data to determine goals, assessment of school effectiveness and promotion of organizational learning, creation and implementation of plans for the achievement of goals, promotion of permanent and sustainable progress and monitoring and evaluation of progress and harmonization of plans. The second standard states that the principal promotes the success of each student by creating, nurturing and maintaining a school culture and programs conducive to student learning and the professional development of school staff. To achieve the second standard, the principal must nurture and maintain a culture of cooperation, trust, learning and high expectations, create a comprehensive, strict and harmonized curriculum, create a personalized and stimulating environment for student learning, supervise teaching, develop a system for monitoring and evaluating student progress, develop teaching and leadership skills, maximize time for quality teaching, promote the use of the most effective and appropriate technologies to support teaching and learning, monitor and evaluate the impact of teaching programs. The third standard places before principals the task of promoting the success of each student by ensuring the management of the organization, its functioning and the provision of resources for a safe, sufficient and effective learning environment. Functions for the achievement of the third standard include monitoring and evaluation of management and leadership systems, obtaining, deploying, harmonizing and effectively using human, financial and technological resources, promoting and protecting the well-being and safety of students and employees, developing distributive leadership skills and ensuring the orientation of teachers and organizational time towards the provision of quality teaching and student learning. The fourth standard states that the principal promotes the success of each student through cooperation with higher education institutions and the social community, respecting different social interests and needs and by mobilizing all community resources. To achieve this, the principal promotes the success of each student through the collection and analysis of data and relevant information about the environment in which the school operates, promotes understanding, appreciation and use of the various cultural, social and intellectual resources of the community, builds and maintains a positive relationship with families and guardians, and builds and maintains a productive relationship with community partners. The penultimate, fifth standard, states that the principal must act with integrity, justice and ethics in striving for the success of all students. In fulfilling this goal, the principal must ensure a system of responsibility for the academic and social success of each student, be self-aware, transparent and ethical, protect democratic values, principles of equality and the right to diversity, consider and evaluate the possible moral and legal consequences of decision-making, and promote social justice and ensuring information on all aspects of education for each individual student. The last, sixth standard, sets before the principals the task of promoting the success of each student through understanding, reacting and influencing the political, social, economic, legal and cultural context in which the institution they lead operates. This standard covers three functions: representation of children, families and guardians; influencing local, regional and state decisions related to student learning and assessing, analyzing and predicting trends and initiatives in order to adapt leadership strategies in a timely manner.



### 3. RESEARCH METHODOLOGY

Aim, problems and research hypotheses:

The goal of the research is to find out the views of principals of primary and secondary schools regarding the functions of principals specified in the ISLLC standard. Based on the objective, the following research problems are posed:

- 1) to examine the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the level of the educational institution they manage,
- 2) to examine the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the size of the educational institution they manage,
- 3) examine the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the principal's gender,
- 4) to examine the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the total length of service.

According to the set goals and problems, the following hypotheses were formulated:

- H1: There is no statistically significant difference in the views of principals of primary and secondary schools about the functions specified in the ISLLC standard, with regard to the level of the educational institution they manage.
- H2: There is no statistically significant difference in the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the principal's gender,
- H3: There is no statistically significant difference in the views of principals of primary and secondary schools about the functions specified in the ISLLC standard, with regard to the size of the educational institution they manage.
- H4: There is no statistically significant difference in the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the total length of service.

Respondents:

The research was conducted in September 2017, and the questionnaire was filled out by 46 principals of primary and secondary schools, out of a total of 51 principals, which is 90%. Out of 46 principals, 27 female principals (59%) and 19 male principals (41%) completed the questionnaire. The questionnaire was answered by 30 principals from primary schools (65%) and 16 principals from secondary schools (35%). The average age of all principals is 49.98 years. There are the most principals with total work experience between 26 and 35 years (37%), then between 16 and 25 years (35%), then principals with more than 36 years of experience (15%), and the smallest number of principals with less than 15 years of experience (13%). According to the number of students in the school, the same number of principals (20%) come from schools with between 101 and 200 students, between 201 and 300 students and between 301 and 400 students. The questionnaire was answered by 17% of principals whose schools have between 401 and 500 students, 15% of principals with more than 501 students, and only 9% of principals managing schools with less than 100 students.

Instrument and data processing:

A questionnaire designed for this research was used to collect data. The first part of the questionnaire includes the socio-demographic characteristics of school principals important for this research, and the second part lists the functions specified in the ISLLC standard in such a way that each function is accompanied by a five-point Likert-type scale (1 - I do not agree at

all, 2 - I do not agree, 3 - neither agree nor disagree, 4 - agree, 5 - completely agree). All 31 functions are listed. The scale has a high coefficient of internal consistency, Cronbach's alpha ( $\alpha$ ) reaches 0.915. Descriptive statistics were used in the processing, namely arithmetic mean (AS), standard deviation (SD), minimum (MIN) and maximum (MAX). The t-test of independent samples for two groups and one-way analysis of variance ANOVA were used to analyze the statistical significance of the difference between the selected characteristics of the respondents.

#### 4. RESEARCH METHODOLOGY

Descriptive analysis of statistical data shows that the arithmetic mean is 4.02, which means that the principals, participants in the survey, agree to a greater extent with the functions specified in the ISLLC standard.

Function	Number of respondents (N)	Arithmetic mean (AS)	Standard deviation (SD)	Minimum (MIN)	Maximum (MAX)
The principal's function is to collaboratively develop and realize a common vision and mission	46	4,43	0,720	1	5
The principal's function is to collect and use data to determine goals, evaluate school effectiveness, and promote organizational learning	46	3,96	0,759	1	5
The principal's function is to create and implement plans to achieve goals	46	4,15	0,666	1	5
Funkcija ravnatelja je promicanje trajnog i održivog napredovanja	46	4,26	0,713	2	5
The principal's function is to promote permanent and sustainable progress	46	4,00	0,730	1	5
The principal's function is to foster and maintain a culture of cooperation, trust, learning and high expectations	46	4,48	0,505	4	5
Funkcija ravnatelja je stvaranje sveobuhvatnog, strogog i usklađenog nastavnog plana i programa	46	2,87	1,002	1	5
The principal's function is to create a comprehensive, rigorous and coordinated curriculum	46	4,13	0,687	2	5
The principal's function is to supervise the teaching	46	3,72	0,958	1	5
Funkcija ravnatelja je razvijanje sustava praćenja i ocjenjivanja napretka učenika	46	3,37	1,019	1	5
The principal's function is to develop a system for monitoring and evaluating student progress	46	3,80	0,957	1	5
The principal's function is to maximize time for quality teaching	46	3,61	0,745	2	5
The principal's function is to promote the use of the most effective and appropriate technologies to support teaching and learning	46	4,22	0,664	2	5
The principal's function is to monitor and evaluate the impact of teaching programs	46	3,46	0,836	1	5

The principal's function is to monitor and evaluate the management and leadership system	46	3,87	0,833	2	5
The principal's function is to acquire, allocate, harmonize and effectively use human, financial and technological resources	46	4,39	0,714	1	5
The principal's function is to promote and protect the welfare and safety of students and employees	46	4,57	0,720	1	5
The function of the principal is to develop the ability for distributive leadership	46	3,89	0,795	1	5
The principal's function is to ensure that teachers and organizational time are focused on providing support for quality teaching and student learning	46	4,46	0,546	3	5
The principal's function is to collect and analyze data and relevant information about the environment in which the school operates	46	3,76	0,899	1	5
The principal's function is to promote understanding, appreciation and use of the diverse cultural, social and intellectual resources of the community	46	4,15	0,759	1	5
The principal's function is to build and maintain a positive relationship with families and guardians	46	4,09	0,755	2	5
The principal's function is to build and maintain productive relationships with partners in the community	46	4,24	0,705	1	5
The principal's function is to provide a system of accountability for the academic and social success of each student	46	3,80	0,778	2	5
The principal's function is to be self-aware, transparent and ethical	46	4,51	0,757	1	5
The principal's function is to protect democratic values, the principle of equality and the right to diversity	46	4,54	0,751	1	5
The principal's function is to consider and evaluate the possible moral and legal consequences of decision-making	46	4,20	0,749	1	5
The principal's function is to promote social justice and ensure that each individual student is informed about all aspects of schooling	46	4,28	0,688	3	5
The principal's function is to represent children, families and guardians	46	3,65	0,948	1	5
The principal's function is to influence local, regional and national decisions related to student learning	46	3,85	0,918	1	5
The principal's function is to assess, analyze and predict trends and initiatives in order to adapt his management strategies in a timely manner.	46	4,07	0,800	1	5

*Table 1: Descriptive indicators of principals' views on the functions specified in the ISLLC standard*

Descriptive analysis shows that respondents least agree with the statement The principal's function is to create a comprehensive, strict and harmonized curriculum (AS=2.87). The next statement with which respondents show the least agreement is The principal's function is to develop a system for monitoring and evaluating student progress (AS=3.37). There is a significant difference from the first to the second function, and the reason may lie in the clumsy translation of the English word rigorous as strict. Surely the principals would have expressed a higher level of agreement if perhaps the word used was strong, firm or accurate. Principals agreed the most with the statement The principal's function is to promote and protect the well-being and safety of students and employees (AS=4.57), and with slightly less agreement with the statement The principal's function is to protect democratic values, the principle of equality and the right to diversity (AS=4.54). If the results obtained through the descriptive analysis are grouped in such a way as to calculate the arithmetic mean of each individual standard, i.e. group the functions into the corresponding standards, it can be concluded that in no standard does the bell of the Gaussian curve have a regular shape, but everywhere, more or less, is tilted to the right. So, the principals more or less agree with all the standards. The least agreement is with the third standard (AS=3.74), which expects the principal to promote the success of each student by ensuring the management of the organization, its functioning and providing resources for a safe, sufficient and effective learning environment, and the most agreement with the fifth standard (AS=4.27) which envisages promoting the success of each student by acting with integrity, justice and ethics. In order to confirm or refute the set hypotheses, it is necessary to determine whether there is a statistically significant difference according to the selected characteristics of the respondents and their attitudes expressed in the questionnaire.

H1: There is no statistically significant difference in the views of principals of primary and secondary schools on the functions specified in the ISLLC standard, with regard to the level of the educational institution they manage.

The first hypothesis about the relationship between the principal's attitudes and the level of the educational institution they lead (primary or secondary school) was tested with an independent samples t-test. Since the obtained result is  $p=0.216$ , which is significantly more than 0.05, it can be concluded that there is no statistically significant difference between the mean values of the attitudes of primary and secondary school principals. The obtained result confirmed the first hypothesis. There is no connection between the principal's views on the functions specified in the ISLLC standard and the level of the educational institution they manage.

H2: There is no statistically significant difference in the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the principal's gender.

The second hypothesis was also tested with a t-test because it is about the relationship between the principal's attitudes and the distribution according to gender (men, women). The obtained results of  $p=0.605$  confirm the second hypothesis that there are no statistically significant differences between the mean values of the attitudes of male principals in relation to the attitudes of female principals.

H3: There is no statistically significant difference in the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the size of the educational institution they manage.

In the third hypothesis, it was assumed that there is no statistically significant difference in the views of principals of primary and secondary schools about the functions specified in the ISLLC standard with regard to the size of the educational institution, and its size is measured by the number of students who attend it. Testing of the third hypothesis was performed by one-way analysis of variance (ANOVA). Five subgroups of school size were formed according to the number of students (schools with up to 100 students, schools with between 101 and 200 students, between 201 and 300 students, between 301 and 400 students, between 401 and 500 students and schools with more than 501 students). The analysis established that there is no statistically significant difference in the views of the principal in relation to the size of the school, ie the number of students attending the school ( $p=0.194$ ).

H4: There is no statistically significant difference in the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the total length of service.

The third hypothesis assumes that there is no statistically significant difference in the views of principals of primary and secondary schools on the functions specified in the ISLLC standard with regard to the total length of service. The testing of the third hypothesis was also carried out by one-way analysis of variance (ANOVA), and for the purposes of the analysis, four subgroups were made according to the length of service (principals with up to 15 years of service, principals with between 16 and 25 years of service, principals with between 26 and 35 years of service and principals with more than 36 years of service). The analysis confirmed the hypothesis ( $p=0.398$ ), which means that there is no statistically significant difference in the attitudes between principals regarding the total length of service.

## 5. CONCLUSION

The education system has never been so relevant and mentioned in wider social debates as it has been until now. It can still be said that its importance has finally been recognized in the context of the development of the 21st century world. It is precisely this opportunity that enables researchers to shed light on a topic that has not been discussed for a long time, the topic of competences, functions and work of principals of primary and secondary schools. The importance of principals as pedagogical leaders of educational institutions has been unquestionably proven in many studies, but regardless of that, Croatia is among the few countries in the European Union that have not resolved the issue of the so-called licensing of principals. This research showed how principals recognize their functions or roles that they need to fulfill in order to achieve the task of successful pedagogical management of schools. Although the standards were used as a basis in the research made for the United States of America, their universality to all parts of the world is obvious. Compliance with functions is recognized by all principals, regardless of gender, length of service, size of the school they come from or the level of the school they lead. This research can certainly contribute to the initial fulfillment of the goal foreseen in the Strategy of Education, Science and Technology, to the creation of a licensing model for principals. The research unquestionably proves that principals are aware of the functions they need to fulfill, and now they still lack a model that would teach them and help them fulfill them. Whether the principalship will become a profession or whether it will remain a function, and whether the reform period that is ahead of us will use the opportunity and finally resolve this issue, remains to be seen in the period that follows. In any case, the influence of 20% on the possible achievements of students must not be ignored, and a framework and licensing model for those on whom this percentage is proven to depend must be established.

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